

ASSESSMENT OF MANGO VALUE CHAIN IN BANGLADESH

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ABSTRACT

Addressing the systemic constraints is very important for the economics of mango production in Bangladesh, which is the 7th largest mango producing country in the world. Based on the functions any value chain includes three function actors and different dimensions such as inclusiveness (i.e., extreme poor inclusion) and gross margin, the study qualitatively and quantitatively assessed mango fruit value chain. Methodologies were applied with an assemblage of bottom-up and top-down approaches. Structured questionnaires were used to survey mango producing households, input sellers and mango buyers. The percentile value of composite revealed that mango fruit production and selling the annual specified gross margin (SGM) were Tk.1,600 (66%) for extreme poor (hereafter referred to as EP) producers, while Tk.1,09,880 (64%) for rich producers and Tk. 2,43,000 (76%) for retailers/middleman. The profit margin of medium and rich producers as well as middlemen was better, but less for poor and EP households due to the systemic market constraints. This assessment aims to prepare improving strategies and/or interventions for mango production that elucidates what actions could be taken for the mango fruit value chain in different segments such as improved technologies, harvesting, grading, packaging, transportation, marketing, etc. so that the poor and EP households will get more profit margin from mango production.

Keywords: Value Chain, Local service provider, Gross margin, Inclusiveness

INTRODUCTION

Mango production has been facing multiple systemic constraints such as low quality of inputs, limited access to financial support and access to markets. To realize the better options for systemic change and capture the yet untapped potentials of mango fruits and most importantly, to integrate market works for the poor (M4P, a value

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chain approach) (ACIAR, 2005), the team conducted an in-depth assessment of the mango subsector. The economy of Bangladesh is highly dependent on agriculture. Since about 87% of the rural households mostly rely on agriculture for at least part of their income (World Bank, 2006) that clearly indicates the poverty reduction potential of the fruit sub-sector. It is an established fact that a high quality of nutrition of fruit is very important for the proper physical and mental growth of people, particularly for children (Sandstrom et al., 2013). The annual fruit production in Bangladesh is 1.8 million ton while demand is estimated to be 4.34 million ton (BBS, 2005). There is a gap of 2.57 million tons of fruit between demand and supply (BBS, 2005). This illustrates how urgent is the need to increase the production of fruits. There are about 70 types of fruits grown in Bangladesh (ADB, 2020). The most widely and commercially cultivated fruit is mango. The consumption of fruit per head per day presently stands at around 32 g, vis-a-vis the recommended intakes of 75 g fruit/day, that indicates the present production meets 42.67% only of the requirements (Bari and Jalil, 2013). Consequently, consumers face an acute shortage of fruit's nutrition for which supply fails to meet the demand of the growing population.

The main objective of this study is to assess and understand the mango value chain in facilitating sustainable systemic changes that address critical bottlenecks in the mango production that will help to take activities for mango cultivation and marketing of producers, which contribute to growth in mango business and income for economic development and poverty alleviation. in Bangladesh.

MATERIALS AND METHODS

The assessment was done in three steps: secondary research, in-depth primary assessment, and data analysis and reporting. This study was conducted in Rajshahi, Bogura and Rangpur region (hereafter referred to as value chain area). As a major mango growing area the first two steps were done simultaneously in Rajshahi. These steps are shown in figure 1.

Secondary research

Secondary data collection was made from available sources, including Department of Agricultural Extension (DAE) and, BARI, Horticulture Center, and Mango Research Center. Further desk research was conducted to gain knowledge on the sector, understand the core constraints and opportunities as well as development interventions to address the problems.

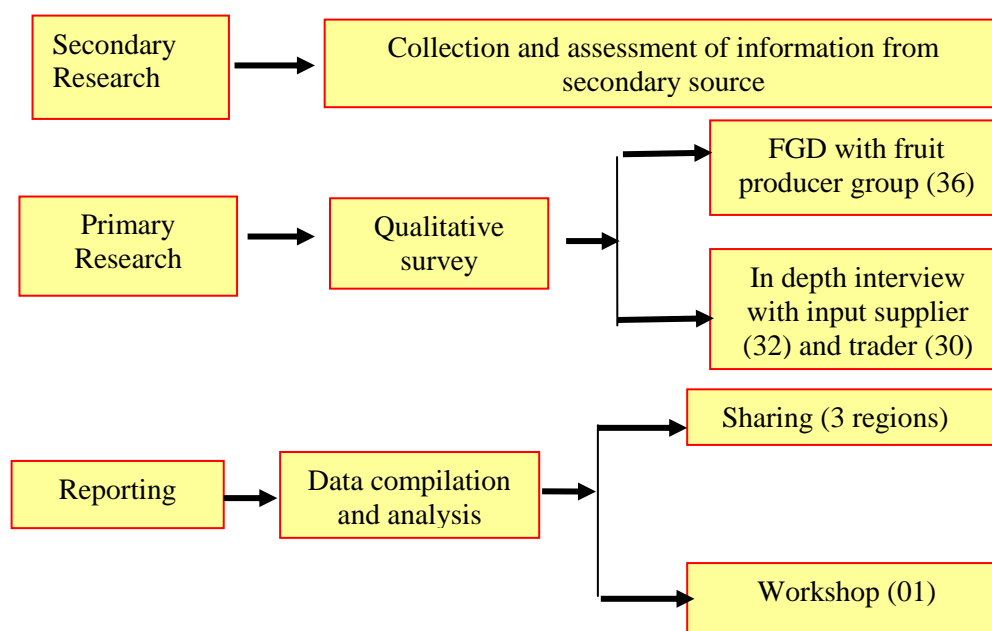


Figure 1. Diagram showing the steps in the methodology for data collection in the assessment

Primary research

A set of questionnaires was prepared for different actors, one for the mango farmers, one for traders (different level traders), and one for the input sellers. Primary research was conducted using the following steps. First, the team selected actors in different locations including Rajshahi, Bogura and Rangpur districts. Then different types of actors were interviewed such as producers (36 groups, consisting 25 producers in each), lease holders/ “baral” (under the same 36 groups), arotdars (32) and big traders (30) including fruit processors as well as exporters (3). Focus group discussions (FGDs) were held with producer groups and lease holders. Key Informant Interviews (KII) were held with individual local buyers and small traders at different mango local markets such as Shibgonj haat, Kansat Bazaar, Puthia Bazaar, Baneshhor haat, etc. of Rajshahi division. The team also visited the different national markets such as Amin bazaar, Jirani bazaar, Gazipur Chowrasta bazaar, Jatabari market, Narayangonj fruit markets to complement the information given by the producers and traders. Besides, the assessment team also visited different national markets to complement the information given by the producers and traders. Finally, an interview was done with Monayem Group of Industries, the Acme Laboratories Ltd. and PRAN Agor Business Ltd., which are involved in mango processing and distributing to domestic as well as export markets. Different mango products such as mango pulp, mango bar, mango juice etc. are exported to different countries of the world.

Analysis and reporting

It captured primary experiences through discussion with other Value Chain Experts within the Rajshahi region; a value chain map was developed and invaluable experience was gained. The data collected from different actors were compiled and analyzed using excel sheets and used for presenting the current report. Finally, a first draft inception report was developed on the collected data and the data analysis among the anticipation in the whole process. This inception report was presented in a validation workshop where few feedbacks were given by the experts and had incorporated afterward.

RESULTS AND DISCUSSION

The study findings are described in different sub sections. The subsections are overview of the fruit value chain, fruit value chain map, characteristics of supply and demand, fruit value chain core function and the actors, geographical distribution and major market places, supporting functions, existing enabling environment and constraints as well as strategies and interventions to address those constraints. These subsections are illustrated below sequentially:

Overview of the mango fruit value chain

The following three main components of the fruit value chain were considered: core functions, supporting functions and enabling environment.

Core function actors

The core functions in the mango value chain are mango production, buying of mango, collection, packing, transportation of mango, retailing, and again processing and distribution to the consumer markets. There are about 70000 households in the value chain assessed area under the three regions in which 44% are involved in mango production. Among them, 15, 40, 34 and 11% of the producers were extremely poor, poor, medium and rich respectively. In addition, about 2300 leaseholders were involved in the production, who are active in taking land lease for mango production or mango trees. They are locally called Biral.

In the assessment area, there were about 544 wholesalers who were involved in buying mango from district level traders and transport by truck for distribution at the other districts and national level markets. There were three processor companies (PRAN Agro Business Ltd., Acme Laboratories Ltd., and Monayem Group Ltd.) involved in fruit processing as well as pulp production for manufacturing mango juices. These processors distribute fruit juice to retailer shops in addition to exporting to different countries.

Supporting function actors

There are about 853 supporting function actors such as pesticide, fungicide and fertilizer retailers, nursery owners who were involved in supply of quality inputs such

as tree sapling and post harvesting and packaging materials. About 300 poor and extremely poor households supplied bamboo baskets and only 2 companies (Bengal Ltd and RFL) supplied plastic crates to traders for mango packaging. 103 Local Service Providers (LSP), a trained advanced mango producer, were also involved in supplying improved tree sapling with advisory services. Uncounted money lenders provided financial services to fruit producers. About 4643 local EPs were involved in small scale fruit production as well as they also involved in collection, packaging and transportation as labour. All are actors of supporting functions.

Enabling environment function actors of mango fruit

The enabling environment supporting functions are providing rules for nursery and maintain quality sapling, quality fertilizer and pesticides and also for production and extension of environmentally friendly fruits, quality standards for fruit related crime such as artificial ripening of mango fruits, carries out research on mango fruits and solving different critical problems related to mango production raised by producers of the mango fruit. The actors are mainly undertaken by government organizations: Ministry of Agriculture (MoA), DAE, BADC, BARI, BINA, Horticulture Center, Mango Research Center, FTIP-BAU District Admin. Union Parishad, Upazila Parishad, City Corporation, BSTI, etc. MoA has enacted a policy named the New Agricultural Extension Policy (NAEP). The objectives of this policy are to provide high quality infrastructure and GoB services, agricultural inputs that will enable farmers to produce and market products at low cost (NAEP, 2006).

Value chain map for mango

Figure 2 presents value chain actors, who are producing and buying and supplying mango fruits from producer to consumer in different levels, and their functions, name and number of in the study areas. Moreover, it demonstrates actors' sales volume of mango fruits including net profit/Gross Margin to better understand the overall findings for the mango value chain analysis. Supporting function actors and enabling function actors are also shown on the right side of the map.

In this map, all green color boxes indicate core function actors for which number in the study area, their average turns over volume of mango production are mentioned for each actor. According to assessment in the assessed value chain area, total mango production is 1,17,140 MT which is 12% all over the country as compared to total production given by BBS (BBS, 2005) and this total volume of produced mango is also mentioned in green box. The upper end arrows indicate that input sellers provide inputs to producers and producers produce mango fruits and sell mango fruits to local small traders. These local small traders sell their mango fruits to big traders/wholesalers at district level. The district level wholesalers sell their mango fruits to national retailer markets or to processors or direct export markets. It is noted that there is an actor known as "baral" who plays roles both as producers and as well as buyers of the mango fruit chain.

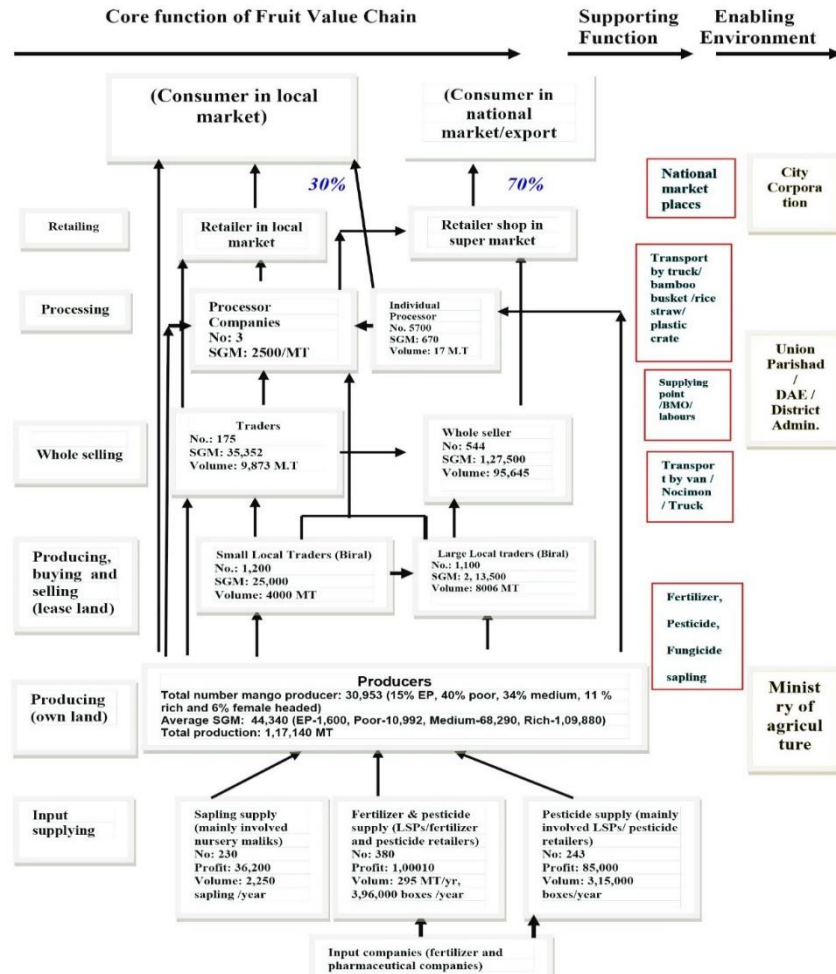


Figure 2. Mango value chain map

The turquoise color boxes indicate that input sellers (fertilizer, pesticide, fungicide, sapling), buyers, private sector organizations, processors, transport authorities, business association govt. line departments, Research Institutes such as BARI, BRRI, etc. are playing supporting functions discussed earlier. And the orange color boxes indicate that City corporation, Upazila Parishad, District admin, Bangladesh Standard Testing Institute (BSTI), business management committees, govt. line departments etc. are playing to set up an enabling environment for the mango fruit chains. Upper level in the map the percentage value indicates that from the assessing areas mango fruits, about 30% is consumed by the local people or consumers while the rest 70% is sold to other district and national markets including export markets.

Characteristics of mango supply and demand

Among the assessing value chain areas, Rajshahi region which includes 15 unions 8 upazila under Rajshahi, Chapai Nababgonj and Pabna districts; Bogura region which includes 7 unions 5 upazila under Gaibandha, Rangpur and Dinajpur districts; and in Rangpur division 6 unions of 5 upazila under Rangpur, Lalmonirhat, Nilphamari, Dinajpur, Thakurgoan districts.

Total estimated mango production in the value chain area was 1,17,140 M.T which was about (total production all over the country is 1800000) (BBS, 2005) 6.5% of the fruit production of Bangladesh. It was found that each producer of the community on an average sells 192 kg mango fruit per year and one local trader buys 410 kg mango fruit per annum for selling in the different markets. It says that the supply of mango fruits only meets half of the demand (50%). The supply and demand for mango fruits in the selected value chain areas is presented in figure no. 3:

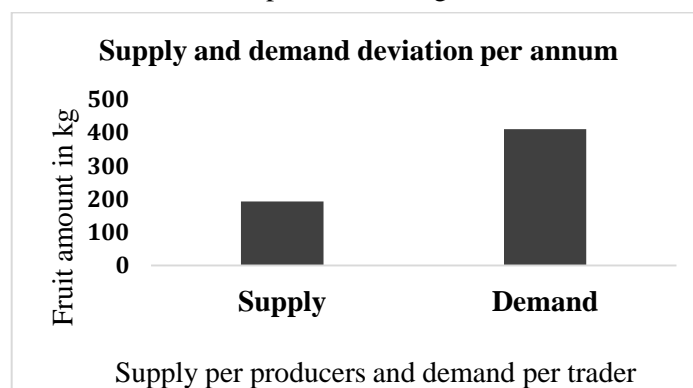


Figure 3. Deviation between supply and demand of mango fruit

Producers involved in mango fruit production

There on an average 44% were involved in mango fruit production; as a total of 70,000 households were assessed, therefore, the total mango producers were 30,953 households. Most of them were individual producers. Among them, 15, 40, 34, 11, and 6% of the producers were extremely poor, poor, medium, rich and woman headed producers, respectively. As per the aim of this study, consideration of involvement of poor and extremely poor it was counted as well-being status. Table 1 displayed total number of mango producers, average HHs per community, percent of HH and well-being status.

Table 1. Categories of mango growers in the study areas

Particular	HHs	Mango fruit producer	Well-being status of mango fruit producer				Female headed mango fruit producer
			EP	Poor	Medium	Rich	
Average number HH / community	133	59	20	53	45	15	8
Total HH	70000	30953	4643	12381	10524	3405	1857
Percent of HH		44	15	40	34	11	6

Annual specified gross margin (SGM) of actors involved in mango fruit value chain

The yearly harvesting, buying and selling, annual simplified gross margin of producers and different types of actors are presented in Table 2. These Values were found by determining the annual volume of mango sold with the amount of money.

Table 2. Marketing and profitability of mango by different actors

Type of actors	No. of actors for mango	Annual selling (MT)	Annual gross sales per actor (Tk.)	Variable cost per actor (Tk.)	Annual SGM per actors (Tk.)
EP Producer	4,643	6082	2,258	658	1,600
Poor producer	12,381	36485	12,592	1,600	10,992
Medium	9,996	28,560	97,290	29,000	68,290
Rich	3932	34,007	1,72,976	63,096	1,09,880
Biral	2,300	23,860	2,07,478	1,10,000	97,478
Traders	175	9,873	65352	30,000	35,352
Wholesaler	544	95,645	4,20,000	2,92,500	1,27,500
Processor	3	1,447			2500 Tk. per MT
Retailer			3,20,000	15,5,000	2,43,000

The money value of the composite revealed that the annual profit margin with the amount of money (Tk.) of medium and rich producers as well as middlemen is better, but less for poor and EP households due to the systemic market constraints.

Comparison on annual specified gross margin (SGM) of producers and percentage contribution by mango fruits in livelihood based on well-being

It was seen by above analysis that the profit margin of the medium and rich was better and in good condition because they were involved in fruit production as their main profession and they are able to take proper management for the mango trees as the good practices and also get access to markets. Comparatively, EP households produced mango fruits within their small homestead in which they had less than five mango trees on an average and also, they got less access to markets (Figure 4).

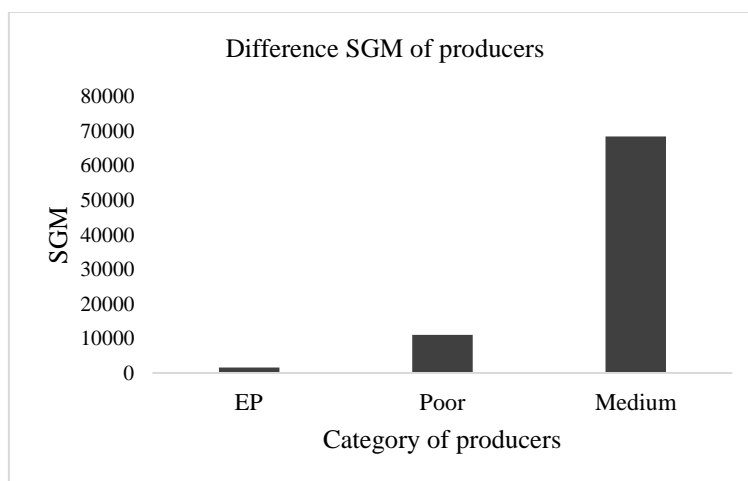


Figure 4. Comparison in SGM of producers

Besides, it was found that the percentage of livelihood contribution by mango fruit production is 5.3% for EP producers, 10.2% for poor producers, 26% for medium producers and 30.3% for rich producers and percentage of livelihood contribution to EP producers by mango fruits were lower than other producers due to the similar systemic causes (Figure 5).

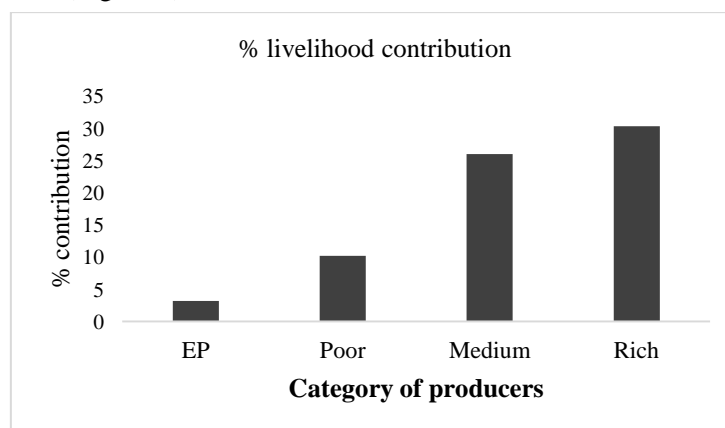


Figure 5. Comparison in livelihood contribution by mango fruit production of producers

Geographical distribution and major mango market places

In the assessing area there were some major market places from where mango fruits were generally distributed to other markets of the country. Each and every actor involved in the mango fruits chain was active on a daily basis during the mango season within these markets (Alam et al., 2017).

Constraints for mango fruit value chain

Several constraints were found during the assessment of the mango fruit value chain. The systemic constraints of mango value chain were lack of technical know-how of producers on pest and disease management, post-harvest technologies, paying low prices to producers, low volume of production and less involvement of Eps, limited services to reach out to all poor and EP mango fruit producers, limited access to financial support, and lack of access to markets. These are mainly systemic constraints (Ademonla, 2017) which affect the mango production in assessing areas as well as all over the country.

Identified strategies and interventions

Considering value addition prospects, the major discussions are undertaken of strategies for mango cultivation and marketing system improvement. There were many organizations who were working with the mango fruit sub sector, but still there was a lack of new strategies which were untapped by those organizations. (Chay et al., 2019). Hence, the validation advisors mostly suggested undertaking the untapped strategies for mango fruit improvement. The strategies to address systemic constraints are capacity building training for all level of actors on technical know-how including leadership, linkage, negotiation and collaboration, business plan and fund management; creating self-awareness for mango fruit producers so that they will increase production, specially EP producers who produced only 1 to 5 mango trees; and strengthening and training up sufficient LSP on mango fruit so that these trained LSPs could provide services to mango producers. Other strategies include creating access to financial support, especially for poor and EP producers, and ensuring quality and low-price inputs such as pesticides as well as quality mango saplings.

Most importantly, strategies should be taken to improve the market information system and access to markets for all producers equally. This will establish a systematic marketing network, which could avoid getting low prices through collective marketing. Taking into action this issue, the fruit selling committee involving producers and buyers might be developing. Earlier contracts would be made between producers and buyers through fixing actual rates for mangos. Similarly, considering value addition prospects, subsequently the intervention has been taken to address those constraints particularly the existing marketing channels with many middlemen, inadequate market infrastructures, less profit for poor and EP mango producers, lack of market information, lack of knowledge and skills, and lack of specialized training (Hossain et al., 2013).

To address those the major interventions are training on improved technologies and management practices (for fruit producer, LSPs, NMS, input suppliers, lease holders, traders), demonstration for introducing new technologies (tree improvement, production technology, post-harvest technology etc.), improved management practices to reduce disease and pest infestations, community meeting and Farmers Field Day (FFD) to disseminate the technologies, facilitate private companies to

establish functional linkage and formal contact between producers and traders and processors, provide awareness training for building awareness on more production of fruit, match making workshop and formal contract between producers and private companies to ensure quality and environment friendly inputs such as chemical insecticides and fungicides for proper management as well as quality mango seedling and between MFI and producers to provide agricultural loans with flexible conditions such as installment after harvesting, less interest etc.

CONCLUSION

The research findings demonstrate that there is a great scope to increase the economic contribution to the livelihood of the poor and EP through the mango fruit value chain. There is a high demand for mango fruit both in the local, national and international markets. Increased demand for quality mango fruits has become an important income generating activity for the poor and EP farmers, which can be accelerated by reducing poverty. The findings indicate there is a high potential to reach critical mass or inclusiveness and enrollment of poorer and EP mango producers. Key interventions for improving mango fruit chain include reducing middleman; improving market information through group motivation, input, finance and other services availability through LSPs; increasing chain performance through enhancing the level of collaboration with market actors; and promoting profit growth. It should be noted that the findings of this study as well as the lessons learnt are not limited to the mango fruit value chain, rather it will help different actors to improve the fruits value chain development and management. Though, building sustainable fruit value chain is contingent on many issues, whenever the benefits of fruit value chain are targeted for the EP households then the government and private companies have to invest in institutional dimensions for the pro-poor and inclusive growth of fruit sector.

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