

# ANALYSIS ON DESIGN APPROACH OF WHOLESALE KITCHEN MARKET IN DHAKA CITY

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## Abstract

Wholesale Kitchen Market is a vital function for a city due to its great contribution for providing food supply to city dwellers. Wholesale market is an essential component of any agricultural marketing system, especially for horticultural crops producing country like Bangladesh (Seidler, 2001). Dhaka, the capital city of Bangladesh, is one of the largest metropolitan cities of 565 square mile area with 14 million populations (City Population, 2011). Like any other megacity, Dhaka tries to meet its every day food demand from different edges of the country and even from abroad.

Unfortunately, in Dhaka, wholesale kitchen markets are growing without having any particular planning guideline and operational system which results a completely unplanned, unorganized and unhygienic market system. Infact the overall scenerio of these market places are highly crucial than imagination. Severe traffic congestion in the middle of the city due to unplanned loading and unloading system, inhuman working and living environment because of unorganized structural zoning system, intolerable pollution for unhygienic garbage disposal system are making the market place unapproachable.

Considering a great demand, arising problems and sustainable solution; a design decision method will be proposed through this research for future development of Wholesale Kitchen Market in Dhaka city where the writting will focus on six major aspects of consideration and these are space requirements, zoning, transportation system and loading unloading, unit detail, human resource and waste management.

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**Keywords:** Wholesale Kitchen Market, Space Requirements, Transportation System and Loading Unloading, Unit Detail, Human Resource and Waste Management

## 1. Introduction

### 1.1 Preface

Wholesale market is a crucial component of any agricultural marketing system, especially for horticultural crops (Seidler, 2001). The consumption and production of marketed food are spatially separated (White, 1991). Production is generally in rural areas and consumption primarily in urban areas and marketing is the process that overcomes this separation, allowing products to be moved from an area of surplus to one of need (White, 1991). A wholesale kitchen market (in Bengali kitchen market means “kacha bazaar”) is a very vital function for the city as it makes the bridge between internal parts of a city and other parts of the country as well.

A wholesale kitchen market deals with a number of very raw perishable products which come in and go out with different vehicles and where a large number of people of different identity are involved themselves with this activities. This organic perishable product generates huge volume of garbage which cause intolerable odor and unbearable unhygienic environment in the market place. At the same time, severe traffic congestion due to unplanned loading and unloading system, inhuman working and living environment because of unorganized structural zoning system, intolerable pollution for unhygienic garbage disposal system are making the market place unapproachable.

In Dhaka city, wholesale kitchen markets are growing without having any particular planning guideline and operational system which results a completely unplanned, unorganized and unhygienic market system. So it is very essential to encompass appropriate planning guideline for designing or establishing a wholesale kitchen market. This paper is based on field survey data, observational study and analysis. A B.Arch Thesis, titled “Design approach of wholesale Kacha Bazar in Dhaka city” is the main inspiration of this paper.



Figure 01 & 02: Current unhygienic and chaotic situation of Karwan Bazar (Largest wholesale kitchen markets in Dhaka City)

## **1.2 Objective of study:**

Wholesale Kitchen Market creates link between the producer and the consumer. A hygienic and good environment should be maintained here which is not practiced in current situation. The objectives of this study are:

- To identify the problems of existing wholesale markets in six major aspects and these are space requirements, zoning, transportation system and loading unloading, unit detail, human resource and waste management.
- To determine the efficient system and planning guideline of improving Wholesale Kitchen Market.

## **1.3 Limitations:**

The research work is limited by the following limitations facing through the working period:

- Limitation of research period.
- Limitation of manpower for survey and collection of data.
- Limitation of resources from private and public sectors.
- Absence of concrete policy and proposal for developing or designing a wholesale kitchen market.
- Limitation of proper data collection due to midnight operation and chaotic management system.

## **1.4 Methodology:**

**Field survey:** A detail photographic, observational study and field survey has been done in three steps. Firstly, an observational study and field survey to comprise an idea of approximate area or space occupied by the wholesale markets in Dhaka city presently. Secondly, observational study and field survey to determine the percentage of area occupied by different types of products. Finally, an Observational survey and a questionnaire survey have been done in the individual units of some of existing wholesale markets randomly to encompass idea of the six aspects. ‘Karwanbazar’, ‘Shambazar’, ‘Jatrabari bazar’ have been investigated for vegetable, fruit, roots and tuber, cereals and fish, ‘Suareeghat’ has been investigated for fish, ‘Babubazar’ has been investigated for fruit market and ‘Mohammadpur Krishi Market’ has been investigated for cereal. Existing system of wholesale kitchen market, the transportation system and types used, loading unloading types and spaces, storage size and type, display system, selling and buying unit dimension, waste management system, labour accommodation, utility services of existing wholesale market can be understood from this investigation.

**Literature review:** Literature study has been done from different reports, thesis and books, specially the regulatory standards of the world food and agriculture organization.

**Process of data:** The data collected from field investigation has been compiled and plotted on paper or charts which has made easy to have a comparative analysis.

**Observational study and analysis:** To analyze the system of market an observational study is important. These field survey and literature review have been comparatively analyzed to get the better option.

## 2. Definition of Wholesale Kitchen Market:

‘Wholesale’ means the business of selling goods to retailers in larger quantities than they are sold to final consumers but in smaller quantities than they are purchased from manufacturers (Reverso Dictionary, 2000). Wholesale kitchen market is the place where the fruits, vegetables, cereals, root and tuber, fish etc are brought in bulk amount from village assembly market and store them or sale them to the local markets of the city.

## 3. Observation of characteristics of existing Wholesale Kitchen Markets in Dhaka city

Dhaka city has wholesale markets in Karwanbazar (mixed), Shambazar (vegetable and roots & tuber), Suareeghat (fish), Babubazar (fruit), Badamtoli (rice), Mouluvibazar (spices), Mohammadpur (rice) etc. There are also some wholesale activities in other markets like Jatrabari, Amin Bazar etc. Karwanbazar is the biggest one and serves the maximum parts of Dhaka city. Again Shambazar is the only river side wholesale kitchen market and Jatrabari bazar is another large market located at the southern part of the city. These three markets have been taken as case studies of whole sale kitchen market for this research work. Again, for studying retail market, new market, hatirpul kitchen market, utara kushol center and karwanbazar have been surveyed.

<u>Dhaka City</u>	: <u>Wholesale markets</u>
Karwan Bazar	:Vegetable, Fruit, Roots and Tuber, Fish
Sham Bazar	: Vegetable and Roots and Tuber
Badamtuli	: Rice and Fruit
Suareeghat	: Fish
Mouluvibazar	: Grocery goods
Jatrabari	:Vegetable, Fruit, Roots and Tuber, Fish
Mohammadpur Krishi market	: Rice

The survey and analysis have been taken place on six major points: space requirements, zoning, transportation system and loading unloading, unit detail, human resource and waste management.



Figure 03: Vegetable market of Karwan Bazar



Figure 04: Vegetable market of Sham Bazar market.



Figure 05: fruit market of Jatrabari Bazar



Figure 06: Fish market of Shuarighat

### 3.1 Site estimation and space requirements:

The wholesale kitchen markets of Dhaka were not established with specific site estimation system, rather government allocates sites and areas for the function randomly. The transportation system and road network should be considered for locating a wholesale function, where as site estimation, space requirement, transportation system, road network, serving population, type of product etc should be very significant issues for a wholesale kitchen market.

Food and Agriculture Organization (FAO) proposed ‘demand approach’ and ‘supply approach’ for estimating consumption, from which we can find the estimated sales areas for catchment population (White, 1991). However, due to lack of proper guideline, Dhaka city’s wholesale kitchen markets are not growing in appropriate method, which causes insufficient space of products for serving the city, chaos in the service, traffic congestion

etc. Future projection is also very essential concern which has been never considered in the current system.

Again, the internal layout, road, open space, green, built area ratio are important for a wholesale kitchen market. According to Food and Agriculture Organization (FAO), a rough rule-of-thumb for the portion of the site covered by buildings should be around 20 - 30 percent, road space and parking between 50 - 60 percent and other uses, including drain reserves 10 - 20 percent of the total area (White, 1991). Here the existing situation is described with pie charts as follows (Figure 07).

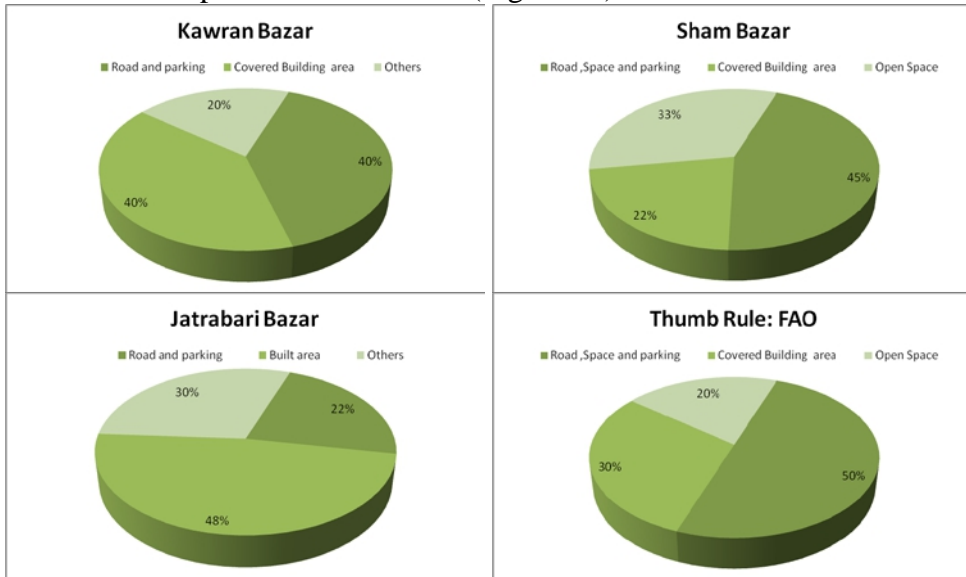


Figure 07: Pie Chart of percentage of functions in the wholesale kitchen markets in Dhaka. (Karwan Bazar; Buildings 40%, road space and parking 40% and other uses 20%. Sham Bazar; Buildings 22%, road space and parking 45% and other uses and open spaces 33%. Jatrabari Bazar; Buildings 48%, road space and parking 22% and other uses and open spaces 30%)

### 3.2 Zoning:

Zoning can be considered by the selling products of the wholesale kitchen market. Basically two broader types of item are found in wholesale kitchen market; ‘Perishable Item’ and ‘Non-perishable Item’. Perishable item needs quick trading facilities and generates more waste; for examples vegetable, fruit, fish. Whereas non-perishable item needs long term storage facilities and generates dry waste; for examples cereals, roots and tuber. Again zoning can be done by wet zone items and dry zone items. The Perishable item, such as fish, is a wet zone item where as vegetable and fruit are semi wet zone items. Non-perishable items are generally the dry zone items.



Currently there is no appropriate zoning system in the wholesale kitchen markets of Dhaka city (Figure 08 & 09). Lack of planning guide, authority’s concern, owner’s concern and proper zoning have been observed in the markets which create problems in waste management, human resource management, trading, loading unloading system, unit details etc. Here Karwan bazar, Sham bazar, Jatrabari bazar, suarighat fish market, Mohamadpur Krishi Market have been surveyed. Karwan bazaar, Sham bazaar, Jatrabari bazaar is being surveyed for understanding the current zoning system and plot them to in functional layout.

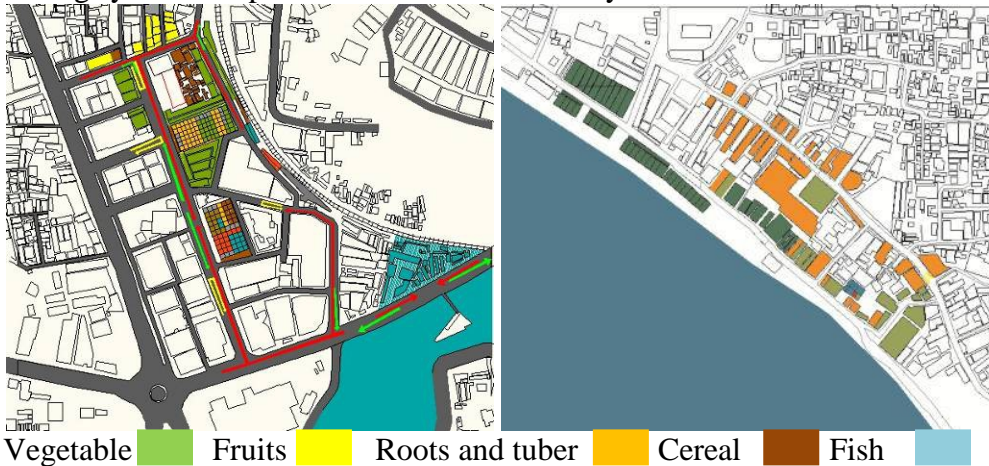


Figure 08: locating the types of product sold by the units in the plan of Karwan bazar Figure 09: locating the types of product sold by the units in the plan of Sham bazar

### 3.3 Transportation System and Loading-Unloading:

Transportation system of a Wholesale kitchen market is very critical as different types of vehicle approach here every day for loading unloading. Both heavy and light vehicles are involved with the operation of wholesale kitchen market. Heavy vehicle like, truck, pickup, covered van etc and light vehicle like, auto rickshaw, rickshaw van, rickshaw (a local non motorized vehicle) arrive here in parallel, which create traffic congestion and conflicting situation. Poor and inadequate parking facility is one of the major problems of wholesale markets in the city (Figure 10 & 11). There is no separated space for loading unloading. As a result loading unloading system occupies the entire road which creates traffic congestion.



Figure 10: Parking and Loading unloading system in Karwan bazar



Figure 11: Loading unloading system in Jatrabari bazar.

In the wholesale kitchen markets of Dhaka city, both heavy and light vehicle are allowed in same roads which create very chaotic situation. Auction is a very significant event for this sort of function but there is no particular space for Auction has been found during field survey. For functional purpose, we can find 3 broader types of vehicle, incoming vehicle, outgoing vehicle and vehicle of retails. Incoming vehicle carries bulk product from rural or district assembly market and mostly involved with unloading process. Outgoing vehicle carries product from city wholesale market to the city retail market and mostly involved with loading process. Some vehicles come to the retail market.

	INCOMING	OUT GOING	RETAIL
HEAVY VEHICLE			
TRUCK	██████████		
PICKUP	██████████	██████████	██████████
BUS	██████████		
RAIL	██████████		
LIGHT VEHICLE			
AUTO RICKSHAW		██████████	██████████
RICKSHAW VAN		██████████	██████████
RICKSHAW		██████████	██████████
WATER WAY			
STEAMER	██████████		
ENGINE BOAT	██████████	██████████	
BOAT	██████████	██████████	██████████

Figure 12: Analysis of types of vehicle in the wholesale kitchen market. (Source: field surveyed data)

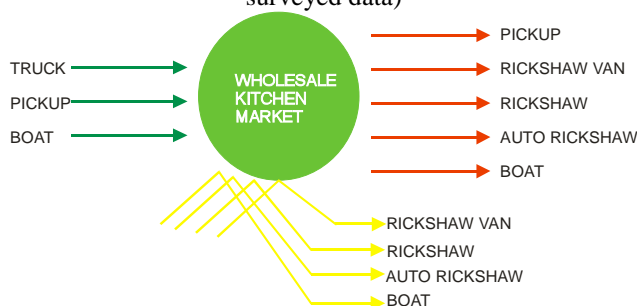


Figure 13: Figurative representation of relationship between types of vehicle in the wholesale kitchen market (Source: field surveyed data)



**System:**

Incoming traffic → Parking → Unloading → Auction → Shop  
 Loading → Out going

From observational survey, the flow of product through transportation and loading unloading system is found as above.

**3.4 Unit detail:**

Around 100 shops have been surveyed for searching the existing shop unit detail. Location, size, grid pattern, corridor width, display type, storage type etc of every individual shop has been taken as concern issues for survey. Area required for storage, tukri (bamboo basket in which labor carries goods on head), sacks, bundle have also been measured. According to sold products, units can be divided in five large categories and these are vegetables, fruits, roots and tubers, cereals and fish.

**Vegetable:** Existing shop or unit size comes from structural system. The corridor is generally 6 ft, if it is road then 10-20 ft and occupied by the shop products. Two types of planning grids are found; firstly based on structural members and secondly by dividing the site in equal span. Generally there was no defined space for display and storage in the existing units. Sleeping facilities are in mezzanine floor (drop ceiling). Everyday a bulk amount of vegetable trade occurs under this very functional unit.



Figure 14: Existing units of vegetable in Karwan bazar



Figure 15: Existing units of vegetable Sham bazar

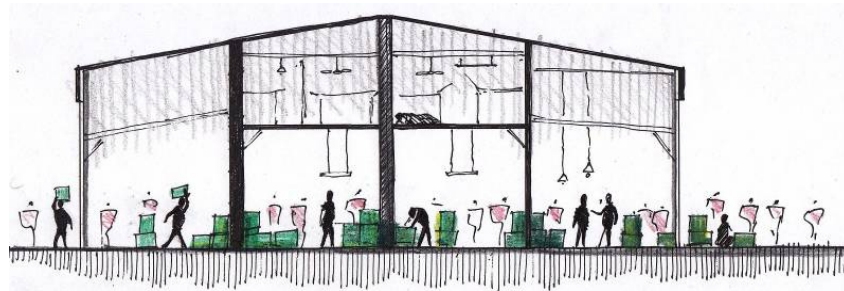


Figure 16: Conceptual Sketch of existing vegetable units. (Source: Drawn during field survey)

**Roots and tuber:** Existing shop size are generated from structural system as same as the case of vegetables. These types of units need space for semi permanent storage.



Figure 17: Existing units of Roots and tuber in Karwan bazar



Figure 18: Existing units of Roots and tuber in Sham bazar

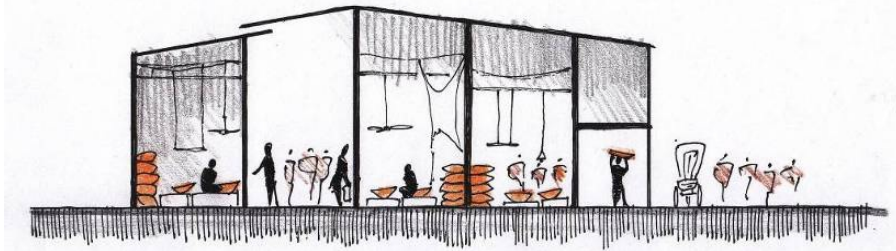


Figure 19: Conceptual Sketch of existing Roots and tuber units. (Source: Drawn during field survey)

**Fruits:** Existing shop size come from structural system. These types of units need spaces for preserve the fruit or in some cases process the fruit. Defined space for display has been found in a few units during survey; office and storage has been also found in the survey.



Figure 20: Existing units of Fruit market in Karwan bazar



Figure 21: Existing units of Fruit market in Babu-bazar)

**Cereal:** Existing shop size comes from structural system and this type of units need spaces for long term dry storage and wide corridors (Figure 22 & 23). This type of unit is the larger than other type due to its long term storage facility. Again this type of unit allows loading unloading truck in the unit corridor or common space which is a very important concern. These units have defined space for display, office and storage.



Figure 22 & 23: Existing units of Cereals (Mohammadpur Krishi Market)

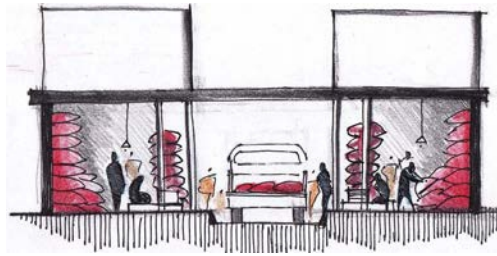


Figure 24: Conceptual Sketch of existing Cereals units. (Source: Drawn during field survey)

**Fish:** Existing unit size again comes from structural system. This type of unit is very unique for the product type. The fish market trades in very short time. Fish markets deals with ice and water (Figure 25), as a result corridors are always flooded with water (Figure 26). This type of unit needs spaces for packing, ice crushing and display. Fish market needs refrigeration system for short term storage. Fish is a quick rotten item so there is always a bad smell found in this market.





Figure 25 & 26: Existing units of Fish market (Jatrabari fish market)

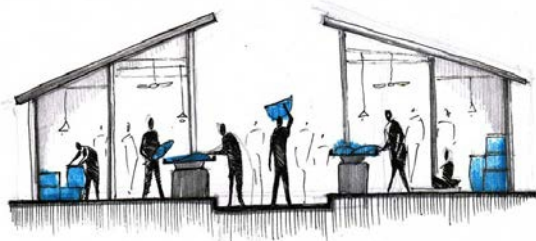


Figure 27: Conceptual Sketch of existing Fish units. (Source: Tuli, 2010)

### 3.5 Human resource management:

People of different levels have been occupied with different types of activities in the wholesale kitchen market. So it is essential to consider the functional needs of people or stakeholders related with this function. ‘Bapary’ (local term of the people who buys goods from producers in village assembly market and take goods to city wholesale markets by suitable transport), ‘Arotdar’ (local term of the people who store these goods in the wholesale market), Labour, waste collector, truck driver, retail seller, retail buyer, office staff, consumer etc can be stated as stakeholders of this function. Each of these stakeholder required different functional arrangements (Figure 28), for example, a group of people who reside in the market, requires accommodation. Basically the stakeholders of the wholesale market require four types of functional facilities. They are accommodation, meal/food, recreation, toilet and bathing facilities.

user	Accommodation	meal/food	recreation	bathing and toilet facilities
Bapary				
Arotdar				
Labour				
Waste collector				
Truck driver				
Truck helper				
retail seller				
retail buyer				
office staff				
consumer				

Figure 28: Four types of facilities needed for different stakeholders of the wholesale markets. (Source: Field Survey)

Existing accommodation system of wholesale kitchen market in Dhaka city is very vulnerable. Basically shop owner makes a drop slab (mezzanine floor) in the shop with wooden panel and post made of mild steel for solving the accommodation crisis (Figure 29). Mostly labours sleep on floor or on their tukri (bamboo basket in which labor carries goods on head) (Figure 30). The other groups stay in dorm or small hotel. There is no defined space for sleeping or resting has been found during survey. Existing accommodation system conforms inadequate spaces, inappropriate systems, unhygienic environment and risky arrangements.



Figure 29: Existing accommodation system in drop slab in Jatrabari bazar



Figure 30: labours accommodation system in Karwan bazar



Figure 31: Existing accommodation system. (Source: Drawn during field survey) (Blue part is the accommodation space)



Again the source of meal or refreshment is several small road side shops and cafeteria. There are no recreation facilities for the stakeholders are found in the existing market places. There are insufficient numbers of bathing and toilet facilities available in the existing market which is very unhealthy and unhygienic.

**3.6 Waste management:**

Waste management is very significant for wholesale kitchen market. Dhaka city produces large volume of food waste and which is almost 67% of total waste (Enayetullah, 2008). According to the field observation and questionnaire survey to DCC waste collectors, Karwan bazaar generates 300-400 tons of waste each day. Hence, it is very difficult to remove it in very short time.

The waste generates from wholesale kitchen markets, both raw organic waste and dry crust which are rotten quickly and creates an unhygienic environment in the market. Again the collection of waste from internal roads, parking spaces and corridors interrupt the general activity of the market. But if the waste is not removed quickly, it will create odor, insects, germs etc. Hence there should be rapid system to remove wastes which is currently unavailable in our market.

Existing system of waste collection

Waste dumping on road or corridor



Figure 32: Waste in the corridor

Kuli of DCC workers gathered them



Figure 33: Kuli gathering the waste

Dump in suitable place



Figure 34: Waste dumping area

DCC trucks collect the waste



Figure 35: Waste loading in the truck

DCC either sell to waste concern  
or dump them to their land fill project or  
dumping on river



Figure 36: 'waste concern' treated waste



Figure 37: land fill project of DCC

It is very important to identify the volume and type of wastes generate in different spaces to introduce rapid removal system. From the survey, it is found that highest percentage of wastes are collected from the unloading bay and second highest percentage from unloading bay parking. The shops, loading bay and retail area produce relatively lower percentage of waste than the unloading bay. If the waste can be removed systematically from the source then it will not spread away to create unhygienic environment.

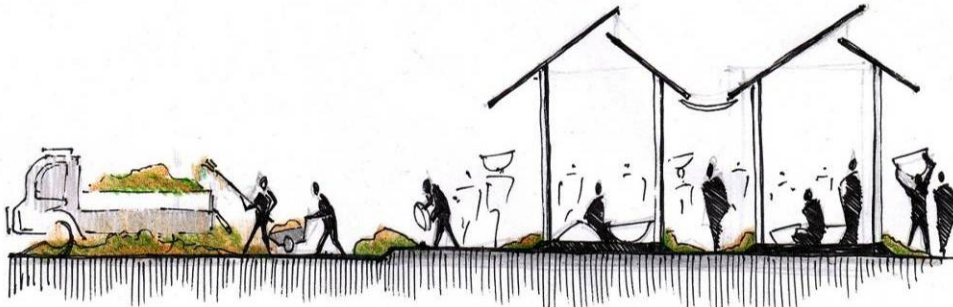


Figure 38: Conceptual sketch of existing system of waste collection in the wholesale kitchen market (Source: Drawn during field survey)

#### 4. Discussions on Policy and Proposal

From the above discussion, it is found that the existing wholesale kitchen markets need to be redesigned, restructured, renovated and refurbished. As the city is growing faster, there is also need for more wholesale kitchen markets for which the authority should establish a proper guideline for maintaining health and hygiene issues. In order to make the market infrastructure sustainable, maintenance activities are also necessary (Marocchino, 2009).

Based on field survey and comparison with standards, the following remarks can be drawn.

- For designing and planning of wholesale markets require identification of a site that is appropriate in terms of size and in line with the

development of transport links to and within the urban area (Seidler, 2001). The space requirement should be calculated according to demand or supply approach. It is very essential to fix the catchment population with future projection.

- Internal zoning should be defined with proper percentage of build area, road with parking area and other functions should be based on perishable and non-perishable items. It will be better if the fish market can be placed separately at a distance from the other functions as the operation and maintenance of this market is different from others.

- A very vital feature of market design has become the ease of circulation, parking and maneuvering of vehicles (White, 1999). Adopting one way circulation, central zoning of markets and ring road system is better for wholesale kitchen markets according to Food and Agriculture Organizations (FAO). It is better to avoid crossroads. There should be good number of parking facilities with proper dedicated unloading and loading bay. This area should be designed for improving the system. There should be spaces for auction as well.

- All units should be designed considering its need and flexible function. For example Units for vegetable and fruit need short term storage facilities and watering facilities where as units for cereals and roots and tuber need long term storage facilities. The unit size should be flexible so that owners have the options to have different size of units. Corridor for circulation, grid system for units, storage and display facilities etc should be designed properly. Lighting and ventilation should be ensured for every unit.

- Proper accommodation, meal/food facilities, recreation, bathing and toilet facilities should be ensured in the area.

- Waste should be treated as ‘wealth’ like renewable source. Waste collection system should be operated 24 hours in the market areas and there should be authorized workers for waste collection. As wholesale kitchen markets generate maximum organic waste, hence waste treatment plant or disposal system should be near to market area or within the market area.

- As a huge chunk of land used for market activity, occupied only the ground floor so multiple use of land can be introduced; specially the roof and underground. Roof can be use as rain water collector or can produce solar energy power. Underground space can be used as extra parking or designed bio gas plant.

- The products of the kitchen markets can be polluted by the exhausted smoke from truck or other vehicle. A green smoke barrier as a buffer can be designed between road and shop areas.

## 5. Conclusion:

Wholesale kitchen market is a very critical functional space which deals with very raw perishable products, different levels of people and various types of vehicles. Designing a wholesale kitchen market is basically designing an efficient system for the market maintaining the health and hygiene. Inefficient system will be responsible for wastage of the food, human labor, energy and health hazard; which will not be expected for a developing country like Bangladesh. Moreover, an appropriate system of wholesale market can ensure an easy path for the product from the producer to consumer, provide better prices to producers and improve the availability of competitively priced produce to consumers (White, 2003).

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