

Present Status and Prospects of Ginger and Turmeric in NE States

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The North Eastern Region produces a variety of spices including chillies, ginger, turmeric, large cardamoms, black pepper, tejpatta etc. Ginger and turmeric are prominent among them and their cultivation is undertaken as a cash crop mostly in **jhum** fields spread over the hills and tribal areas of the entire 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 northeastern region. These varieties are high yielder of rhizomes as compared to standard cultivars like Nadia and Rio-De-Janeiro but have more fibre content. The ginger produced in higher altitude contains high oleoresin and gives higher oil recovery.

The region as a whole produces over 207 thousand tonnes of raw ginger every year. The product is mostly marketed in the fresh form. The local demand being very limited, roughly 70-80per cent of the total production is reportedly available as marketable surplus from the region. A sizeable quantity of ginger is wasted in transit because of the perishable nature of the commodity. The post harvest loss is estimated to be about 10.5 per cent during handling and transportation (Deka *et. al.*, 2004). 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 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.

Similarly, in turmeric, apart from improved varieties like Lakadong and Megha Turmeric-1, a number of local cultivars exist in northeastern region. The turmeric produced in this region contains high oleoresin and curcumin content. The product is mostly marketed in the fresh form. The local demand being very limited, roughly 70-80per cent of the total production is reportedly available as marketable surplus from the region. As it is abundantly available in the region, different products like turmerones (turmeric oil), oleoresin, and powder can be prepared for export, which are very common in developed countries.

Present status of ginger and turmeric production in NE region

The area under ginger in NE region is 30.84 thousands ha which gives total production of 209.15 thousand tonnes at an average yield of 6.78 t/ha against the national productivity of 3.56 t/ha. The production of ginger is highest in Meghalaya followed by Mizoram and Arunachal Pradesh. However, the productivity is highest in Manipur (9.86 t/ ha) followed by Nagaland (9.05 t/ ha) and Arunachal Pradesh (Table 1). The most popular cultivated variety in the region is Nadia that possess low fibre (4.10 per cent) and has maximum demand for culinary purposes. Although it is said that Nadia is popular among the farmers on productivity aspect, the local medium sized varieties are still grown in larger area in the region.

The area under turmeric in the region is 17.27 thousands ha with a total production of 32.36 thousand tones. The productivity of the crop is much lower (1.87t/ha) compared to the national productivity of 3.47 t/ha (Spices Statistics, Spices Board, 2004). The production of turmeric is highest in Meghalaya followed by Assam, Tripura and Nagaland. However, the productivity is

highest in Mizoram (Table 1). The most popular cultivated variety in the region is Lakadong (7.5 per cent) and Megha Turmeric-1 (6.8 per cent) that possesses higher curcumin content and has maximum demand

Table 1. State-wise area, production and productivity of ginger and turmeric in northeastern region (2004-05)

| State | Area ('000 ha) | | Production ('000 t) | | Productivity (t/ha) | |
|--------------------|----------------|--------------|---------------------|--------------|---------------------|-------------|
| | Ginger | Turmeric | Ginger | Turmeric | Ginger | Turmeric |
| Arunachal Pradesh | 4.61 | 0.40 | 38.02 | 1.50 | 8.25 | 3.75 |
| Assam | 4.20 | 12.00 | 32.10 | 8.00 | 7.64 | 0.67 |
| Manipur | 1.27 | 0.37 | 12.52 | 2.09 | 9.86 | 5.69 |
| Meghalaya | 8.40 | 1.60 | 46.59 | 8.70 | 5.55 | 5.44 |
| Mizoram | 4.53 | 0.30 | 38.07 | 2.97 | 8.40 | 9.9 |
| Nagaland | 1.37 | 0.60 | 12.40 | 3.10 | 9.05 | 5.17 |
| Sikkim | 5.10 | 0.50 | 24.00 | 1.70 | 4.71 | 3.40 |
| Tripura | 1.36 | 1.50 | 5.45 | 4.30 | 4.01 | 2.87 |
| N.E. Region | 30.84 | 17.27 | 209.15 | 32.36 | 6.78 | 1.87 |
| India | 86.32 | 150.5 | 307.09 | 521.9 | 3.56 | 3.47 |

Table 2: Promising varieties of ginger grown commercially in northeastern region

| Sl.No. | Adapted Varieties | Crude fibre (per cent) | Dry matter (per cent) | Gingerol (per cent) | Oil (per cent) | Yield (t/ha) |
|--------|-------------------|------------------------|-----------------------|---------------------|----------------|--------------|
| 1 | Nadia | 4.56 | 22.25 | 0.64 | 1.45 | 30.00 |
| 2 | Poona | 6.24 | 19.76 | 0.93 | 1.17 | 25.10 |
| 3 | Varada | 5.93 | 21.38 | 0.96 | 1.75 | 22.00 |
| 4 | Thingpui (local) | 5.74 | 22.47 | 1.25 | 1.80 | 19.30 |

Diversity of ginger and turmeric 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, Bhola and Jorhat Local of Assam have been reported to be equally good in rhizome yield as well as in size. Dry ginger recovery of these varieties has been found to be even better than exotic type Rio-de-Janeiro. The pungency in ginger is due to gingerol, which is found highest in Meghalaya Local genotype (medium size) and very suitable for export purposes. In Mizoram, local types **Thingpui**, **Thingaria** and **Thinglaidum** 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 for commercial as

well as their own use. 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 **Meghalaya Local** and **Tura Local**, considerable area has been brought under selected type **Nadia** (Table 3).

Similarly, there are several cultivated types of turmeric available in the region, which are generally named after the localities they are being grown. Certain indigenous types namely Manipur Local, Nagaland Local, Sikkim Local and Jorhat Local of Assam have been reported to be equally good in rhizome yield. Dry matter recovery of these varieties has been found to be even equal or better than certain improved types. In Meghalaya, Lakadong is the main variety and more than 50 per cent area is under this variety.

Table 3. Promising local genotypes of ginger of North East Region

| Genotype | Crude fibre content (per cent) | Dry matter content (per cent) | Gingerol (per cent) | Oil (per cent) | Yield (t/ha) |
|-----------------|---------------------------------------|--------------------------------------|----------------------------|-----------------------|---------------------|
| Manipuri No. 1 | 6.77 | 21.18 | 1.14 | 1.45 | 17.126 |
| Basar | 7.02 | 22.54 | 1.12 | 1.30 | 20.940 |
| Tura Local | 5.50 | 21.9 | 1.32 | 1.55 | 17.826 |
| Thingpui | 5.74 | 22.47 | 1.25 | 1.80 | 19.341 |
| Maran | 6.25 | 24.02 | 1.10 | 1.75 | 19.815 |
| Meghalaya Local | 6.02 | 20.12 | 1.71 | 2.10 | 14.765 |
| Thinglaidum | 5.86 | 22.38 | 1.23 | 1.45 | 15.425 |
| Kachai Ginger | 5.72 | 24.87 | 1.20 | 1.70 | 20.097 |
| Nagaland Local | 6.93 | 19.8 | 1.18 | 1.85 | 19.18 |
| Nadia | 4.56 | 22.25 | 0.64 | 1.45 | 30.00 |

Source: Sanwal *et al*, 2007

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 may be given to develop those varieties, which are having the above qualities. The Indian Institute of Spices Research, Calicut has evolved Varada, a new variety of ginger, which is being multiplied at Ginger Development Station, Umsning, Meghalaya and the performance of the variety is quite encouraging. The local varieties of ginger contain higher quantity of gingerol compared to the variety like Nadia and Varada.

Production and marketing constraints

1. Abiotic factors: Ginger and turmeric are mostly grown in sub-tropical hill zones where soil is acidic in nature. Cultivation is being practised on steep slopes under **jhum/ bun** (raised beds) system in rainfed conditions without adoption of soil and water conservation. Deep virgin soils of forest brought under **jhum** system are giving higher yields in first and second year of cultivation even under zero nutrient management conditions. But heavy rains and earthing works associated with the cultural operations and harvesting accelerate the erosion reducing the fertile soils into abandoned wasteland. In second cycle of cultivation on such fields after a gap of 3-5 years very low

yields (5-8 t/ha) are obtained. Farmers apply only FYM at planting and no other nutrient application strategies are followed. These factors lead to low productivity. Research on soil water conservation technologies, sustainable production system etc is being carried out by the Institute.

2. Biotic factors: Non-availability of quality planting material is another important factor attributing to low productivity. The serious diseases of ginger are seed rhizome borne, viz. soft rot (*Pythium sp*, *Rhizoctonia sp* and *Sclerotium rolfsii*), dry rot (*Fusarium oxysporum*) and bacterial wilt (*Ralstonia solanacearum*). Some of these, particularly bacterial wilt once introduced into cultivated fields it is very difficult to eradicate. The supply of quality planting material free from diseases can contribute enormously to enhance the productivity. Ginger stem borer (*Dichochrosis punctiferalis*), Shoot borer weevil (*Prodiotes halmaticus*) causes crop damage between 30-40 per cent during July-September.

There is a need for the establishment of seed agencies to supply certified seed rhizome in north-eastern region. Farmers / Farmers' clubs / NGOs could be trained to develop technical skill to produce home grown quality seed to meet their own seed requirements. Further, bio-organic/ botanical extracts developed by the Institute controls serious diseases and increases ginger yield. Such materials at low cost are technically feasible in slope areas and are eco friendly substances.

3. Socio-economic factors: Cultivators in northeastern regions are resource poor and have low produce holding capacity. Lack of storage facilities at farm, non-existence of organised marketing system/ growers association etc force the growers to sell their produce just after harvesting through commission agents. Sale in village markets (weekly markets), city markets are very limited.

Absence of adequate number of post harvest processing units to absorb marketable surplus (which is nearly 70per cent) forces the cultivators to sell the produce as fresh only. Unorganised marketing system is another constraint determining the low adoption of improved production packages and enhancing the productivity system. Establishment of processing units in the region is needed to absorb the market surplus and produce value added products that have longer shelf life.

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.

Post- harvest management: There is need to develop quality control measures, adequate packaging, transportation and storage techniques. Intensive research for protocol development of different value added products may be taken up. Low cost storage structure for long-term storage is the need of the hour. Sprouting inhibition after harvesting for a minimum period of 2-3 months using organic sources will increase the volume of export.

Introduction, evaluation and improvement: Introduction of indigenous and exotic high yielding strains suitable for the state may help in increasing the total production of the region. Breeding with local germplasms should be done for high yielding and better quality varieties with resistance to biotic and abiotic stress. DNA finger printing of the local germplasm should be done immediately to safe guard the interest of the farmers.

Quality planting materials: Since there is inadequate supply of quality planting materials and true to the type varieties are not maintained properly, a mechanism may be devised for regulating the production and supply of disease free planting materials to the growers. Micro propagation techniques may help in rapid multiplication of quality planting material.

Emphasis on organic farming: The production system in the northeastern region is organic by default. Bio-organics, bio-pesticides, integrated approach for pest and disease control and strategies for each farming systems has to be worked out. The need of the hour is to have a simplified and affordable organic certification system.

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 and to provide training to the farmers.

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