

## INTEGRATED PLANNING AND DEVELOPMENT OF MARKET FOR SMART CITY

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**Abstract**—“Integrated Planning and Development of Market for Smart City” is that term which acts as a medium for development in market infrastructure, which is influenced by many factors, the most fundamental of which is the size and use of selling space, Market planning and its relationship to traffic circulation and parking. In this report we focus on planning of market with all facilities for vendors, improved resource use efficiency, solid waste management system, infrastructure safety measures. We making market for smart city by taking smart decisions using smart technologies and services. This project report deals with study and development of market which helps to making smart City. We define market with various services which are delivered to its vendors in an effective and efficient manner. The problems of rural and urban Vegetable and fruit markets are not uniform, and that smart market development has to be applied in combination with place-based approach by proposing the integrated planning and development of Market.

Keywords: integrated planning of market, smart development, AutoCAD, anthropometric, solid waste management, infrastructure safety measures.

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### I. INTRODUCTION

The term rural and public market has changed in meaning over time and still differs from place to place. In India, public market has traditionally been defined as a municipally owned and operated building where vendors sell fresh food from open stalls. They typically focus on the sale of a full array of fresh, healthful, value added, and prepared foods often locally grown or produced. They usually include a seasonal, outdoor farmer’s market component. Public markets are located in and/or create a public space in the community. This is the visible aspect of a market – the creation of an inviting, safe, and lively place that attracts a wide range of people. As an effective place where people mix, markets can become the heart and soul of a community, its common ground, a place where people interact easily, and a setting where other community activities take place.

In case of Solapur, market refers to vegetable markets, which offer fresh fruits and vegetables. Basically these markets can be permanent, semi-permanent (morning-Evening shift) and mobile vendors. Vendors are required to pay rental fees for the area they occupy. These markets sell all types of fruit and vegetables. These markets act as a wholesale market for vegetable and fruits with small vendors purchasing from these markets for their business.

The main aim of project is to provide a simple step-by-step approach to developing markets. It concentrates on general principles governing planning and operational efficiency of rural and urban markets. Now it provides information on how to prepare layouts and

building designs, choose equipment and the storage facilities for produce in the market. Also it provides the provision regarding the Solid waste management.

## II. OBJECTIVES

The major objective is to understand the policy environment and develop recommendation based on the study, which protects and promotes systematic development of vegetable markets. The specific objectives are:

1. To study and understand the existing problems and issues of vegetable and fruit markets.
2. To review the existing reports and policies related to vegetable markets.
3. To recommend the policies for better planning and management of the vegetable and fruit market in Jule Solapur.

## III. LITERATURE REVIEW

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#### IV. METHODOLOGY

All the primary and secondary data from field investigations, visual survey, interviews, and desktop research are studied and analyzed; based upon which the problems and issues related with vegetable market are identified. These identified issues are categorized into several groups for convenience of study, and these issues act as the base for making probable recommendations.

Julesolapur market has:

1. Physical aspects:
  - i. Insufficient sales space
  - ii. The presence of poorly designed and constructed sheds
  - iii. Insufficient circulation space and traffic management measures
  - iv. A general lack of building and facilities maintenance.
  - v. Lack of parking provision and areas for unloading.
  - vi. Inadequate site security and overnight storage facilities.
  - vii. Inadequate drainage and severe flooding problems, leading to produce losses and potential health problems.
2. Social and managerial aspects:
  - i. Difficulties in enforcing market bye-laws and regulations.
  - ii. An inefficient or uncontrolled use of market sales space with low sales volume per trader and, often, low rents or charges
  - iii. A high, unmet, demand for places in the market, frequently combined with high-profit margins for traders; and
  - iv. Market management, which establishes no clear relationship between revenues and costs, leading to the market being under-funded, especially for repairs and maintenance.

So that we selected the integrated planning and development of Market for Julesolapur.

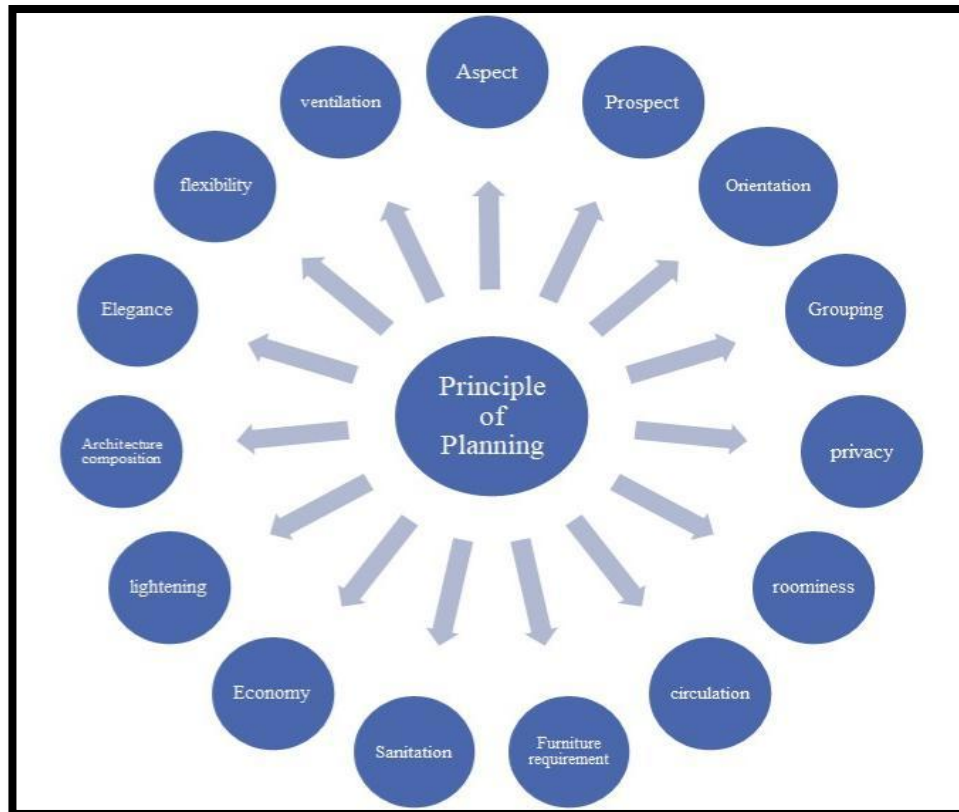
#### V. THEORETICAL FORMULATION

The total site area of 3600sq m is required to accommodate the given covered space area(including sales, utility, administration, and other amenities) should be in the ratio of between 1:4 and 1:3, but can be in the range of 1:5 to 1:2.5 depending upon the context. The overall site area required in square meters can thus be obtained by multiplication of the gross market area and factor of 2.5 to 5, allowing traffic circulation, parking and site landscaping

The main factors to be considered while designing a new market as follows:.

- i. Provision of adequate space is essential, for sales areas, administration, storage, specialized facilities, circulation and parking
- ii. The provisioned space should allow for future expansion needs as well as flexibility according to changing social and economic circumstances of the market.
- iii. This flexibility should be addressed by building design as well.
- iv. In simple rural and urban markets, especially for peak periods, emphasis should be given to the use of low-cost covering of sales area, by using permanent light-weight shade structures or retractable blinds.
- v. For traffic control segregation of pedestrian and hand-cart movement from heavy delivery vehicles must be carried out.
- vi. Solid-waste management system includes biogas plant

- vii. Provision of fire resistance for building safety measures considering standards of IS Code 1641-1988.
- viii. Provision of mechanical ventilation HVAC system for building because lac of natural ventilation in some areas of market building considering standard IS Code 1641-1988.
- ix. Occupational health and safety implications.
- x. Emergency, security and safety plans.



## **VI. PRINCIPLES OF PLANNING FOR MARKET**

### **a) ANTHROPOMETRIC IN ARCHITECTURAL DESIGN**

Anthropometrics is the comparative study of the measurements and capabilities of the human body. It derives from the Greek words 'Anthropos' (meaning human), and 'metron' (meaning measure).

Anthropometry influences a wide range of industries, processes, services and products and has a considerable importance in optimizing the design of buildings. Human dimensions and capabilities are paramount in determining a building's dimensions and overall design. The underlying principle of anthropometrics is that building designs should adapt to suit the human body, rather than people having to adapt to suit the buildings.

There are two basic areas of anthropometry:

1. Static anthropometry is the measurement of body sizes at rest and when using devices such as chairs, tables, beds, weighing machine in shops.

2. Functional anthropometry is the measurement of abilities related to the completion of tasks, such as reaching, manoeuvring and motion, and other aspects of space and equipment use.

#### **b) PLANNING AND ARRANGEMENTS OF MARKET SHOPS.**

Market designed for vegetables, fruits, dry fruits and Masala section, groceries section and meat section on the basis of requirements of equipment and arrangements by considering the anthropometric human body dimensions concept for easy circulation and comfort to the vendors and customers. In the market building there are total 50 shops, in which 48 shops having same dimensions of 2.65m×3.3m and 2 shops having area 15.53m sq. each. Each shop having rolling shutter provision for overnight storage of produce.

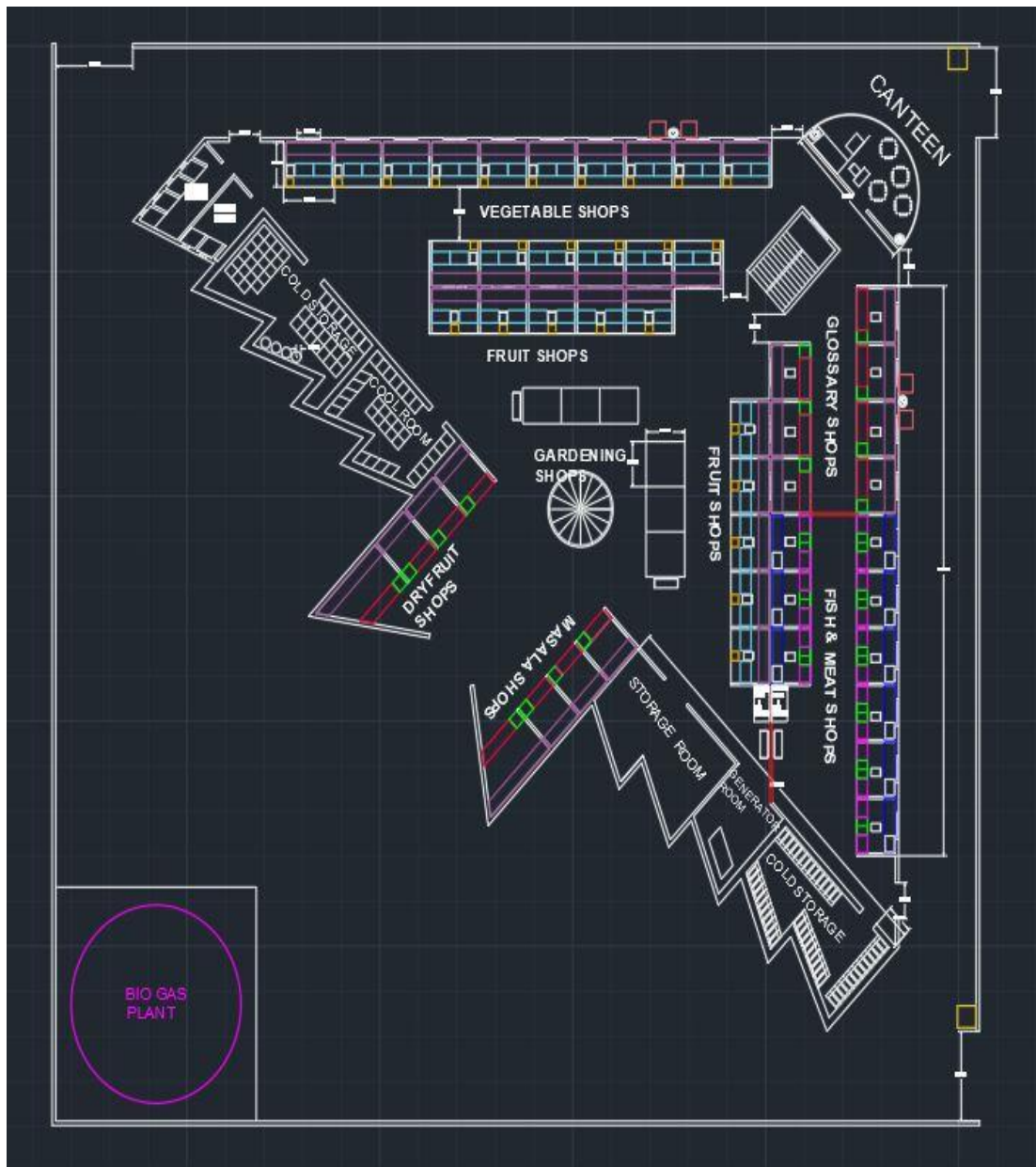
Vegetable & fruit and groceries shops contains 2 movable racks, 1 fixed wooden rack to the back wall of the shop(shown in fig-4.2), flipping plywood entrance to the shop. The meat shops contains glass covered wooden table cage for preventing the flies sitting on meat, meat cutting katta of granite stone for cutting meat on it, hanging screws. Every shop of the market contain chair an money laundering table. The arrangement of all racks and equipment essential to the vendor is in proper manner. (Shown in fig-4.3). There are the provision of window at back side wall of shop for natural ventilation. Some of them shops has mechanical ventilation system provision due to lack of natural ventilation system...

### **VII. PHYSICAL INFRASTRUCTURE OF THE MARKET**

The total site area of the market is 3600sq m. There are various Services and facilities provided in the market as follows:-

- i. Built-up area of market:- 1500sq m.
- ii. Vegetable shop section- 139.92sq m
- iii. Fruits shops- 87.45sq m
- iv. Dry fruits shops- 41.765sq m
- v. Masala shops- 41.765sq m
- vi. Groceries shops- 61.21sq m
- vii. Meat shops- 78.705sq m
- viii. Movable shops- 52.47sq m
- ix. Cold room and cool room for Vegetable and fruits section with 18 metric tons storage capacity- 89.75sq m.
- x. Cold room for meat section with 7 metric tons storage capacity- 44.88sq.m
- xi. Generator room-1 No. having area – 22.
- xii. Main canteen-1No.
- xiii. Cafeteria- 2 Nos.
- xiv. Generator room-1 No.- 250 KVA capacity
- xv. Overhead water tank each of 5000 litre capacity – 3Nos ; with deep tube well
- xvi. Separate men's toilet and women's toilets
- xvii. Readymade toilet blocks outside of market- 2 Nos.
- xviii. Watchman cabin- 2Nos.
- xix. Main entrance gate of market- 2
- xx. Internal entrance- 1 entrance of 5m through which loading vehicle easily go inside the market, 2 entrance at main canteen with stairs, 2 entrance at both corners having inner slope for handcart's movement.
- xxi. Staircase- 1main dog-legged staircase and 1 emergency circular staircase.

- xxii. Parking area
- xxiii. Loading/ Un-loading area(Godown)
- xxiv. Biogas plant at outside of market at the corner site



### VIII. DESIGN OF COLD STORAGE FOR VEGETABLE,FRUIT SECTION AND MEAT SECTION

To design an easily accessible layout for the room, the maximum quantity of storage containers was determined. The client provided the maximum pounds of produce in addition to the size of the storage containers, which include a 55-gallon bulk bin, an 18-gallon tote and a 6.3-gallon bulb crate. The bulk bins, crates and totes are pictured in fig- 1. The client provided estimates for the weight of each produce type that could fit in each container.

These estimates were used to calculate the total number of containers required. These calculations are shown in tables 4.2 and table 4.3.

Produce	Cold or Cool	Weight of Produce (kg)	Volume of Container (m3)	Weight per Container (kg/container)	Number of Container	Volume of Container
Tomatoes	Cool	500	0.024	13.60	37	0.888
Eggplant	Cool	70	0.068	22.68	3	0.204
Cucumber	Cool	150	0.024	13.60	11	0.264
Leafy greens	Cold	25	0.068	5.00	5	0.340
Beets	Cold	1400	0.068	30.00	47	3.196
Cabbage	Cold	1200	0.210	350.00	4	0.840
Carrots	Cold	1500	0.068	30.00	50	3.400
Garlic	Cold	450	0.068	9.00	50	3.400
Onions	Cold	1400	0.024	13.00	108	2.592
Potatoes	Cold	3000	0.024	13.60	220	5.280
Winter squash	Cool	2000	0.024	15.00	133	3.192
Apple	Cold	400	0.024	13.60	30	0.720
Grape	Cold	300	0.024	23.00	13	0.312
Mango	Cool	400	0.024	24.00	17	0.408
Orange	Cool	500	0.024	15.00	34	0.816
Pineapple	Cool	150	0.024	30.00	5	0.120
Banana	Cool	1000	0.024	13.60	74	1.776

**Table-4.2:- Illustrating Data Collection of Produce And Total Nos. Of Containers Required in cold storage of vegetable and fruit section**

Meat category	Cold or Cool	% of all sellers	Weight of meat selling per day(kg)	No. of stalls	Total weight per day	Total weight of meat produce
Goat meat	Cold	11%	800	2	1600	
Chicken meat	Cold	10%	160	2	320	
Fish						6120kg=
a) Fresh fish	Cold	55%	400			6.120Tons
b) Live fish	Cold	17%	300	5	4200	
c) Dry fish	Cold	7%	140			

**Table No- 4.3:-Illustrating Data Collection of Produce And Total Nos. Of Containers Required in cold storage of Meat section**



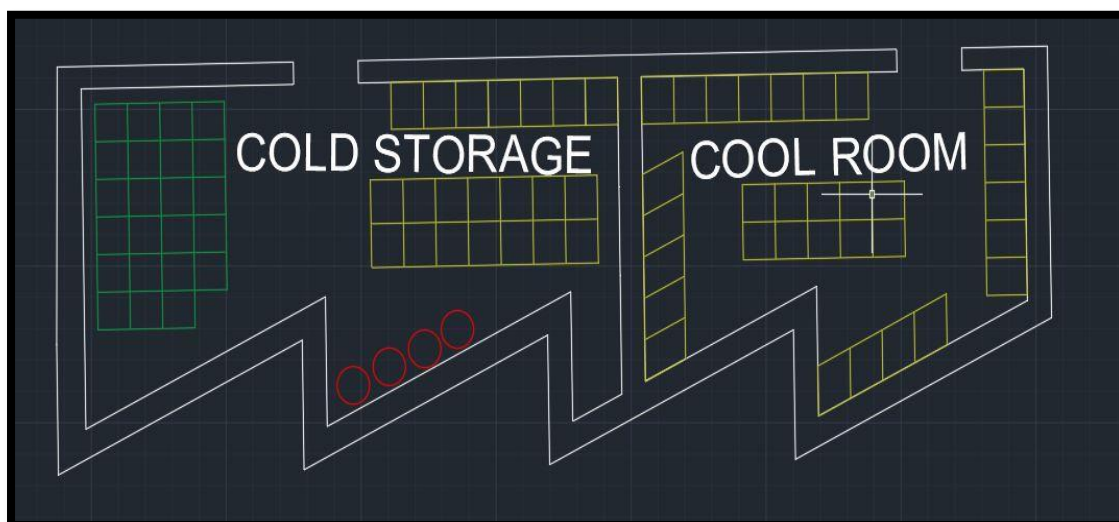
**Fig No.- 4.2 :- Illustrating 55gallon bulk bins(Willow n.d.), 18-gallon tote(sterilite n.d.), and 6.3 gallon bulb crate (vented n.d.), meat storage container crate.**

Based on the calculation shown in table 4.2 and 4.3, the maximum produce load during the fall is depicted in table no.- 4.4

Bin	Cold room	Cool room
55- gallons	4	0
18- gallon tote	152	0
6.3 gallon bulb	371	314
Meat container crate	110	0

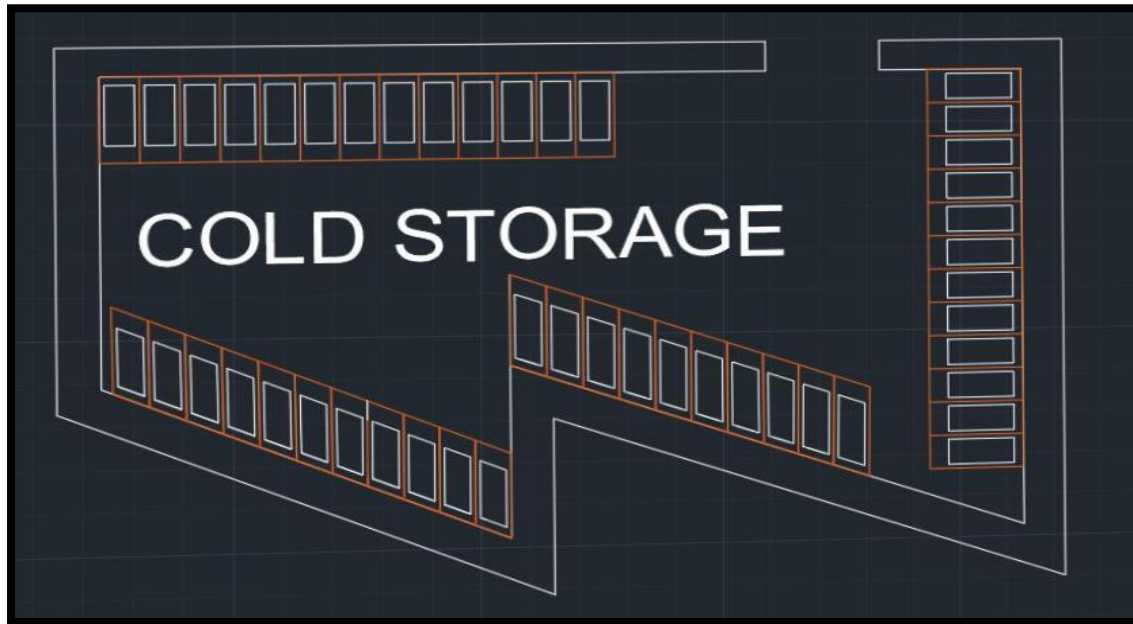
**Table No. 4.4- Illustrating Produce Container Breakdown**

Figures and depict the room layout with each red circle represents one 55-gallon bulk Bin. The green colored rectangles represent the 18-gallon totes. In the cool room totes are stacked four high, and in the cold room they are stacked four and five high depending on their location in the room. Two inch spacing stacks ensures proper air circulation. The yellow rectangles represent the shelving units for the 6.3-gallon bulb crates. Each rectangle represents nine bulb crates, with three stacked per shelf. Two inch spacing between the stacked bulb crates ensures proper airflow. Container arrangement, spacing and numbers are used to determine the necessary room dimensions.



**Fig- 4.3:- Illustrating Plan Of Cold Room And Cool Room Section's Arrangements For Vegetable And Fruit Section**





## IX. CONCLUSION

- After investing a total of 9,00,00,000 rupees nearby we will be getting a estimated amount of 23,00.000 rupees yearly
- A good smart cafeteria, a well planned and managed parking system , Separate toilet systems for ladies and gents with both fixed and movable toilets ,cold storage, A well, neat and cleanest market which adds a greatest factor in smart city projects.
- After applying all this services and technique the overall problems of vendors and public market reduced. Due to this social, economical and overall status of public market increased.

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