

COMMERCIAL PROSPECTS OF GINGER CULTIVATION IN NORTH-EASTERN REGION

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Spices are high value and export oriented commodity crops, which play an important role in agricultural economy of the country. India is the principal source for supply of spices in the global market, though there are number of other countries viz. Indonesia, Malaysia, Pakistan, Australia, Spain, Egypt, Tanzania, etc., producing and exporting to the international market. Spices contributed 1.24 per cent of India's total export earning. The share of spices in the export earnings from agricultural and allied products is 8.5%. The north-eastern region comprising of states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura has tremendous potential for production of spice crops. The climatic condition of the region is highly suitable for cultivation of a large number of spices such as ginger, turmeric, chilli, tejpat, large cardamom, coriander, and garlic. Though recently introduced, the region has a potential for commercial cultivation of black pepper, cumin, vanilla and saffron.

Among all spices, ginger is the main cash crop supporting the livelihood and improving the economic level of many ginger growers of north eastern region. Ginger is grown in almost all the states of the region but the leading states are Meghalaya, Mizoram, Arunachal Pradesh and Sikkim (Govind *et al.*, 1998). Apart from improved varieties like Nadia, China, Varada, etc., a number of local cultivars exist in north eastern region. These varieties are high yielder of rhizomes as compared to standard cultivars like Nadia and Rio-De-Janeiro but have more fibre content.

Uses of ginger

The freshly harvested ginger is used for consumption as green ginger in whole northeastern states. Little amount of surplus is sold outside the region through middlemen at a very low prices. Some times due to marketing problem the farmers are not able to sell their produce since there is no local market big enough to absorb and handle green ginger in large quantities. Therefore, it is essential to convert a part of produce into low volume high value ginger to make the crop remunerative. As it is abundantly available in the region, different products like ginger oil, ginger oleoresin can be prepared for export, which are very common in developed countries. Dried ginger (called saunth) can also be prepared and it may be either sold as such or in the form of an off white to very light brown powder. The dried ginger or ginger powder is generally used in manufacturing of ginger brandy, wine and beer in many western countries. Ginger oil is primarily used as a flavouring agent in confectionary and for soft drinks. The ginger is also used for several medicinal purposes.

Status of ginger in northeastern region

The total area under different spices in the region is 140.00 thousands ha with a production of 436.8 thousand tonnes at a productivity of 3.12 t/ha (anonymous, 2003). The area under ginger in NE region is 33.2 thousands ha which gives total production of 191 thousand tonnes at an average yield of 5.8 t/ha against the national productivity of 3.5 t/ha (Basic Statistics of NER, 2002). Meghalaya is major producer of ginger in the region, which is also second largest producer in the country with total share of 19.59 % after Kerala, which contributes 23.08 % to the total production of the country. The production of ginger is highest in Meghalaya followed by Mizoram and Arunachal Pradesh. However, the productivity is highest in Arunachal Pradesh (Table 1). Meghalaya is having higher per capita/annum availability of ginger than national availability. This shows that farmers are interested for the cultivation of ginger as soil, climate and other ecological factors favour the growth and development of the crop and there is a tremendous scope to increase the yield per unit area and thereby the total production of ginger in North East region.

Table 1: State-wise area, production and productivity of ginger in north eastern region

States	Area (ha)	Production (t)	Productivity (t/ha)
Arunachal Pradesh	4610	38020	8.24

Assam	4200	32100	7.64
Manipur	2140	3530	1.65
Meghalaya	8400	46590	5.5
Mizoram	7290	45000	6.1
Nagaland	500	400	0.8
Tripura	1000	1400	1.4
Sikkim	5100	24000	4.7
NEH region	33240	191040	5.8
India	67200	233900	3.5

[Source: Basic statistics of NER, 2002]

Diversity of ginger in the region

In ginger the region can be considered as treasure house of germplasm. There are several cultivated types of ginger available in the region, which are generally named after the localities they are being grown. Certain indigenous types namely Maran and Jorhat Local of Assam have been reported to be equally good in rhizome yield. Dry ginger recovery of these varieties have been found to be even better than exotic type Rio-de-Janeiro. In Arunachal Pradesh, Basar Local is very much popular due to high yield and its adaptability to the area. In Mizoram, local types Thingpui and Thinglaidon are grown at large scale. Black ginger having rhizomes with bluish black tinge inside is reported to have medicinal properties and is grown by the inhabitants of Mizoram just for their own use. It is also said to be sold at very high price probably due to high medicinal value.

In Tripura also a local selection, Tripura Local performed better in comparison to the other types. In Manipur, Thingpui is commonly preferred in the hills. In Nagaland, a variety having very high pungency but smaller in size is commonly grown by the tribals. Another type of ginger having rhizome with pinkish tinge inside is also found in the state. In Sikkim local types Bhainse and Gorubathan are grown commercially due to their high yield potential and big size rhizomes. In Meghalaya, in addition to local types namely Khasi Local and Tura Local, considerable area has been brought under selected type Nadia (Table 2). At present the variety Nadia is very much popular among all the states of northeastern region due to its low fibre content.

Table 2: Promising varieties of ginger in north eastern region

Sl.No.	Adapted Varieties	Crude fibre content (%)	Dry matter content (%)	Oleoresin (%)	Oil (%)	Yield (t/ha)
1	Nadia	4.1	22.6	5.4	1.4	30.00
2	Poona	6.4	20.4		1.17	25.10
3	Varada	3.2	-	-		22.00

Growing pattern of ginger in northeastern region

Ginger prefers warm, humid climate with well-drained soils like sandy or clay loam, red loam or laterite loam for its successful growth. In North East region ginger is grown as rainfed crop while in other parts of the country it is grown both as rainfed and irrigated crop. It is an exhaustive crop by nature and, therefore, not advised to grow in the same field year after year (Gosh, 1984). In North East region, it is rotated with French bean or soybean, which not only improve the physical condition of the soil but also give additional income to the farmers.

One of the most significant features of the agriculture in the NE region is the prevalence of jhum cultivation in large parts. In the hills of the region ginger is generally cultivated on raised bed (called bun) in the jhum fields (Gosh, 1984). Under this, large tracts of hills are demarcated and the forest in the region is cleared by burning. The land thus available is utilized for cultivation. Raised beds (called bun) of about one meter width are made along the slope and again covered with farm wastes, dried leaves, etc., which are being burnt before sowing of seed rhizomes. The burning of field helps in reducing the weed growth, soft rot disease and increase the availability of certain plant nutrients, particularly the Potash. This jhum land is abandoned after 3-4 years and new piece of land is cleared in similar fashion. This has been the tradition in the region for centuries, and the life style of

several tribes is associated with this cultivation. However, earlier the population being less, the pressure on the forest was less. Thus the land after being abandoned got sufficient time (10-15 years) for regeneration of forests. However with increase in the population, pressure on land has increased and time period for this cycle has got shortened (3-5 years). This is causing considerable concern amongst the researchers and environmentalists. In the region usually the seed rhizomes are stored in the pit under soil cover after harvest. By March-April when the rhizomes start sprouting, they are taken out and planted in the fields. In the plains of Assam and Tripura even earthing up and ridge and furrow planting system is observed in ginger fields.

Commercial qualities

Ginger is generally sold as raw ginger in local markets but there are several other products of ginger like dry ginger, ginger powder, ginger oil, and oleoresin. The oleoresin and oil are known as high value and low volume products, which have great demand in western countries. The varieties with less fibre, high dry matter recovery, and high oil and oleoresin contents are having great export potential in international markets. Therefore, more emphasis should be given to develop those varieties, which are having the above qualities. The variety Nadia is popular in Meghalaya and other states of NE region mainly due to low fibre (4.2%) content (Borthakur, 1992). The Indian Institute of Spices Research, Calicut has evolved Varada, a new variety of ginger, which has a fibre content of 3.2 % (Table 2). This variety is being multiplied at Ginger Development Station, Umsning, Meghalaya and the performance of the variety is quite encouraging. In International market several grades are available and on the basis of that ginger has been categorized in different grades (Table 3). The ginger produced in the region should be at par to this grade for outside export and getting higher prices because the prices vary as per the grades.

Table 3: The quality characteristics of different grades in ginger

Sl. No.	Quality characters	Limits		
		Grade I	Grade II	Grade III
1	Extraneous matter % by mass (max.)	2.0	3.0	5.0
2	Insect damaged matter, % by mass (max.)	1.0	3.0	5.0
3	Pieces less than 25 mm, % by mass (max.)	0.5	1.0	2.0
4	Decayed pieces, % by mass (max.)	nil	0.5	1.0
5	Dry matter, % by mass (min.)	22.0	20.0	18.0
6	Volatile oil as ml/100 gm (min.)	0.7	0.5	0.3
7	Crude fibre content of the dry matter % by mass (max.)	8.0	10.0	12.0
8	Non-volatile ether extract content of the dry matter % by mass (min.)	5.0	3.0	2.0

[Source: Spice India February, 2004]

Major production constraints in north eastern region

In spite of the fact that ginger is an important and oldest spice crop in North East region, no major breakthrough has been noticed in boosting the production and increasing export of ginger. Since it is vegetatively propagated crop, lack of consciousness in selection of high yielding varieties and several characters must presumably have occurred in the past. There had also been interchange of materials, but with all these there has not been tangible increase in the production. The major bottlenecks are as follows:

- **Shifting cultivation:** In this system agricultural crop is grown at one place for 3-5 years and after that farmers start growing at another place. Earlier this cycle was for about 15 years; therefore in the mean time the soil gets sufficient time for regeneration of biomass/forests. Now due to reduction in jhum cycle up to 3-5 years, the soil fertility has reduced. This system has caused large scale deforestation, soil degradation and depletion of resource base.
- **Land tenure system:** For boosting the production of spices, settled cultivation is necessary like other crops. The productivity is also low due to land tenure system prevailing in the region because the farmers do not feel any sense of belonging to the land and therefore, they do not undertake adequate management practices. Settled cultivation and right of ownership of land to

the farmers is necessary for judicious management of land. The owner right is not legalized in the name of entrepreneurs. Patta of the land is still in the name of forefathers or others.

- **Small land holdings:** Because of the terrain, the size of land holding is very small in the region and farmers are taking many crops as per their requirement from the same piece of land. Therefore, the commercialization of crop/variety on large scale is very difficult in the region.
- **Non-availability of quality planting materials and other inputs:** Good quality, high yielding and disease resistance rhizomes are not available to the farmers. The modern inputs like-fertilizers, pesticides, herbicides, etc., are very low in use. Though many high yielding varieties have been identified and recommended by the researchers in the region but quality seed production in a large scale is lacking due to non-existence of agencies responsible for quality seed production.
- **High rainfall:** High rainfall received in the region causes heavy infestation with weeds, pests and diseases and leaching of nutrients.
- **Lack of funds:** Although ginger is major cash crop in the state, but farmers are not getting financial support from Government for purchase of quality seeds and other inputs. There should be a scheme to provide soft loan to the farmers.
- **Low fertilizer and pesticide usage:** This resulted on considerable losses on yield. The average fertilizer usage varies from 2 kg in Arunachal Pradesh to 56 kg in Manipur, as against the national average of 104 kg per hectare. Even the plant protection measures are not taken very seriously
- **Problems of processing and marketing:** For a region like this the success of ginger growing is closely linked with the success of spice processing units, marketing and transport facilities. Till today, there are hardly any cold storage facilities available; few processing units exist but are not functioning up to the desired capacity. Marketing of ginger in the state poses problem due to non-topping of value added products like oleoresin, volatile oils, etc.
- Losses due to faulty storage method and diseases like rhizome rot.
- Lack of trained personnel with sound knowledge in post-harvest technologies.
- Lack of improved production technologies and management practices.
- Remoteness of the state from the national stream:
- With the recent development in the field of telecommunication, net work, the state can be linked with the other parts of the country through internet connection, website for supplying information related to the exact demand and price of the produce in the different markets of the country.

Future thrust

The followings are the areas where more intensive research is needed so that overall scenario of the ginger production can be changed by increasing production and productivity of ginger in the northeastern region.

- **Survey, diagnosis and design:** There is need for survey and diagnosis of lands suitable for ginger and development of area specific farming system model in cluster approach.
- **Introduction, evaluation and improvement:** Introduction of indigenous and exotic high yielding strains of ginger suitable for the state. Breeding should be done for high yielding and better quality varieties with resistance to biotic and abiotic stress.
- **System management research:** There is need to develop micro propagation and other propagation methods for rapid mass multiplication. Use of IPM and Integrated Nutrient Management system is required.
- **Post-harvest management:** Processing and preservation of value added products are required. There is need to develop quality control measures, adequate packing and storage techniques. The processing industry can help in sorting out the problem of proper disposal of perishable commodities. The value-added products can be extracted if processing units are set up in the region. Use of appropriate pre and post harvest practices for spice crops is vital for the success of the crops and to provide good return to the growers.
- **Economics and technology transfer:** The cost benefit analysis of different farming systems is required. There is immense need to strengthen the extension system for transfer of technologies generated and providing training to the farmers.

- **Emphasis on organic farming:** The ginger production in the north eastern region is organic by default because the farmers of the region neither apply the chemical fertilizers nor chemical pesticides in ginger crop. They are only applying the locally available farmyard manures (cow dung, pig manure, poultry manures, rabbit manure, etc.) in whole northeastern region. In this way, the ignorance of the farmers about the technological advances is turning out to be a key to prosperity. Considering the increasing demand for organic produce all over the world, the farmers can definitely hope to get better returns for their produce. But first and foremost they need to have marketable surplus which is available in the region. This surplus than need to be properly collected, stored, packaged and transported to the distant market after due certification. Therefore, there is lot of scope to popularise the organic ginger produce for export in foreign country from the region and establish organic product based ginger industry in the region.

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