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Areca Nut Cultivation in Assam: A Case Study of Kamrup District

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Abstract

Areca nut is the symbol of hospitality in Assam. It is a part of people's daily life in Assam so as part of Assamese culture. Today, areca nut comes under the major commercial crops in Assam and over the times its importance increasing due to the easy selling practice, attractive price, higher return on investment, and so on. By looking at all the advantages of the areca nut cultivation more and morefarmers shifting towards areca nut cultivation and it'sbecoming a source of livelihood in rural Assam, especially in hilly areas.Moreover, due to technical innovation in ago-based industries, now it is possible to make eco-friendly plates from areca nut leafsand people are using it extensively instead of plastic plates. In this study,it is tried to provide an idea about the costs of areca nut cultivation, potential revenue, labor participation, scope of multi-cultivation, problem involves in cultivation and its potential solution, providing a special preference to the Kamrup district of Assam.

Keywords: *Costs, revenue, labor participation, multi-cropping, areca nut leaf*

1. Introduction

Areca nut is one of the important commercial crops of India. Globally it is produced in India, Bangladesh, China, Indonesia and Myanmar. India is the largest producer of areca nut worldwide, followed by China and Bangladesh. India is also the largest exporter of areca nuts and also cultivated in the largest land areas worldwide.In India, States like Karnataka, Kerala, Assam, Meghalaya and West Bengal are the major producer of areca nut. Assam is the third largest producer of areca nut among Indian states which produces 9.51% of total India's areca nut production that is 77900 tones, after Karnatakaand Kerala i.e. 63.16% and 15.88% respectively**(National Horticulture Board, 2017-18).**

For areca nut cultivation area with abundant rainfall is needed because it can't tolerate low rainfall or drought and the ideal temperature should be within 10-40 degree C. The land selected for areca nut cultivation should have the proper drainage system for the monsoon season and proper irrigationfacilities for the winter season because it can't tolerate water logging or drought. It can be grown in variety of soil with good organic material, but sticky soil, sandy, alluvial, brackish and calcareous soils are not good for agriculture cultivation.Once it is planted it starts providing yield around after 6 years, thoughthe average lifespan of an areca nut tree is around 60years, but productivity decline gradually after 40 years. Therefore, once it is planted it can provide earning for a long time period. Apart from it, mixed-cropping option is very high with areca nut;crops such as banana, jackfruit, papaya and various types of fruit and vegetables can be planted within the space of areca nut trees, which can be a value addition to theincome of the grower. The average height of an areca nut tree is around 60 feet. In India, the production of areca nut is concentrated in south western and north eastern areas.

The area of this study is Kamrup district Assam, which is situated between 25.46 and 26.49 north latitude and between 90.48 & 91.50 east longitude. It is bounded by Udalguri and Baksa district in the north, Meghalaya in the south, Darrang district and Kamrup metropolitan district in the east and Nalbari district in the west. It has a total geographical area of 434,500 acres. As per the census 2011, total population of Kamrup is 1,517,542 out of which 778,461 are male and 739,081 are female. The total workforce of Kamrup is 628,954. Total 149,738 workers directly related to farming activity and 42,121 works as labor in agriculture activity.

2. Methodology

For this study, data is collected from both primary and secondary sources. Primary data is collected by the researcher from the 100 growers in the period of April-May 2021, from the grower of the Kamrup district, Assam, India. Samples are selected using simple random sampling, and data is collected through direct interview with the sample grower with the help of well-structured schedule about land size, cost, income, price, forms of selling, multi-cropping, verities, problems etc. and through the direct observation of the garden of the sample growers. On the other hand, secondary sources of data for this study are Directorate of Economics and Statistics, Assam, District Agriculture Office, Kamrup, reports such as Assam Economic Report, Food and Agriculture Organization, etc. Moreover, various articles from research journals, articles from newspaper, research thesis etc. are followed to take necessary advice as well as information. The collected data are represented in tabulated form and for the evaluation statistical tools like mean, percentage etc. are used.

3. Result and discussion

3.1. Size of areca nut gardens

The size of the land holding is the major determinant of the status of a farmer. In Assam land is measured in 'Bigha' (a local measurement of land, 1 *bigha*= 0.3306 acre). Here the only size of the land of the areca nut garden istried to investigate, not the total size of land holding of the growers. On the basis of the size of the garden,growers are categorized into 4 different categories. These are marginal (1-3*bigha*), small (4-7*bigha*), medium (8-10*bigha*) and large (10 above). In the table-1 size of gardens are shown.

Table 1*Size of land holding among sample growers*

Type of grower	Land holding	No. of grower	Percentage
Marginal	01-Mar	47	47
Small	04-Jul	31	31
Medium	08-Oct	14	14
Large	10 above	8	8

Source: Field study, 2021 April

In table 1 it is observed that more than half of farmers belong to the marginal category, followed by the smaller grower i.e. 57% and 31% respectively. Medium grower is only 9% and only 3% grower has areca nut garden more than 10 *bigha.* That means majority of growers belong to small and medium category.

3.2. Labor participation

In the survey area, the sample uses both family labor and hired labor. Since family labors are part of the family, growers need not pay them and their working hours or days and payable wage are not counted as payable costs. But for the hired labors,growers have to pay on daily basis. Generally, sample growers prefer to hire male workers since the productivity of males is higher than females. Female workersare usually hired for such works, for which growers need not pay them daily basis.

In areca nut production in different stages different types of laborare required. These are—

Planting and caring: The first process of areca nut cultivation is land leveling and fencing in the boundary of the plot so that seedlings are safe from cows, goats and from other animals. The next step is the plantation, for this a kind of labor required who has some knowledge about the plantation. For this pits of about 1.5×1.5×1.5 feetis required at a space of 8-10 feet, so that seedlings of 2-3 age are planted. After plantation, till the time of getting yields (around 6 years) special care of seedlings are needed. This care involves clearing (2 times in a year) of the areca nut garden and fertilizing trees (1 time in a year). Labor hired for these works charges 300 rupees for one day (April 2021).

Harvesting: In the process of harvesting, plucking areca nut from the tree is the toughest job according to samples and it is typically done by male. For this one type of skilled laboris required and he has to perform most risky task among all the labors involved in the cultivation process. For this purpose, strong, healthy and people with less weight is needed. Since the maximum height of the areca nut plant is roughly 50 to 60 feet and harvester need to climb 50 to 60 feet to pluck areca nuts and this is done manually. It is risky because once someone fell from the top of the tree; it may impose severe damage on the body or may die. That's why people of relatively young age are perfect for this job i.e. 15 to 25 years old. Since it is a very high risky job, wages are also very high compare to other workers, 10 to 15 rupees for plucking nuts from one tree. Another way of plucking areca nuts is by using bamboo. Here harvester tightly binds one type of sharp instrument (called *kachi* in local language) by a rope in the bamboo and reap on the bunch of areca nut. This technique involves no risk, but it is useful for a height of maximum of 30 feet), after that the earlier method has to use. In this process of harvesting, another type of labor isrequired;to whom the task of gathering errant areca nuts and separation of nuts from bunches is assigned. They are the least paid labors, mostly women and children are used for this task.

De-husking and drying: After harvesting, the next step is de-husking areca nuts. There are two methods of de-husking— one isboil the nuts first then de-husk, another is de-husk first then boil. This process is under the domain of female workers and children and they are paid according to the weight of the de-husked areca nut, generally 6 rupees per kg. After de-husking the last process is drying. It is generally done by the owner itself. For this, a minimum of 10 days of high sunlight is needed, otherwise the quality of the areca nut may damage.

From the sample growers, the researcher found that all types of laborare easily available except labor for plucking. Since plucking is a very high risky job, and generally young labor is required for this (about 15 to 25 years old), parents don't allow their child to do such type of job. So, year by year such type of labor decreasing, on the contrary, there is a tremendous increase in wage of such labor.

Therefore, growers facing a huge labor scarcity about 96% of sample growers facing this problem. After paying a very attractive wage also they are not able to attract such type of labor.

3.3. Multi-cropping system

From the samples researcher find that areca nut growers follow multi-cropping system; they do not grow areca nut alone. Though their main crop is areca nut, they often grow some other crops/fruits. They usually grow 3-4 crops/fruits. Generally, they prefer to grow such types of crops/fruits which does not cover much space, can be grown in the free space between two areca nut trees (within 8 -10 feet). The reason behind this is if they grow crops/fruits which cover much space it will create food disruption among the plants for their survival and it will reduce the productivity of not only areca nut trees but also productivity of other crops/fruits. Therefore they have to choose crops/fruits strategically which can provide them the maximum production. This multi-cropping system reduces the probability of income reduction from areca nut and at the same time, it can supply additional revenue to the growers. Roughly other crops/fruits can provide at least 1/3 portion of the total income of the growers on the same piece of land.

Table 2*Other crops/fruits cultivate by samples*

Crops /Fruits	**Number of sample grower**
Pineapple	61
Betel leaf	73
Black paper	44
Banana	29
Lemon	53
Coconut	8
Papaya	15
Fishery	3
Bamboo	12
Other fruits	17
Other vegetables	35

Source: Field study, 2021 April

In table- 2 it is seen that a majority of growers prefer betel leaf, followed by pineapple. They cultivate 3 to 4 varieties of crops/fruits. But the problem is that the majority of growers don't have proper knowledge about multi-cropping techniques. In case of some grower'scrops/fruits overlaps and for some growers land remain underutilized.A large part of sample growers prefers to grow banana during the gestation period of areca nut because it provide shadow to the seeding and it reduces the dying probability of seedlings. Moreover, approximately 30% of growersdon't have the proper choice about crops, for example- coconut and bamboo, which reduce the production of areca nut as well as other crops.

3.4. Forms of selling and price in local the local Market

Areca nut can be sold Variety of ways. Ways of selling in the study area are—

- Green areca nut: It is green. It can be sold in two ways— firstly, *pun* wise for 50-120 rupees per *pun* (one *pun* =80 areca nut). Secondly, beg wise for 1500-3200 per beg. Its price varies according to size and time.
- Ripe areca nut: It is red, it is harvested when the green areca nut become red. It is sold*pun* wise for 200- 300 rupees per *pun*. Its price varies according to size, color and time.
- White *supari*: It is prepared by de-husking fully ripened areca nuts and drying them in at least 12 days of high sunlight. It is sold weight basis, for 200-385 rupees per kg. Its price varies according to quality.
- Red *supari*: It can be made in two ways— By boiling green de-husked nuts or by de-husking boiled green nuts and then dry them in high sunlight for at least 10 days. It is sold for 300-395 rupees per kg. Its price varies according to quality.
- *Bura tamul*: It is prepared in two ways— firstly by making a 2-3 feet deep hole in the ground where fully ripen nuts are left for 2-3 months covered by areca nut leaf and soil, secondly by drowning in the water for 2-3 months. It is also sold on*pun* basis, for 250-300 rupees per *pun*. Its price varies according to size, color and quality.

Another form of selling is auction type; here the whole garden is sold to the trader for one session. Trader observes and purchases the garden by fixing a certain price with the grower. Price is fixed depending on the number of trees, nuts bearing by trees, current market price, future market price, cost of harvesting and so on; it is done by bargaining with each other. After purchasing, for that particular session trader owned the garden and he has to bear the cost of harvesting, de-husking and for other activities. Moreover, some growers sold the garden for lease for some year to the trader; it is generally done by growers who need money for some propose and it is often happen with poor growers. In this system, there is a huge chance of exploitation by the trader.

3.5. Costs

Cost is a pre-requisite for each and every agricultural activity. In case of areca nut, in different stage of cultivationdifferent types of costs are needed to incur by growers. So, looking at the nature of the costsresearcher decided to categorize total cost into two categories, such as establishment costs and operation and maintenance costs. All those costs are calculated on the basis of costs during April-May 2021.

Establishment costs

Establishment costs are the initial costs. In case of areca nut cultivation establishment costs includecosts from the beginning to the time of getting return i.e. 6 years. For this study researcher divided establishment costs into 7 categories such as land leveling, seedling, fencing (sample growers use bamboo fencing), fencing repairing(bamboo fencing needs repairing one time yearly), planting etc. Althougheach and every grower doesn’tincur all these costs, some growers may incur 4 categories of cost, some may 5 and so on, but while calculating costs all need to be included. Establishment costs are shown in table 3.

Table 3*Average establishment costs (in Rs/bigha)*

Type of cost	Amount of costs	Percentage
Land leveling	13850	15.97
Fencing	21550	24.85
Seedling	6750	7.78
Planting	2310	2.66
Cleaning	7700	8.88
Fencing repairing	23550	27.15
Miscellaneous	11025	12.71
Total	86735	100.00

Source: Field study, 2021 April

In table 3 it is seen that the total cost of cultivating on *bigha* land on an average is Rs. 86735, where initial major costs are fencing and land leveling which cover 24.85% and 15.97% of total establishment costs, respectively. This is very high for poor farmers and not easily affordable. Moreover, according to most sample growers, these two are non-skiable. Therefore, it creates an initial discouragement for the growers.

Operation and Maintenance Costs:

It is the cost incurred by growers to maintain the garden. It is counted yearly, once it starts providing return that is when fruit starts coming. Operation and management costs include plucking, collecting, de-husking, fencing repairing etc.Here researcher calculates costs separately for whole garden sellers and per unit sellers because whole garden sellers not needed to incur costs like plucking, collecting and de-husking. Operation and maintenance costs are shown in table 4.

Table 4*Average operation and maintenance cost (in Rs/bigha/year)*

Type of cost	Per unit seller	Whole garden seller
Plucking	3375	NA
Collecting	1155	NA
De-husking	1980	NA
Drying	NA	NA
Fencing repairing	3925	3925
Miscellaneous	1020	1020
Total	11455	4945

Source: Field study, 2021 April

NA: Not Available

In table 4it is seen that operation and maintenance costs of per unit sellers are more than double of the whole garden sellers that are Rs. 11455 and Rs. 4945 respectively.

3.6. Revenuereceives:

In case of areca nut cultivation revenue can be received once in a year. In this study researcher separately calculates revenue receive for both per unit seller and whole garden seller through table 5.

Table 5*Average revenue (in Rs/bigha/year)*

Revenue receive	No. per unit seller	No. of whole garden seller
20000-30000	NA	4
30000-40000	11	6
40000-50000	17	14
50000-60000	20	7
60000-70000	15	2
70000-80000	4	NA
Total	67	33

Source: Field study, 2021 April

In table 5 it is seen that number of whole garden seller is less than per unit seller. The average revenuereceive by per unit seller and whole garden seller are Rs. 52611.94 and Rs. 44090.90 (using $M=\Sigma fX/N$), respectively.

3.7. Net revenue

Net income of the grower for a particular year can be calculated by deducting total operation and maintenance costs incurred in the year from the total revenue earnings in the same year. That is—

Net revenue receive by per unit seller = total revenue – total cost

= 52611.94 – 11455

= 41156.94 Rs.

Net revenue receive by whole garden seller = total revenue – total cost

= 44090.90 – 4945

= 39145.90 Rs.

Therefore average net revenue receive is Rs. 40151.42

3.8. Payback period

It is the time period to recover the cost of an initial investment. The Payback period of the sample growers for one *Bigha* land is ----

Payback period= Initial investment / Annual payback

= 86735/40151.42

= 2.16 years

That means in around 2-3 years initial investment will recover.

4. Use of areca nut leaf

Earlier, there was no use of leaf of areca nut, most of the time farmers burned it or sometime used it as a homemade fertilizer. But with the advancement of technology, of-late it is possible to manufacture different types of plates. As people are becoming more environmentally conscious, at the same time use of plastic is banned in some states, peopleextensively start using areca nut leaf plates, which is 100% environment friendly. Manufacturers are also very interested in this business since both the sales and availability of raw material is very smooth, at the same time cost of raw material is very less (Rs 1/1.5 per leaf) and no huge initial investment is required. It can be manufactured using capital and labor both. Therefore it has multiple benefits providingemployment, protecting the environment and providing an extra source of income to the farmers. Thus we can categorize it as a sustainable industry.

5. Use and consumption

Chewing areca nut with betel leaf is the common practice among the people of Assam, as well as in India also, irrespective of age. It is an addiction. In Assam, the pair of areca nut and betel leaf is used as a symbol of hospitality. Chewing this pair is a common habit for the people of Assam, after eating something such as after taking tea, after taking breakfast and so on. If someone comes into the home, it's a culture to serve them with a pair of areca nut and betel leaf. On each and every occasion serving this pair is essential. Therefore, it's a part of people's daily life and can be categorized as an essential commodity for the people of Assam. There is various form of consuming areca nut. These are—Green areca nut, Ripe areca nut, White *Supari* and *Bura tamul.* Red *supar*i is made mostly for selling purposes which is used for making some industrial product. In the survey, researcher got that about 96% of the total produced nuts are sold by growers and the remaining 4% are used for home consumption. Table 5 shows the chewing practice among sample growers.

Table 6*Consumption of areca nut among samples (per day)*

No. of consumer	No. of respondent	Percentage
0	2	2
1-3	5	5
4-6	42	42
7-9	27	27
7-10	15	15
10 above	9	9

Source: Field study, 2021 April

In table 6 it is observed that about 98% of samples consume areca nut. Highest 42% of the sample consume 4-6 times per day. People of Assam believe that chewing areca nut increase alertness, increase stamina and hamper smalls from the mouth. But everything has limit. Extensive consumption of areca nut has an adverse effect on health such as vomiting, diarrhea, abnormal heart beat, shortness of breath etc. Moreover, some people consume it with tobacco, which can be a cause of cancer.

6.Problemsandsuggestions

Establishment costs of areca nut garden arevery high, which is not affordable for each and every

farmer. For this reason, many farmers can't go for gardening areca nut, even though they have sufficient land. Therefore, government intervention is needed in the forms of subsidy and cheap loan.

- Farmers do not have proper knowledge about the plantation. They do not know about different varieties of areca nut, which variety provide higher yield, what should be the quality of land, what type of fertilizer and pesticides have to use and so on. So, the government needs to arrange proper training programs or at least some workshop to train the farmers that they can know about the scientific methods of plantation and can get higher yield.
- It is possible to make eco-friendly plats from areca nut leafs and it can provide farmers an extra source of income that will be earned by selling areca nut leaf, but this business is not spread properly because of lack of entrepreneurship mindset, cost involving to setup plants, lack of proper channel etc.
- Most of the growers facing the labor shortage for plucking areca nuts. To solve this problem various tree climbing techniques and machines available at the present time. But the problem is most of the farmers not aware ofit;also such types of machines are not available in local markets. Similarly, it is seen that de-husking is done manually by women and Childs, for this also de-husking machines are already available. But most of the farmers are not aware of it and even though, they are aware they can't afford it, also not easily available. To solve both the problems initially, the government needs to introduce such types of machines by distributing some machinesso that they know about it and need to ensure availability in the local market. Moreover, some financial assistance in the form of cheap or subsidy is needed for purchasing such machines.
- It is seen that in most of the cultivation child labor is used, things do not alter for areca nut cultivation also. Here for plucking areca nut, collecting plucking areca nuts and for de-husking child labor is used, among them plucking is most dangerous. It is happening because most of the farmers are illiterate or less literate. So, proper awareness is needed that using child labor is a crime. But, this situation is now improving day-by-day andneed to improve much more.
- In areca nut cultivation scope of mixed-cropping is much more. But problem is that growers have less knowledge in choosing crops/fruits. Some grower cultivates bamboo, coconut and other big fruits with areca nut, which reduce the production of areca nut. So proper training is needed for this or government needs to organize some workshops about mixed-cropping with areca nut and how growers can acquire maximum benefit from multi-cropping. Even though government organizes such types of programmers, it is less.
- Most common problem face by growers is plantation failure, often seen in the winter season that some seeding dies because of lack of water. So, proper irrigation facilities are needed.
- Price of the areca nut is very dynamic it changes every day in local markets, by taking advantage of this changing behavior some intermediaries exploit the growers. It can be stopped by setting organization/society among farmers so that they get proper price related information.

7. Conclusion

From this study, it is observed that the areca nut is a highly commercial crop as well as highly profitable. It is the livelihood for most of the people of the rural areas and dominating source of income and in case of some people the only source of income, especially in hilly areas. Employment

potential is also very high, according to the sample growers, in only one *bigha* land 365 days of employment can be generated if the multi-cropping system is adopted properly, also if grower properly adoption the multi-cropping system the same one *bigha* land can provide double income to the grower. Moreover, sample growers generally used traditional techniques for cultivation and cultivate a local variety of areca nut, which productivity is less, so if they cultivate using scientific techniques and hybrid varieties of areca nut it can increase their productivity as well as income. Another observation is that most ofthe farmers are trying to shift from rice production to area nut because the return on investment is high for areca nut and the possibility of damage due to flood and drought is also very less for areca nut. In the present situation due to covid, since people migrating from urban areas to rural areas due to job losscan become a great source of self-employment. Moreover, it can be a game changer to improve the socio-economic wellbeing of the rural people; also government can earn a huge amount of revenue by exporting areca nuts. For all this encouragement among growers and some degree of government intervention is needed.

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