Problems and Prospects of Growth of Sandalwood and Medicinal Plants in Karbi Anglong District of Assam with Special Reference to Diphu

** Joyjit Sanyal*
*** Bishnu Terang*

Abstract

Karbi Anglong itself is rich in natural resources because of fertility of land. The district was divided into two parts in the year 2016 and named as East and West Karbi Anglong. Many valuable trees are grown naturally in this part of the state and some are grown by people taking special initiative in different areas of the district. Apart from different areas of Karbi Anglong, Diphu is making a tremendous progress in growing different types of commercial trees in the last few years which include the plantation of rubber, teak, etc. and this wave is spreading. Along with the cultivation of rubber, in recent years people have started cultivation of the second most valuable tree in the world i.e. sandalwood. In addition, many wild plants are also found which are used in many ayurvedic medicines for the treatment of different diseases both for human beings as well as for animals. Though these are found in forest areas of Diphu, many of the wild medicinal plants are preserved in the bio-diversity cum recreation park which is located at a distance of 4 km from Diphu town on the way to Diphu-Manja road.

This paper tried to focus on the cultivation of sandalwood and medicinal plants as an entrepreneurial venture in the process of economic development. Entrepreneurship occupies a significant position in the economic as well as social upgradation of a nation. A study covering 20 households in the bio-diversity cum recreation park range, located at the road side of Diphu-Manja Road was conducted. The study brought to light the positive attitude of the society towards cultivation of sandalwood and medicinal plants and the entrepreneurship culture in the town.

Keywords: Bio-diversity cum recreation park, entrepreneurship, marketing, medicinal plant, sandalwood

Sandalwood is a tree with a highly aromatic wood and it is the second most valuable tree that is one of the most sought after trees in the world. It is economically and culturally important for many countries around the Pacific and Eastern Indian Ocean regions where it grows or is traded. The wood is prized for making furniture, ornaments, sacred objects, carvings, and joss sticks (incense). Its essential oil is used in medicines, perfumes, and for aromatherapy (Brocke, Eh, & Finke, 2005; Ochi, Shibata, Higuti, Kodama, Kusumi, & Takaishi, 2005).

The use of sandalwood tree for medicines and for other purposes is not an outcome of years or a day. We could find the use of sandalwood in Indian history and in histories of other parts of the world.

A 1792 edict by Tipu Sultan, the ruler of the kingdom of Mysore created a problem. The edict declared sandalwood a royal tree during his time and he banned the trade of sandalwood. Like all other valuable items it was considered government property. This policy continued under the British reign and after independence as the government wanted to stop misuse of sandalwood plantation owing to its precious nature. Karnataka and Tamil Nadu later adopted the edict and kept sandalwood under government control. But this did more harm than good as many legal obligations were imposed on sandalwood cultivation. "Having a sandalwood tree in your backyard or farm was more of a hassle than benefit. You had no rights of ownership, but if your tree got stolen you were in trouble with the authorities. So people started distancing themselves from the tree" (Burdock & Carabin, 2008; Kumar, Joshi, & Ram, 2012).

There are 16 species of sandalwood (*Santalum*) that grow naturally throughout the Pacific and Eastern Indian Ocean regions. Sandalwoods are evergreens ranging in size from tall shrubs up to large trees. They grow in a variety of climates (Burdock & Carabin, 2008).

In India sandalwood (*Santalum album*) is mostly grown

* *Assistant Professor,* Department of Commerce, Assam University Diphu Campus, Diphu, Karbi Anglong, Assam- 782642. (e-mail: joyjit50@gmail.com)
** *Ex- Student,* Department of Commerce, Assam University Diphu Campus, Diphu, Karbi Anglong, Assam- 782642.

in the Deccan plateau in southern India, with the majority of the trees in the states of Karnataka and Tamil Nadu. Santalum aldum is found in dry, deciduous forest; it is a slow growing tree and is easily damaged by fire (Kumar, Joshi, & Ram, 2012).

Medicinal plants have been identified and used throughout human history. Plants have many chemical compounds that are for biological functions, including defence against insects, fungi, and herbivorous mammals. This not only enables herbal medicines to have beneficial pharmacology, but also gives them the same potential as conventional pharmaceutical drugs that cause harmful side effects (Fox, 2000). The use of plants as medicines pre-dates written human history. Ethnobotany, the study of traditional uses of plants by humans is recognized as an effective way to discover future medicines (Hansda, 2009). The use of herbs to treat disease is almost universal among non-industrialized societies and is often more affordable than purchasing modern pharmaceuticals. Some of medicinal plants and their uses are:

- *Abscess root (Polemonium reptans)* is used to reduce fever, inflammation, and cough (Hansda, 2009).
- *Açai (Euterpe oleracea)*: Although açai berries are a longstanding food source for indigenous people of the Amazon, there is no evidence that they have historically served a medicinal purpose as opposed to their nutritional role. In spite of their recent popularity in the United States as a dietary supplement, there is currently no evidence of their effectiveness for any health-related purpose (Hansda, 2009).

These were reported by Hansda (2009):

❖ *Alfalfa (Medicago sativa)* leaves are used to lower cholesterol. These are also used for kidney and urinary tract ailments, although there is insufficient scientific evidence for its efficiency.

❖ *Aloe vera* leaves are widely used to heal burns, wounds, and other skin ailments.

❖ *Arnica (Arnica montana)* is used as an anti-inflammatory and for osteoarthritis.

❖ *Asafoetida (Ferula assa-foetida)* might be useful for IBS, high cholesterol, and breathing problems.

❖ *Ashoka tree (Saraca indica)* is used in Ayurvedic traditions to treat gynaecological disorders. The bark is also used to combat oedema or swelling.

❖ *Bilberry (Vaccinium myrtillus)* is used to treat diarrhoea, scurvy, and other conditions.

❖ *Bitter gourd (Momordica charantia)* is used as an agent to reduce the blood glucose level.

❖ Bitter leaf (*Vernonia amygdalina*) is used by both primates and indigenous people in Africa to treat intestinal ailments such as dysentery.

❖ *Bitter orange (Citrusaurantium)* is used in traditional Chinese medicine and by indigenous people of the Amazon for nausea, indigestion, and constipation.

❖ *Black cohosh (Actaea racemosa)* historically is used for arthritis and muscle pain, and has more more recently been used for conditions related to menopause and menstruation.

❖ *Cat's claw (Uncaria tomentosa)* has a long history of use in South America to prevent and treat disease.

❖ *Cayenne (Capsicum annuum)* is a type of chilli that has been used as both food and medicine for thousands of years. Uses have included reducing pain and swelling, lowering triglyceride and cholesterol levels and fighting viruses and harmful bacteria due to high levels of Vitamin C.

❖ *Celery (Apium graveolens)* seed is used only occasionally in tradition medicine. Modern usage is primarily as a diuretic.

❖ *Chamomille (Matricaria recutita and Anthemis nobilis)* has been used over thousands of years for a variety of conditions, including sleeplessness, anxiety, and gastrointestinal conditions such as upset stomach, gas, and diarrohea.

❖ *Chaparral (Larrea tridentata)* leaves and twigs are used by Native Americans to make a herbal tea used for a variety of conditions, including arthritis, cancer and a number of others. Subsequent studies have been extremely variable at best. Chaparral has also been shown to have high liver toxicity, and has led to kidney failure and is not recommended for any use by the U.S. Food and Drug Administration (FDA) or American Cancer Society.

❖ *Chasteberry (Vitex agnus-castus)* has been used over thousands of years for menstrual problems, and to stimulate lactation.

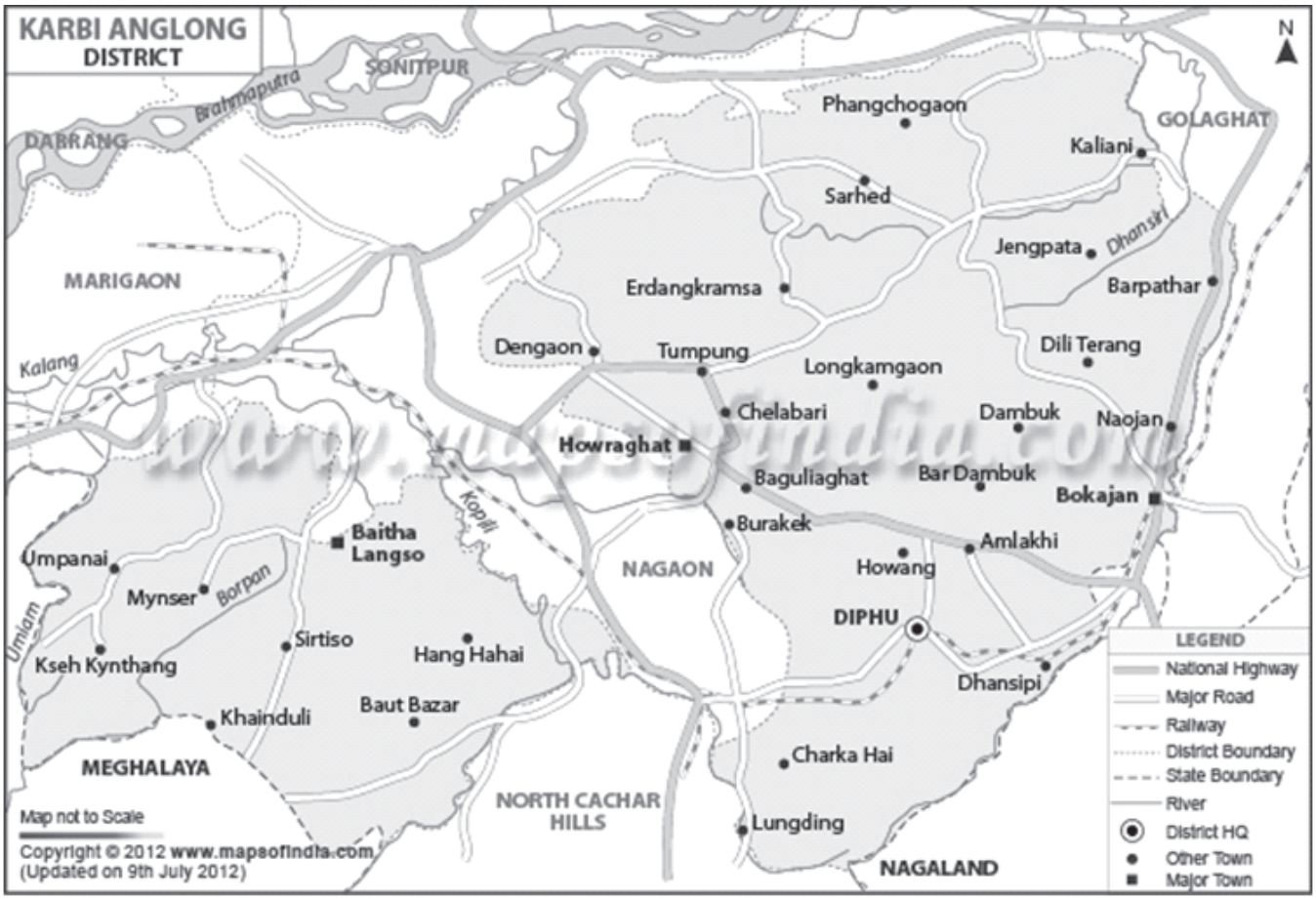
❖ *Ginger (Zingiber officinale)* is used to relieve nausea.

❖ *Ginkgo (Ginkgo biloba)* leaf extract has been used to treat asthma, bronchitis, fatigue, and tinnitus.

❖ *Ginseng (Panax ginseng and Panax quinquefolius)* has been used medicinally, in particular in Asia, for over 2,000 years, and is widely used in the modern society.

Apart from the given region, the state of Assam particularly, the districts of Hojai (after separation from Nogaon) and Karbi Anglong combining (both east and west) have high entrepreneur prospects of cultivation of sandalwood (Santalum album) as well as medicinal plants. The study was conducted only in Diphu area.

Figure 1. Map of Karbi Anglong District of Assam



Statement of the Problem

The cultivation of sandalwood and medicinal plants in India is booming and spreading to various parts and adds economic value. It is also reaching the North East region as the soil is suitable for cultivating those medicinal plants especially, in the district of East Karbi Anglong and West Karbi Anglong. However, the people of this area are unaware of this valuable cultivation.

Similarly, in Diphu in the East Karbi Anglong district, most people are unaware of sandalwood cultivation and its use as a medicinal plant. Therefore, they are devoid of its high economic value. In spite of these issues, a few local people are taking the initiative of cultivating sandalwood within a small area or in their garden. Therefore, the present study attempted to find the level of awareness among people and their willingness to start plantation entrepreneurial ventures.

Review of Literature

In order to gain knowledge about the problem and to identify appropriate methodology, research design, method of measuring concepts, and techniques of analysis, it seemed logical to present a brief review of the available literature relating directly or indirectly to the field under study.

Review of related literature revealed the following:

❖ Caldecott, Todd (2006), Ayurveda: The Divine Science of life contains a detailed monograph on Santalum album (Chandan) as well as a discussion of health benefits and usage in clinical practice.

❖ Article by Smita Bhattarcharyya published on September 16, 2015 on fresh aroma in Assam air stated that sandalwood plantation prospects is bright in Karbi Anglong (both East and West Karbi Anglong).

❖ Kumar, Joshi, and Ram (2012) stated that heart wood of sandalwood tree is treasured for its aroma. It is one of the finest natural materials for carving and is used for many purposes. They strongly argued that it is essential to encourage the establishment of community/corporate sandalwood plantation in different regions of India with appropriate incentive and adequate protective measures.

Objective of the Study

i) To study the economic evolution in the selective study area on plantation of sandalwood and medicinal plants.
ii) To bring focus on prospect of entrepreneurial development of sandalwood and medicinal plants in the study area.

Research Queries

On the basis of the above objectives, the following research queries were formulated:
i) Which factors influence the people of the study area to practise the process of cultivating sandalwood in their household or in large open areas?
ii) What are the challenges faced by them in due course of cultivating sandalwood?
iii) Is there any future prospect or benefit for the people of the study area in cultivating sandalwood and medicinal plants?
iv) How did the evolution of sandalwood cultivation emerge in the small area of Diphu of East Karbi Anglong?

Research Area/Universe

The study was exclusively conducted in Diphu area, and bio-diversity cum recreation park, which is located on the way to Diphu –Manja Road just 4 km away from Diphu town.

Population of the Study

In the research method, population is the entire aggregation of items from which samples can be drawn. The population of the locality is engaged in cultivating sandalwood and medicinal plants. Various forest offices are located in Diphu area including bio-diversity cum recreation park.

Sampling Techniques

The sampling procedure used for the present study was judgement sampling method under which respondents were identified so that appropriate member of the population had an equal chance of being selected.

Sample Size

The total sample size identified for this study was 20 households randomly selected in Diphu area and bio-diversity cum recreation park, which is located on the way to Diphu–Maja Road just 4 km away from Diphu town.

Type of Data

Descriptive research was followed in this study which generally includes survey and fact finding enquiries of different kinds. The major purpose of descriptive research was to describe the state of affairs as it exists at present.

Method of Data Collection

This study was mainly based on primary data. For this study primary data were collected from the selected respondents. Questions were presented with exactly the same wording and in the same order to all respondents and a separate questionnaire were presented to the officer in-charge of bio-diversity cum recreation park.

Findings of the Study

The researchers conducted field survey in the month of April, 2016 extensively in the Diphu area of the district to gather knowledge in order to fulfill their objectives. The researchers gathered information with regards to both the types of plantation activity in the region, i.e. sandalwood plantation and medicinal plant cultivation.

The wild plants which are found around our environment serve as medicinal plants but due to the age of modern medicine we are ignoring the use and utility of wild plants which is leading to the destruction of our valuable nature resources. Medicinal plants have been identified and used throughout human history. Plants make many chemical compounds that have many biological functions, including defence against fungi, various bacteria, and viruses as well. The use of herbs to treat disease is almost universal among non-industrialized societies and is often more affordable than purchasing modern pharmaceuticals. Many of the herbs and species used by humans to season food also yield useful medicinal compounds.

❖ The researchers identified the following types of medicinal herbs grown in the district extensively with multiple number of uses:

❖ The study was carried out to investigate the findings about venture of cultivation of sandalwood and medicinal plants in Diphu Karbi Anglong district of Assam. This study investigated the process of judgment sampling. It was found that among the 20 respondents, majority of sandalwood wood plantation cultivation is

Table 1. Different Types of Medicinal Plants and Their Uses

Karbi Name	Assamese Name	English Name	Botanical Name	Family	Parts Used	Uses
Arman Hanserog	Bon Bhendi	Devil's cotton	Abelmoshus moschatus Medic	Malvaceae	Ripe seeds and fruits.	Leaves and roots of the plant are used to cure gonorrhoea.
Jok -an- Kelok	Boga Bahak/ Tita bahak	Malabarnut, Vasaka	Adhatoda Zeylanica Medic.	Acanthaceae.	Leaves	Powdered leaves are used for skin affections.
Tara	Tora	----	Alpinia allughas (RetZ.) Rose	Zingiberacea	Leaves	Useful in headache, lumbago, rheumatic pain, sore throat, sour irritations stitting, pain in the chest, diseases of kidney.
Mirve	Bishohari	----	Amaranthus bicolour linn.	Amaranthaceae	Leaves	Used to stop bleeding
Bab nemso	Domona	----	Artemsia nilgirical linn	Compositste	Leaves	Used to treat headache
Ingtat Arong	Dewachali	----	Artocarpus lakoocha Roxb	Moraceae	Barks and seeds	Used as a laxative, cure boils with pus, pimples reheumatism, hernia. Seeds are purgative.
Dampijuik	Leteku		Baccaurea Ramiflora Lour	Euphorbiaceae	Fruits	It is used as a tonic and as an antidote to snake poison.
Chong Amok	Bor Manimuni	----	Centella asistica(Linn.) urban	Apiacea	Entire plant. It is also used as a vegetable	The plant is used to treat insomnia, it helps in digestion, and solves gastric problems.
So-ik	Mahudi lota	----	Croton caudatus Geiseler	Euphorbiaceae	Leaves	It is used to stop bleedings of fresh cuts, wounds etc. Leaves are applied as apoultice to sprain; tender shoots are used as a medicine for Cholera. It is used by Karbis to blacken their teeth.
Bab jangthu	Chitranala	Citronella grass	Cymbopogon nardus Linn	Gramineae; poaceae	Oil	It is used for expelling gases, lowering body heat, curing spasms, in case of vomiting, headache, insomnia, and sleeplessness.
Me abap.	Pate-goja	Sprout Bat Plant, Hem Sagar.	Kalanchoe heterophylla Prain	Crassulaceae	Leaves	Its juice is given in ½ to tola doses with double the quantity of butter in case of diarrhoea, dysentery.
Hanmoiso	Kachi doi	--	Vernonia volkemaefalia DC.Vern	Compositae; Asteraceae	Entire part	Used as a pain killer.
Mehek	Mehek	Verbinum	Viburnum colebrookianum Wall.exCl	Carprifoliaceae	Leaves	Medicines for indigestion and used to purify blood etc.
Themuki arong	Manipuri urahi	--	Parkia roxburghii G. Don	Mimosaceae	Tender pods and barks	Used in the treatment of diarrhea, dysentry, and externally it is used as a liniment.
Jok-an	Tita-phul	--	Phlogocanthus thyrsiflorus Nees	Acanthaceae	Leaves, flower and fruits.	Useful in chronic bronchitis, asthma, painful swellings and malaria fever etc.
Bikron Okso	Jangali Pan	--	Piper thom sonii Hook.f.	Piperaceae	leaves	Used in the treatment of fever, cough, vomitting etc.
Hanboka	Bhojo guti	--	Olax acuminate Wall.ex Benth	Olacaceae	Leaves, leaves are edible	Used in the treatment of small pox.
Rikang nemthu	Bhebeli-lota,	--	Paederia Foetida Linn.	Rubiaceae	Leaves and roots	Used in the treatment of diarrhoea, dysentery, and externally it is used as liniment. It is also useful in intestinal disorders
Lopong	Modina, Babai Tulashi	Sweet Basil	Lippia Geminata H. B. & Kunth	labiatae	LeavesA	Used in treatment of eye diseases, headache, gastric problems.

Source: Field Survey (Authors' extract)

done by the age group between 45-60.

❖ The culture of cultivation of sandalwood is a recent wave in the area though some of the trees have existed for ages, but these are not known by the people of the region. However, it has been popularized by Mr. Ranjan Kumar Baruah (Forest Ranger in-charge of bio-diversity-cum recreation range) in recent years.

❖ The researchers in the quest to understand the evolution of sandalwood plantation in the region interviewed the locals and were bestowed with the knowledge that it was Miss Ruplan Engtipi, a retired school teacher residing in Lurolangso who was the one to report about a sweet soothing fragrance emanating on burning of some woods at his residence. Later on it was confirmed by the forest official that the wood being burnt belonged to a sandalwood tree. This led to the beginning of research on sandalwood plantation. However, the incident also brings to light the fact that the locals are unaware about the presence of this valuable plant.

❖ However, once the plant was discovered, many locals have undertaken the activity of growing sandalwood in their gardens in the past few years. It was also found out that most of the household have atleast 3-5 sandalwood plants in their compound.

❖ We also found out that the expenditure incurred on cultivation of sandalwood is nil when it is undertaken at the household level or many times it grows naturally through the process of spreading of sandalwood seeds by birds.

❖ When compared to large scale cultivation, the expenses incurred may amount to just over ₹ 1,00,000 per year. For instance, one of the respondents Mr. Horen Sing Bey (MAC) of Karbi Anglong Autonomous Council has planted sandalwood trees on 25 hectare land for which he has employed a keeper and is spending around ₹ 1,20,000 yearly as wages.

❖ The researcher also found out that the locals face high risks with regards to the safety of fully grown and matured sandalwood plants from their gardens. Cases of entire trees being uprooted from the ground taking advantage of the darkness at night have been reported.

❖ Furthermore, local authority or the state government has not prescribed any royalty value till date for the growth of this particular plant. With this advantage, most of the people are selling sandalwood products without paying any revenue to the local authority or to the government.

❖ We also found out that due to the lack of proper market in the region most of the growers sell off sandalwood plants at low prices ranging from about ₹ 500 to ₹ 1000 per kilogram which is a great loss for the growers of the region.

❖ We reported that most of the valuable medicinal plants are cultivated extensively in the bio-diversity cum recreation park but unfortunately it is not done for commercial purpose. Thus, this restricts the opportunities of these plants to be used for commercial purpose which is hampering revenue generation.

Conclusion

Sandalwood is becoming immensely popular in Diphu area of Karbi Anglong district of Assam (undivided). When investigating all the variables and the responses of the respondents, this study revealed that the perception of people can be changed by awareness program. The present cultivators are able to change their economic status by selling some sandalwood trees. This also indicates that the current rate of developing sandalwood can give birth to an entrepreneur in the long run which is a great opportunity for the society. Despite the benefits for the society, it is coupled with some challenges. The study shows that the major challenges are low security and the rate of royalty which are not prescribed by the local authority. Thus, it can be concluded that if the both the forest authority and local government take necessary steps to secure cultivation of sandalwood and make proper channel for the cultivator, there will be tremendous opportunity in the region and it may become one of the states in India that produce sandalwood.

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About the Authors

Joyjit Sanyal (M.Com, PGDHRM, B.Mus) is Assistant Professor with Department of Commerce, Assam University Diphu Campus. He completed Post Graduation from the Department of Commerce, Guwahati University, India in the year 2013 and is also presently pursuing his Doctorate degree from the same department. Before joining as a permanent faculty at his present workplace in July 2014, he also served as Assistant Professor on a part-time basis at Lalit Chandra Bharali College, Guwahati and Department of Commerce, Guwahati University. He had also joined as a Junior Research Fellow in the Department of Commerce and served there for over two months.

Bishnu Terang completed his Masters of Commerce from the Department of Commerce, Assam University, Diphu Campus and is a budding entrepreneur of the hill district of Assam, East Karbi Anglong. He started several ventures just after completion of his M.Commerce in 2016 and is slowly and steadily gaining momentum in his business endeavours. He is also engaged in various plantation activities and also owns a nursery in Diphu town.