



A PROJECT REPORT

**“An Overview of Cold Chain Network of Golden Harvest in
Bangladesh”**

Submitted To

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LETTER OF ACCEPTANCE

Date: 20/12/2018

To
Professor Dr.Md. Bellal Hossain
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Subject: Submission of the Project Report.

Dear Sir,

I would like to take this opportunity to thank you for the guidance and support you have provided me during the course of this report. Without your help, this report would have been impossible to complete.

To prepare the report I collected what I believe to be most relevant information to make this report as analytical and reliable as possible. I have concentrated my best effort to achieve the objective of the report and hope that my endeavor will serve the purpose. The practical knowledge and experience I have gathered during preparation report will immeasurably help in my future professional life. I request you to excuse me for any mistake that may occur in the report despite of my best effort.

I would really appreciate it you enlighten me with your thoughts and views regarding the report. Also, if you wish to enquire about an aspect of my report, I would gladly answer your queries.

Thank you again for your support and patience.



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DEDICATION

This research work is dedicated to my beloved father **Md. Abdur Razzak Akund** and mother **Mst. Rehana Begum** and my Brother-in-law **Md. Kamal Hossain** who gave me the support and courage to fulfill this work successfully.

LETTER OF RECOMMENDATION

This is to certify that the project report entitled “An Overview of Cold Chain Network of Golden Harvest in Bangladesh” submitted for assessment to the examination committee by Md. Abu Sofian bearing ID: 153-34-463 a students of Department of Nutrition and Food Engineering. I am pleased to declared that this report is entirely written by the author and the all the related research work have been conducted by the researcher under my strong supervision and observation. This is a piece of original work and has neither been submitted to nor been published anywhere before for any other purpose.

I strongly recommend the approval of the report by the authority and by the same token, I also recommend a positive and fare evaluation of the work.

I wish every success in his life.

Yours Sincerely

Dr. Amir Ahmed
Associate Head
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ABSTRACT

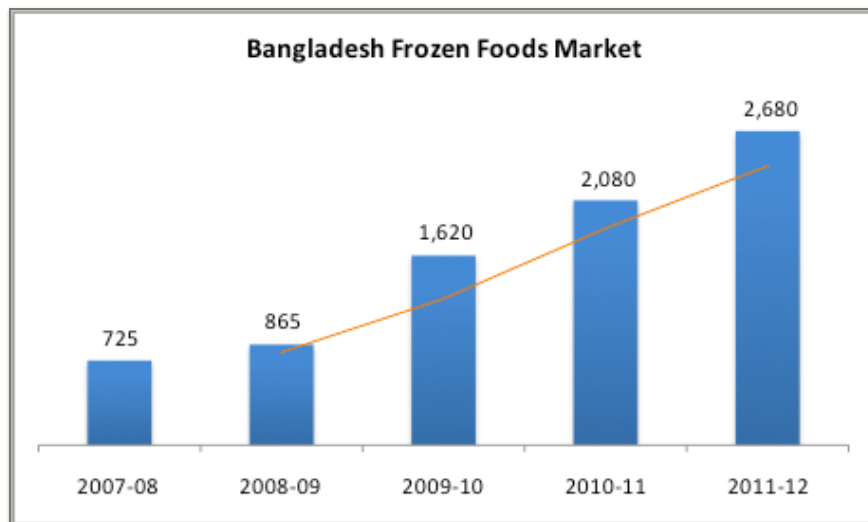
Golden Harvest a market lead and pioneer in frozen food market. Golden Harvest has recently introduced a Cold Chain Network in Bangladesh in association with USAID. This study has attempted to explore different dimensions of the newly established network of Golden Harvest it terms of technological advancement, economy in logistics and overall well-being of farmers in food spoilage and waste management process. Study reveals the Cold Chain Network of Golden Harvest has contributed a lot in food silage and waste management issues of farmers who do not get a cold storage facilities. The three different logistics models studied and all these are adopted into Golden Harvest Cold Chain Network. This cold chain network has not only contributed at farm area but also initiated a new trend of frozen food. These new trend of frozen food is a time demanding approach to match with urban lifestyle. Observational data shows the evidence that not only Golden Harvest, many other players in the particular are effectively maintain cold chin in retail shops especially the chain shops such AGORA, MINA BAZAR, SHAWPNO, NANDAN and Non-Brand medium and large grocery outlets. Understanding of logistic management of cold chain network is found with prime importance as it has been predicted by experts that the market will grow by 80-90% in next 5 years.

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1. INTRODUCTION:

The Golden Harvest is one of the prominent frozen food producer in Bangladesh and pioneer in introducing frozen confectionary items especially in the chain shops in the Dhaka city. Golden Harvest launched a cold chain network on September 19th, 2014, the first of its kind in Bangladesh, to facilitate the storage and mobility of temperature-controlled food products across the country. Preservative transportation and food storage network, the Cold Chain Network can revolutionize agriculture and nutrition in Asian country. In general, in dairy farms the farmers have two choices, either selling products when harvested and receive the lowest price because the market is flooded with same things of many farmers or building a store and hold the best price from the market. By the help of this Cold Chain Network now the farmers of Bangladesh can transport and store their products through the cold chain network and get better prices as the Golden Harvest introduced the cold storage facilities for the farmers and others. In Bangladesh, through use of this opportunity in agriculture sector, farmers can maximize the profits and consumers can get hygienic and fresh foods. Being the first venture in the cold chain network in the Bangladesh market Golden Harvest developed it to facilitate the customers with process-friendly and easy to access network.



The aim of the initiative is to reduce post-harvest losses, deliver high-value products to market, ensure fresh and hygienic food for consumers and fair prices for the farmers and improve the

availability of locally-produced nutritious foods. Currently, over 40% crops are being wasted in the country due to lack of post-harvest preservation facilities and technologies (.....). The Cold Chain Network has the capacity of storing half a million liter products. It will be accessible for all segments of temperature-controlled products in Bangladesh and for producers willing to store and transport their products.

The Golden Harvest is implementing the project supported by the Cold Chain Bangladesh Alliance and funded by USAID. The project is being implemented at a cost of \$50 million which will be invested in phases. The Golden Harvest has already invested \$15 million while its partner USAID \$4.92 million in the first phase. The storage facility is initially offered from two centers – Dhaka and Gazipur and service is provided from Chittagong, Comilla, Sylhet, Rajshahi and Khulna very soon.

However, frozen foods are being increasingly popular in the urban areas of Bangladesh (.....). All chain shops and most of the modern and semi-modern grocery shops have been selling a line of a good number of frozen food in Dhaka and other metropolitan cities in Bangladesh. Golden Harvest is not only a company of many similar companies but also a leading and a pioneer brand in this particular sector. In addition, other major players in the market are as follows:

- AG Agro Products Ltd.
- Bengal Meat Ltd.
- Kazi Farms
- Pran Group
- Aftab Group
- Rich
- CP
- Eurasia
- BRAC

2. LITERATURE REVIEW:

Goyal and Gunasekaran (1995) considered the impact of market policies on the demand of the perishable commodity. They developed an integrated production inventory-marketing model to determine the economic order quantity (EOQ) and the economic production quantity (EPQ) model for deteriorating items in a multistage production system.

Joshi et al, (2011) had studies key performance attributes and decisions factor to evaluate cold chain performance. They uses series of methodology to aid decision makers to measure performance index and understand complex relationships among cold chain attributes.

Lin & Chen, (2003) takes on to problem of dynamic allocation of uncertain supply of perishable goods. They used a generic algorithm to improve both net profit and shortage rates in perishable supply chain.

Ucar (2013) conducted study to know insight about influence of education on the practices and knowledge of consumers to protect or maintain the cold chain. He found out that educated people cautious towards using refrigeration techniques. They are also people using these techniques properly.

A simple model for distribution of perishable goods in cold chain logistics is given by Verbic (2006). His model consists of three stages shown in figure 1.

3. OBJECTIVE OF THE STUDY:

i) This study is an attempt to explore the cold chain network and its activities of Golden Harvest a famous frozen food brand in Bangladesh.

ii) In addition, it will also focus on the alliance of Golden Harvest with USAID in terms of its recent investment in cold chain and its presumptive impact on the perishable food product market in Bangladesh

4. SIGNIFICANCE OF THE STUDY:

Cold chain logistics is one of the newest inclusion in the frozen food sectors in Bangladesh. Considering today's level of wastage in fruits and vegetables as well as country's requirement for food security and better health care cold chains can be could be an effective options in meeting food demand. Thus, it seems the current emerging cold chain market would have a double digit growth in next five years. This study of cold chain network newly implemented by Golden Harvest in collaboration with USAID in Bangladesh is a remarkable inclusion towards wastage management of perishable product and quality management of frozen food. This study has explored different critical areas of cold chain management where immediate improvements are required. This study also includes an observational finding of cold chain maintenance at different chain shops where frozen foods are being sold on a regular basis. Over all study of cold chain network by Golden Harvest and few other brands will definitely enrich knowledge of the reader in this emerging area of integrated food value chain management.

5. METHODOLOGY:

This study is mostly based on recent inception of cold chain network in Bangladesh and the emerging trend of frozen food consumption in urban lifestyle. Methods includes both study of secondary information about could chain and some primary data collected by researcher including personal interviews and observation.

5.1 Investigation Techniques:

This study includes following methods in collecting data and information:

- Secondary data about cold chain system, its national and international network including cold chain practice of Golden Harvest were from different journals, company information and web documents. Some statistical data were also collected from the archive of Bangladesh Bureau of Statistics (BBS).
- Primary data and some relevant information about Golden Harvest have been collected from the respondents of the company.
- Primary data have also been collected by paying visit to different chain sops and grocery stores where Golden Harvest products are available.

5.2 Instruments:

- In-depth interview with semi-structured questionnaires.
- Observation.

6. FINDINGS

6.1 Concepts, Definition and Classification of Cold Chain:

Cold chain logistics is a systematic process that assures the quality of food and lessens the spoilage and wastage of food. It acquires that the freezing and frozen food are always kept under a low temperature when producing, storing, transporting, selling, and every other steps before consumption (Wang zilin, 2005, pp. 18-20).

WHO, (2004) defines Cold Chain as a network of refrigerators, cold stores, freezers and cold boxes organized and maintained so that vaccines are kept at the right temperature to remain potent during vaccine orders and supplies, their transportation, storage and distribution from factory to the point of administration to target peoples.

Cold chain is applicable under the following areas: primary agricultural products: vegetables, fruits; meat, chicken, eggs; aquatic products, flowers. Artifactitious foods: deep freezing food, packing cooked food of chicken, meat, aquatic products and so on, ice cream, dairy products; raw materials for short order. Special goods: medicine (Wang zilin, 2005, p. 18).

6.2 Characteristics of Cold Chain Logistics:

Depending of time and environment freezing and type of frozen food the cold chain logistics has following characteristics:

First, the end quality of freezing and frozen food rests with three Ts: a) temperature controlling, b) time of cold chain and c) tolerance of product. Thus, transportation service matters a lot with the quality of freezing and frozen food even in the final selling to consumers. (Su Xiujin, 2005, p. 31)

Second, in order to ensure the food which can be easily perished are placed under the necessary low temperature during each step, many facilities and equipment are needed, such as the temperature controlling system, refrigerator car and so on. Moreover, for the sake of enhancing logistics operating efficiency, some advanced information systems are required. All of these are obviously higher the cost of cold chain logistics. Therefore, there is a close relationship between cold chain logistics cost and the whole operation of the cold chain logistics.

Third, cold chain logistics is a complex system that pays much attention on temperature. For example, if there's a tiny mistake in any process of transportation, the food may go bad. The whole cold chain of the food is broken. Thus, the harmony among every segment is important in keeping safety of food in the process of processing, transportation as well as selling. It's a low temperature system with high technology.

6.3 Benefits of Cold Chain:

- i) Reduce product spoilage
- ii) Reduce transport costs
 - Rerouting Shipments
 - Reducing damage due to bad handling
 - Improving packaging efficiency
 - Detecting hotspots promptly
 - Using reusable packaging and shipping containers



iii) Reduce operational cost Activate tracking through logs and real-time alerts about temperature breaches give shippers and 3PLs enough of heads-up to contain problems before the damage is irreparable.

iv) Increase shelf life:

- A perishable food product stored at 25 degrees Celsius for one hour would yield the same amount of spoilage if the same product was stored at 1 degree Celsius for one week.

v) Protect the environment

- Food waste emits 3.3 billion metric tones of carbon dioxide, which is slightly behind the greenhouse gases China and the U.S. emit.

v) Eliminate crisis management costs

- The cost of cold chain risk management is always high, at the same time the cost of cold chain failure is always extreme. The consequences are loss of consumer trust, loss of market share, or in extreme circumstances, even the loss of life, can sink even the hardiest of companies. While good cold chains are the first line of defence against preventable losses, real-time cold chain monitoring can help contain or reduce the impact.

vi) Improve health

- Improper refrigeration allows for the growth of dangerous bacteria, such as Salmonella. Proper handling of food throughout the supply chain will save lives, reduce healthcare expenses, and prevent law suits.

6.4 Study of Different Types of Cold Chain Logistics Model:

Cold Chain logistics models includes both traditional and modern logistics facilities that ensure maximum output. The traditional models are:

- Simple Logistics Model:

In this model Verbic (2006) represent that first a product being undergone production phase, packing phase and storage of goods. Second is transportation of goods and third is reload and storage of goods.

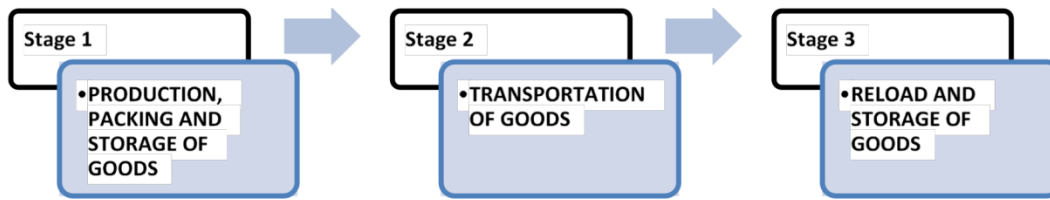


Figure 1. Plain logistic chain from the source to the supply market (Source: Adopted from Verbic, 2006)

- Five Stage Model:

In this model WHO, (2004) suggested a five stages procedure shown in figure 2 for establishing cold chain. Monitoring and supervising have been given highest emphasis in this model.



Figure 2. Managing Cold Chain (Source: Adopted from WHO, 2004)

- Current Supply Chain Models:

There are two kind of supply chain for fresh fruits and vegetables exist in Indian subcontinents. First is traditional and second is organized market supply chain (Ministry of Agriculture, 2011). A traditional supply chain model for fruits and vegetables is shown in Figure 3. It shows minimum numbers of intermediaries involved in this supply chain. Majority of trade flows through this route. Generally, a local Middleman or Agent buys and collect from Farmers and sell produce to Traders. Trader further sells it to wholesaler. Before reaching customer, it moves from Wholesaler to Retailer and finally reaches customer via Retailer. Problem with traditional supply chain is that it involves lots of intermediaries between Grower and Consumer which increases transaction cost as well as wastage.

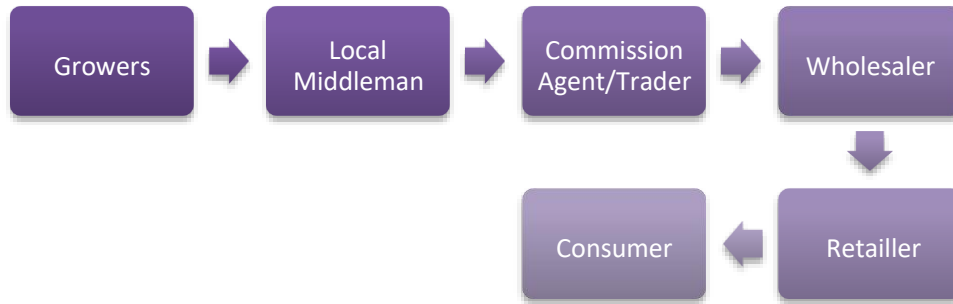


Figure 3. Traditional Supply Chain for Fruits and Vegetables (Source: Adopted from Ministry of Agriculture, 2011)

Second type of supply chain is adopted by multiple organized retail chains (shown in figure 4). This model is based on value chain model. Organized retailer directly buys from farmers and sells to customer. It cuts intermediaries transaction cost as well as wastage.

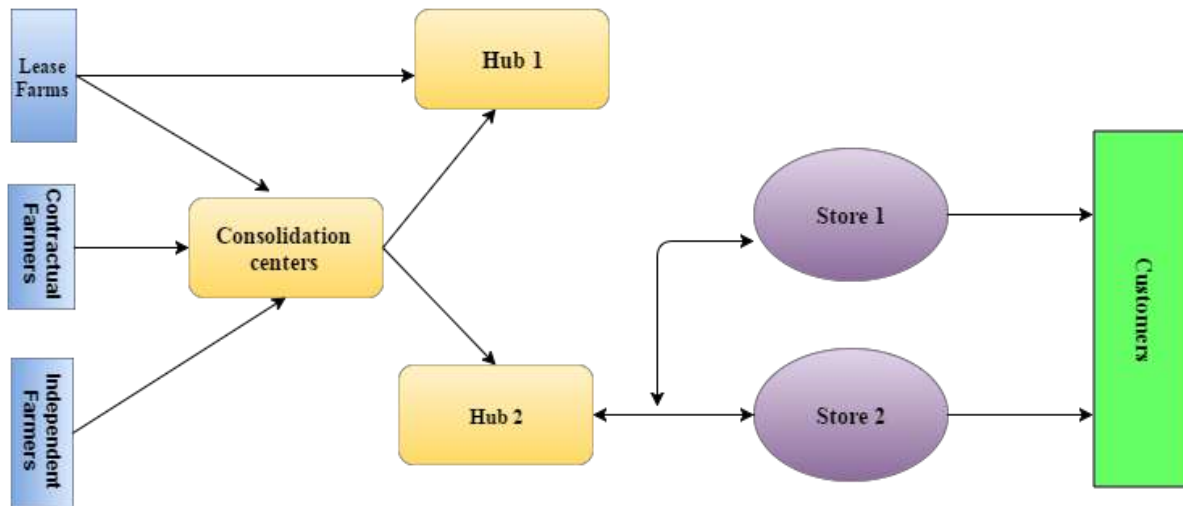
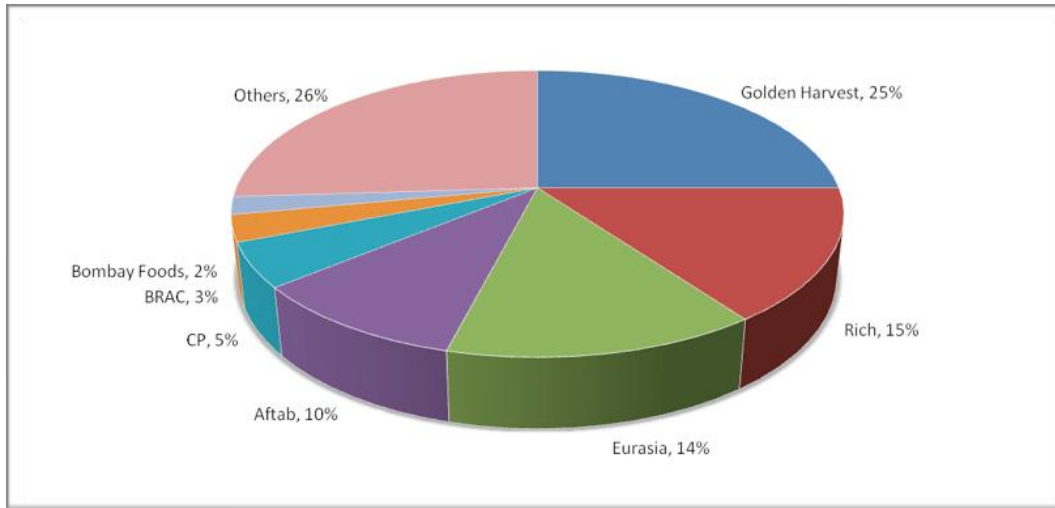


Figure 4. Value Chain model adopted by Organized Retail Chains. (Source: Adopted from Ministry of Agriculture, 2011)

6.5 Cold Chain practice in Frozen Food:

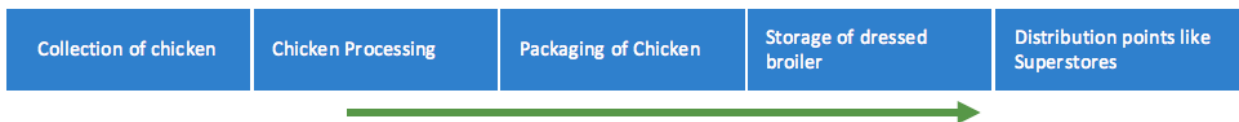


Competitive Scenario: Bangladesh Frozen Foods Market

Figure 6. Market share of Frozen Food in. (Source: Adopted from Ministry of Agriculture, 2011)

Cold chain for frozen chicken:

The diagram below illustrates the value chain for frozen chicken market where products are directly transferred from poultry firms to dressing facility for onward processing. Once processed, the dressed chickens are packaged and stored in chilled warehouse; subsequently moving to end point for sales.



6.5 Golden Harvest Cold Chain Network:

In Bangladesh, products, fish, and meat make their voyage from the wide open to urban focuses without the advantage of refrigeration. Almost 50% of all new sustenance turns sour before it very well may be sold; this is a noteworthy test for Bangladeshi purchasers, nourishment organizations, and smallholder ranchers alike. The Feed the Future Strategy for Bangladesh recognized the advancement of a 'chilly chain' — a system of gathering focuses, cool stockpiling units, and refrigerated trucks as a basic advance for sustenance security in Bangladesh. In any case, chilly chain improvement would be cost restrictive and unsustainable for a benefactor to attempt without an accomplice that is focused on the nearby market. USAID/Bangladesh found the arrangement in a neighborhood organization, Golden Harvest, who was eager to put resources into chilly chain foundation. USAID's own assets (its system, specialized help and brand esteem) served to enhance Golden Harvest's interests in an association that is gaining critical ground on sustenance security in Bangladesh.

As the organization came to fruition, Golden Harvest made a responsibility of \$10.2 million with the understanding that USAID would give access to specialized specialists in chilly chain the board and additionally on-cultivate help for Golden Harvest providers. Notwithstanding money ventures, Golden Harvest entered the organization with existing resources basic to building a chilly chain in Bangladesh: influence generators that could keep up the cool chain even where power isn't accessible, and a current armada of refrigerated trucks.



USAID's Technical Assistance for Smallholder Farmers:

Notwithstanding bringing its system of worldwide specialists, USAID likewise has profound skill in agrarian profitability and effective cultivating rehearses. Through its implementer Winrock International, USAID likewise given preparing and support to agriculturists that supply Golden Harvest. Ranchers make up almost 50% of the populace in Bangladesh. Most are subsistence ranchers, tending little plots of land to encourage their families. When they have an excess, they move their vegetables, meat, and fish at nearby markets. Be that as it may, without refrigeration frameworks or then again information of appropriate taking care of and bundling of meat and vegetables, Bangladeshi ranchers lose quite a bit of their collect before it tends to be sold.



6.6 Complication of Golden Harvest cold chain practice

Although, temperature control has effectively been maintained from collection phase to carrying phase and subsequently storage phase but complication arises when labor shift goods from freezing van to the temporary storage. In this particular phase of cold chain which requires approximately 2-3 hours, temperature control become a crucial factor. However, observational data shows that individual product pack changeover time does vary more than 45-50 minutes a temperature uncontrolled period. This particular challenge has been figured out to overcome by increasing the manpower during changeover time which may seem a cost elevated procedure but overall impact is effective to achieve the objectives of cold chain management.

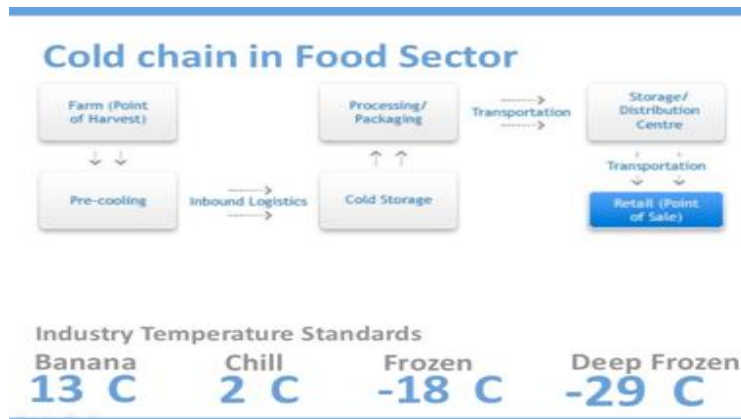


Figure-9 Processed chicken cold chain flow chart

6.7 Frozen food product line of Golden Harvest:



Figure-10 Different frozen food items of Golden Harvest

6.8 Golden Harvest- an overview:

Mission

Consistently deliver international standard innovative products & services for improved lifestyle.

Vision

To be the most trusted and preferred brand to every household in Bangladesh.

Other Business:

1. Golden Harvest Agro Industries Ltd.
2. Golden Harvest Ice cream Ltd.
3. Golden Harvest Foods Ltd.
4. Golden Harvest Express.
5. Golden Harvest Dairy Ltd.
6. Golden Harvest Developers ltd.
7. Fatehpur Estate Ltd.
8. Golden Harvest Commodities ltd.
9. Golden Harvest InfoTech Ltd.
10. Brain train studio Ltd.
11. Sonali Life Insurance Ltd.

List of different frozen products:

Table-1: Frozen product line

SI	Product	Product	Product
1	Aloo paratha	Mini Beef spring roll	Fish finger
2	Aloo puri	Chicken burger patty	Mega deshi paratha
3	Aloo singara	Chicken meat ball	Rice root
4	Aloo rooti	Dal puri	Straight cut french fries
5	Beef burger patty	Fish Ball	Mini chicken spring roll

Cold Chain Model of Golden Harvest:

In (figure- 11) it has shown that how material flow in cold chain system for food items at different outlets. In the process at the 1st step material are in captive by the producer, and then it will be transferred from producer to local storage centre. From local centers it will be transferred to central storage and distribution facility. In the next phase, the distribution phase central distribution facility will sends goods to local hubs. Lastly, goods will be delivered to consumer via retailer.

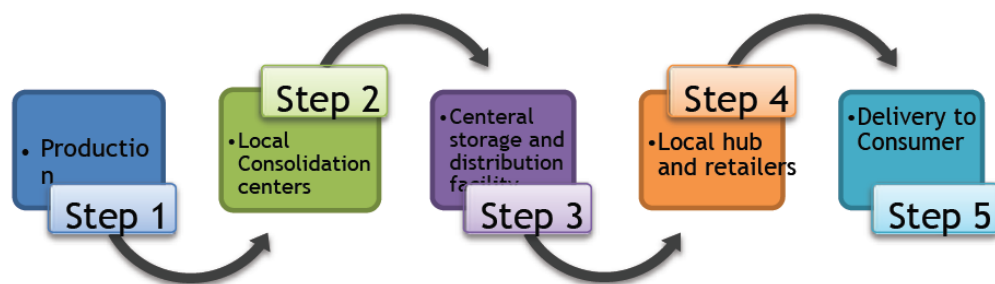


Figure 11. Material flow in supply chain network.

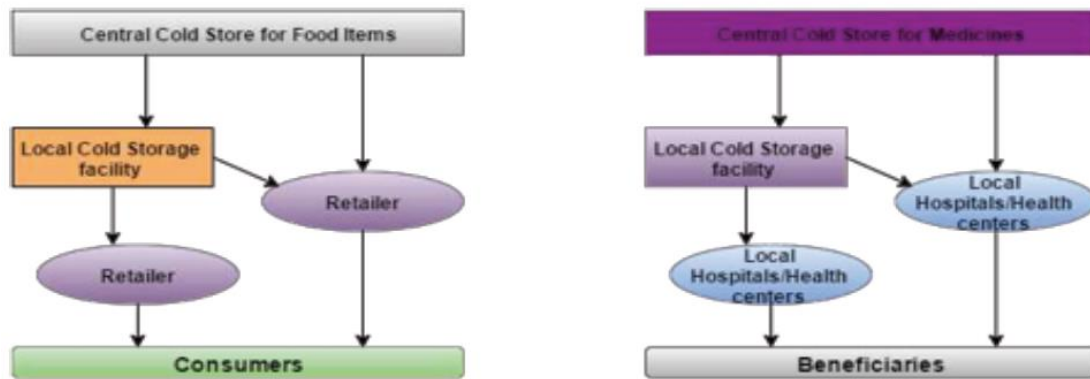


Figure 12. A simple model of local cold storage facility used for storing food items and medicines.

7. Discussions:

Cold chain logistics is one of the emerging sectors in Bangladesh. Incorporation of cold chain is a consequence of increasing trend of frozen foods consumption in urban lifestyle which is in turn an effect of busy urban lifestyle. However, considering today's level of wastage in fruits and vegetables and country's requirement for food security and better health care cold chains can be crucial in meeting food demand. The development of cold chain industry is important in reducing the wastage of the perishable commodities and thus providing remunerative prices to the growers. There are surely other factors which contribute in building robust supply chain for perishables. In this paper I tried to give an overview of the cold chain network of a renowned company Golden Harvest a conglomerate engaged in diversified business. Frozen food is one of its prominent concerns. The findings include solution for problems in existing supply chain of perishables, also referred as cold chain, by building a workable model of cold chain network. The study incorporates remarkable findings in cold chain practice in real time from researcher's own observation in several outlets in the Dhaka City.

7.1 Scope for cold chains:

In Bangladesh, a major portion of retail is unorganized sector and traditional model is most prevalent model of supply chain. In this model there are multiple intermediaries which share supply chain profits, due to long chain of intermediates profit margins of are low despite high prices of retail value. Due to lack of substantial margins, producers not able to adopt best agriculture practices and often discouraged to farming. In hilly areas of Uttarakhand, fruits and vegetables production is dispersed over large areas. It is hard to classify group's villages into specific fruits and vegetable cluster. If most of production is spread over large areas it will be difficult for logistics to collect supplies and a cost over-run can be faced during this activity. Development of product specific cluster can solve this problem. It will minimize transportation cost and benefit in producing large quantity from specific areas. During disaster, it is often seen that there is unavailability of last mile distribution system for disaster relief. Cold chains can prove to be of great use during relief operations. Cold chains established in strategic locations can improve response time in relief operations. They also have better reach and last mile coverage. Currently, most of cold chains are being established in plains areas of state. Although plains areas having high production rates as well as relevant industries, but few cold chains also need to be establish in mountain areas to meet dual purpose of securing local produce and providing cold storage for food supply and medicines.

Establishing a cold chains indeed require a high level of investment. Considering current state of infrastructure, building a successful chain is not an easy task. Developing country like India requires a lot of investment in its back end infrastructure to optimize its resource usage. It surely a daunting task, but with lot of promises.

7.2 Benefits of Cold Chain:

Increment in timeframe of realistic usability and keeping up nature of nourishment things. There are such a large number of variables which portrays how cooling or chilly stockpiling is helpful for expanding time span of usability and nature of sustenance things: x cooling diminishes transpiration because of which decrease water misfortune and less shrinking which keeps up the dampness and freshness of nourishment for longer era. x It decreases ethylene creation which is in charge of maturing; it makes the aging procedure moderate and increment the life of nourishment thing. x It supportive in holding the surface of sustenance things and keeps it from sautéing and jelly the flavor and supplements of nourishment as cooling diminishes the action of miniaturized scale living being, by this nature of sustenance things remains its best. Generation of foods grown from the ground in India is occasional. Chilly chain can protect perishables things for longer use. It is additionally observed amid transportation frequently nature of sustenance things break down, particularly likewise because of hot climatic conditions in nation.



Chilly chains coordination's can help keeping up nature of sustenance things notwithstanding a matrons porting longer separations. Decrease in misuse of nourishment things Due to customary long store network of new deliver, there is a little waste in each phase of inventory network.

This little waste in each stage, total and frame a significant bit of starting produce. Cool chain coordinations with abbreviate store network can supportive in forestalling such expansion squander at each stage. Giving appropriate capacity temperature to medications In therapeutic field, chilly stockpiling assume a good example as it supportive in saving numerous prescriptions and antibodies (DPT or DTP, Hepatitis-B) which is utilized against numerous destructive illnesses through cool chain stockpiling these immunizations and medications can store for their usable life. Cool store can likewise supportive in building and keeping up basic medication stock. Cool Stores in a debacle help in the event of calamity, Cold chains can likewise be utilized

for arranging a catastrophe reaction, pre-situating stock at vital areas, steering supplies to influenced regions and alleviation focuses in the district. Chilly chain as go about as local appropriation focuses where impermanent sustenance and basic drug supplies can be set. According to new model chilly storeroom will be built up at vital areas, which are close to calamity areas, it will help in enhancing reaction time and also last mile inclusion.



Cold Chamber



Frizzing Container

8. CONCLUSION & RECOMMENDATION

Establishment of cold storage a permeative concept was beneficial from many different angles. It helped a wide range of farmers not only in increasing shelf life of perishables but also wastage management of food items. However, over a period of the cold storage concepts have been modernised with cold chain management facilities which includes lots of sophisticated machines. At times of disaster, strategically implemented cold chains can be beneficial securing essential medicine and food supplies. Golden Harvest's cold chain network is time demanding venture which will definitely add value to both the objectives increasing shelf life and decreasing food wast management. It has also reviled from the study that in remote location and difficult terrain farmers cannot avail cold storage facilities at site rather they have to travel a long distance. With proper planning a multipurpose cold chain network can help these farmers to either maintain a cold chain at the terrain or can be transported to the central hub. As it has been observed a growing number of demand at the retail sector for cold chain will be increased due to the urban lifestyle where frozen foods are indispensable components. Thus, cold chin facility in food sector is a demand of the time and appropriate emphasis needs to be given by private sectors and government authorities.

9. APPENDIX:

Photos of the observation:









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