

Status of Medicinal Plants in Assam

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Abstract

Assam, which is known for its rich bio resources and ethno cultural diversity, has also various medicinal plants. People living in remote and forest area still practice and depend on the indigenous plants and cultivation to great extent. There are different types of medicinal plants that exist in Assam are the beliefs and treatment of various diseases. The paper highlights the status of medicinal plant in Assam.

Keywords: Medicinal Plant, Assam,

1. Introduction :

Assam is one of the richest biodiversity state which harbor a good number of medicinal plants and 70% folk population of Assam still using the herbal products obtained from the medicinal plants (Kalita D, Saikia j, Sarma Baruha M., 2013). Medicinal plants have strong faith on traditional herb. The medicinal practices based on traditional knowledge are a popular social tradition for several generations even in the context of modernization and it has been continued till now. Natural products continue to play a most significant role in the drug discovery and development process (Newman and Cragg., 2007).

According to World Health Organization (WHO) -"Any plant and its organs containing any substance that can be used therapeutically, or can be used as raw material for chemical / pharmaceutical synthesis" is classified as drugs.

2. Objectives:

The main objectives of the study are as follows

- To study the status of the medicinal plant of Assam.
- To emphasize the importance of medicinal plants of Assam.

3. Research Methodology:

This descriptive type paper is based on secondary data collected from the various research papers, books and internet.

4. Status of medicinal plant:

Assam covered a total geographical area of 78,438 km². Over 3.39 crore people in 2106 lived in Assam. Majority of them belong to diverse cultures and communities. This large human populace with diverse life styles, beliefs, traditions and cultural heritage inhabiting Assam has learnt to utilize natural resources and products available in Assam by various ways. Herbs and plants have been used for medical or therapeutic purposes.

In North-East India estimated number of medicinal plants is about 2000. In Assam example of some typical medicinal plants are *Aquilaria malaccensis* agar Lam, *Ambroma augusta* Devil's cotton and *Camellia sinensis* tea.

Increasing demand of fast-growing market of herbal medicines and other herbal healthcare products obtaining from medicinal plants has resulted into trade, legitimate as well as illegal results to the depletion of habitat and medicinal plant population. Convention on Biological Diversity (CBD) states that indigenous people play a vital role in environment management and development through their traditional practices. It requires nations to protect the traditional knowledge and customary practices related to the use of biological resources.

Some of the medicinal plants found in Assam are-

Adhatoda vasica L., *Aegle Marmelos* Linn., *Ageratum conyzoides* L., *Allium ascalonicum*, *Allium sativum* L., *Alocasia macrorrhiza* (L.), *Aloe barbadensis*, *Alstonia scholaris*, *Ananas comosus* (L.), *Annona squamosa*, *Aphanamixis polystachya*, *Aquilaria agallocha* Roxb., *Artocarpus integrifolia*, *Asparagus racemosus* Willd., *Averrhoa carambola* L., *Bacopa monnieri* (L.) *Annona squamosa*, *Azadirachta indica*, *Alstonia scholaris*, *Adhatoda vasica*, *Andrographis paniculata*, *Bixa orillana*, *Bacopa monnieri*, *Cissampelos pareira*, *Calotropes gigantea*, *Clarodendrum colebrookianum*, *Clarodendrum viscosum*, *Dillenia indica*, *Euphorbia nerifolia*, *Glycosmis arborea*, *Homalomena aromatic*, *Houhuynia cordata*, *Justicea gendurossa*, *Melia azadirach*, *Murraya koenigii*, *Nyctanthes arbortristis*, *Oroxylum indicum*, *Phlogacanthus thyrsoflorus*, *Phyllanthus embelica*, *Paederia foetida*, *Rauvolfia serpentine*, *Spondias pinnata*, *Saraca indica*, *Syzygium cumini*, *Tinospora cordifolia*, *Terminalia arjuna*, *Terminalia bellerica*, *Terminalia chebula*, *Tabernaemontana divericata*, *Vinca rosea*, *Vitex negundo*.

5. Challenges:

- The younger generation is showing disinterest and even abandoning the age-old medical practices due to the arrival of modern technologies.
- Excessive extraction of herbal raw material from the wild has resulted in considerable depletion of the population of such species.
- Depletion of natural resources including forest, soil and water leads to the increasing loss of biodiversity.

6. Importance of medicinal plant:

6.1 Antimalarial Agents:

Quinine is considered to be the drug of choice for severe chloroquine-resistant malaria due to *P.falciparum* (Sangita kumari, Govind Shukla and A. Sambasiva Rao). Certain plants such as *Azadirachta indica*, *Psidium guajava*, *Leucas aspera*, *Carcica papaya* have the potential to control mosquito larvae. Presence of active chemicals like ethylamine, flavanoids, alkanoids, trepenoids are very active against the mosquito larvae.

6.2 Antibiotics:

Today new important antibiotics are discovered from microbial, plant, and animal sources. For example, the antimalarial agent, Artemisinin, was isolated from the Chinese medicinal plant *Artemesia annua*.

6.3 Antibacterial Activity:

Antimicrobial drugs are used in medicinal practices for treating food borne diseases. Certain medicinal plant extracts which are rich in antibacterial compounds such as *Houttuynia cordata*, *Drymaria cordata*, *Psidium guavaja* against to human pathogenic bacteria *E.coli* (Kalita D, Saikia j, Sarma Baruha M., 2013).

6.4 Anticancer Agents:

The major anticancer drugs are natural products from plants. Examples of such important anticancer drugs are Vincristine, Vinblastine, Mitomycin Streptozocin.

6.5 Indigenous use:

Different parts of medicinal plants were used in treatment of diseases of different body parts such as bronchitis, bones, skin, ear, stomach, teeth, nose, throat, snake bites etc. In ancient Ayurvedic medical text books it is recommend that quality of water can be increased by boiling it with several locally grown medicinal plants (Unnikrishnan Payyappallimana and Osamu Koike).

7. Conclusion:

Herbal medicines have been practiced by different communities and societies for thousands of years from generation to generation The first written record detailing the use of herbs in the treatment of illness are in the form of Egyptian papyrus. Primitive men and women treated illness by using plants, animal parts and minerals that were not part of their usual diet. Ayurveda, Unani, Siddha are the roots of Indian traditional system of medicine which enhanced the better quality of health which is researched and supported by the people. It may be concluded safely that herbal medicines hold good future prospects and they may, one day emerge as good substitutes or better alternatives for synthetic chemicals-based allopathic drugs or may even replace them.

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Prospects and Challenges of Horticultural crops for Agricultural Development in NER: A case study specially in Assam

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Abstract:

Horticulture is the branch of agriculture that deals with the art, science, technology, and business of growing plants. It includes the cultivation of medicinal plants, fruits, vegetables, nuts, seeds, herbs, sprouts, mushrooms, algae, flowers, seaweeds and non-food crops such as grass and ornamental trees and plants.

The Northeast Region is the eastern-most region of India. It comprises the contiguous Seven Sister States (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura) plus the Himalayan state of Sikkim. The region occupies about 8 per cent of the total geographical area of the country.

The NER has its own unique combination of living species, habitats and ecosystems, which together make up its diversity rich resource. This region offers scope for cultivation of a wide variety of horticultural crops such as fruits, vegetables, flowers, tuber and spices because of its diversities in topography, altitude and climatic conditions. Apart from the nutritional value, many regional horticultural crops are used for medicinal purposes and income generating source in the rural areas. The NER states of India offer immense scope for exploiting the export potential of their horticulture products. These States have been producing substantial quantities of fruits and vegetables, which have considerable potential for exports to the international markets. With the integration of Indian Economy with the global markets, the potential of horticulture exports from this region can provide a huge competitive advantage in international trade in the coming years. However these States have not been able to achieve much growth

in this sector due to many inherent weaknesses such as lack of transport infrastructure, lack of awareness and poor marketing linkages.

The proposed paper is targeted to examine the existing position of horticulture in NER with a view of assessing the prospects and challenges of horticulture products in these States (Assam in special).

Key words:- Horticulture, North East, Crops, Prospect, Challenges, Economy etc)

Introduction:-

The origins of horticulture are intimately associated with the history of mankind. The term horticulture is relatively recent origin. It first appeared in written language in the seventeenth century. The word is derived from the Latin "Hortus" means garden and "Colere" means cultivate. Horticulture is the branch of agriculture that deals with the art, science, technology, and business of growing plants. It includes the cultivation of medicinal plants, fruits, vegetables, nuts, seeds, herbs, sprouts, mushrooms, algae, flowers, seaweeds and non-food crops such as grass and ornamental trees and plants.

Horticulture development in India:-

India has been bestowed with wide range of climate and physio-geographical conditions and as such is most suitable for growing various kinds of horticultural crops such as fruits, vegetables, flowers, aromatic, spices and plantation crops.

India has witnessed voluminous increase in horticulture production over the last few years. Significant progress has been made in area expansion resulting in higher production. Over the last decade, the area under horticulture grew by about 2.7% per annum and annual production increased by 7.0%. During 2013-14, the production of horticultural crops was about 283.5 million tonnes from an area of 24.2 million hectares (ha).

Export of horticulture products from India:-

India's diverse climate ensures availability of all varieties of fresh fruits & vegetables. It ranks second in fruits and vegetables production in the world, after China. As per National Horticulture Database published by National Horticulture Board, during 2012-13 India produced 81.285 million metric tonnes of fruits and 162.19 million metric tonnes of vegetables. The area under cultivation of fruits stood at 6.98 million hectares while vegetables were cultivated at 9.21 million hectares.

India is the largest producer of ginger and okra amongst vegetables and ranks second in production of potatoes, onions, cauliflowers, brinjal, Cabbages, etc. Amongst fruits, the country ranks first in production of Bananas (22.04%), Papayas (40.74%), Mangoes (including mangosteens, and guavas)(32.65%).

The vast production base offers India tremendous opportunities for export. During 2014-15, India exported fruits and vegetables worth Rs. 7474.14 crores which comprised of fruits worth Rs. 2771.32 crores and vegetables worth Rs. 4702.78 crores.

Mangoes, Walnuts, Grapes, Bananas, Pomegranates account for larger portion of fruits exported from the country while Onions, Okra, Bitter Gourd, Green Chillies, Mushrooms and Potatoes contribute largely to the vegetable export basket.

The major destinations for Indian fruits and vegetables are UAE, Bangladesh, Malaysia, UK, Netherland, Pakistan, Saudi Arabia, Sri Lanka and Nepal.

Horticulture in the NER:-

The north east region of India comprising the States of Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim, is one of the richest reservoir of genetic variability and diversity of different crops i.e. various kinds of fruits, different vegetables, spices, ornamental plants and also medicinal and aromatic plants

It constitutes about 8% of the country's geographical area and 4% of its population. The major horticulture crops of the region are potato, onion, tapioca, sweet potato among vegetables and tuber crops; ginger, turmeric and chillies among spices; banana, pineapple, orange/other citrus fruits, mango, litchi, jackfruit among fruit crops and coconut and areca nut among fruit-nuts. Other horticultural crops, which are produced in the region, are cabbage, brinjal, cauliflower among vegetables; apple, pears, plums/peach and passion fruit among fruit crops.

Apart from the nutritional value, many horticultural crops found in this region are used for medicinal purposes and income generating source in the rural areas.

The Government of India has been providing support for the holistic development of horticulture through various schemes such as National Horticulture Mission (NHM), Horticulture Mission for North East and Himalyan States (HMNEH), National Horticulture Board (NHB) and Coconut Development Board (CDB).

Variety of Horticulture crops grown in NER:-

A wide range of tropical, sub-tropical and temperate fruits such as lemon, mandarin, pineapple, passion fruit, banana, ginger, turmeric, and vegetables, both indigenous and exotic, are grown in the region. The sub-tropical climate of Northeastern India is extremely favorable to the cultivation of many plantation crops. Among the three important crops viz, tea, coffee and rubber, tea was introduced in Assam and Tripura as an industrial crop during the middle of nineteenth century, which has spread to other non-traditional states in the region in recent years. Suitable land and climatic conditions provide favorable environment for tea, coffee and rubber plantation in Arunachal Pradesh, Manipur, Meghalaya, Mizoram and Nagaland, but it is not fully exploited. Seasonal crops like vegetables in the formative years of the plantation crops and permanent crops like areca nut, agar, tree beans, black pepper, gooseberry etc. could be grown in the matured plantation to augment productivity and profitability.

Among the NER states from here onwards we are going to discuss about the data available about horticulture for the state of Assam only-

Plan investment in Horticulture in Assam:-

In view of increasing potential for rapid growth and economic return, various development programmes have been undertaken for the development of horticulture sector in commercial

line and plan investment for horticulture development increased significantly from the Fifth Five Year Plan onwards and resulted in considerable strengthening of the horticultural development programmes in the state. Table - 1.1 presents the investment in different plan periods for the development of horticulture sector in Assam.

Table - 1.1 :
Plan Investment on Horticulture in Assam during Fifth five year plan to Eleventh five year plan (Rs. In lakh)

Plan	Year	Approved outlay	P.C. to total Crop
Fifth Plan	1974-79	150	4.63
Sixth Plan	1980-85	250	1.50
Seventh Plan	1985-90	472	2.62
Eight Plan	1992-97	560	2.48
Ninth Plan	1997-02	800	1.65
Tenth Plan	2002-07	193.49	0.53
Eleventh Plan	2007-12	2,101	1.70

Sources: Planning and Development Department, Govt. of Assam

Table 1.1 shows that approved outlay of expenditure on horticulture increased in each five year plan. The allocation for horticulture increased many folds during the period with the launching of various horticultural development schemes such as Technology Mission for Integrated Development of Horticulture, National Horticulture Mission, Micro irrigation Programme, National Bamboo Mission etc.

Horticultural production in Assam:

Over the years, there has been significant improvement in the production and productivity of various horticulture crops. In the recent years, there has been a significant change in the scenario of the state in terms of increasing in area, production and productivity in horticultural crops.

Assam produces (as per Indian Horticulture Database, data period: 2010-11) about 5.07 m. MT (metric ton) of horticulture produce from an area of 0.58 m. ha. (hectare) which is 2.11% of the total horticulture production of the country. The major production constitutes fruits (34.75%), vegetables (57.65%), plantation crops (3.23%) and spices (4.38%).

Assam is one of the leading producers of Banana in the country and accounts for 2.4% of the total production of banana in the country. The production of banana in the state is 0.72 m. MT from an area of 0.05 m. ha. The main varieties of banana in the state are Malbhog, Jahaji, Borjahaji, Manjahaji, Chonia (Manohar), Kanchkol, Chini Champa, Bhimkol, Attikol, Jatikol, Digjowa, Kulpait and Bharat Moni.

Assam is one of the leading producers of Citrus in the country and accounts for 3.6% of the total production of citrus in the country. Assam is ranked sixth in the country among orange producing states in the country and accounts for 5% of the total production of orange in the country. The production of orange is 0.17 m. MT from an area of 0.01 m. ha. Major orange growing belts in the state are Tinsukia NC Hills and Karbi Anglong.

The production of citrus is 0.27 m. MT from an area of 0.03 m. ha.. Assam accounts for 5% of the total production of lime/lemon in the country.

Assam is ranked third for producing Litchi in the country and accounts for 8.2% of the total production of litchi in the country. The production of litchi is 0.04 m. MT from an area of 0.005 m. ha. The production of litchi is concentrated in Kamrup, Sonitpur, and Bongaigaon regions of the state.

Assam is one of the leading producers of papaya in the country and accounts for 3.2% of the total production of papaya in the country. The production of papaya is 0.13 m. MT from an area of 0.007 m. ha. The production of papaya is concentrated in Nagon, Darrang and Karbi Angling regions of the state.

Assam is the second pineapple producing state after West Bengal in the country and accounts for 15.6% of the total production of pineapples in the country. The state produces 0.22 m. MT of pineapples from an area of 0.01 m. ha. The major pineapple producing belts in the state are Nagaon, Kamrup, Karbi Anglong, Cachar and NC Hill.

Assam is ranked fourth for producing Cabbage in the country and accounts for 8% of the total production of cabbage in the country. The production of cabbage is 0.63 m. MT from an area of 0.03 m. ha.

Assam is the seventh major Cauliflower producing state in the country and contributes about 6% of the total production of cauliflower in the country. The production of cauliflower is 0.33 m. MT from an area of 0.02 m. ha.

Assam accounts for 3% of the total production of Okra in the country with production of 0.15 m. MT from an area of 0.01 m. ha, which is the third highest in the country. The production of okra is concentrated in Darrang, Nagaon and Sibsagar regions of the state.

Assam contributes about 2% of the total production of potato in the country and ranked seventh among the most potato producing states in the country.

Assam is the fourth most Sweet Potatoes producing state in the country and accounts for 3% of the total production of sweet potato in the country. The state produces about 0.04 m. MT of sweet potato from an area of 0.009 m. ha.

Assam contributes about 0.4% of the total production of Tapioca in the country with production of 0.03 m. MT from an area of 0.004 m. ha..

Assam is ranked third among the most arecanut producing states and accounts for 13.1% of the total production of arecanut in the country. The state produces about 0.06 m. MT of arecanut from an area of 0.07 m. ha.

Assam contributes about 0.9% of the total production of Coconut in the country with production of 0.10 m. MT from an area of 0.02 m. ha..

Spices Assam is the seventh most Spice producing state in the country and accounts for 4.15% of the total production of spices in the country. The state is producing 0.22 m. MT of spices from an area of 0.09 m. ha.

Floriculture is also a promising sector of horticulture in Assam. The Small & Marginal farmer of Assam can generate higher income through commercial cultivation of flowers like Orchid, Anthurium, Gerbera, Marigold, Tube rose etc. Through flower cultivation the income of Small & Marginal farmer (having 0.5-1.0 ha land) can be enhanced to Rs 2.4 lakh to Rs 4.2 lakh per ha per annum

Prospects:-

Horticulture is considered as an important sector for agricultural development in India. It promotes agro-industries development and value addition as well. The government has already identified horticulture crops as a means of diversification for making agriculture more profitable through optimum utilization of natural resources (soil, water and environment) and creating employment for rural masses especially for women folk. The relative importance of horticultural crop is well established in human nutrition as source of foods. They are highly remunerative and are generally considered as high value crops with ample export potential. The horticultural crops have the potential to generate gainful employment, promote trade and commerce and earn foreign exchange besides fighting against malnutrition a common menace.

In a flood prone state like Assam where productivity of major crops like rice is not stable, increase in production of horticultural crops can minimize the impact of crop failure and provide monetary security to the farmers.

Infrastructural facilities available for development of horticulture crops in Assam:-

Sound infrastructure with easy access to key utilities like road connectivity, quality power supply, land availability, sound marketing system, cold storage facilities etc. are very much necessary for the development of horticulture sector in Assam. The infrastructure facilities available for horticultural crops in the State are presented in Table - 1.2 and Table - 1.3:

Table - 1.2 :
Cold Storage Facilities in Assam

District	Number	Capacity(MT)	Sector	Commodi
Barpeta	1	3,000	Co-operative	Multiple
N.Cachar	2	10,000	Private	Potato, Apple, Grap
Dhubri	3	2,120	Public (2), Private (1)	Multiple
Golaghat	1	3,600	Private	Potato, Cabbage & C
Kamrup	12	21,956	Private	Potato ,Chilly
Nalbari	1	4,000	Co-operative	Multiple
Tinsukia	2	9,200	Private	Potato & Apple
Hailakand	2	10,000	Private	Potato
Sonitpur	1	4,000	Private	Potato, Chilli & Ap
Karimgan	2	7,400	Co-operative(1),Private (1)	Potato, Apple & Pe
Nagaon	3	11,500	Private (2) Co-operative(1)	Multiple
Assam	30	86,776	Co-operative (4)Private (24)	

Source: Assam Small Farmers' Agri business Consortium, 2009

Table - 2.3 :

Godowns constructed for agricultural and horticultural crops under Rural Godown Scheme of Govt. of India

Name of the RMC	Location	Capacity (MT)
Dhubri	Dharamsala	500
	Bogoribari	500
	Kathalipara	500
	Hatsingimari	1000
	Kaldoba	500
Goalpara	Krishnai	500
	Jaleswar	500
Boharihat	Mandia	500
Nalbari	Rampur (Kaplabari)	500
Guwahati Sub-Div.	Maloibari	1000
	Singimari (Pacharia)	1000
	Nagarbera	1000
Jorhat	Madhopur	1000
	Dohotia	1000
	Jengrai (Majuli)	500
	Chenijan	1000
Golaghat	Naojan	500
	Gomariguri	500
Lanka	Kharikhana	500
Tinsukia	Tingrai	500
Darrang	Kharupetia	500
Rangia Sub-Div.	Athgaon	500

(*RMC- regulated market committee,

Source: Assam Small Farmers' Agri business Consortium, 2009)

Beside the above mentioned infrastructural amenities, the State government established 6 nos. of fruit processing units of Pineapple and Orange with support from the Ministry of Food Processing Industry (MFPI) and one more unit is in the pipeline.

Challenges of Horticultural Crops in Assam:-

Though the state of Assam has high potential for the development of horticultural crops, it is yet to become a commercial venture. Factors hindering the horticultural development in the state are as follows:

➤ Poor cultivation practices and low yield

General neglect and non-adoption of scientific cultivation practices are the major constraints for poor return from most of the horticultural crops in the state. Despite conducive environment, the productivity and growth of all horticultural crops are lower than the all India average.

➤ **Lack of desirable planting material**

The disease free, genuine planting material is absolutely lacking in case of a number of horticultural crops. It is imperative to generate disease free & healthy planting materials & screening of planting materials before its distribution is of utmost importance.

➤ **Lack of marketing facilities**

Due to lack of organized marketing structure the farmers are getting low return as compared to their counterparts in other states of India, whereas the middlemen amass a large chunk of profit at their expenses. For almost all the commodities including specialized products like citronella oil, the producers face considerable marketing problems. Due to perishable nature of the products and absence of adequate market support, the farmers sell their produce at a throw away prices to the middleman without even getting the opportunity to display them. Transportation and storage is perhaps the most serious constraints in the horticultural development of this region.

➤ **Scarcity of trained manpower and extension support**

Shortage of trained manpower and inadequate extension support can be considered another set of pressing problem in the way of horticultural development in this part of the country.

➤ **Long Gestation Period**

Since horticultural crops more specially, plantation crops have long gestation period and initial cost of establishment of plantation is high, it becomes almost impossible for the marginal farmers to go for such ventures without long-term credits from financial institutions. Nationalized banks, do not find it a favourable investment and are not sure about the recovery of loans because the existing land tenure system particularly in the tribal belts, does not permit land mortgages in favour of lending banks. Apart from these, the farmers are not tuned to the idea of considering agriculture as a business proposition and are not accustomed to the processing of the bank loans. Thus, until and unless the system is changed, the much-needed financial investment will not be forthcoming.

➤ **Problems of processing**

For a state like Assam, the success of fruits and vegetable growing is closely linked with the availability of processing facilities. The processing industry can help to a certain extent in sorting out the problem of proper disposal of perishable commodities. Till today, there are a few number of cold storage facilities available (table 1.2); few processing units exist but are not functioning up to the desired capacity. Use of appropriate pre and post harvest practices for horticultural crops is vital for the success of the crops and also to garner good returns. Unfortunately, this is one of the weakest areas in the entire region.

➤ **Inadequate Investment on Research**

Investments on research in horticulture have always remained low when compared to the large number of crops it covers. As a result, many more financial issues remain unexplained for years together. There is an urgent need to increase the level of investment on research front.

➤ **Absence of adequate insurance coverage**

Risk management in horticultural crops is almost non-existent although the crops like onion and potato are covered under the National Agriculture Insurance Scheme. There is a

need to cover the risk in case of other horticultural crops as well, perhaps on the basis of potential production coverage instead of average yield. This would encourage higher investment to achieve higher productivity.

Conclusion:-

The development in the horticulture sector in Assam has not picked up momentum as desired. A strong system has to be implemented by Government which ensures post-harvest handling, assembly, storage, transport packing, processing, credit and modern marketing system for horticulture products in public-private-partnership mode. Floriculture potential available in Arunachal Pradesh, Meghalaya, Mizoram, Nagaland and Sikkim can be exploited on commercial scale through preparing a feasibility studies and action plan.

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