

Marketing Indigenous Fruits of Meghalaya: Challenges and Opportunities

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Meghalaya state in northeastern India has low development indices, despite vast natural resources including a plethora of indigenous fruits with high nutritive and therapeutic value. These fruit trees are often grown in the forest, available only seasonally and suffer from poor marketing strategies. Based on in-depth interviews of a representative random sample of 300 households in East Khasi Hills district, and survey of farmers it was found that these fruits are highly popular but only half consume regularly due to low availability. Majority are aware of their high nutritional and therapeutic values and would appreciate more regular availability. The fruits have many positive features, but have short shelf life and suffer from poor storage and transportation problems. With governmental support for higher production, efficient marketing strategies including packaging, pricing, storage, transportation and promotional/educational campaigns, indigenous fruits can greatly enhance the economy and social life of indigenous populations everywhere.

Keywords: Indigenous Fruits, Meghalaya state, Marketing Strategies, Challenges, Solutions

Introduction

Agriculture is the backbone of several indigenous populations including those in the North Eastern region of India and Meghalaya, in particular (Gopalakrishnan et al 2001). About one third of this state is forested and nearly 10% of the total geographical area of Meghalaya is under cultivation. The climatic conditions of the state favours the growth of a large variety of horticultural crops including fruits, vegetables, flower, spices and medicinal plants (Arunkumar et al 2012). Despite such wealth of agricultural resources, Meghalaya has the lowest development indices in India, as evidenced by other indigenous populations. The major reason is the poor marketing management combined with limited infrastructural capacity. With the exception of a

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few, the Indian cultivator is not a good businessman. Mostly, they do not understand the importance of marketing but focus only on production problems; ignoring the importance of marketing or its relation with production. Marketing activities involves not only the function of buying and selling, but also the preparation of produce for marketing, such as assembling, packaging, transportation, grading, storage, processing and retail (Varmudy 2001).

Globally, fruits are highly regarded for their variety, convenience and health benefits (Abate and Peterson, 2005). Countries such as Africa, North and Central America, South America, Asia, Europe and Oceanic are known for growing a number of fruits, with China, the United States and Turkey having the highest production (FAO, 2013). On the other hand, indigenous fruits are rare and mostly grown in the wild or forest. These fruits receive less attention as compared to the exotic ones because the latter can fetch good income to the farmers in terms of production and sales. There are only few or minimal programmes undertaken by the government to encourage the farmers to grow indigenous fruits for commercial purposes. To add to the problem, the marketing activities undertaken by the farmers are in a shabby or poor state, starting right from pricing, distribution and promoting the fruits.

Amongst the various fruits in Meghalaya, the indigenous fruits are of significance for a number of reasons. Primarily, the indigenous fruits are an important source of nutritive diet. For instance, the Sohphie leaf, fruit, root and bark are used for treating worms, jaundice and dysentery (Laloo et al 2006). The Sohiong fruit is used as an astringent and the leaf for diuretic and in dropsy (Murugkar and Subbulakshmi 2005). These fruits also serve as an essential constituent of human diet supplying the body with minerals and vitamins in addition to protein and energy (Akubugwo, et al 2007).. Literature review of Meghalaya shows that there are no systematic studies being done on the marketing aspect of the indigenous fruits. Thus, a research t was conducted to determine the strengths, weaknesses, opportunities and threats (SWOT) of indigenous fruits, to document the existing marketing and promotional strategies used, and the economic benefit to the farmers, and to recommend effective marketing and promotional tools and strategies. The methodology and salient findings are presented in this paper and specific suggestions made for Meghalaya and similar indigenous populations.

Material and Methods

Indigenous fruits, also known as minor fruits, are defined as those fruits which are consumable, less palatable than other fruits, have lesser demand in the market, grown limitedly and usually not cropped in (Mazumdar 2012). These indigenous fruits are enriched with nutritional and medicinal value, and can be grown even in wastelands without much care (Chakraborty et al 2011). They are also known as less-known fruits, less appealing fruits, less-exploited fruits, stray fruits, wild fruits, etc.

Meghalaya has over 100 such wild fruits whose parts such as roots, tubers, stems, leaves, flowers, fruits and seeds can be used in raw or cooked forms (Sawian et al 2007). The District Horticultural Office of East Khasi Hills district (2011) lists the following 15 main crops/fruits which were growing wild or in scattered areas:

1. Sohiong	<i>Prunus nepalensis</i>
2. Sohphie	<i>Myrica nagi</i> and <i>Myrica esculenta</i>
3. Sohshang	<i>Eleagnus Khasiamum</i>
4. Sohphoh Khasi	<i>Docynia indica</i>
5. Sohkwit	<i>Citrus macroptera</i> (Satkura)
6. Sohphlang	<i>Flemengia vestita</i>
7. Sohmon/soh matan	<i>Prinsepia utilis</i>
8. Sohramdieng	<i>Baccauree hispide</i>
9. Sohliang	<i>Gynocardia odorata</i>
10. Sohryngkham	<i>Vaccinium donianum</i>
11. Sohmad(utron)	<i>Citrus medica</i>
12. Sohtum	<i>Elaco carpus robustus</i>
13. Sohbroi	<i>Zyziphus jujubo</i>
14. Sohmyndong	<i>Citrus jambhiri</i>
15. Sohngang	<i>Kurime pulcherima</i>

There is a great and urgent need to document these and many other wild edible plants of Meghalaya for enhancing and understanding the indigenous knowledge systems which could be useful for future agricultural research (Kayang 2007; Shankar & Synrem, 2012). For this research, three of the most popular fruits, namely, Sohiong, Sohshang and Sohphie, were chosen, which are briefly described below.

Sohiong: Scientifically, known as *Prunus nepalensis*, they belong to the family Rosaceae locally known as *Sohiong* in Meghalaya. It is an evergreen tree which is medium-tall in size. The fruits are considered an important indigenous fruit of Meghalaya as they are consumed to a great extent for their unique taste by the rural and tribal masses. The fruit is dark blackish/purplish in colour, round in shape and cherry like temperate fruit which grows in the Himalayan region but found mostly in East Khasi Hills, West Khasi Hills and Jaintia Hills district of Meghalaya. The fruit is harvested from August to October. This fruit is also found in some parts of Manipur also. The fruits are eaten raw /fresh and also in the processed form such as jam, juice, pickle and wine. An image of *Sohiong* fruit is shown in Figure I:



Figure I : Image of sohiong fruit

Sohshang: Scientifically known as *Elaeagnus latifolia*, the plant is a native of South Asia and found in countries like Burma, Malaya, Sri Lanka, and China. It also occurs in other states of northeast India as well as Western Ghats and west coast of India. The plant is found growing in backyard home gardens of many families in the state. The fruit is oval/oblong in shape with dark pinkish-red in colour at the time of ripening. The fruits are harvested during March-April. A mature fruit of Sohshang (*Elaeagnus latifolia*) has a nutritive value of 3702.73 (kcal/kg) and contains 14.8g protein, 13.6gK, 172mg Fe, 5860 mg Ca per 100g of fresh fruit¹⁴. The fruits can be eaten fresh or value added in the form of pickle. The fruits are perishable and do not stay for more than three to four days at room temperature. The *Sohshang* fruit is shown in Figure II.



Figure II: an image of sohshang fruit

Sohphie: Scientifically known as *Myrica Esculenta*, this fruit belongs to the plant family Myricaceae and is also called *Myrica Nagi* and commonly referred to by the name *Sohphie* locally. It is native to the Hilly regions of the countries Nepal and India. It is mostly found in the East Khasi Hills district in Meghalaya and also has its presence in the northern region of India, especially in the state of Punjab. The fruit is wrinkled in appearance, round in shape and has two colour and size. The smaller variety which is sweeter in taste is red in colour and the big variety which is green in colour has a sour and acidic taste. The acetone extract of this fruit has the highest quantity of phenolic compounds, flavonoids and flavonols (antioxidants) has shown signs of reducing power and radical scavenging activity (Seal 2011). People have found many uses of the fruit besides enjoying its fresh fruit. These include homemade pickle, jams and jelly. The herb *Myrica Nagi* has found many uses as a medicinal herb. It can be used internally or as a preparation that can be applied externally. The fruit is harvested during April-June. The fruit has great medicinal properties. It is eaten in the fresh as well as processed form such as juice and pickles. An image is shown in Figure III.

A three-pronged approach was adopted to collect the relevant primary data for this research: one was an interview survey of a random sample of households in rural and urban areas in East Khasi Hills district representing Meghalaya state, secondly an in-depth key informant survey of all farmers who had experience in cultivating indigenous fruits and thirdly, randomized controlled intervention study of marketing impact of packaging and labelling of one of the fruits in selected departmental stores



Figure III: an image of sohpie fruit

in Shillong.

For the consumer survey, a quantitative, descriptive, cross-sectional study design was adopted using a stratified random sampling technique. Meghalaya state is composed of 11 districts, and one typical district, the East Khasi Hills district was chosen, which has 8 blocks including the capital, Shillong. 2 blocks were chosen randomly to represent the rural and urban household samples. From the chosen blocks, 2 villages or 2 wards were randomly selected and completely surveyed. A total of 300 HH was decided as the minimum sample size for this study (100 Urban; 200 Non-urban), based on the presumed variability of the consumer behaviour among the households with a precision of 20% of the estimate, a type 1 error of 5% and power of 80%, and allowing for 10% non response. A detailed interview schedule was developed after discussion with the community leaders and subject specialists, pilot tested, made suitable for computerization, and finalized. In addition, about 10 farmers who had earlier experience in growing indigenous fruit trees were also interviewed in depth. Data was collected by the first author during 2013-14. The information from each form was entered into MS Excel sheet and checked by the researcher to correct any error or incompleteness, and analyzed using SPSS software.

The farmer survey was also a cross-sectional survey to provide an insight and understanding of the underlying reasons, thoughts and opinion on the marketing and promotional activity undertaken by the farmers. There was no well documented or written information with respect to specific areas where the indigenous fruits are grown. Thus, it was through local knowledge and verbal information from officers of the Department of Agriculture (East Khasi Hills District) Government of Meghalaya, certain village names was cited by them. Based on this information, and as per the local knowledge and information provided by the official, the researcher purposely selected one block i.e. Myllem block where all the three indigenous fruits was chosen for the study. It was observed that very few farmers actually were growing the indigenous fruits chosen for this research. There were only five farmers who were growing and selling all the three variety of indigenous fruits viz. Sohiong, Sohshang and shophie in the study area. Finally, only five farmers were found suitable for this aspect of the study. Initially an official from the Department of Agriculture (East Khasi Hills), Government of Meghalaya, recommended a local person who has a

local knowledge about the area and the farmers who grows these fruits. Based on his information and knowledge farmers were identified and interviewed.

Prior to the data collection, the purpose of the research was explained briefly to the headman and permission was also sought from him. On approval the researcher along with the local person met the farmers, establish good rapport, seek their cooperation, and assuring them full confidentiality in the responses elicited by them. A day was fixed where the researcher interviewed the farmer using an interview checklist. The interview was carried out in a comfortable setting in a systematic manner, clarifying and encouraging frank responses.

A randomized control cluster study design was chosen for the third objective, using popular shops in the study areas such as Laitumkhrah, Nongthymmai, Police Bazaar, Kachari and Last stop. The researcher purposely, did not choose Bara Bazaar (Local Market) as one of the area to display the products, because the sale of fruits in this market is unorganized. One of the intentions of the researcher is to market the fruit in an organized market such as a departmental store where the customer can get access to both packed and loose fruits in one shop. From here it will be easier for the researcher to track down the preferences of the consumers as well as sales of the sampled fruits which were grouped into two categories for the experiment (both packed and loose). In the experimental group, the researcher incorporated elements such as packing and labelling and in the control group the fruits were left in the original form (Loose) without any packaging and labelling.

Altogether, five departmental stores were selected randomly which were located at the commercial area of the town, both the experimental and controlled products were kept at each of these stores. Before carrying out the third objective, the researcher went through certain stages. Firstly, the researcher seeks permission from the Food Security Officer of the Directorate of Health and Medical Office, Government of Meghalaya. Secondly, the food inspector then visits and inspects the place where the experimental study is to be carried out. Thirdly, the food inspector gives certain guidelines on the important elements that is obligatory to be incorporated in the label of the package and finally and gives the letter of approval to carry out the experiment . Using a random sampling method, the researcher selected 5 departmental stores located in the urban commercial area. The researcher then visited the departmental stores, furnishes the letter given by the food inspector and seeks the permission from the owner/manager, to carry out the survey.

A pilot study was conducted before the main study in order to assess and test the approach and method of the experiment. The test sample was sorted out, clean, dried, measured, packed and labelled in an inexpensive, cost effective and attractive package. The control sample was measured and tied with a rubber band without any packaging material. However, variable like weight and price were kept constant in both cases. The very next day, the researcher distributed the samples equally to each of the departmental store in batches. The pricing was arrived at, by giving a certain mark-up to the cost price which includes the cost of the fruits, disposable bowls, label, cello-tape and transportation cost. Detailed cost price of the fruits and materials used is shown in Data was collected everyday in the evening on the status of the sales of

the fruits. Each time, the samples were sold out or otherwise, if the remaining samples were not sold (due to lapse of expiry date), the next batch of samples were distributed. The whole process of selling and distribution was done in five batches.

The experimental study was carried out when the fruits were in season, during August-September and October 2014. Differences in the amounts of fruits sold by each method, and the income accrued through the sales in each method were tested for statistical significance using the proportion test and t-test.

Findings

1. Household Interview Consumer Survey: Of the 300 respondents, 93 are male and 207 are female respondents. The age groups of the respondents ranged from approximately 19 years to 80 years old, and were permanent residents of Meghalaya state. Overall, 92.0% are buyers of indigenous fruits. 86.0% among males and 94.7% among females. Fruit-wise, 92.0% (86.0% Male and 94.7% female) are buyers of Sohiong fruit, 90.3% (83.9% male and 93.2% female) are buyers of Sohshang fruit and 93.7% (88.0% Male and 96.2% Female) are buyers of Sohphie fruit. Although, females show a higher percentage of buying of the indigenous fruit, the differences between male and female buyers were not statistically significant. Likewise, the buyer rates by fruit or gender differences for each fruit were not statistically significant. The frequency of consumption of the 3 indigenous fruits is presented in Table 1.

Table 1: Frequency of Consumption of Indigenous Fruits

Inter viewee	Option	Sohiong		Sohshang		Sohphie		All Fruits	
		No. of Resp	%						
Male	Never	1	1.3	2	2.6	0	0.0	3	1.3
	Very Rarely	24	30.0	21	26.9	23	28.4	68	28.5
	Rarely	14	17.5	13	16.7	12	14.8	39	16.3
	Quite Often	31	38.8	33	42.3	34	42.0	98	41.0
	Frequently	10	12.5	9	11.5	12	14.8	31	13.0
	Total	80	100	78	100	81	100	239	100
Female	Never	2	1.0	2	1.0	1	0.5	5	0.8
	Very Rarely	55	28.1	57	29.5	39	19.5	151	25.6
	Rarely	38	19.4	39	20.2	35	17.5	112	19.0
	Quite Often	71	36.2	71	36.8	83	41.5	225	38.2
	Frequently	30	15.3	24	12.4	42	21.0	96	16.3
	Total	196	100	193	100	200	100	589	100
Male & Female	Never	3	1.1	4	1.5	1	0.4	8	0.97
	Very Rarely	79	28.6	78	28.8	62	22.1	219	26.45
	Rarely	52	18.8	52	19.2	47	16.7	151	18.24
	Quite Often	102	37.0	104	38.4	117	41.6	323	39.01
	Frequently	40	14.5	33	12.2	54	19.2	127	15.34
	Total	276	100	271	100	281	100	828	100

Table 2: Reasons for consuming Indigenous fruits by the buyers

Respondent	Option	Sohiong		Sohshang		Sohphie		Buyers	
		No.	%	No.	%	No.	%	No.	%
Male	Just as Snacks	21	26.3	22	28.2	19	23.5	62	25.9
	Rich in Vitamins	25	31.3	22	28.2	27	33.3	74	31.0
	Taste	28	35.0	29	37.2	28	34.6	85	35.6
	Others consuming it	2	2.5	3	3.8	2	2.5	7	2.9
	Combination	2	2.5	2	2.6	2	2.5	6	2.5
	Others	2	2.5	0	0.0	3	3.7	5	2.1
	Total	80	100.0	78	100.0	81	100.0	239	100.0
Female	Just as Snacks	27	13.8	35	18.1	27	13.5	89.0	15.1
	Rich in Vitamins	49	25.0	33	17.1	39	19.5	121.0	20.5
	Taste	93	47.4	100	51.8	104	52.0	297.0	50.4
	Others consuming it	2	1.0	3	1.6	4	2.0	9.0	1.5
	Combination	13	6.6	11	5.7	12	6.0	36.0	6.1
	Others	12	6.1	11	5.7	14	7.0	37.0	6.3
	Total	196	100.0	193	100.0	200	100.0	589	100.0
Both	Just as Snacks	48	17.4	57	21.0	46	16.4	151.0	18.2
	Rich in Vitamins	74	26.8	55	20.3	66	23.5	195.0	23.6
	Taste	121	43.8	129	47.6	132	47.0	382.0	46.1
	Others consuming it	4	1.4	6	2.2	6	2.1	16.0	1.9
	Combination	15	5.4	13	4.8	14	5.0	42.0	5.1
	Others	14	5.1	11	4.1	17	6.0	42.0	5.1
	Total	276	100.0	271	100.0	281	100.0	828	100.0

Overall, the number of respondents including both male and female who consumed all the indigenous fruits quite often and frequently is approximately 54.35% and only 0.97% never consumed the fruits at all. Overall, 52.5% of the total buyers of Indigenous fruits, buy them from the local market, 26.4% from a market in their locality, 10.9% from the forest, 5.8% as gifts and 4.3% from other sources which include a garden in their backyard. Overall, 74.5% of the buyers consumed the fruits every time the fruit is in season, 25% consumed the fruit last year and only 0.5% of the respondents do not remember the last time they consumed it. There is no significant difference between male and female buyers on the most recent consumption of indigenous fruits. There is no significant difference on the most recent consumption of indigenous fruits between Sohiong and Sohphie.

However, there is a significant difference between Sohiong and Sohshang and between Sohshang and Sohphie on the most recent consumption of indigenous fruits. The reasons for consuming indigenous fruits by the buyers are indicated in Table 2.

Overall, 46.1% of the respondents consumed the indigenous fruits because of the taste factor, 23.6% because the fruits are rich in vitamins, 18.2% consumed the fruits just as snacks and 5.1% consumed the fruits because of more than one of the factors listed above.

Table 3: Place of buying the Indigenous fruits by the buyers

Inter-viewee	Option	Sohiong		Sohshang		Sohphie		All Fruits	
		No. of Resp	%						
Male	Local Market	43	53.8	39	50.0	41	50.6	123.0	51.5
	Locality Market	17	21.3	19	24.4	19	23.5	55.0	23.0
	Gifts	5	6.3	5	6.4	7	8.6	17.0	7.1
	Forest	6	7.5	9	11.5	8	9.9	23.0	9.6
	Others	9	11.3	6	7.7	6	7.4	21.0	8.8
	Total	80	100	78	100	81	100	239	100
Female	Local Market	113	57.7	97	50.3	102	51.0	312	53.0
	Locality Market	58	29.6	60	31.1	46	23.0	164	27.8
	Gifts	4	2.0	13	6.7	14	7.0	31	5.3
	Forest	19	9.7	18	9.3	30	15.0	67	11.4
	Others	2	1.0	5	2.6	8	4.0	15	2.5
	Total	196	100	193	100	200	100	589	100
Male & Female	Local Market	156	56.5	136	50.2	143	50.9	435	52.5
	Locality Market	75	27.2	79	29.2	65	23.1	219	26.4
	Gifts	9	3.3	18	6.6	21	7.5	48	5.8
	Forest	25	9.1	27	10.0	38	13.5	90	10.9
	Others	11	4.0	11	4.1	14	5.0	36	4.3
	Total	276	100	271	100	281	100	828	100

The response rate on the reasons for consuming indigenous fruits between male and female buyers are statistically significant with respect to the taste factor.

Overall, 74.5% of the buyers consumed the fruits every time the fruit is in season, 25% consumed the fruit last year and only 0.5% of the respondents do not remember the last time they consumed it. There is no significant difference between male and female buyers on the most recent consumption of indigenous fruits.

There is no significant difference on the most recent consumption of indigenous fruits between *Sohiong* and *Sohphie* (During the season $Z=2.11$, $P<0.05$). However, there is a significant difference between *Sohiong* and *Sohshang* ($Z=3.09$, $P<0.0001$) and between *Sohshang* and *Sohphie* on the most recent consumption of indigenous fruits.

The usual place from which indigenous fruits are brought by the buyers are given in Table 3.

Overall, 52.5% of the total buyers of indigenous fruits, buy them from the local market, 26.4% from a market in their locality, 10.9% forage, 5.8% received as gifts and 4.3% from other sources which include a garden from their backyard. The response rate by gender and by fruit is not statistically significant with respect to the place of buying the indigenous fruits

In Table 4 we represent gender wise and fruit wise comparison with respect to the importance of the availability attribute/characteristics by buyers of the Indigenous fruits.

Table 4: Importance of availability attribute by buyers

Inter-viewee	Option	Sohiong		Sohshang		Sohphie		All Fruits	
		No. of Resp	%						
Male	Somewhat Important	34	42.5	37	47.4	35	43.2	106	44.4
	Important	30	37.5	25	32.1	31	38.3	86	36.0
	Not Important	16	20	16	20.5	15	18.5	47	19.7
	Total	80	100	78	100	81	100	239	100
Female	Somewhat Important	54	27.6	55	28.5	56	28	165	28.0
	Important	125	63.8	122	63.2	128	64	375	63.7
	Not Important	17	8.7	16	8.3	16	8	49	8.3
	Total	196	100	193	100	200	100	589	100
Male & Female	Somewhat Important	88	31.9	92	33.9	91	32.4	271	32.7
	Important	155	56.2	147	54.2	159	56.6	461	55.7
	Not Important	33	12.0	32	11.8	31	11.0	96	11.6
	Total	276	100	271	100	281	100	828	100

Table 5: Willingness to pay for the fruits by the buyers

Inter-viewee	Option	Sohiong		Sohshang		Sohphie		Buyers	
		No. of Resp	%						
Male	Same price as before	40	50	34	43.6	35	43.2	109	45.6
	More	6	7.5	14	17.9	9	11.1	29	12.1
	Price does not matter	34	42.5	30	38.5	37	45.7	101	42.3
	Total	80	100	78	100	81	100	239	100
Female	Same price as before	80	40.8	74	38.3	78	39	232	39.4
	More	17	8.7	26	13.5	25	12.5	68	11.5
	Price does not matter	99	50.5	93	48.2	97	48.5	289	49.1
	Total	196	100	193	100	200	100	589	100
Male & Female	Same price as before	120	43.5	108	39.9	113	40.2	341	41.2
	More	23	8.3	40	14.8	34	12.1	97	11.7
	Price does not matter	133	48.2	123	45.4	134	47.7	390	47.1
	Total	276	100	271	100	281	100	828	100

88.4% of the buyers of indigenous fruits feel that the availability of the fruit is an important characteristic for buying the indigenous fruits and 11.6% feels that availability is not an important factor. There is no statistical difference by gender or fruit wise with respect to availability of indigenous fruits.

93.8% of the buyers of indigenous fruits consider nutritional value of the fruits an important characteristic and 6.2% as not important. The response rate between gender and fruit wise buyers with respect to nutritional value of indigenous fruits is not statistically significant.

In Table 5, we present gender-wise and fruit-wise responses with respect to willingness to pay for the indigenous fruits.

As presented in this Table, 47.1%, both male and female buyers feel that price does not matter while purchasing the indigenous fruits, 41.2% are willing to pay the same price as before and 11.7% are ready to pay more for the price of the indigenous fruits.

There is no statistical difference in response rate by gender (Same price as before, ($Z = 1.08, P > 0.05$; More, $Z = 0.08, P > 0.96$; Price does not matter $Z = 1.17, P > 0.05$) and fruit wise with respect to their willingness to pay for the price of indigenous fruits.

The opinion on the perception of prices of indigenous fruits both gender-wise and Fruit-wise is depicted in Table 6 by the buyers of indigenous fruits.

63.3% of both male and female buyers perceive the price of the indigenous fruits as cheap and 36.7% of the buyers perceived the price of the indigenous fruits as expensive.

The response rate with respect to their perception on the prices of indigenous is not statistically significant by gender.

In Table 7 is shown the opinions of buyers on trading of Indigenous fruits by the producer.

Overall, 65.2% of the buyers strongly agreed to the statement that traders should

Table 6: Perception of price of Indigenous fruits by the buyers

Inter-viewee	Option	Sohiong		Sohshang		Sohpie		Buyers	
		No. of Resp	%						
Male	Cheap	54	67.5	48	61.5	57	70.4	159	66.5
	Expensive	26	32.5	30	38.5	24	29.6	80	33.5
	Total	80	100	78	100	81	100	239	100
Female	Cheap	111	56.6	123	63.7	131	65.5	365	62.0
	Expensive	85	43.4	70	36.3	69	34.5	224	38.0
	Total	196	100	193	100	200	100	589	100
Male & Female	Cheap	165	59.8	171	63.1	188	66.9	524	63.3
	Expensive	111	40.2	100	36.9	93	33.1	304	36.7
	Total	276	100	271	100	281	100	828	100

Table 7: Opinion of buyers on trading Indigenous fruits

Inter-viewee	Option	Sohiong		Sohshang		Sohphie		Buyers	
		No. of Resp	%						
Male	Strongly Agree	50	62.5	48	61.5	54	66.7	152	63.6
	Agree	25	31.25	25	32.1	24	29.6	74	31.0
	Partly Agree/Disagree	3	3.75	3	3.8	2	2.5	8	3.3
	Don't Agree	0	0	1	1.3	0	0.0	1	0.4
	Strongly Disagree	2	2.5	1	1.3	1	1.2	4	1.7
	Total	80	100	78	100	81	100	239	100
Female	Strongly Agree	128	65.3	125	64.8	135	67.5	388	65.9
	Agree	54	27.6	47	24.4	51	25.5	152	25.8
	Partly Agree/Disagree	10	5.1	16	8.3	10	5.0	36	6.1
	Don't Agree	4	2.0	5	2.6	4	2.0	13	2.2
	Strongly Disagree	0	0.0	0	0.0	0	0.0	0	0.0
	Total	196	100	193	100	200	100	589	100
Male & Female	Strongly Agree	178	64.5	173	63.8	189	67.3	540	65.2
	Agree	79	28.6	72	26.6	75	26.7	226	27.3
	Partly Agree/Disagree	13	4.7	19	7.0	12	4.3	44	5.3
	Don't Agree	4	1.4	6	2.2	4	1.4	14	1.7
	Strongly Disagree	2	0.7	1	0.4	1	0.4	4	0.5
	Total	276	100	271	100	281	100	828	100

Table 8: Opinion of the buyers towards advertisement

Inter-viewee	Option	Sohiong		Sohshang		Sohphie		Buyers	
		No. of Resp	%						
Male	Strongly Agree	30	37.5	27	34.6	30	37.0	87	36.4
	Agree	31	38.8	30	38.5	30	37.0	91	38.1
	Partly Agree/Disagree	15	18.8	16	20.5	15	18.5	46	19.2
	Don't Agree	2	2.5	3	3.8	4	4.9	9	3.8
	Strongly Disagree	2	2.5	2	2.6	2	2.5	6	2.5
	Total	80	100	78	100	81	100	239	100
Female	Strongly Agree	81	41.3	81	42.0	82	41	244	41.4
	Agree	82	41.8	75	38.9	80	40	237	40.2
	Partly Agree/Disagree	18	9.2	21	10.9	20	10	59	10.0
	Don't Agree	11	5.6	12	6.2	12	6	35	5.9
	Strongly Disagree	4	2.0	4	2.1	6	3	14	2.4
	Total	196	100	193	100	200	100	589	100
Male & Female	Strongly Agree	111	40.2	108	39.9	112	39.9	331	40.0
	Agree	113	40.9	105	38.7	110	39.1	328	39.6
	Partly Agree/Disagree	33	12.0	37	13.7	35	12.5	105	12.7
	Don't Agree	13	4.7	15	5.5	16	5.7	44	5.3
	Strongly Disagree	6	2.2	6	2.2	8	2.8	20	2.4
	Total	276	100	271	100	281	100	828	100

continue selling the indigenous fruits, 27.3% of the buyers agreed, 5.3% of the buyers partly agreed/disagreed and 0.5% of the buyers strongly disagreed with the statement.

In Table 8 is displayed the opinion of the buyers towards importance of advertisement in order to improve the marketing of indigenous fruits.

Overall, 40% of the buyers strongly agreed that for the marketing of the indigenous fruits, advertisement is important, 39.6% agreed to the statement, 12.7% partly agreed/disagreed, 5.3% don't agree and 2.4% strongly disagreed with the statement. The response rate between gender buyers is statistically significant with respect to strongly agree/agree option ($Z = 2.03$, $P < 0.05$), while there is no significant difference with respect to the other option. There is no significant difference between *Sohiong* and *Sohshang*, *Sohiong* and *Sohshang* and between *Sohshang* and *Sohphie*.

Gender-wise opinions on the need to label indigenous fruits are presented in Table 9.

Table 9: Buyers opinion on labelling of indigenous fruits

Interviewee	Option	Buyers	
		No. of Respondents	%
Male	Yes	65	81.3
	No	15	18.8
	Total	80	100
Female	Yes	158	80.6
	No	38	19.4
	Total	196	100
Male & Female	Yes	223	80.8
	No	53	19.2
	Total	276	100

80.8% of both male & female buyers (81.3% male & 80.6% female) feels feel that it is necessary for the Indigenous fruits to be labelled in order to be easily identified whereas 19.2% of the buyers (18.8% male and 19.4% female) feels that it is not necessary for the Indigenous fruits to be labelled in order to be easily identified.

Finally we present the motivations for buying the indigenous fruits in Table 10. 39.4% of both male and female respondents buy the fruits because of Taste (Others category) factor, 32.6 % because it is cheaper than other fruits, 24.8% just because it is available in the market and 3.3% because they were influenced by other people consuming it. About 77.9% of the buyers of indigenous fruits feel that the size of the fruit is an important characteristic for buying indigenous fruits and 22.1% feel that size is not an important factor.

Table 11 represents the ranking of attributes from the most important to the least important by the buyers. As noted from Table 11, the attribute considered most important by all the buyers is Taste, followed by Freshness, Cleanliness, Quality, Nutritional Value, Colour, Availability, Appearance, Price and Size. Nearly 50% of both male and female buyers feel that price does not matter while purchasing the indigenous fruits, 41.2% are willing to pay the same price as before and 11.7% are ready to pay more for the price of the indigenous fruits.

Table 10: Reasons for buying Indigenous fruits

Respondent	Option	Sohiong		Sohshang		Sohphie		Buyers	
		No.	%	No.	%	No.	%	No.	%
Male	Cheaper than other fruits	35	43.8	35	44.9	37	45.7	107	44.8
	Available in the market	24	30.0	22	28.2	22	27.2	68	28.5
	Others consuming it	2	2.5	2	2.6	3	3.7	7	2.9
	Others	19	23.8	19	24.4	19	23.5	57	23.8
	Total	80	100	78	100	81	100	239	100
Female	Cheaper than other fruits	54	27.6	55	28.5	54	27.0	163	27.7
	Available in the market	46	23.5	45	23.3	46	23.0	137	23.3
	Others consuming it	7	3.6	6	3.1	7	3.5	20	3.4
	Others	89	45.4	87	45.1	93	46.5	269	45.7
	Total	196	100	193	100	200	100	589	100
Both	Cheaper than other fruits	89	32.2	90	33.2	91	32.4	270	32.6
	Available in the market	70	25.4	67	24.7	68	24.2	205	24.8
	Others consuming it	9	3.3	8	3.0	10	3.6	27	3.3
	Others	108	39.1	106	39.1	112	39.9	326	39.4
	Total	276	100	271	100	281	100	828	100

63.3% of both male and female buyers perceive the price of the indigenous fruits as cheap and 36.7% of the buyers perceived the price of the indigenous fruits as expensive. Overall, 65.2% of the buyers strongly agreed to the statement that traders should continue selling the indigenous fruits, 27.3% of the buyers agreed, 5.3% of the buyers partly agreed/Disagreed and 0.5% of the buyers strongly disagreed with the statement. The response rate between the male and female buyers is not statistically significant with respect to their opinions on trading of indigenous fruits.

2. Farmers' Survey:

The following are the main problems faced by the farmers in selling Indigenous

fruits: They cannot fetch a high price in selling the fruits; the presence of pests and insects destroys the quality of the fruits especially in the case of Sohshang fruit; Storage, Transportation and Weather conditions especially during rainy days also contribute to the problems. During the survey, the farmers suggested that they would like to know more about marketing of the indigenous fruits and proper pricing. All these farmers are interested in fruit processing but lack technical knowledge and resource to do so. They also need monetary assistance and training on sales skills.

3. Intervention Study

Out of a total of 340 quantities of fruits distributed, 170 quantities of packed and 170 bundles of loose Sohiong fruit were distributed in the 5 departmental stores. The total number of packed fruit sold in all the 5 batches is 86 numbers which is equivalent to 50.58% and the number of loose fruit sold is 31 numbers which is equivalent to 18.2%. Hence, the sales of packed fruits were significantly higher as compared to sales of loose fruits. The income generated from the sales of packed Sohiong fruit is approximately 3 times more than the income generated from the sales of loose Sohiong fruit.

Discussion

Findings from this study confirm that indigenous fruits are popular and are the potential wealth of Meghalaya state. Proper Marketing to take full advantage of these strengths seems to be the need of the hour and the various strategies require clear identification and implementation. This is an urgent concern for the State which is lagging behind both in the health and development of the population. Similar situation must be existing in other parts of the northeastern region. Experiences from other countries should help. For example, Malawi, with over 75 indigenous fruit trees (IFTs) bearing edible fruits, is reported to be rich in minerals and vitamins, sold for cash income and serve as an important food sources during famines and or emergencies (Akinnifesi et al., 2004). Meghalaya has 124 wild edible trees (Sawian et al., 2007) and studies on different wild edible plants of the state of Meghalaya in India, has found that the mature fruits of *Sohshang* are widely used in not only in Meghalaya but also in Assam and Manipur. Different surveys showed the significance of wild fruit variety for indigenous people (Prakash, 2011; Mahapatra & Panda, 2012 and Mazumder & Dutta, 2009). The farmer's survey disclosed that in Meghalaya, selling indigenous fruits is only a part time occupation. In contrast, almost 80% of the population in Bangladesh are highly dependent on indigenous/ minor fruits which are grown on their home garden for their livelihood and these fruits serve as a safety net during hardships and disaster (Rahman & Rahman, 2014). In Tripura, the availability of such edible fruits in good amount helped these people to depend on the indigenous plant resources as integral part of their livelihood (Mazumder & Dutta, 2009). As mentioned before, although the income generated from the sale of indigenous fruits in Meghalaya is minimal, they seem to supplement the cash needs of the households and some farmers also mentioned that they depend entirely on indigenous fruits for food and income especially when all the other crops cultivation

have failed due to many factors (Mwema et al., 2013). Apart from the poor income in an indigenous population, another major characteristic of such populations is their low nutritional status, and the indigenous fruits provide a good source of specific vitamins and essential micro nutrients, as reported by other investigators (Mwema et al., 2013). Findings from this research clearly show that 23.6% of the respondents consumed indigenous fruits because they are rich in vitamins and rated fifth rank in order of importance of attributes. Likewise, 26.8%, 21% and 23.5% of the buyers consumed the *Sohiong*, *Sohshang* and *Sohphie* fruits because they are rich in vitamins. Thus, at least some of the people are aware of the nutritional status of indigenous fruits and this aspect needs to be widely publicized in various health education programmes of the State. The consumer survey has also revealed that almost 59.8% of the respondents are aware of the other uses of indigenous fruits like jams, pickles, juice and wine. None have ever mentioned about eating other parts of the fruits. An ethno-botanical survey conducted by Kayang (2007) has brought to light that the plant parts such as roots, tubers, stems, leaves, flowers, fruits and seed of a number of wild plant species are used as edibles, either in raw or cooked form. Some studies have divulged that the income from the fruits could be increased by at least three to five times after making pickles, squash and jam (Sundriyal & Sundriyal, 2004). Research must be done urgently to determine which of the indigenous fruits have the potential for value addition.

In many countries around the world, support for local agriculture has been an escalating issue involving the development of the local foods movement as an alternative marketing. For example, Arsil et al. (2014) in a study in Indonesia examined the cultural and geographic differences with respect to the consumers' perceptions of local foods. Similar changes were also seen in developed countries such as the United States and United Kingdom where many states promoted local foods systems as a movement towards sustainable food. It has reported that the quality of local fresh produce from Delaware was the same as the fresh produce from other states; consumers were willing to pay a premium price for locally produced food and consumers perceived that the quality of local foods as a fresher product both tasted better and looked better. A local foods system was promoted by the government of UK in early 2002 involved a policy of sustainable food consumption and supported a "dynamic element of the food system, consumers had a very positive attitude toward developing their local foods. They believed that locally grown produce was of a better quality, safer and more nutritious compared with national or imported foods (La Trobe, 2001; Arsil et al., 2014). . The tree species, shrubs and herbs of the underutilized minor fruits plants have been used for generations by the Meitei community in Imphal Valley which have medicinal value and therapeutic application (S. Singh et al., 2014). Even the dried fruits of aonla are useful in the treatment of dysentery, jaundice, dyspepsia, and cough (Hiwale, 2015). Laloo et al. (2006) confirm that *Sohphie* leaf, fruit, root and bark are used for treatment of worms, and jaundice. Fruit-wise and gender-wise data illustrate that the minor fruits of Meghalaya, are consumed quite often and frequently these studies reveal the medicinal value the indigenous fruit possess, which could be a huge advantage on the part of different stakeholders such

as producers, government as well as the consumers. Secondly, these fruits are a rich source of essential vitamins, minerals and nutrients. For instance, Amla or Indian gooseberry is a rich source of ascorbic acid, a vital vitamin for its antioxidant value (Hiwale, 2015), Water chestnut is very rich in carbohydrate, protein and calcium, jamun as well as wood-apple are also highly valued for their nutritive value (Maiti & Kundu, 2015). Laloo et al. (2006) confirms that Sohphie is also rich in vitamin C (Patel & De, 2006). Some wild fruits are known to have better nutritional value than the cultivated fruits (Eromosele et al., 1991; Maikhuri et al., 1994) and they are good substitutes for exotic fruits which are not easily accessible to a majority of the poor population (A. Ahmed & Borthakur, 2005; Hynniewta & Kumar, 2008). A third advantage is that these trees can be grown even in wastelands without much care (Chakraborty et al., 2011). Apart from these three, buyers mentioned a few attributes such as taste and freshness as important. Further most of the minor fruits/ indigenous fruits are highly appreciated by the consumer as having unique potentiality to value addition through processing and product development (Rahman & Rahman, 2014). These fruits can be processed into jams, jellies, pickles, juices, marmalades, wine and even medicines (Patel & De, 2006). Compared to imported fruits, a great advantage of local indigenous fruits are their relatively lower price as stated in other studies (Murugkar & Subbulakshmi, 2005). In India, the indigenous fruits collected from the wild, play an important role in meeting the food and cash income requirement of the rural poor and the tribal's (Deshmukh & Shinde, 2010; Mahapatra & Panda, 2012). Selling of these fruits helps generate extra cash income to women in Meghalaya (Mithofer et al., 2006). This aspect was not clearly seen in this research whereas, in Bangladesh and Miombo Woodlands in Malawi, it is reported that majority of the population lives in rural areas and is highly dependent on sale of indigenous fruits from their home gardens for their livelihood (Rahman & Rahman, 2014; Akinnifesi et al., 2004). Counteracting these positive aspects, indigenous fruits of Meghalaya also suffer from a few weaknesses that result from the basic qualities of the fruits but largely due to poor management practices. Low availability, Seasonality, limited access, poor storage facility, poor logistics in handling fresh produce, lack of technological, transportation and financial support were identified in this study as major weaknesses, many of which could be effectively manageable through government support and public cooperation. A common feature in the northeast India is the poor transport infrastructure which renders the fruits more prone to physical damage as well as shrinkage due to exposure to harsh conditions (Kachule & Franzel, 2009). A survey by Bhardwaj et al. (2012), reported that, the main problems in marketing apples is lack of vehicles, non-availability of transport on time, villages not linked with metalled roads and high transportation charges. Thus Perishability is one of the major problems and the fruit once harvested needs to be sold immediately (Farmers survey, Product). The problem intensifies if the fruit has high moisture content, and becomes a disadvantage as these fruits are highly perishable and difficult to store in the fresh form (Roy, 2000). During the interventional study, it was found that amongst the three fruits chosen for research, *Sohiong* fruit had the highest shelf life of a maximum of four to five days depending on how mature the fruit was. Still, this can be considered as low shelf life. For fruits like *Sohshang* and *Sohphie*, the

shelf life is hardly one to two days under normal condition and therefore highly perishable (Deka et al., 2003). Studies in Africa and Asia also highlighted the complexity in trade of fresh indigenous fruits as most of these fruits have a very short shelf life (Awono et al., 2002; Kalaba et al., 2014) and even if they are available locally, marketing of indigenous fruit products are limited and poorly developed (Ramadhani, 2002; Hughes & Haq, 2003). Underlying all these weaknesses is the utter lack of modern marketing strategies, requiring development of proper marketing infrastructure including packing, grading, transportation, storage, etc. Unorganized marketing system has a direct bearing on production levels because of uncertainty created amongst farmers on availability of a ready market for the fruits (Kachule & Franzel, 2009).

Feedback from household survey and findings from the interventional study show that the packaging, labelling and branding of the products go a long way in promoting the four P's of marketing mix. For instance, packaging materials with and without perforation was used to extend the shelf life of *Sohshang* fruits at ambient condition. Packaging of fruits in non-perforated polypropylene extended the shelf life of fruits up to nine days with better retention of almost all the quality characteristics of the fruits (Deka et al., 2003). Most pharmacological work has been done on bark, fruits, flowers but the pharmacological potential of the other part of the trees constitute a potential area for research in future. Efforts should be made to standardize a technique for its utilization of all the parts which will lead to wider commercial applicability (Panthari et al., 2012). The experimental study revealed that the batch-wise and shop-wise, sale and income generated from packaging of *Sohiong* fruit significantly increased as compared with the fruits sold loosely. This gives ample scope to think beyond the conventional way of selling. Apart from having an appeal, packaging has other important role to play as well like preserving the freshness of the fruit, prevent spoilage, maintain its shelf life, take care of its convenience and maintain the original flavour and taste of the contents (Pandey & Tewari, 2010). Packaging also acts as a powerful tool in communication or promoting the buying experience (Qing et al., 2012).

Another serious threat to indigenous fruit production is the more global problem of exploitation and radical reduction in forest cover owing to urbanization and encroachment so that many wild and minor fruit trees and shrubs are disappearing rapidly and become threatened species (Paul, 2013; UNEP, 2001). This implies that the livelihood of the poor rural people who are largely dependent on this natural resource is also threatened (UNEP, 2001). Therefore, considering the benefits offered by these fruits and the threat to their survival, there is strong justification to domesticate them.

A major observation during the interventional study was the variability in the shelf life of the three indigenous fruits; *Sohiong*, *Sohshang* and *Sohphie* especially in the packed form. Different studies have showed that there are some techniques that can be used to extend the shelf life of different products. For instance, to double the shelf life of refrigerated poultry breast fillets, irradiation can be used in combination with Modified Atmosphere Packaging (MAP) (Mantilla et al., 2012). Enclosure of

food products in gas-barrier materials, by changing the gaseous environment is known as MAP (Sivertsvik et al., 2002; R. Shankar et al., 2008). Scientists from the Bhabha Atomic Research Centre (BARC) developed a novel combination technology on papaya cubes by including osmotic dehydration, blanching and infrared drying to make intermediate moisture (IM) to prevent these losses (Hindu, 2016). A combination of candelilla wax, gum arabic, jojoba oil, and pomegranate polyphenols were prepared and applied by immersion into the fruit surface of pear fruit to improve its shelf life (Cruz et al., 2015; Nath et al., 2012). When passion fruits were waxed and packed in polyethylene terephthalate package, the shelf life of the fruit increased up to five weeks (Patel et al., 2009) with similar results being seen in Kinnow mandarin (Thakur et al., 2002). Salts such as calcium carbonate and calcium citrate are added to food products to enhance the nutritional value (Diana et al., 2007). A preservative and firming agent such as calcium chloride has been widely used in vegetable and fruit industry for whole and fresh-cut commodities (Brant, 2003). A chitosan coating can be applied to sliced papaya, to preserve the quality attributes and prolonged the shelf life of this fruit since papaya pulp is highly perishable (Chien et al., 2013). Due to global climate change, water scarcity, population increase, and ever-increasing demand for food Abano & Buah (2014) developed biotechnological approach that have the potential to enhance the yield, quality, and shelf-life of fruits and vegetables. Along with extending shelf life of fresh fruits and preventing food wastage, packaging is also providing a solution to other feature such as food wastage (Williams et al., 2012). Plastic packaging materials have shown to reduce PLW and decay, retain firmness, colour and nutrient loss during storage of pear fruit (Nath et al., 2012).

Similar results were seen in Nigerian indigenous fruits such as fresh pawpaw (*Carica papaya L.*) fruits where packing (wrapping) materials have also showed extending shelf life of the fruit. It was also found that if fruits were individually wrapped with waxed paper (TIXO) in ambient conditions in plastic crate, they have a shelf-life of 17 days as compared to fresh pawpaw fruits in evaporative coolers for 7 days (Ubani et al., 2011).

The Government of Bangladesh now tries to encourage private and public enterprises to make good marketing system by encouraging private sector investment in establishing warehouses and cold storage facilities for agricultural produces (Jahan & Alam, 2013). The Ministry of Agriculture (2010) in Bangladesh encouraged setting up village market and improving distribution to main markets and the Government will facilitate smooth flow of agricultural produces from the production point to the consumption point. Steps to diversify products, explore new and potential markets abroad, promote the services required by farmers and entrepreneurs for value addition to agricultural products are some of the initiative taken by Government of Bangladesh. Institutes such as Japan International Cooperation Agency provides technical support in the promotion of fruit and vegetable production amongst smallholder farmers in Dedza at Lobi, The European Union funded the Farm Income Diversification Programme aimed at enhancing rural incomes through agricultural diversification, World Agro-forestry Centre, also called ICRAF (International Council for Research in Agroforestry) promoting fruit production and marketing of both indigenous and exotic fruits to enhance people's income and food security through the agro-forestry

and Food Security Programme (Kachule & Franzel, 2009). Indigenous fruits of Meghalaya can also get Organic Certification can add value to the produce. It can also get a Geographical Indication which some other states of India have which is known world wide such as Nilgiris Tea, Basmati Rice, Tellicherry Pepper, Kanchipuram Silk Sari and Darjeeling Tea. Internationally “Dijon Mustard” from the French town of Dijon, “Chianti Wine” from Italy, “Champagne Wine” from France; “Tequila Spirit” from Mexico; “Idaho Potatoes” from USA and “Swiss Chocolates” from Switzerland refers to the geographical indication of a country or a place situated therein as being the country or place of origin of that product. Typically, such a name conveys an assurance of quality and distinctiveness which is essentially attributable to the fact of its origin in that defined geographical locality, region or country” (Geographical Indication Registry, n.d; Shafiulla, 2013; Bagade & Metha, 2014). Meghalaya could also think of getting one so that it can create an identity of its own as well as world wide. Some of the names suggested by the researcher could be for *Sohiong* fruit as “*Khasi Sohiong*”, *Sohiong Khasi*”, “*Shillong Sohiong*”, and “*Meghalaya Sohiong*”.

The research findings have provided critical information on all aspects of production, processing and sale of the indigenous fruits based on a sample of three representative fruits. Further research on improving the genetic properties of the indigenous fruits to make them more palatable, better nutritional value and improved shelf-life reducing the perishability (Abano & Buah, 2014). The Agricultural and Horticultural departments and their laboratories should make this a priority (Ashie et al., 1996). Another area of research is in increasing public awareness, involvement of producers and consumers in active promotional activities and methods of better communication (Dadras & Morga, 2015; Gao et al., 2011). Such communication research is an essential part of any public health and preventive medicine programs. A third area of research concerns methods to protect the valuable indigenous fruits from extinction, motivating the farmers to cultivate the fruits, and research into developing farmers’ cooperatives and involvement of government departments to provide suitable incentives, financial support and training, developing local leadership and entrepreneurs (H. Singh, 2009; Mahapatra & Panda, 2012; and Maikhuri et al., 1994). A fourth and major area concerns research into packing and labelling technology, promoting better marketing strategies and management research into the logistics of transport, handling, storage and distribution which will enable pricing to be as low as possible and preventing seasonal escalation (Chaudhary, 2014; Butkeviciene et al., 2008). Studies and experiences in other countries, both developed and developing have shown the way in ensuring that locally produced fruits have always a competitive (Kalaba et al., 2014; Deshmukh & Shinde, 2010; Kusugal & Nagaraja, 2013; Makdoh et al., 2014). Meghalaya state should be a pioneer and leader in carrying out cutting edge research on all aspects of enhancing marketing of indigenous fruits and significantly impacting the socioeconomic development. This research has highlighted the opportunities and strengths of indigenous fruits that could be taken advantage of through research-oriented production, processing, branding and marketing.

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