



# Challenges in Supply Chain to Export Mangoes from Chapainawabganj

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ARTICLE INFO	ABSTRACT
<p><b>Received date:</b> Sep. 21, 2018</p> <p><b>Accepted date:</b> Dec. 18, 2018</p>	<p>This study is an exploration and problem findings research on supply chain to export mangoes from mango district Chapinawabganj that encounters challenges due to the shortage of the secondary supply chain activities. The study has explored the primary and secondary functions of supply chain to investigate the loophole of failure to export mangoes. Personal and telephone interview from mango farmers, middlemen and export experts have been carried out. Findings show that demand uncertainty, disorganized marketing system, grading problem, quality setting issues with the help of quarantine test are the major challenges in the mango exporting supply chain. Though mango farmers are able to cope with producing quality mangoes using the fruit bagging technology, the absence of contract farming and lack of application of all good agricultural practices (GAP) guidelines are recognized as the other drawbacks. So, the effectiveness of contract farming, development of infrastructure, quarantine test center and mango packaging center, direct transport facility with cooling van, organized marketing system are inevitable to resolve the challenges to export mangoes from Chapainawabganj.</p>

**Key words:** Good agricultural practice, Mango export, Marketing, Supply chain, Value chain

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## 1. INTRODUCTION

Supply chain refers to the value delivery network that connects producers, middlemen, suppliers, and customers (Kotler and Keller, 2016), suppliers, transporters, warehouses and retailers (Chopra et al., 2013) that collaborate to gain leverage strategic fit to improve operating efficiency (Bowersox et al., 2013). Supply chain requires inbound or primary activities including smooth production and outbound or secondary functions like shipping out final product to the final consumers to the value chain (Porter, 1985). Additionally, supply chain surplus or profitability

equals customer value minus supply chain cost. In other words, the difference between revenue generated from the customers and the overall cost is known as supply chain gain (Chopra et al., 2013).

Mango (*Mangifera indica*) is one of the species of plant in the sumac and poison ivy family *Anacardiaceae*, which is cultivated in huge quantity in Chapainawabganj. This district is located to the North-East of Rajshahi division inherited with many quality mango orchards. The supply chain of exportable mangoes from this region is connected with farmers, middlemen, and exporters.

First, the exporters form contract farming with the mango farmers who produce quality mangoes and ship the produces to the exporters. Then, the exporters undergo all the technical and chemical steps to package the exportable items, and finally, the mangoes are exported to the detained countries through the air. As such, the supply chain of exportable mangoes constitutes inbound and outbound activities. Though inbound supply chain activities like producing by the farmers to reaching the inputs to the exporters from Chapainawabganj do not encounter major challenges, outbound functions, in particular, triggering technical aspects to move on the products by the exporters seem to be much more challenging.

Bangladesh is positioned as the eighth country in the world in terms of mango production although in exporting its place is not mentionable (RHRSC, 2015). On 24<sup>th</sup> of June 2015, Chapainawabganj initiated shipping mangoes for the first time to the supermarkets of the United Kingdom creating a huge commercial potential for mango growers to gain higher prices of their best quality harvest. In the beginning, two tones of Langra and Fazli varieties of mango were shipped to the Walmart Chain Super Shop in the UK that is recognized as the first export journey of mangoes of Chapainawabganj to mainstream international supermarket through Messers Barkullah Traders in the district town. The mangoes were being sent to the chain shop and other Bangladeshi markets in the UK through Deep Enterprise (The Daily Observer, 2015).

Mango export has significantly dropped in 2016 only after one year start of shipment of this delicious fruit due to the failure of quarantine tests adhere to the European standard (Mirdha, 2016). Though Bangladeshi mangoes are consumed in the ethnic market, and the formal export commenced on 17 May 2015 making Bangladeshi mangoes available for consumption of the UK people.

However, the journey towards export started with ASDA (a Wal-Mart subsidiary) in early 2014 with a sample of Himsagar, Langra and Amrapali mangoes trailed by a Bangladeshi export-oriented firm known as DIP international. Within a shorter possible of time, the supply chain of mango export has faced few challenges as the participants in the supply chain of mango exporting has not been able to maintain few conditions set by the importers (FAO, 2015).

The conditions set for exportable mangoes include germ, insects and spot free mangoes with an average weight of each mango 200 to 350 kilogram, its colorful skin solid core part inside along with light sweetness (RHRSC, 2015). FAO (2015) further reports that exporters have mainly set three conditions consisting of quality standard, on-time delivery and proper documentation for mangoes from Bangladesh to be exported to the European countries.

In addition, few guidelines to produce quality mangoes known as good agricultural practice (GAP) are also given to the mango growers. However, it is almost difficult to follow all the guidelines to the point.

Communication gaps persist between the farmers and mango exporter regarding the quality of exportable mangoes. Farmers perceive that their harvested mangoes are delicious and standard enough to meet the international standard whereas international standard requires some specific conditions to be met, and farmers lack adequate information about the international standard of mango production (RHRSC, 2015).

The present study intends to fill in the gaps exploring what are the loopholes lie to the supply chain so as to exporting mangoes from Chapainawabganj. Specifically, this study aims to focus on two objectives as; (1) to explore the drawbacks in the supply chain to export mangoes from Chapainawabganj, (2) to suggest few recommendations to overcome the problems associated with mango exporting. Then, two research questions have been constructed refining the aim and objectives of the study as; (1) what are the challenges in the supply chain to export mangoes from Chapainawabganj? (2) how can the challenging issues be resolved to make the supply chain smooth to accelerate mango exporting from Chapainawabganj.

## 2. METHODS

### 2.1 Research approach

This study has followed exploratory research approach since the challenge to export mango from Chapainawabganj is a contemporary issue that lacks sufficient understanding. Cooper (2013) reports exploratory research becomes fruitful when researchers lack proper ideas about the problem in which insights are sought when the domain of the investigation seems to be new. Exploratory research as a problem identification research where a researcher knows a little about the problem (Nargundkar, 2012) seeking understanding in general (Aaker et al., 2011), that helps to increase comprehension when adequate information is not in hand (Boyce, 2011).

### 2.2 Data collection

Secondary data adhering to the problems have been searched through online and other sources. Related published materials including books, articles, news have been reviewed. Furthermore, previous documents from the farmers like cooperatives related to mango farming, previous documentation for exporting, and certification of the government regarding supervision of mango production have been thoroughly checked out to sense the problem from the ground.

Primary data have been gathered undertaking one to one in-depth interview from the stakeholders concerned with the supply chain of mango exporting. The sample frame was received from the secretary of mango production and export from Chapainawabganj.

Total five persons have been interviewed including the secretary of mango production association in Chapainawabganj and other three farmers having direct involvement in mango production and export. The secretary

(interviewee 1), three farmers (interviewee 2, interviewee 3 and interviewee 4), and the senior scientific officer and mango export expert (interviewee 5), responded the five questions about the challenges and recommendations regarding supply chain so as to mango export. All the respondents were between 35 to 55 years old. The corresponding author has acted as the interviewer following a pre-determined questionnaire in hand.

Mango orchards of the farmers involved in export have been physically visited to have a look at the fruit bagged mangoes during the interview. Furthermore, mango export specialist and a government higher official also have been interviewed. All the five interviews were recorded taking the kind consent of the five interviewees. Later on, the five audios have been dictated and transferred to the written format.

After preparing the audio scripts of five interviews, they were sorted from interview 1 to 5. Then, the written scripts were matched with the audios. The question-answer session covered 2 to 4 pages altogether 15 pages following single line space. Keeping the problem of the study in mind, only the responses of the interviewees relating to challenges in the supply chain to export mangoes have been noted.

Furthermore, suggestions of the respondents also have been mentioned with great importance. Besides the exporter's requirements regarding quality, time and documentation, other invaluable insights also have been explored through the interview. As such, the data analysis has tried to bridge the gaps between the importers and stakeholders concerning supply chain to export mango from solely Chapainawabganj.

### 3. RESULTS

#### 3.1 Challenges in the supply chain to export mangoes from Chapainawabganj

##### 3.1.1 Quality related challenges

The first interviewee and secretary of mango production association and pioneer of mango export in Chapainawabganj said that export quality mangoes were being produced from 2016 following good agricultural practices (GAP) though no authority in our country persists to look after the GAP. However, it is 90% possible to accommodate the GAP conditions to produce quality mangoes.

The second interviewee claimed that best effort is carried out to produce quality mangoes for exports, but due to extensive sorting and grading by the exporters, the quantity reduces by 10% at the end, and they are capable enough to document the required papers entirely.

The third interviewee who is altogether a farmer and middleman reported that he can send mangoes to the exporters on time as per the requirements of GAP. The conditions of GAP are a bit tough though it does not pose any problem to produce export quality.

The fourth interviewee who is a farmer and secretary of local mango and crops protection association urged that

mangoes from Chapainawabganj are delicious, sweet and good enough unboundedly but they are fully uncertain about sending the quantity of mangoes due to the lack of permanent contract with the exporters or the middlemen.

The fifth interviewee the senior scientific officer and mango export specialist at mango research center replied as to quality mango export is that farmers are in practice under the GAP since 2015 using the fruit bagging technology resulting in the production of 100% exportable mangoes. However, it may not be possible to test the quarantine here in Chapainawabganj.

##### 3.1.2 Maintenance of documentation during the mango production and export process

All the interviewees agree on the point that they are fully able to keep the record of mango production process along with export-related documents.

##### 3.1.3 Timely mango delivery to the exporter

All the farmers come to the point that they are able to send mangoes on time to the exporters who further send mangoes abroad.

##### 3.1.4 Other challenges

The first interviewee added that uncertainty about the demand for exportable mango is a major drawback. For instance, about 7 tones of mangoes were bagged in the special fruit bag, but it is uncertain how much to be exported in the current season. Furthermore, government officials require being more sensitive to this issue.

The third interviewee claimed that uncertainty about demanded quantity is the main problem. Communication gaps with the exporters and farmers, lack of collective efforts to control fruit flies and other pests and natural spots on mangoes are also treated as the challenges.

When the government official and mango export expert the fifth interviewee was asked about the lack of seriousness from the government side, he replied that the concerned authority is trying its best to accelerate mango exporting from Chapainawabganj.

The farmers are highly successful in producing and delivering the exportable mangoes to the middlemen, but major challenges lie in managing demand uncertainty and required test that are beyond the means of the farmers engaged in mango export supply chain.

The expert also added that it is also the responsibilities of the farmers to communicate with the field officers, mango research unite on the problems related to quality mango production and its export.

It is noted that all the farmers were happy about the price per kilogram ranging from BDT 80 to 100 they receive from the exporters, and it costs around BDT 25 to 40 for per Kg mango worth to be exported.

When the fifth interviewee was asked about the demand uncertainty of exportable quantity of mangoes, he acknowledged the crucial problem. He opined that if the

farmers, exporters, export promotion bureau or any party in mango export chain is uncertain about the number of

export along with an arrangement of crops insurance to offset the risk of their harvest.

Table 1 Response of the interviewees concerning mango production and export.

Respondents	Age	Supply chain functions	Perceptions	
Interviewee 1	35-40	Quality mango production	90% positive	10% negative
Interviewee 2	40-45	Documentation ability	100% positive	0% negative
Interviewee 3	40-45	Timely delivery to exporters	100% positive	0% negative
Interviewee 4	50-55	Demand uncertainty	0% positive	100% negative
Interviewee 5	40-45	Quarantine test	0% positive	100% negative

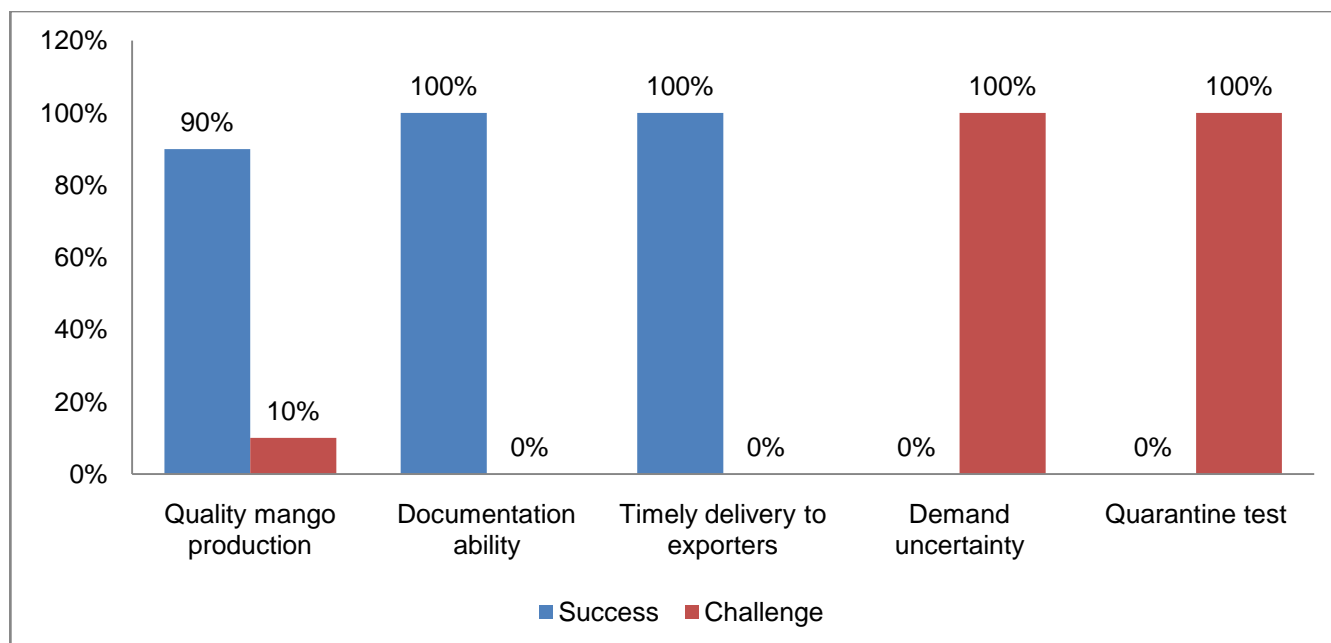


Fig. 1 Challenges in the supply chain to export mangoes from Chapainawabganj.

exportable mangoes that how much to be exported this year, then the whole supply chain in mango exporting will be severely harmed.

All respondents unanimously responded that quarantine test is very crucial to trace the quality of the exportable mango from this district since there no facility to justify such chemical test. Additionally, the marketing system for exportable mangoes is not organized since the marketing management of mango export is not developed in Chapainawabganj.

### 3.2 Ways to resolve the issues to accelerate mango exporting from Chapainawabganj

The first Interviewee recommended that effectiveness of the GAP necessarily can resolve the challenges to export mangoes from Chapainawabganj. Rajshahi and Chapainawaganj can be prioritized to produce mangoes for

The third interviewee admitted that three grading quality like grade A, B and C can make sense for the mangoes to minimize their loss as the rejected mangoes by the exporters cause their massive loss. Notably, contract farming and proper deed maintenance among the parties involved in export is extremely important. In addition to grading and contact farming, proper care from the concerned agricultural officials about promoting Chapainawabganj mangoes abroad is indispensable to resolve the challenges connected to mango export.

The fourth interviewee added that exportable mangoes must be packed in the garden and quarantine test center should be available in the Chapainowabganj district. Agricultural officials have to communicate about the scientific and updated technologies to harvest quality mangoes with the farmers.

The fifth interviewee claimed that demand uncertainty can be resolved following three issues. Contract farming must be completed for the next year just after finishing the current harvesting season. Second, a specific work plan should be devised every year ensuring obligation to maintain the contract with the farmers under the contract law. Finally, a separate unit will monitor the entire process from mango production to export.

Furthermore, the expert stressed on the recommendation about forming organized export marketing system the district lacks. Additionally, effective training for the mango farmers to develop their mango farming efficiency and application of GAP can resolve the challenges in the supply chain to export mangoes from Chapainawabganj.

## 4. DISCUSSION

### 4.1 Drawbacks in the supply chain to export mangoes from Chainawabganj

RHRSC (2015) points out a few challenges as to produce and export mangoes from Chapainawabganj consist of natural calamities, short duration of mango, lack of high water treatment, extensive use of chemical to protect and ripe mangoes are mentionable. Moreover, dissatisfactory packaging and transportation system, unawareness of the farmers about export condition, exporters' knowledge gaps about Bangladeshi mangoes, improper research and extension initiative to promote mangoes, fewer air cargoes, insufficient cooperation from the government and lack of suitable principles regarding mango export are considered the other challenges.

Basically, three requirements comprising quality mangoes, proper documentation for entire mango production and exporting process and timely shipment of the consignment were imposed for mango export (FAO, 2015). All the three instructions are the parts of Good Agricultural Practices (GAP) for mango production and export for the European prescribed by RHRSC (2018) consisting of 26 principles.

They include seeking permission from plant quarantine; listing farmers for contract farming through the registered forms from the allowed exporters; ensuring safe and chemical free quality mangoes under contract farming; continuation of the GAP principles from commencement of mango production to the end of export; taking sufficient measures to be taken to free mangoes from fruit flies with proper documentation for traceability.

Making sure satisfactory arrangement for controlling mango stone weevil and mango pulp weevil; carrying out cleanliness campaign every year in the mango orchard; and collecting to packing mangoes should be done in way so that mangoes are not attacked by flies. In addition to these, maintenance of fruit bagging technologies as per international standard; applying the best tools and techniques in the garden; using of cooling van for transporting mangoes from packing to shipment (RHRSC, 2018).

Ensuring the supervision of the Upozilla team as to the entire cooling process; following HACCP principles for collecting, sorting, grading, packaging, storing and transporting mangoes; maintenance of tidiness of the farmers according to HACCP; not transporting other goods along with mangoes in the same transport; ensuring maximum residue limit test; specifying price with the farmers before mango collection; ensuring that mangoes shall be transported to the central packing house through cooling van, and after washing, drying, grading, packing of exportable mangoes will be finalized and they will be stored in the cooling chamber (RHRSC, 2018).

Moreover, concerned official of the cooling chamber will accomplish the required documentation; the consignment will be shipped directly to the airport, and respective airport authority will finish export formalities to the cargo airline; every mango shall pass the test of export quality; after exporting, rest of the mangoes will be marketed in the home market as premium quality mango followed by GAP (RHRSC, 2018).

The mango farmers in Chapainawabganj are able to harvest exportable mangoes as per the principles of GAP, but facilities and infrastructure to transport quality mangoes to the exporters in the light with GAP have not been developed fully. Therefore, lack of supportive activities to facilitate mango export seems to be the major challenge in the supply chain.

Porter (1985) developed the value chain possesses substantial elements as to understanding supply chain challenges to export mangoes from Chapainawabganj. The current study reveals that farmers are capable enough for the production of exportable mangoes, but they require adequate inbound and outbound logistics support which they lack. Furthermore, especial promotional campaign to grab foreign market is missing currently requiring special services by the concerned home and abroad government officials.

Besides primary supply chain activities, secondary supply functions need to be updated related to collection of mangoes, facilities development deploying experts with modern technology-based mango farming. As such, current supply chain is affected by major value chain activities linked with shipping mangoes abroad.

### 4.2 Ways to overcome the problems associated with mango exporting

The whole secondary supply chain activities should be devised from collecting quality mangoes from Chapainawabganj to shipment to the airport, and all the parties across to the entire supply chain must accept their cost to generate supply chain surplus. As per RHRSC, (2017) fruit bagging technology refers to using a special white bag for the colorful mangoes and brown bag for the other mango varieties. Those two particular research-based bags cover the mangoes to produce chemical and fly infection free fruits.

However, an absence of application of the other principles of Good Agricultural Practices (GAP) can result



in failure to gain quality mango production. If international marketing system for mango is not developed, organized mango marketing system in Chapainawabganj is not ensured, adequate transportation for mango carriers are not

so that mangoes from this region can be shifted abroad without any hurdle. As sufficient mangoes are available exceeding home demand, mango export will inevitably boost the economy of Bangladesh bringing a breakthrough in this

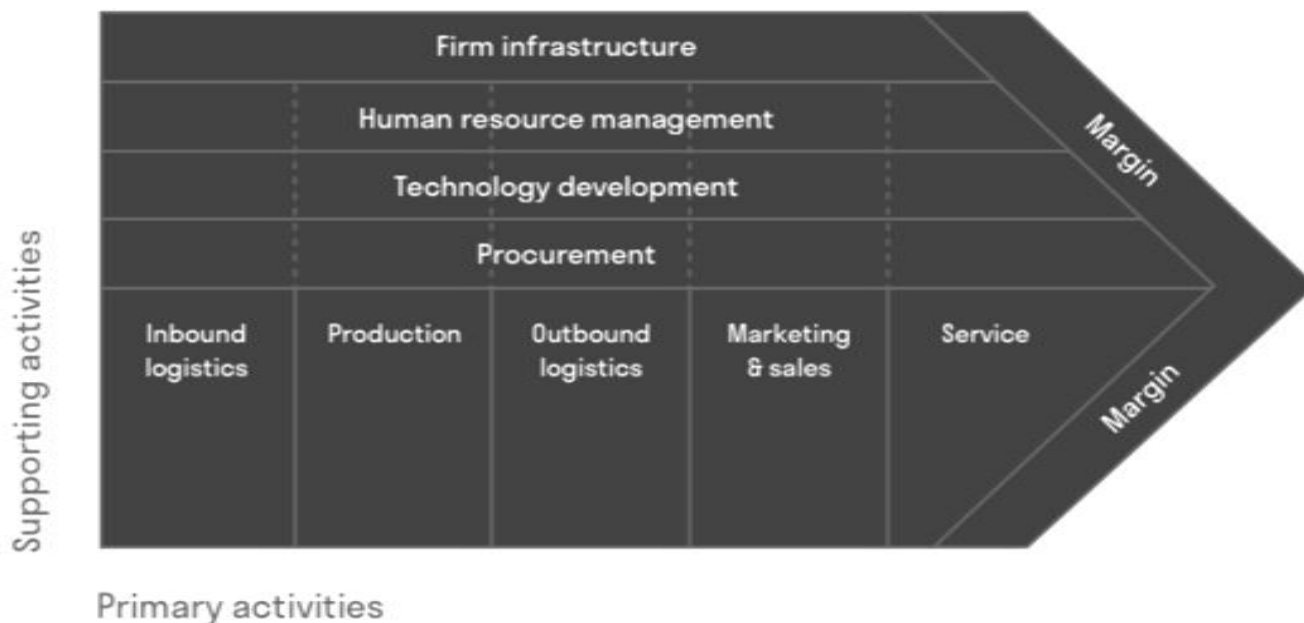


Fig. 1 Michael Porter's value chain analysis related to supply chain in 1985.

arranged, farmers will not be able to receive the benefit of fruit bagging technology properly.

This study strongly recommends solutions to the challenges in the supply chain to export mangoes. In particular, contract farming to resolve the demand uncertainty, development of quarantine test center in this district with required infrastructure are highly required. Furthermore, mango packaging center in the mango garden, direct transport facility from the origin to airport with cooling van facilities, organized marketing system are crucial to accelerate the smooth functioning of supply chain to export mangoes from Chapainawabganj.

## 5. CONCLUSION

Supply chain to export mangoes from mango district Chapinawabganj has become challenging due to the unavailability of the secondary supply chain facilities and infrastructures. In addition, an absence of contract farming and limitation of applying all GAP guidelines are considered as the other challenges.

Nevertheless, the mango farmers are able to cope with the challenges to produce international quality standard mangoes subject to providing them with appropriate training. Adequate assistance to supply chain to export mangoes can enhance the supply chain efficiency making sure that all the stakeholders are doing their best.

The government, researchers, exporters, importers, middlemen need to work together to overcome the challenges to make the mango export supply chain smooth

region in terms of standard of living. Further research is highly required involving mango exporters and importers to spotlight the problems in the supply chain to export mangoes along with resolving the existing challenges the farmers are facing for the betterment of the mango farmers in Chapainawabganj.

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## Appendix 1 Interview questions to the farmers.

Dear mango farmer,

We are conducting a research titled on “Challenges in supply chain to export mangoes from Chapainawabganj”. The result of this research will help our academic field, and it also will assist to ease mango exporting from Chapainawabganj. Therefore, your cordial cooperation is highly appreciated. You are requested to answer the following question that might take your few minutes.

1(a). Do you face any quality related problems in exporting mango as specified by the exporter? (i) Yes (ii) No

(b) If your answer is “yes”, please explain.

2 (a). You require to maintain documentation during the mango production and export process. Do you face any challenges or problem? (i) Yes (ii) No

(b) If your answer is “yes”, please describe.

3(a). As mangoes are perishable product, you need to follow a time limit to send mangoes to the exporter. Do you face any problem to send mangoes to the exporter within this limit time? (i) Yes (ii) No

(b) If your answer is “yes”, please specify.

(4) How much per kg mango does cost to send the exporter and what is your profit, you earn for per kg mango?

Thank you for your time.

Your name:

Age:

Address:

Contact number:

Your role in exporting mangoes: (a) Farmer (b) Middleman

## Appendix 2 Interview questions to the senior scientific officer and mango export expert

Dear Sir,

We are conducting a research titled on “Challenges in supply chain to export mangoes from Chapainawabganj”. The result of this research will help our academic field, and it also will assist to ease mango exporting from Chapainawabganj. Therefore, your cordial cooperation is highly appreciated. You are requested to answer the following question that might take your few minutes.

1. Would you tell us about the quality issue of exportable mangoes from Chapainawabganj?
2. The mango producers claim that the government officials lack seriousness in cooperating them in producing and exporting mangoes. What will you tell about this?
3. What are your opinions about demand uncertainty to export mangoes and how it can be resolved?
4. As a mango export expert, what are your suggestions to improve the supply chain to export mangoes from Chapainawabganj?

Thank you for your time.

Your name:

Age:

Address:

Contact number:

Your role in exporting mangoes: