

# Feasibility study of beetroot cultivation and sale in Bangladesh

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## ABSTRACT

**Aim:** The study was carried to evaluate beetroot cultivation, feasibility of production and market value in the country.

**Materials and Methods:** The basic characteristics of beetroot were highlighted. Then, the responses of 22 beetroot farmers and 53 beetroot sellers were analyzed.

**Results:** The farmers and sellers were familiar to the beneficial effects of consuming beetroots. The farmers wanted to continue their cultivation and to get adequate technical assistance. Because the major challenges they faced during this crop cultivation was seeds crisis. Most of the farmers sold their cultivated crops to the local market. One of the major problems of selling beetroot vegetables to customers and dealing with buyers is pricing.

**Conclusion:** It was concluded that this vegetable found economically feasible to the most of the sellers. It urged that beetroot production and selling should be prompted in Bangladesh and necessary steps are to be taken to increase its production.

**Keywords:** Crop residues, non-puddled, strip tillage, yield.

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## Introduction

Beet is considered to be as a temperate crop, which has been successfully developed by an international agrochemical company named "Syngenta". It originally grown some sugar beet genotypes under tropical climate conditions. Beet is a immune boosting food which acts as antioxidants, antimicrobial and antiviral agents simultaneously due to its enrichments of nutrients like magnesium, sodium, potassium, vitamin C and betalaine (Neha *et al.*, 2018). As this vegetable contains a number of active compounds such as carotenoids, saponins, betacyanines, betanin, polyphenols and flavonoids, it is highly expected that the beetroot can prevent several life-threatening diseases like cancer (Neha *et al.*, 2018). For example, betalains of beetroot, comprised of betacyanins and betaxanthins, can prevent as well as treat hypertension/cardiovascular diseases while the proliferation of cells in human tumor cells can also be inhibited.

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The most important features of this tropical sugar beet are its high sucrose content (14-20 %) with a recovery of 12-14%. In addition, sugar beet requires only 5 to 6 months for maturation, which is shorter duration than that of other sugar-containing substance like sugarcane. Therefore, sugar beet is superior to sugarcane since sugarcane has lower sucrose content (10-12%) and also it takes longer time to mature (12-14 months).

In Bangladesh, sugarcanes are used as raw materials to meet only 25% sugar demand domestically while the rest amount of sugar has to be imported due to the decrease in the production of sugarcane every year. Most of the sugar mills in Bangladesh remain inoperative for a particular period of time due to acute shortage of sugarcane. It's a matter of hope that the maturation of sugar beets is completed within March-April in Bangladesh while the duration of sugarcane crushing is expired. Therefore, it can be assumed that the sugar beets can be considered as an excellent alternative to sugarcane for the production of sugar and ethanol. Although the feasibility study of sugar beet cultivation in Bangladesh is under investigation, immediate initiatives should be

taken to process sugar beets in sugar mills of Bangladesh. Besides, people are already growing low sucrose containing genotype, which are used as salad and vegetable purposes. There are variety of tropical sugar beets reported by Rahman *et al.* (2006) and Hossain *et al.* (2011). It was reported that the growth, yield and sugar recovery of tropical sugar beet mainly depends on the suitable variety with proper fertilization (Seadh *et al.*, 2013) and (Bairagi *et al.*, 2013). Hence it is important to select suitable genotypes of sugar beets for promoting it as a supplementary sugar based cropping system in Bangladesh.

A number of farmers have gotten fruitful in test development of recently presented sugar beet crops development on his own territory at Shatkhira, Lalmonirhat, Bogura, Ishordee and Gozaria regions in Bangladesh. It was conceivable to develop sugar beet in Sundarban region, where rice can't be grown because of overabundance saltiness. In Northwestern regions of Bangladesh, ranchers are bringing more regions for sugar beet pull crops development for more benefit. It was discovered that the atmosphere of Bangladesh is good for sugar beet farming. It was conceivable to develop it in the salt-influenced seaside zones, which is an excellent part of sugar beet, as the majority of the harvest of Bangladesh can't be developed here because of abundant saltiness. As sugar beet is a beneficial crop, it may very well be normal that ranchers will approach to develop sugar beet in future. BAU germplasm focus provided five assortments for development of white, red purple round, oval and ball molded beetroot throughout the country. Local production was not sufficient to satisfy the demand of the country. Hence, the study was aimed to examine the production and selling feasibility of this healthy vegetable commercially in the country.

### Materials and Methods

All the data on beetroot production and selling was collected from different districts of Bangladesh. The information on beetroot production was collected from 22 beetroot farmers while beetroot selling related questions was asked to 53 beetroot sellers of different districts of the country. Along with basic information, the straightforward questions related to beetroot production were amount and type of cultivating lands, economic aspects of its

production and challenges facing during cultivation. While beetroot selling case study mainly focused on the market value and economic feasibility of beetroot during its sale. All the collected information was sorted in Excel file for illustrating graphs.

### Results and Discussion

#### *Case study on Beetroot cultivation in Bangladesh*

A number of case studies was performed among 22 beetroot farmers, who are directly involved in cultivation of sugar beet and beetroot vegetables in Bangladesh.

#### *Basic information about beetroot farmers*

Basic personal information of the farmers involved in this study including their origin and age was recorded (Fig. 1). It showed that most of the farmers participated in this survey were from Rangpur (41%). The age distribution showed that mostly older people (age more than 50) were cultivating beetroots due to their expertise in farming. Besides, young (age from 20 to 30 and 30 to 40 years old) and middle-aged (age from 40 to 50 years old) people were also interested in cultivating beetroots.

#### *Cultivation of sugar beet*

In this section, the information related to sugar beet cultivation was collected from farmers participated in this study and summarized (Fig 2). It was summarized that most of the farmers had their own land for beetroot cultivation while some had shared others crops. Out of 22, six farmers had a total of one to three Bigha lands of their own. The highest amount of total land was recorded to be five to ten acres for only one farmer. It was categorized the amount of cultivating land used for beetroot farming where 53% and 26 % farmers used 10 to 30 decimal and one to three Bigha lands respectively, for cultivating beetroots. Only 16% farmers used least amount of lands for cultivation of beetroot. A large number of farmers (37%) had started beetroots vegetable cultivation as a new crop in recent time and get cultivation experience less than six months. However, longer cultivation experience (more than years like 10 to 20 years old) was also observed for 26% farmers, as most of the farmers involved in this study were more than 50 years age who spend a long time in beetroot cultivation. It was observed that most of the beetroot farmers (70%) had highlands while only 10% farmers had lowlands which they used

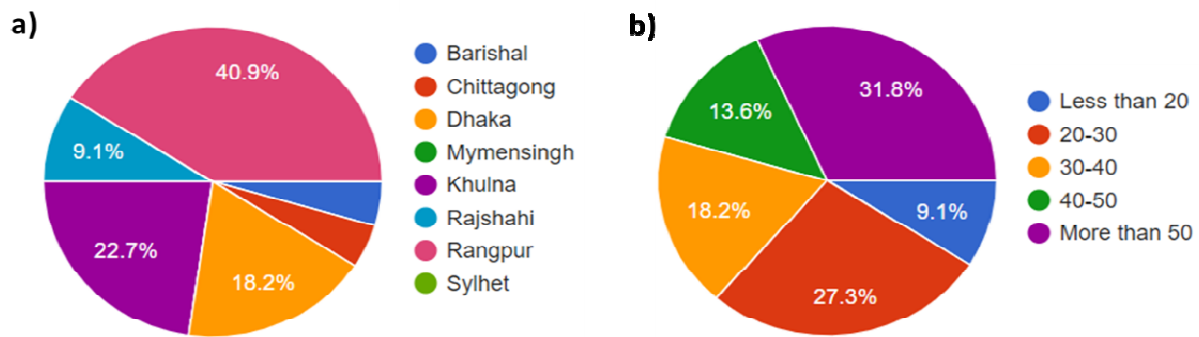


Fig 1. a) Origin and b) Age distribution of beetroot farmers participated in this study.

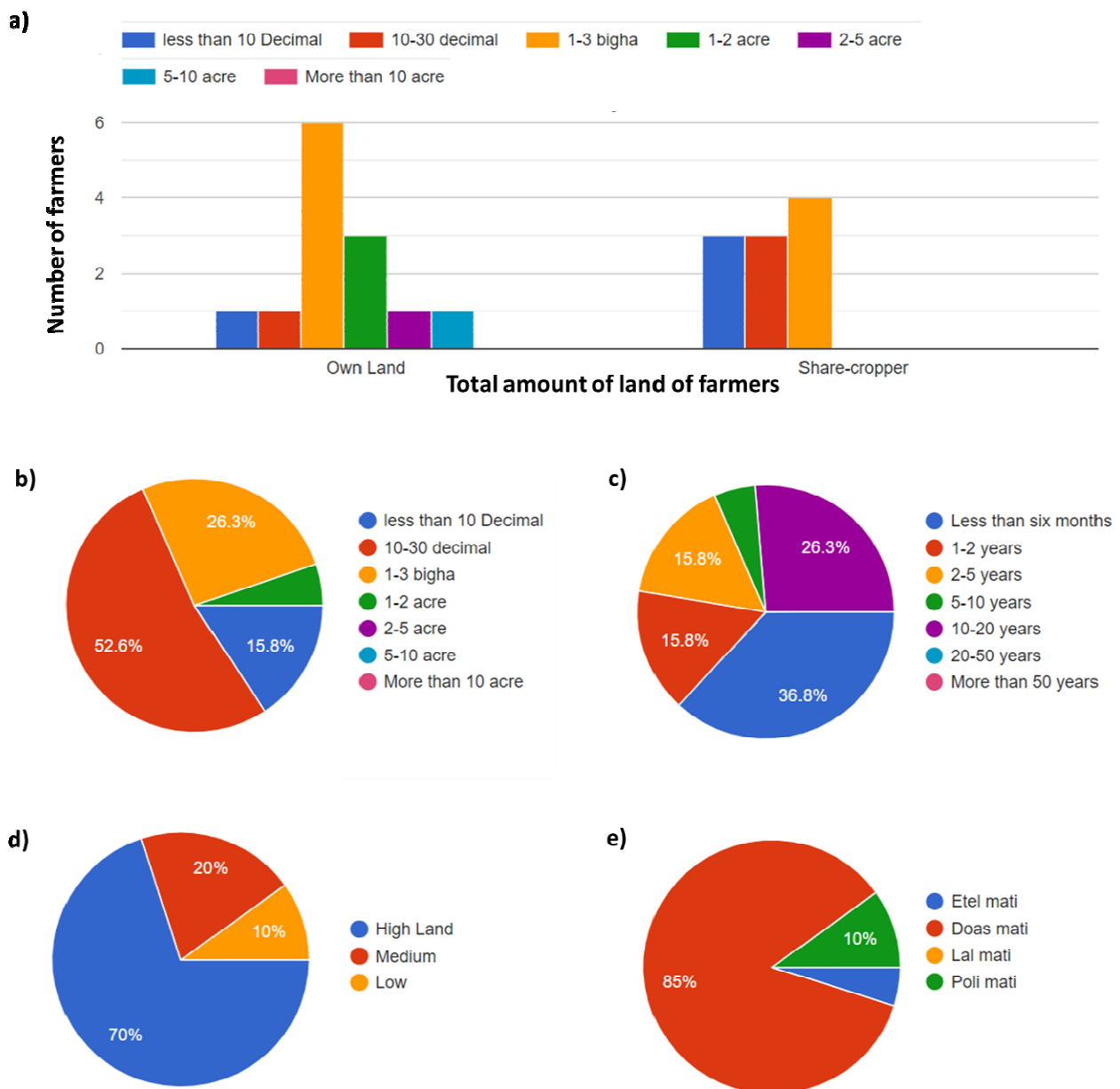


Fig 2. a) Total amount of land of the farmers; b) Amount of land used for cultivation of beetroot; c) Years of experience of beetroot cultivation; d) Type of cultivating land; and e) Type of soil of the cultivating land.

for cultivating beetroots. In addition, the soil type: 85% of farmers growing beetroots in Doasmati. However, beetroots also grown in other types of soils like Polimati, Etelmati.

#### *Cause of cultivating beetroot vegetables*

As in Bangladesh beetroot vegetable was observed a new crop that had lots of health benefits and become popular due to its colorful appearance, most of the participated farmers (53%) were cultivating it just as a hobby (Fig 3). However, 32 % farmers grow it for hobby commercial purpose.

#### *Economical aspects of beetroot production*

Farmers usually sell the produced beetroots in the local or regional market. This survey found the most common portal for selling produced beetroots. It was identified that most farmers (65%) sell their produced beetroots to local markets while some farmers (15%) did not sell the products. Only 10% farmers went to the regional markets for selling the beetroots (Fig. 4).

The selling cost of the produced beetroot where the price varies according to farmer's choice, which may be related to their production cost like cost of seeds, traveling cost etc.

The profits gained by selling the beetroots produced per decimal lands were categorized. More than 4000 Tk profit per decimal land achieved by 40% farmers while 22% farmers collected less profits.

The responses of farmers about the economic feasibility of producing beetroots and was observed that most of the farmers were benefitted from the production of this new crop.

#### *Challenges faced during cultivation of beetroots*

The farmers had to face diverse challenges during cultivation of this new crop, like seed and labor crisis, high labor cost, excessive rainfall etc. it was showed that the most of the farmers (46.7%) had faced seed crisis problem during cultivation of beetroot. About 60% farmers agreed to get technical assistance from Agricultural department during cultivation. After all of these challenges, 95% farmers still wanted to continue their cultivation of beetroots and increase their production if they can get adequate technical help during cultivation (Fig. 5).

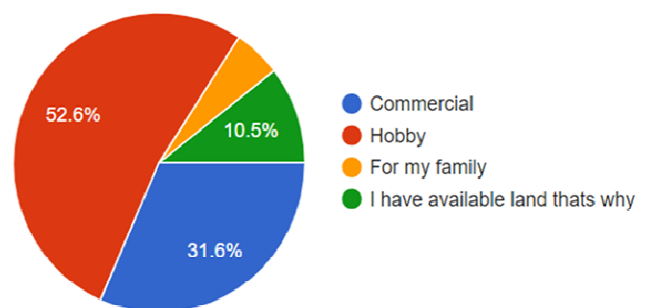
#### **Case study on Beetroot selling in Bangladesh**

A number of case studies were performed among 53 participants, namely 'beetroot sellers', who are directly or indirectly involved in selling beetroots vegetables in Bangladesh.

#### *Basic information about beetroot sellers*

Basic personal information of the participants involved in this study including their age, gender, educational qualification, family size etc (Fig. 6). It was observed from that young people from 20 to 30 years age (38.5%) were more interested in selling beetroot than other age ranges. Although middle aged-people (30 to 50 years age) were also engaged in selling this vegetables. While, women were less involved in selling of beetroots than man. Most of the involved participants in this study were from Dhaka, while others were from Chittagong and Barisal. It was also observed that a large percentage of beetroot sellers (44.2%) only had primary educational qualities. Most of the participant's families were middle-size including three to six family members.

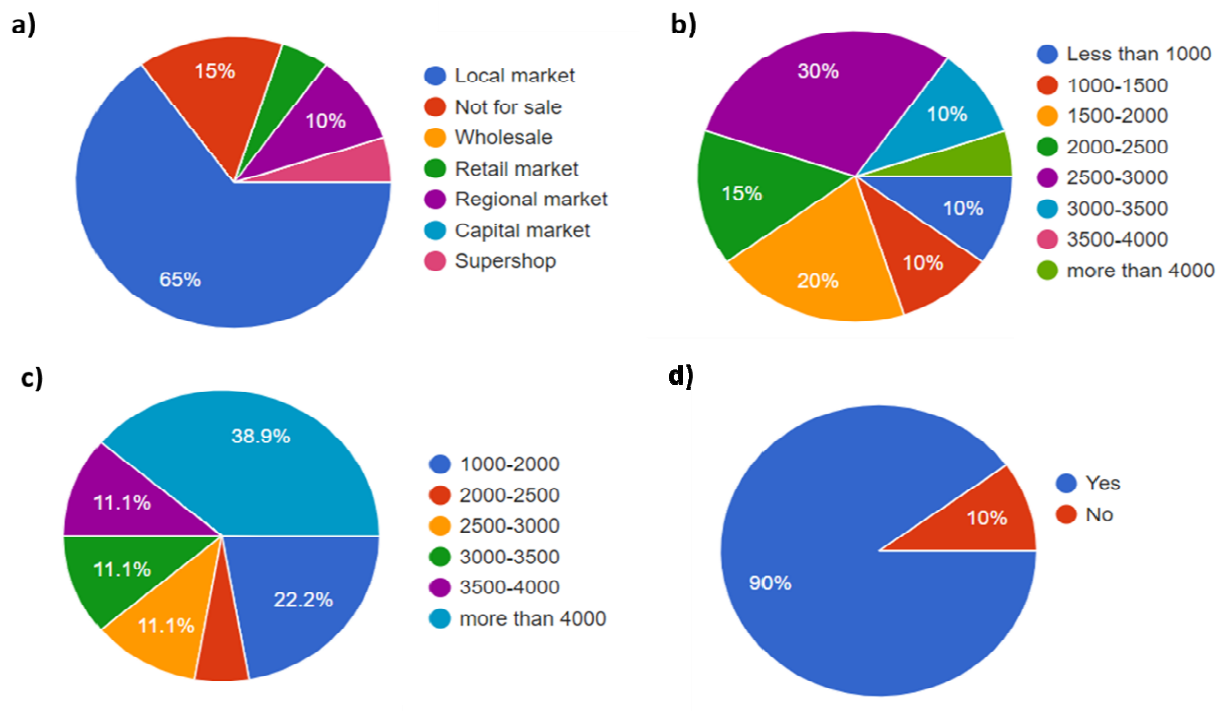
It was observed surveying report based on the current business status of the participants (Fig. 7). For example, most of the beetroot sellers (61.5%) were not connected to any business group, rather they did their business independently. In addition, their involvement to beetroot selling was average depending on their age and choice. The major income source of the beetroot sellers, who mainly depended on beetroot selling for their livelihood, was shown. A 2-5 years of business period was found for 24 % sellers while the 17.4 % sellers did their selling business for less than six months as well as 10-20 years. Most of the sellers (58%) got information about beetroot form supplier.



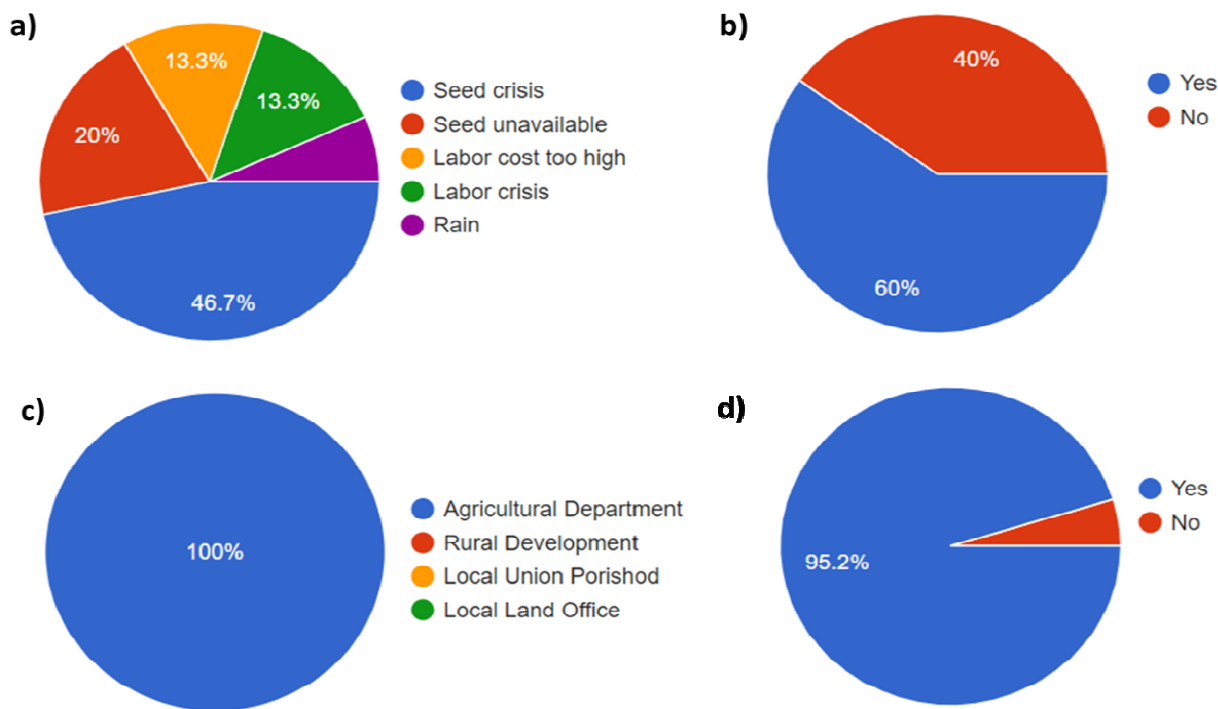
**Fig 3.** The reason for the cultivation of beetroot

#### *Knowledge of sellers about basic information of beetroot*

This section helped to evaluate the knowledge gap of beetroot sellers about the basic information of beetroot (Fig. 8). In this regard, some basic questions about beetroot and its production were asked to the sellers.



**Fig 4.** a) Selling point of beetroots produced by the farmers; b) Selling cost (in Taka) of produced beetroots per decimal lands; c) profit (in Taka) of produced beetroots per decimal lands; and d) Comment about economic feasibility of producing beetroots.



**Fig 5.** a) Problems faced during cultivation; b) Inquiry about getting any technical assistance during cultivation; c) Type of department providing cooperation during cultivation; and d) Willingness of farmers to cultivate/increase beetroots.

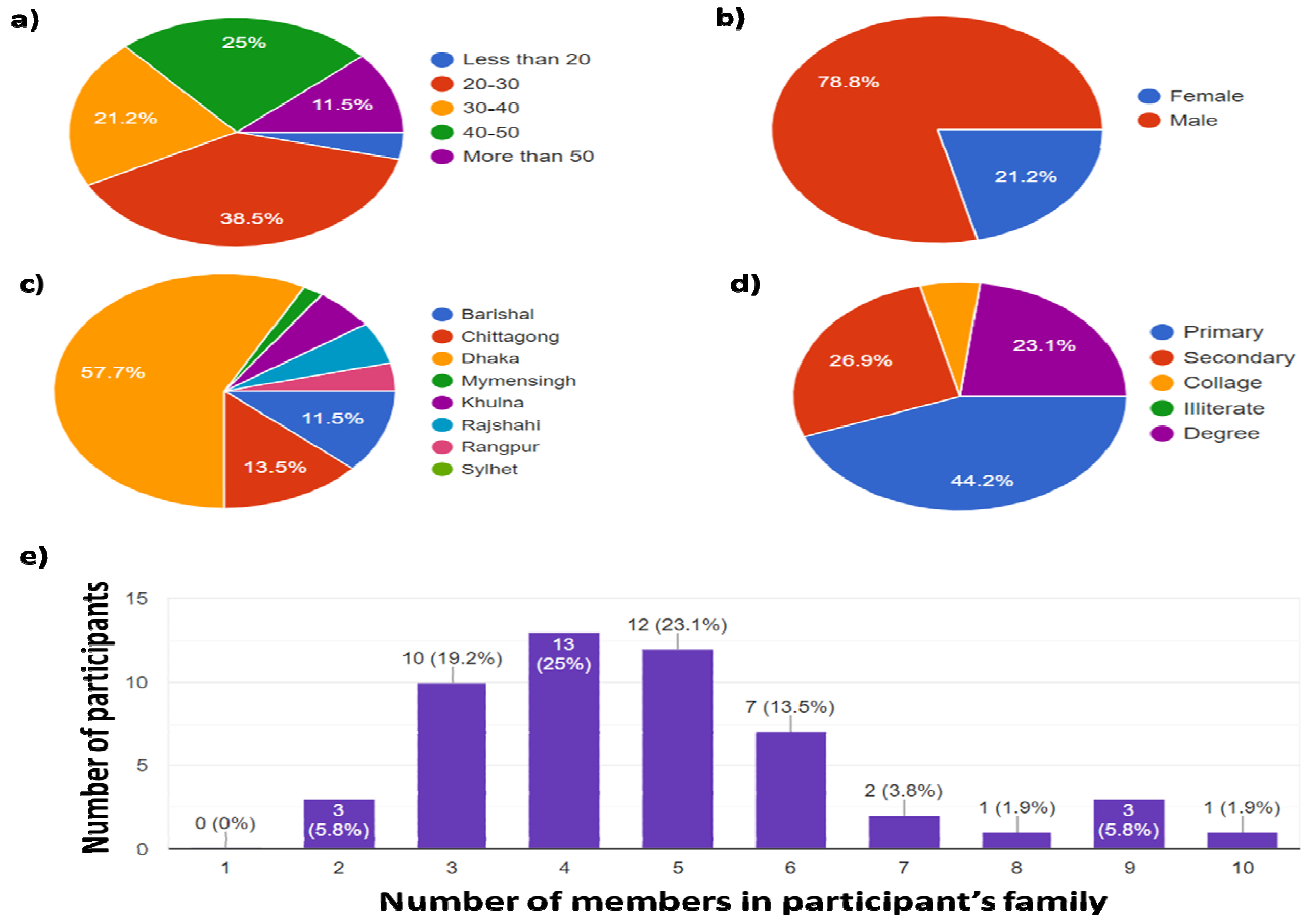


Fig 6. a) Age distribution, b) Gender distribution, c) Origin, d) Educational qualification, and e) Family size of beetroot sellers participated in this study.

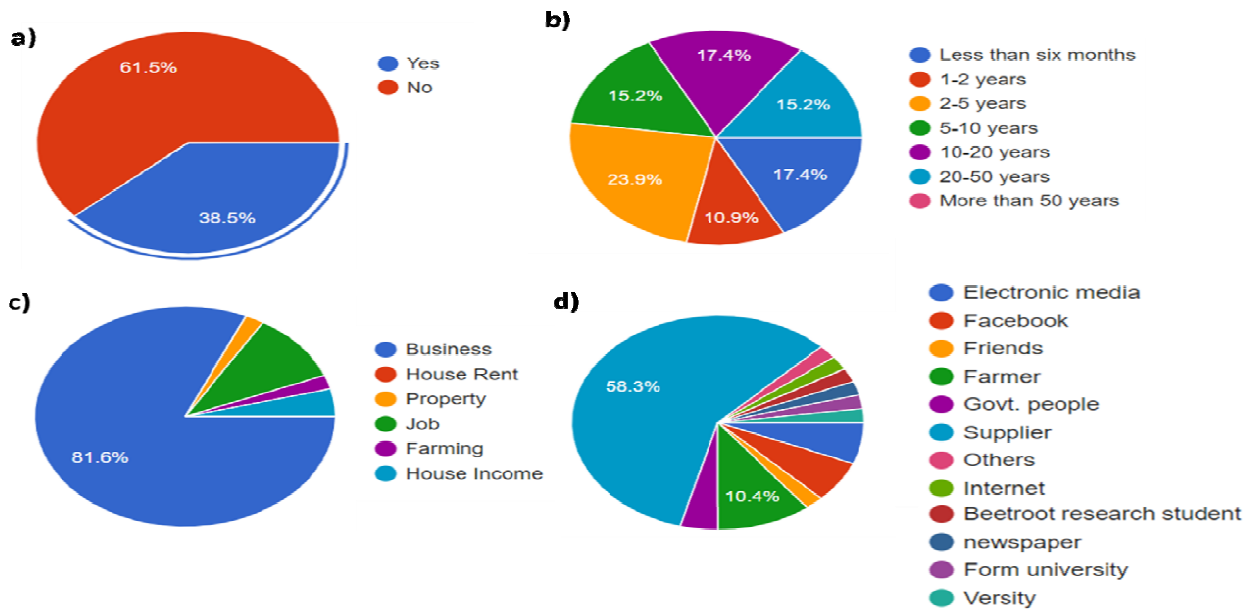


Fig 7.a) Survey on belonging of participants to a business group, b) Participant's individual business period, c) Their major income source, and d) Source of information about beetroot.

Although 85% sellers heard the name of beetroot, only 51% sellers know about the basic of its growing while 57% participants did not know the processes of its cultivation. Among all the participants, 55% did not even have any known sources of adopting/cultivating beetroot. It should be mentioned that although 40% sellers were engaged in selling these root vegetables for one to two years, they were not aware of basic criteria of beetroot growing procedures.

#### *Market Information*

In order to predict the demand of beetroot in market, the sellers were asked to provide their opinion about availability of beetroot vegetables in market and the main attractive feature of this root vegetable to buyers (Fig. 9). It was clear to get fresh beetroot vegetables directly from market (90%) while farmers were also delivering fresh vegetables on demand. The supply of fresh beetroot vegetables was thought to be enough to 60 % participants while the others think that the production of this vegetable should be increased to meet the market demand. Furthermore, the beetroot was a demandable vegetable to the buyers due to its different beneficial properties like taste, organic farming, appearance, seasonal availability etc. Among these, the most voted property of this vegetable to the sellers was its organic farming capability. This organic farmed vegetable had gained so much demand in the marketplace than vegetables cultivated using chemicals fertilizers and pesticides. Because during organic farming, the farmers can easily avoid pesticides, thus protect the environment.

#### *Challenges faced during selling of beetroot vegetables*

In practice, it was very reasonable to face many problems in selling new type of products like beetroot vegetable in market (Fig. 10). One of the major problems of selling beetroot vegetable to customers (66%) and dealing with buyers was pricing (70%). Besides, the sellers were also facing other minor problems due to lack of knowledge of beetroot vegetable (17%), shortage of supply (12.8%) during dealing with buyers.

A number of parameters were considered during the selection of target market when selling the beetroot as well as choosing buyers. The major selection criteria of target market during selling beetroot were considered as profit range, proximity of destination, potential of existing market and market accessibility etc (Fig. 11). Profit margin (40%) was considered as the most important factor during the selection of target

market for selling beetroot vegetables. The sellers mainly were using trade associations (35%) for locating buyers of beetroot vegetables while other sources like direct communication (33%), private sources (15%) were also used. The selling process of this new vegetable may be affected by different kinds of costs like vegetable cost, packaging, transportation, storage etc. It indicated that 69% sellers gave objection about product cost while transportation (21%) and storage costs (17%) also came to timeline for some of the sellers.

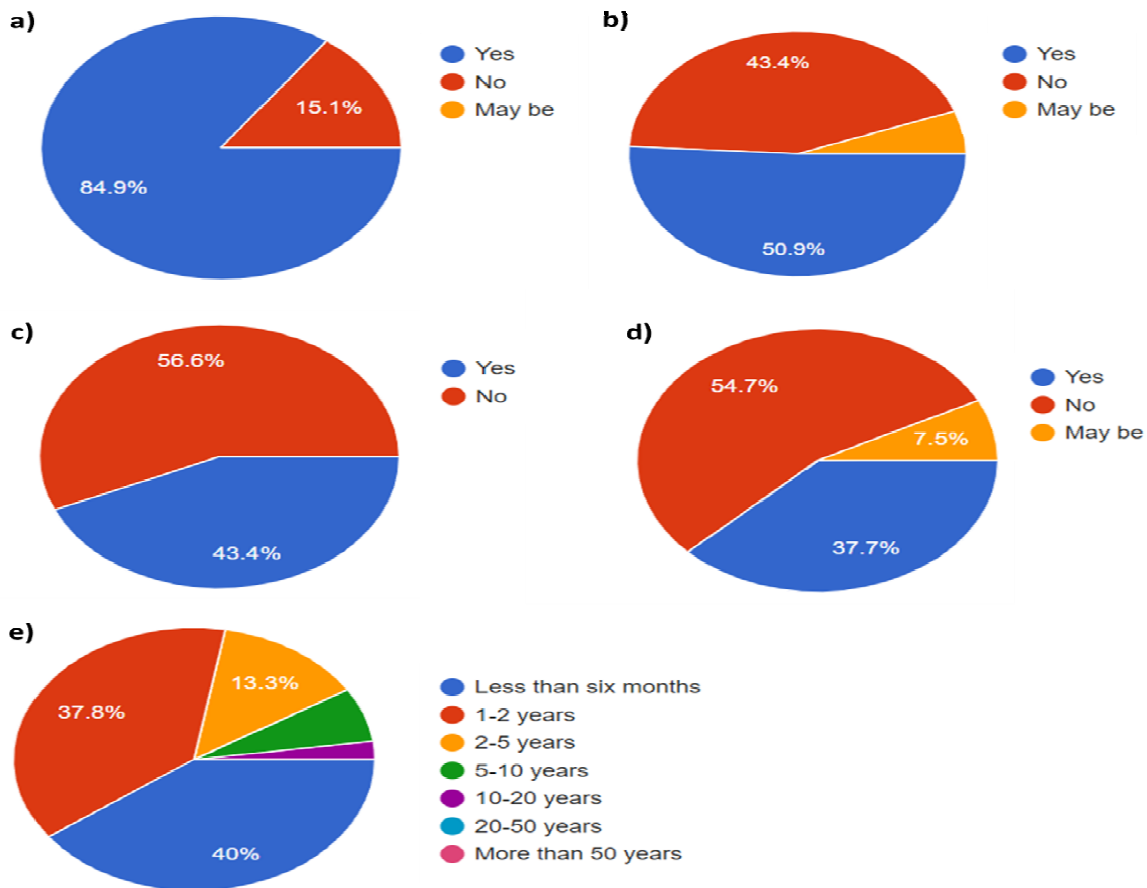
#### *Economic Viability of beetroot vegetables*

The economic viability of beetroot vegetables was assessed for evaluating various economic effects that may result from the implementation of a beetroot vegetables project (Fig. 12). The responses of 49 participants and 92% participants agreed about economically profitability of beetroot cultivation. It was presented the average income per year from beetroot vegetables. Therefore, we can say that the selling of sugar beet vegetables is economically feasible.

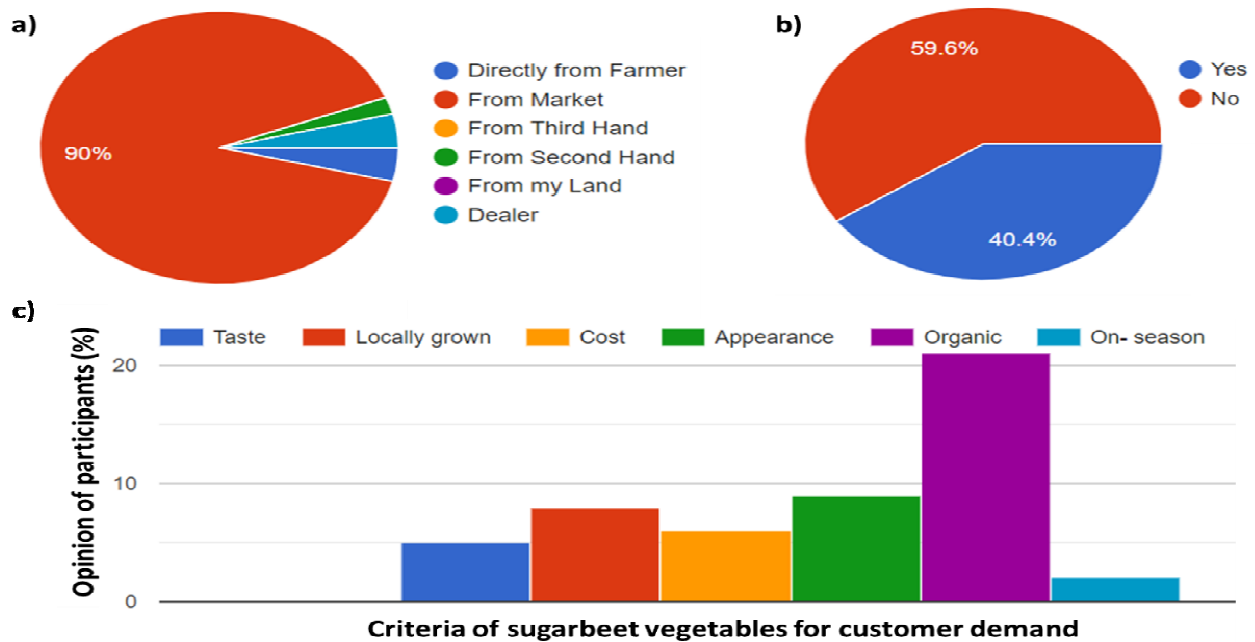
#### *Perception towards beetroot*

As the sellers already had sold this beetroot vegetables, it was necessary to take their viewpoints about its qualities and performance as a vegetable. There were a lot of beneficial properties of beetroot vegetables recognized by the sellers participated in this survey. It highlighted the seller's viewpoints and 56% sellers marked it as a healthy vegetable while 16% gave comments about its colorful appearance and 14% recommended its freshness (Fig. 13). Because of its numerous beneficial characteristics, all of the participants agreed to have it as a new crop. It showed that 21 and 18 participants categorized it as very good and excellent respectively, in terms of its performance as a vegetable. Vegetable was getting popularity day by day as a vegetable due to its health benefits.

As per above discussion, beetroot can be cultivated and sold out commercially. Some test basis cultivation of beetroot in different parts of Bangladesh showed that the yield could be 500 to 600 kg per decimal of land. These amounts of beet will produce 90 - 110 kg of sugar (The Daily Star, 6 March 2015). It has been trying to introduce the cultivation of tropical sugar beet in Bangladesh and therefore doing research on it.



**Fig 8.** Evaluation of knowledge acquired by beetroot sellers involved in this business by inquiring the following basic information about beetroot like: a) Pre-familiarity to beetroot; b) Way of growing beetroot; c) Procedures of beetroot cultivation; d) Known sources about adopting/cultivating beetroot, and e) Involvement period in selling beetroot vegetables.



**Fig 9.** Market information of beetroot vegetable: a) Source of delivery of beetroot vegetable; b) Opinion about sufficient supply of beetroot vegetable; and c) Main property of beetroot vegetable for buyer demand.



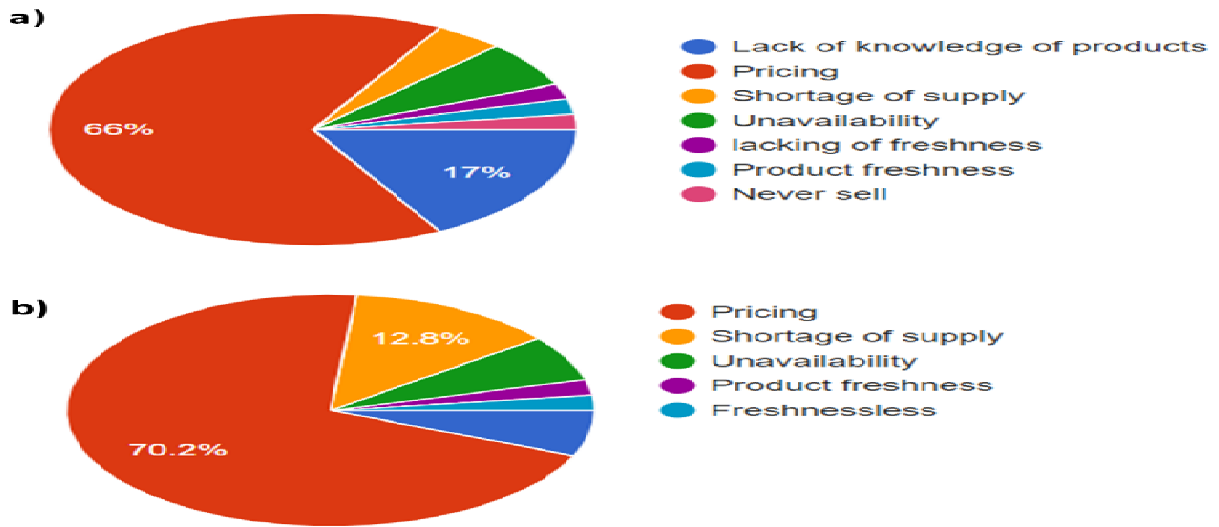


Fig 10. a) Problems faced during selling beetroot Vegetables; b) Problems faced while dealing directly with buyers.

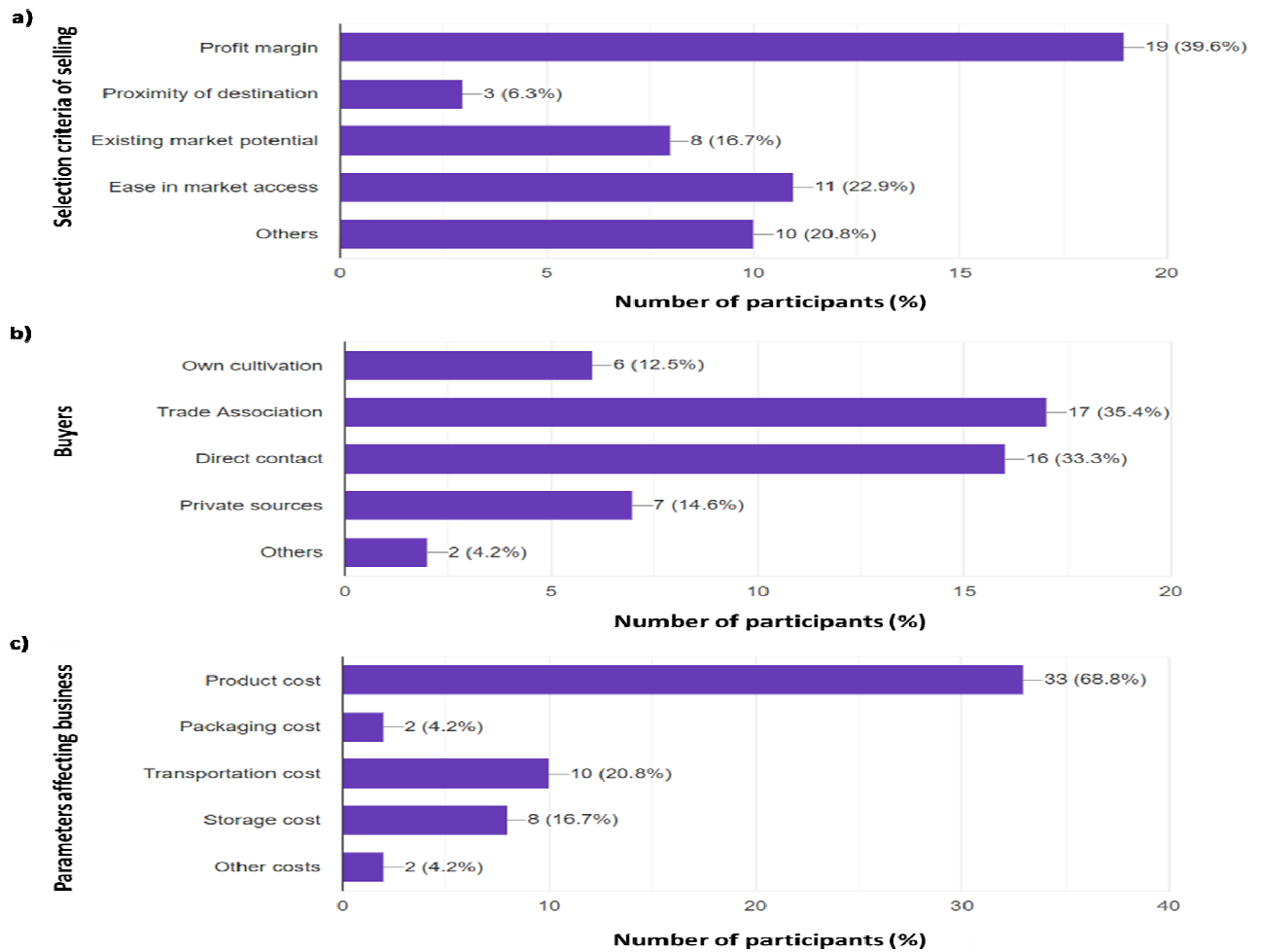


Fig 11. a) Selection of target market during selling beetroot vegetables; b) Source of choosing buyers; and c) Factors affecting selling business.

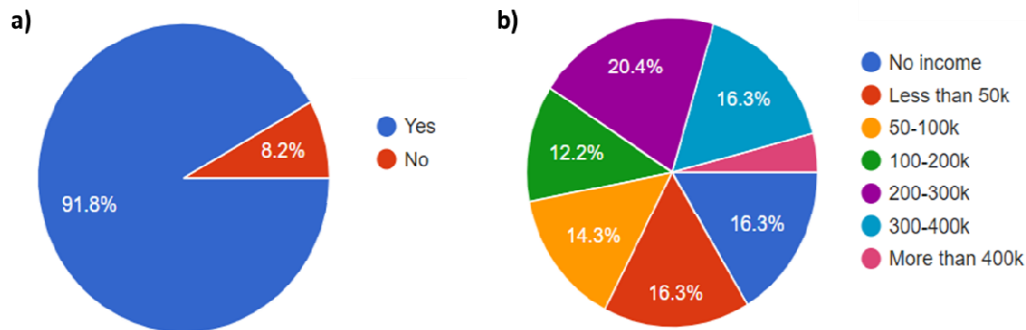


Fig 12. a) Profitability of beetroot vegetables; b) Average income per year from beetroot vegetables.

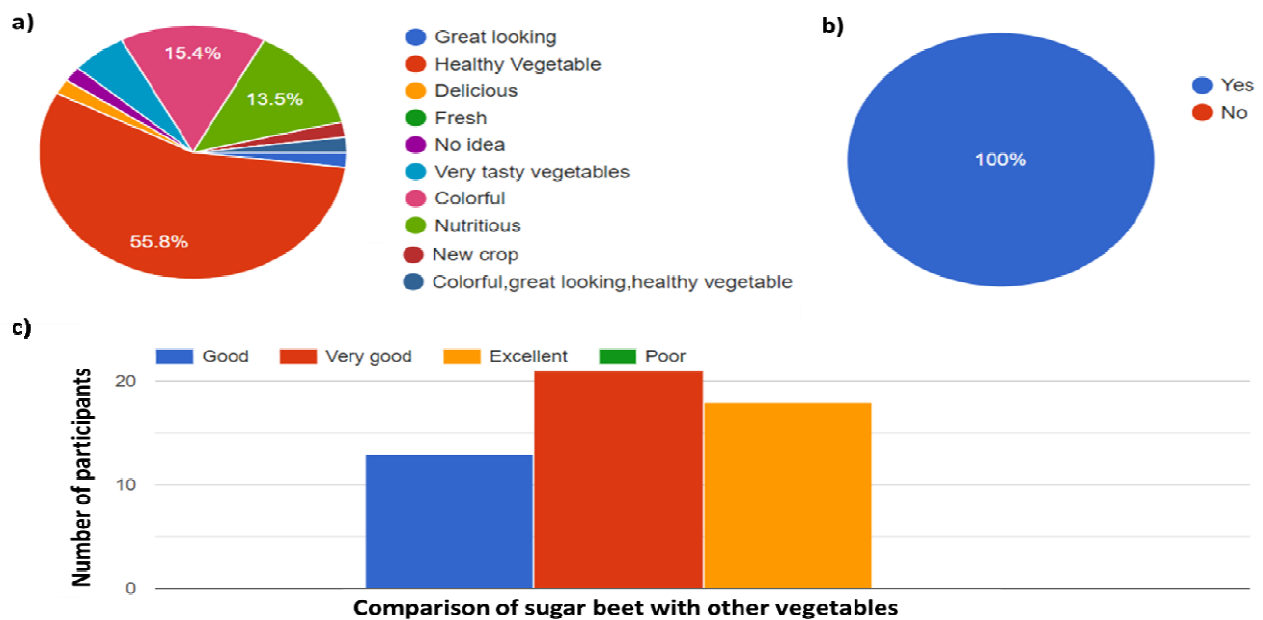


Fig 13. a) Sellers viewpoints about beetroot; b) Opinion about its quality to have in a new crop; and c) Comparison of beetroot's performance with other vegetables.

**Conclusion**

This study found that beetroot can be cultivated successfully in different areas of Bangladesh and its cultivation and selling seems to be profitable in terms of the country perspective. Therefore, we believe that the production of sugar beets on a commercial basis may meet the current demand of sugar in the country. Moreover, the cultivation of beetroot vegetables may also offer a new prospect for food industry to produce phyto-nutrients rich food products such as, beetroot pickles, jam, cake, biscuit, pasta and so on. It is expected that the farmers of the country may come forward to cultivate more beet in future if they can get proper helps during cultivation and selling.

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