

Global Comparison of Hygiene Practices in Agriculture Wholesale Markets



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WUWM
World Union of Wholesale Markets
Promoting wholesale and retail markets world-wide

Focus Areas

- 1. Physical Parameters**
- 2. Premises Hygiene Parameters**
- 3. Food Safety Infrastructure**
- 4. Food Testing Equipments**
- 5. Waste Disposal Parameters**

1. PHYSICAL PARAMETRES

Parameters for Planning and Designing of Wholesale Markets effecting cleanliness

PARAMETERS STUDIED

- Sales area as percentage of tot. area
- Per trader area allotted
- Tot. Parking & Circulation as a percentage of total area
- Water consumption per meter square of tot. area per day
- Produce handled per meter square per annum of sales area in MT's
- Area covered by buildings as a percentage of tot. area
- Area under other reserves as a percentage of tot. area
- No. of toilets per 100 persons

COMPARISON OF INDIAN MARKETS VIS-A- VIS FAO STANDARDS

Parameters	Bangalore	Azadpur	Jaipur	Hyderabad	Gwailor	Pune	Safal	FAO Standards
Sales area as percentage of tot. area	21.54%	18.45%	14.62%	12%	2%	NA	5%	25-33%
Per trader area allotted	21.18 sqm	30.76 sqm	109.59 sqm	NA	NA	NA	27.45 sqm	100.sqm
Tot. Parking & Circulation as a percentage of total area	16.34%	21%	NA	62%	15%	50%	NA	60%
Water consumption per meter square of tot. area per day	0.31 lts	1.75 lts	0.018 lts	NA	NA	NA	0.89 lts	4 lts
Produce handled per meter square per annum of sales area in MT's	33.23	186.76	5.24	33.33	17.88	NA	5.25	10 to 25 MT's
Area covered by buildings as a percentage of tot. area	NA	19.8%	NA	13%	3%	NA	NA	20 to 30%
Area under other reserves as a percentage of tot. area	NA	NA	NA	NA	NA	8%	NA	10 to 20%
No. of toilets per 100 persons	NA	NA	NA	NA	NA	NA	36	4

AVERAGES FOR VARIOUS PARAMETERS

Parameters	Avg.of different Indian markets	FAO Standards
Sales area as percentage of tot. area	12.2%	25-33%
Per trade area allotted	47.25 sqm	100.sqm
Parking & Circulation as a percentage of tot. area	32.87%	65%
Water consumption per meter square of tot. area per day	0.74 lts	4 lts
Produce handled in MT/ sqm per annum.	21.57Mts	10 MT's
Area covered by other buildings as a percentage of tot. area	12%	20 to 30%

Other Global Physical Parameters Vs. Indian Markets

where we lag?

- 1. Automation*
- 2. Planning and Designing*
- 3. Vehicle Movement and Transport*
- 4. Hygienic Premises*

SYDNEY Market (SML): Gate Management System Vs. Indian Markets



Smart Phone Based Market Management System at HiGreen SchenZhen Market, China



Market Premises/Trading Areas

SML Market



INDIAN Markets



New Covent Garden Markets



Taladthai Market



Truck Loading Area

SML Market



Indian Markets



Hygienic Premises

Rungis Seafood Market



Rungis Meat Market



Rungis Poultry Market



Hongkong Fish Market



Hongkong Fish Market



2. Food Premises Hygiene and Safety Parameters

Comparison of WUWM Standards with Indian Markets/FSSAI guidelines

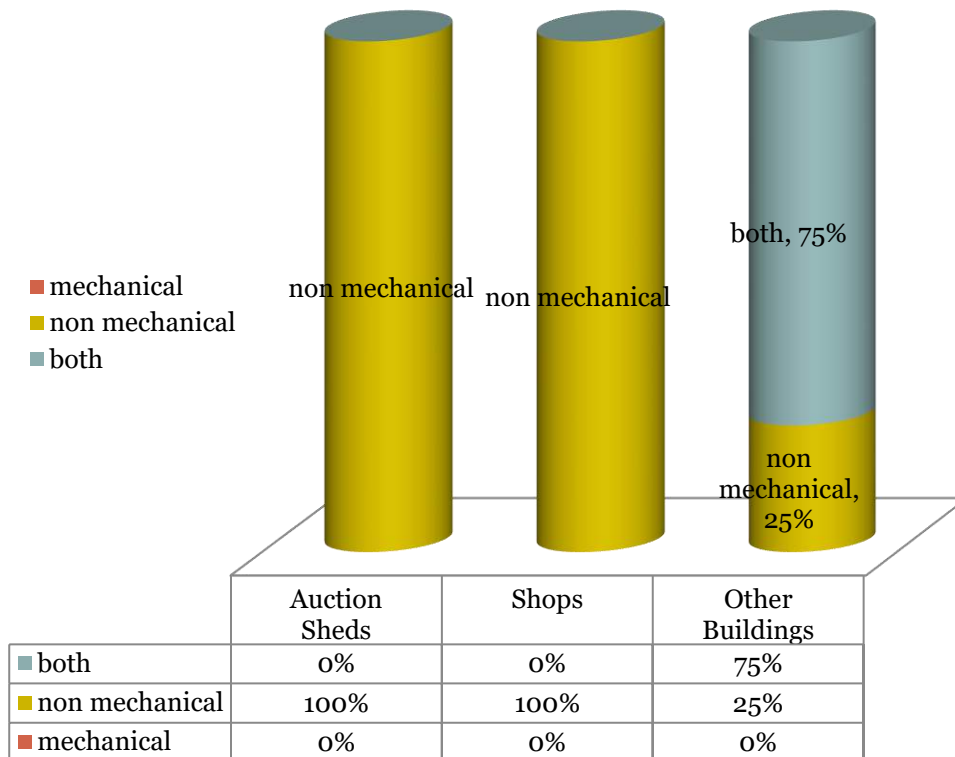
Parameters under study (Indian Markets)

1. Ventilation
2. Lighting
3. Maintenance of Premises
4. Temperature
5. Cleaning and Disinfection
6. Pest Control
7. Personal Training
8. Responsibility for Equipment
9. Services and Responsibility
10. Personal Hygiene of Staff

1. Ventilation

Mechanical/Non-Mechanical

Prevailing situation in Indian Mkts



Ideal situation according to WUWM:

The place where the produce is kept should have well circulated and ample supply of air to prevent the produce from

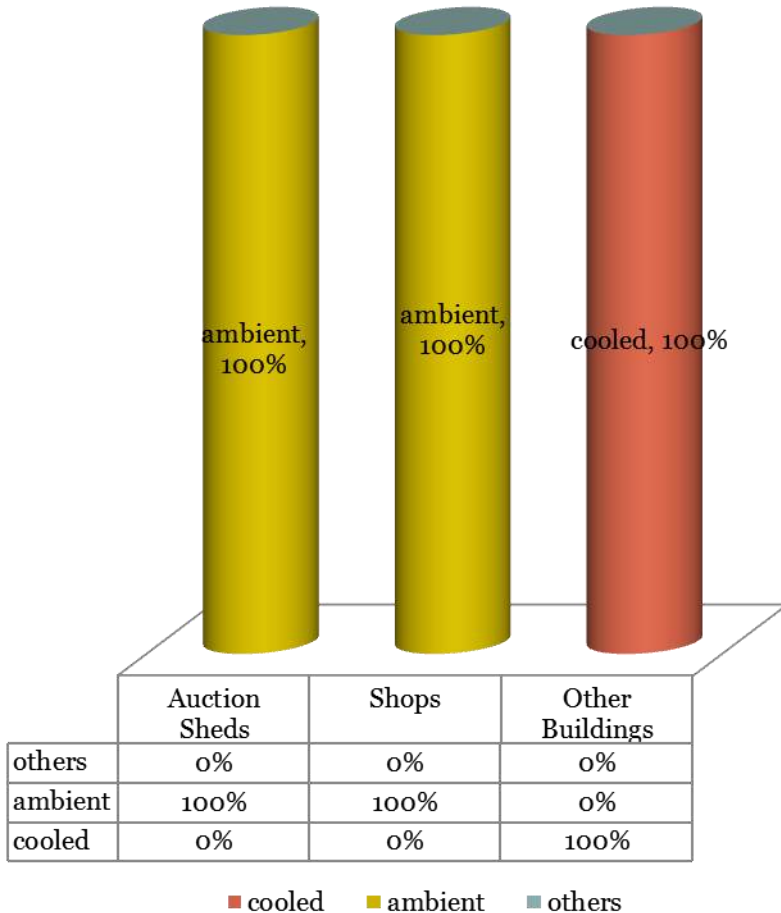
- a) Contamination
- b) Increase shelf life

In case of other buildings the ventilation system, should meet two basic requirements:

- a) To supply fresh air for the occupants.
- b) To change the air in the room sufficiently so that smells, fumes and contaminants are removed.

1. Ventilation

Prevailing situation in Indian Mkts



Ambient / cooled / refrigerated / heated air

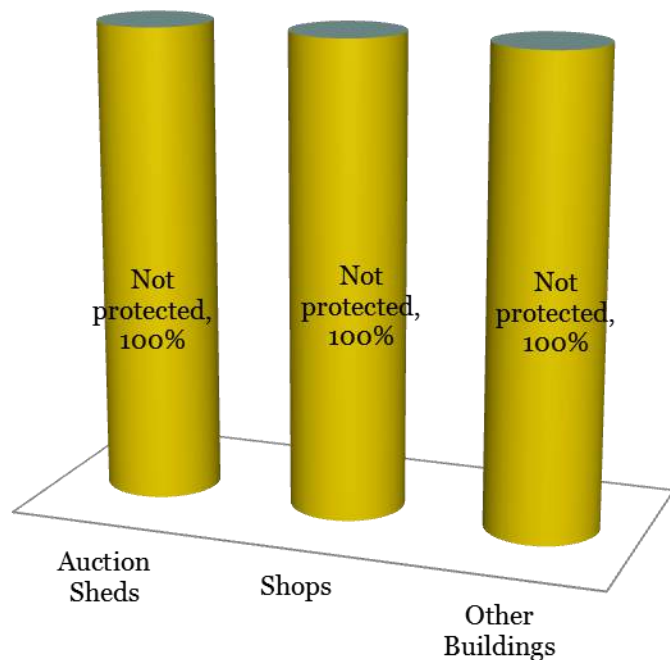
Ideal situation according to WUWM:

Steps should be taken to regulate the temperature of the air in the auction shed depending upon the requirement of the produce.

This is because is a well- known fact that the bacteria in food items grows at a faster when kept in at room temperature.

2. Lighting

Prevailing situation in Indian Mkts



	Auction Sheds	Shops	Other Buildings
As required	0%	0%	0%
Not protected	100%	100%	100%
Protected	0%	0%	0%

■ Protected ■ Not protected ■ As required

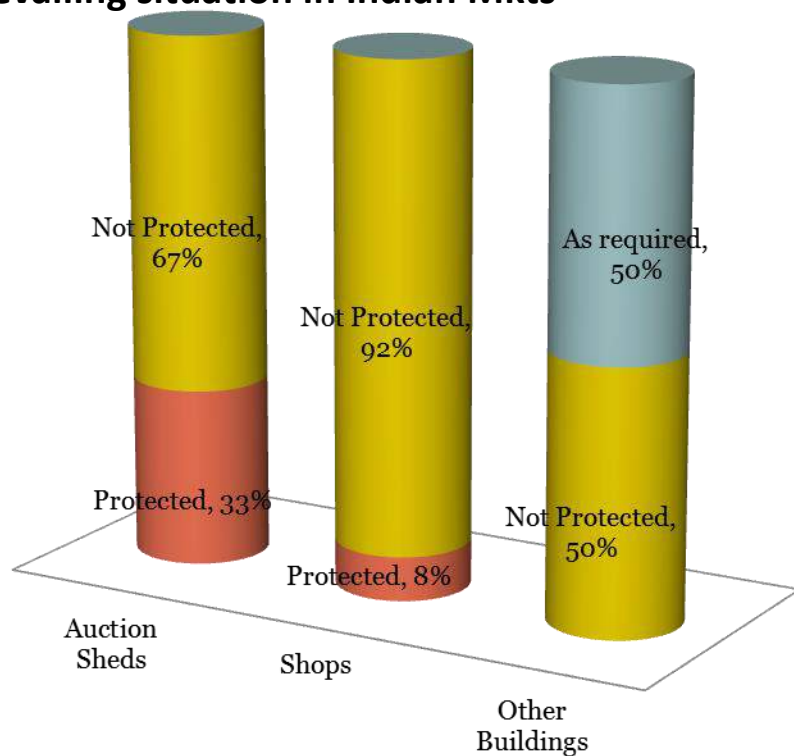
Insect proof screens

Ideal situation according to WUWM/FSSAI:

Fly proof screens comes in the purview of lighting because insects get attracted by lights. These insects carry germs which can contaminate the fruits and vegetables. Hence to protect the produce all openings need to be made fly proof.

2. Lighting

Prevailing situation in Indian Mkts



	Auction Sheds	Shops	Other Buildings
As required	0%	0%	50%
Not Protected	67%	92%	50%
Protected	33%	8%	0%

■ Protected ■ Not Protected ■ As required

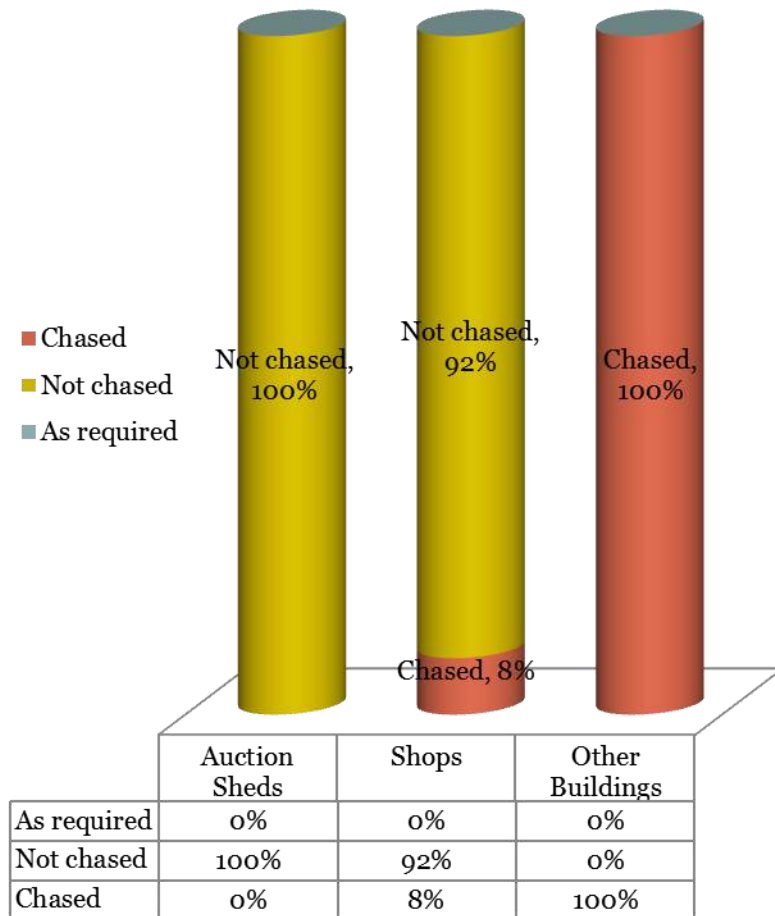
Lighting fitted with protected tubes

Ideal situation according to WUWM/FSSAI:

Lights also need to be provided with protective covering at all places because it may happen that the lights break suddenly and the particles of lighting device enter the fruits and vegetables which are kept uncovered.

2. Lighting

Prevailing situation in Indian Mkts



Wiring chased into the walls or ceiling

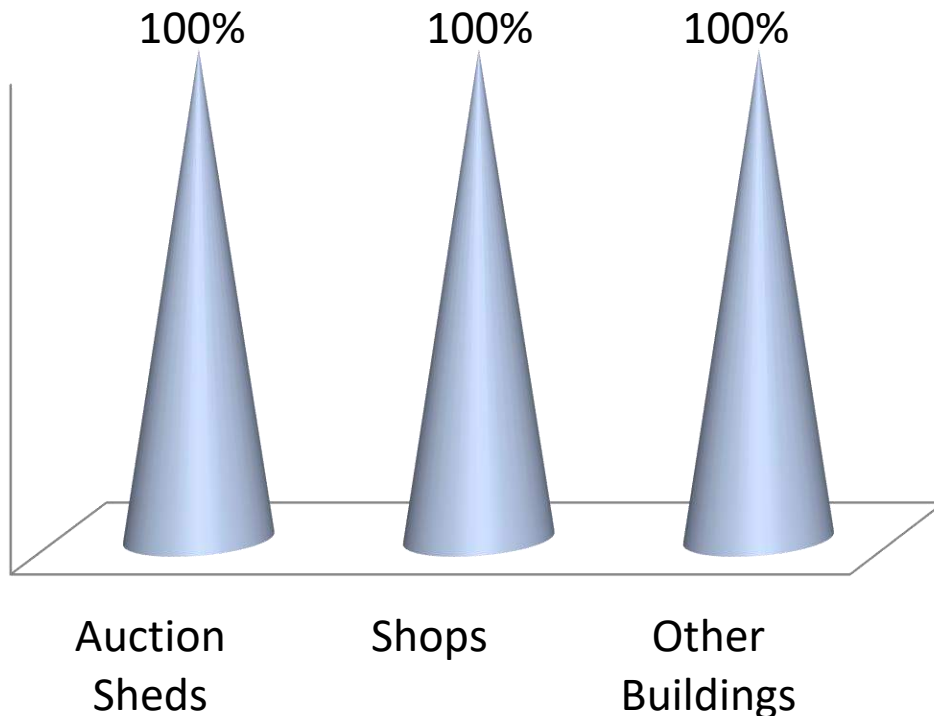
Ideal situation according to WUWM:

The wiring should properly chased into the walls or ceiling. This should be done as open wiring may lead to many loss of life and property.

3. Maintenance of Premises

Regular maintenance for all surfaces, especially walls, ceiling

Prevailing situation in Indian Mkts: **No regular maintenance**



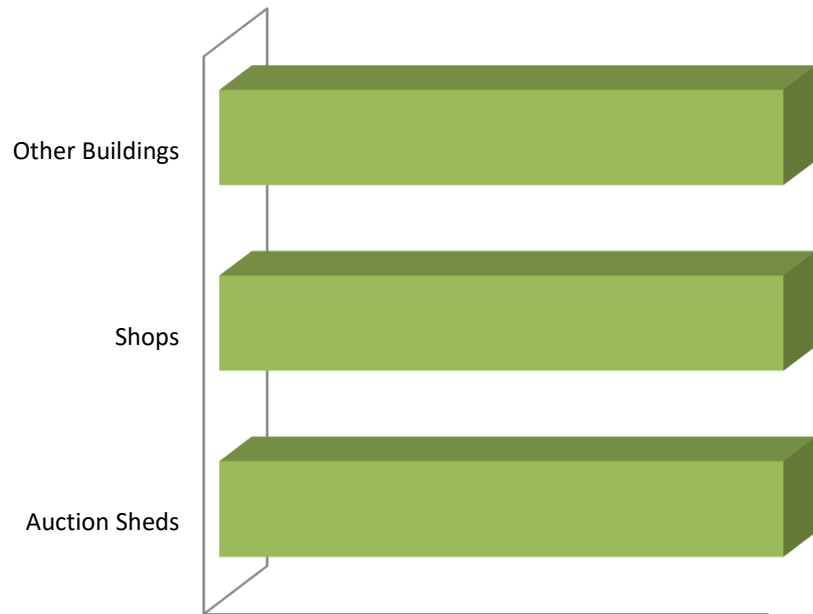
Ideal situation according to WUWM:

There should be maintenance of the all the surfaces especially walls and ceiling to provide for smooth operations and cleaning activity. This is so because a wall or ceiling in the shop, if broken and not repaired will allow the passage of dirt, germs, viruses etc inside.

3. Maintenance of Premises

Prevailing situation in Indian Mkts:

Unscheduled maintenance



Regular maintenance for drainage

Ideal situation according to WUWM:

It is essential to maintain an efficient drainage system especially in the wholesale markets where the risk to contamination from the accumulation of dirt, contact with toxic materials, shedding of particles, condensation

	Auction Sheds	Shops	Other Buildings
yes	0%	0%	0%
no	0%	0%	0%
Yes but unscheduled	100%	100%	100%

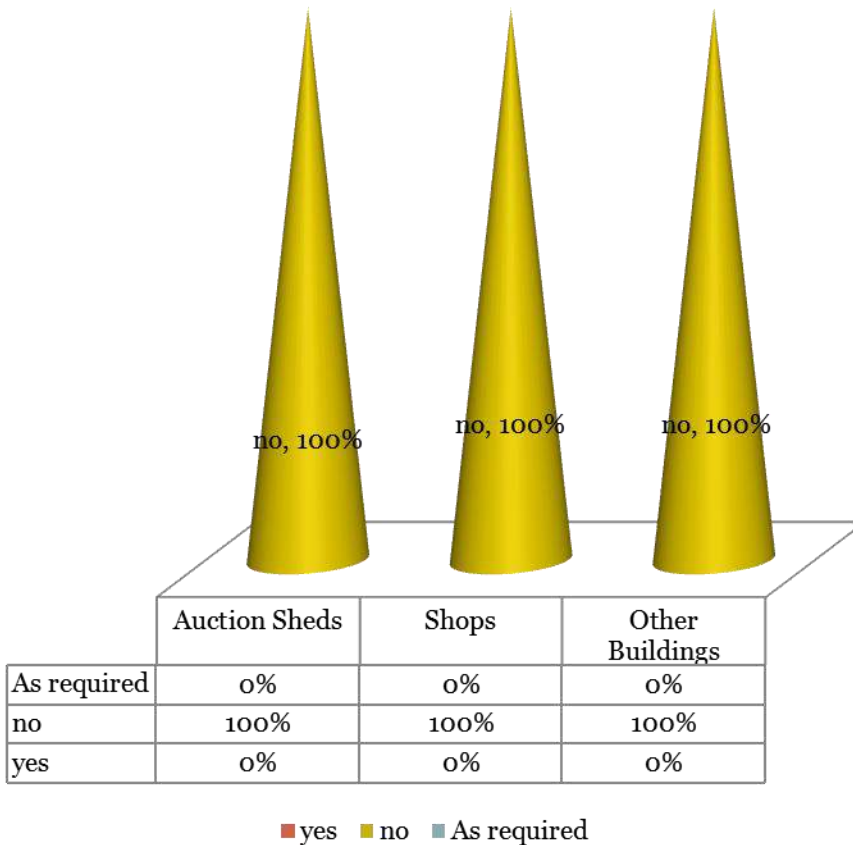
3. Maintenance of Premises

Regular monitoring and recording for leaks and loose fittings,

Prevailing situation in Indian Mkts

Ideal situation according to WUWM:

It is essential to regularly monitor and record the maintenance of all the surfaces, leaks and loose fittings, drainage. Regular monitoring and recording of maintenance helps in taking decisions to improvise the process.



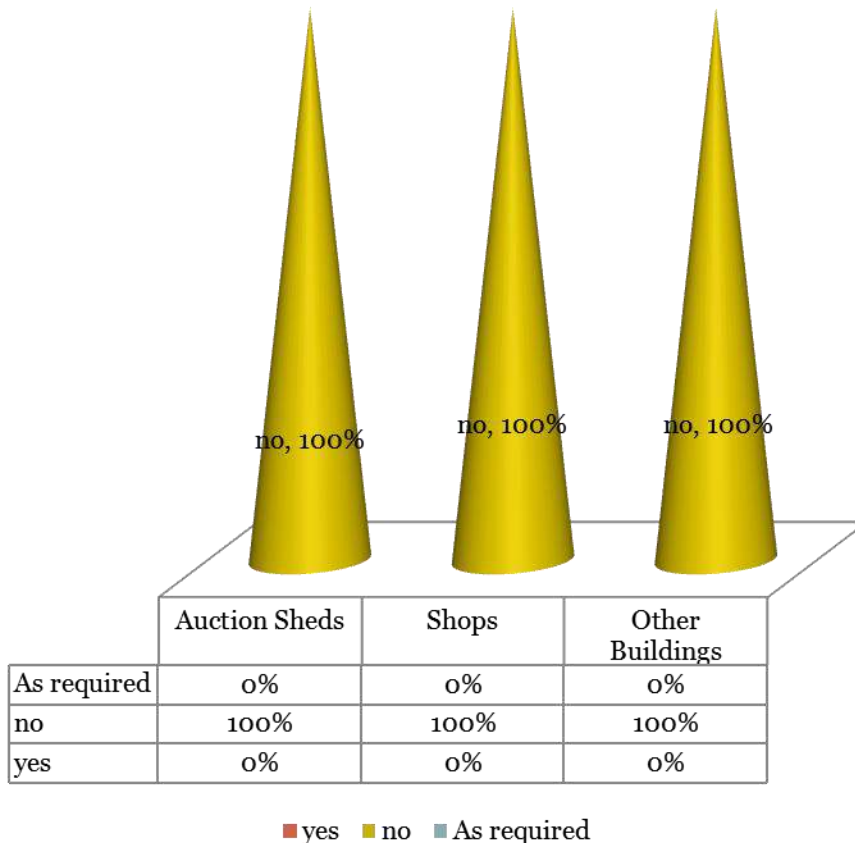
3. Maintenance of Premises

Prevailing situation in Indian Mkts

Regular monitoring and recording for drainage system

Ideal situation according to WUWM:

It is essential to regularly monitor and record the maintenance of all the surfaces, leaks and loose fittings, drainage. Regular monitoring and recording of maintenance helps in taking decisions to improvise the process.



4. Temperature

Prevailing situation in Indian Mkts

The cold storage units in case of Indian Wholesale markets are present outside the mandi premises.

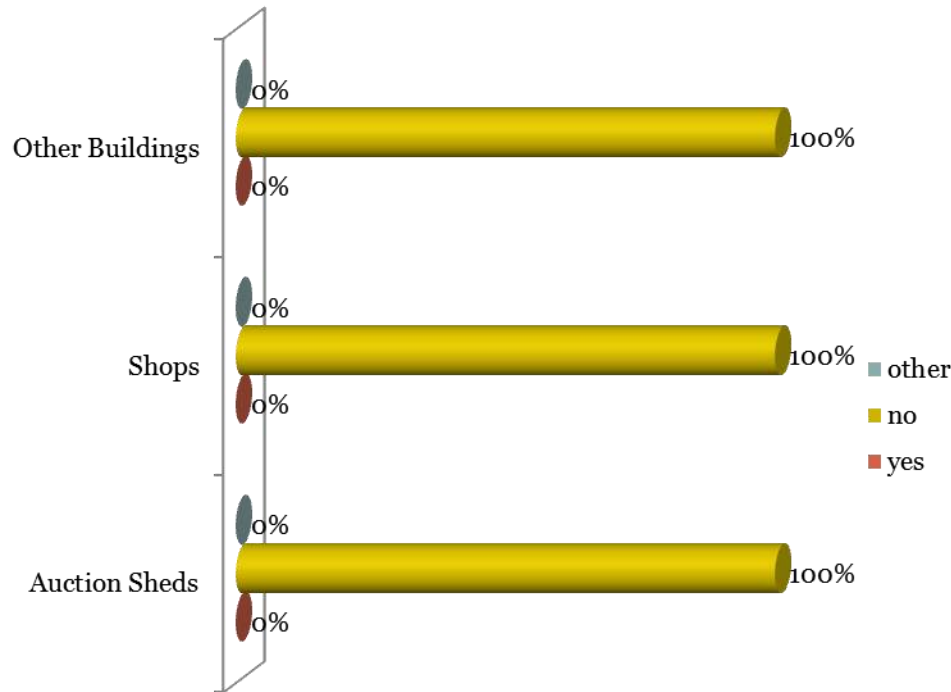
There is no cold storage in the shops or auction shed.

Ideal situation according to WUWM:

- There should be Cold production systems which are calibrated.
- A temperature monitoring and recording device/system, with built in alarms, (recordable, audible and visible) installed in all refrigerated and/or freezer areas in shops and auction areas.

5. Cleaning and disinfection

Prevailing situation in Indian Mkts: no such facility



	Auction Sheds	Shops	Other Buildings
other	0%	0%	0%
no	100%	100%	100%
yes	0%	0%	0%

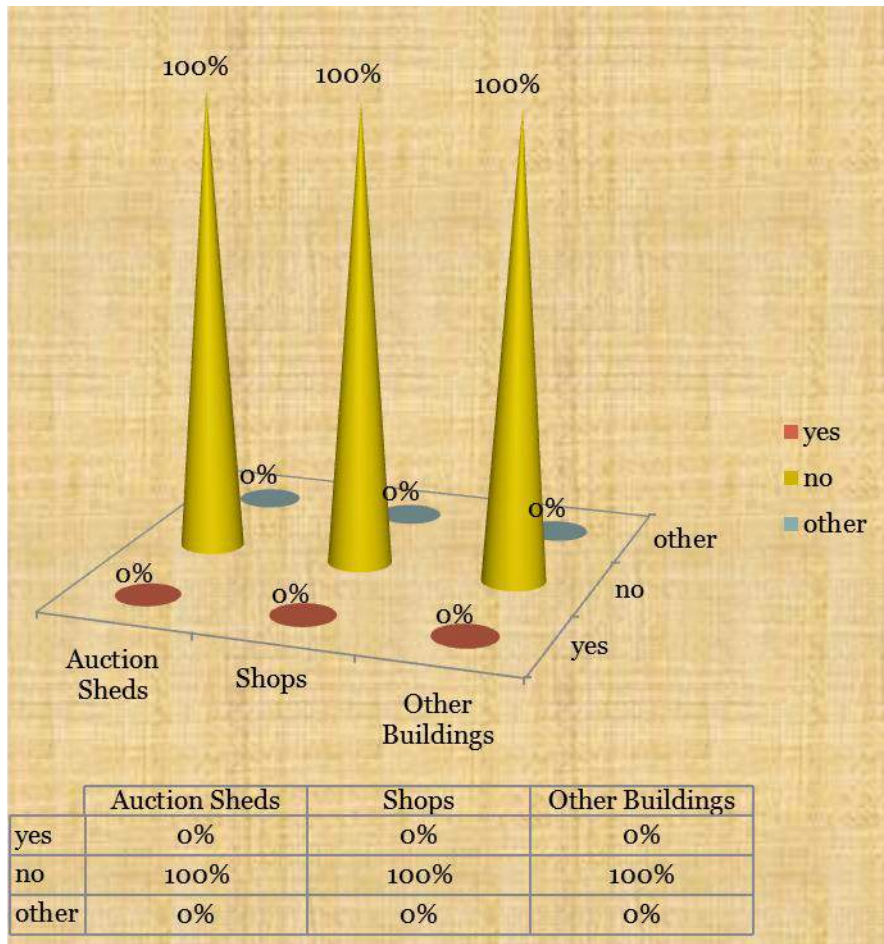
Lockable container or specific storage room to store cleaning agents

Ideal situation according to WUWM:

According to WUWM manual, the lockable containers/storage rooms are provided to keep the cleaning and disinfecting agents. This was done to keep the chemicals away from the place where the produce is handled.

5. Cleaning and disinfection

Prevailing situation in Indian Mkts



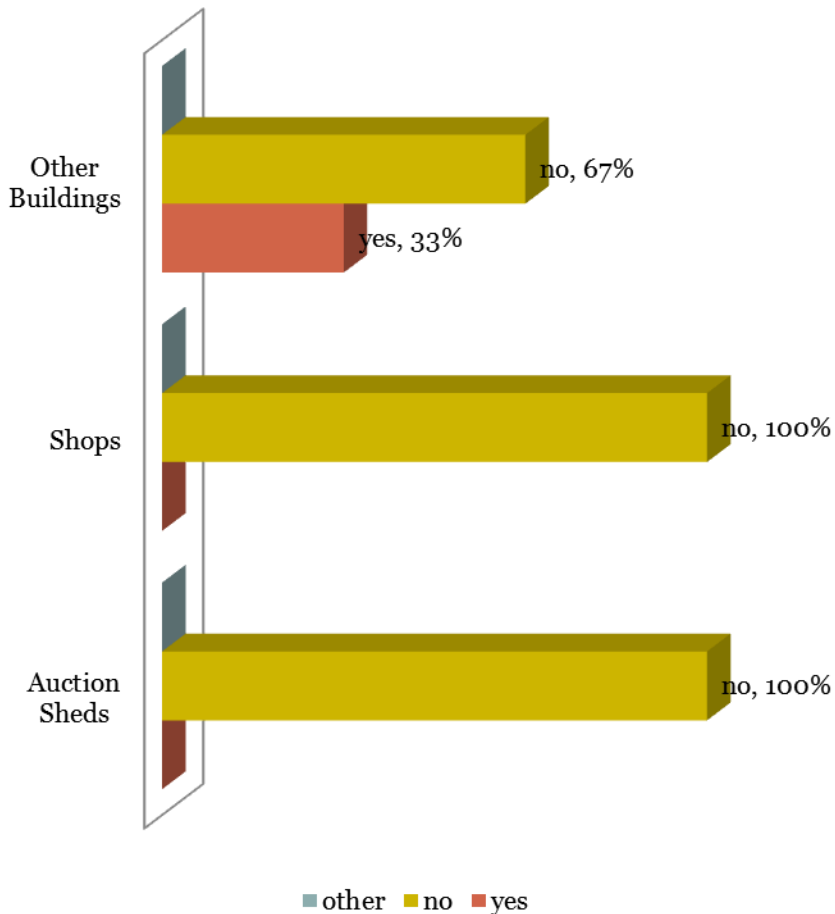
Daily washing of the floor and skirting walls with a disinfectant.

Ideal situation according to WUWM:

The WUWM manual talks about daily washing of the floor and skirting walls with a disinfectant with phenyl to ensure a cleaned and germ free market place for the produce to be handled.

6. Pest Control

Prevailing situation in Indian Mkts



Use of insecticidal spray having knock-down effect

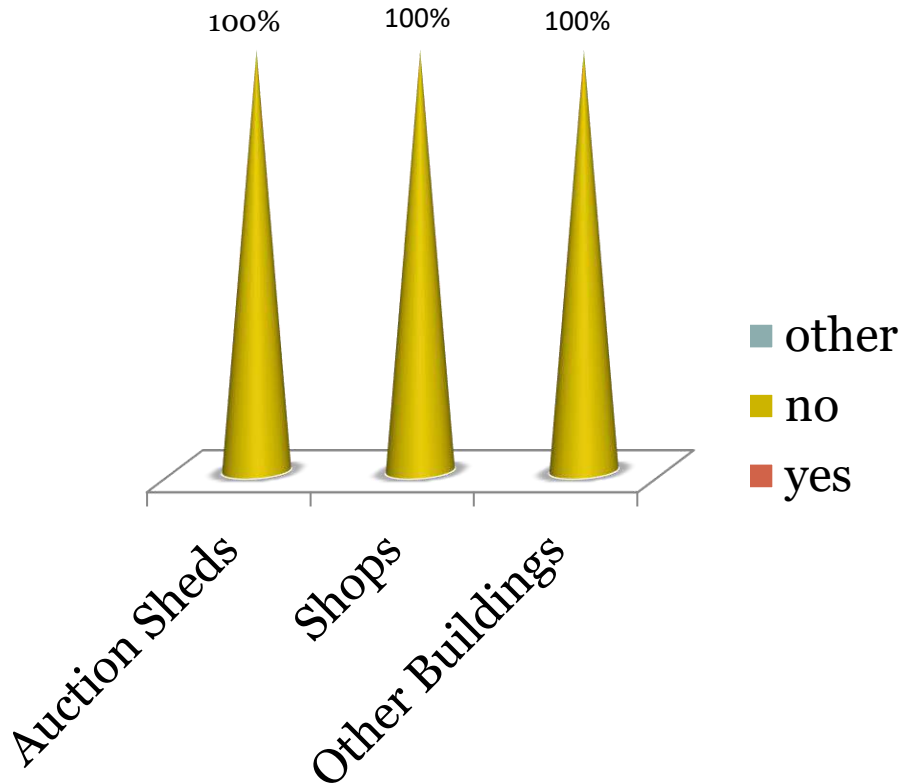
Ideal situation according to FSSAI:

The FSSAI, keeping in mind the Indian markets, aims to keep a check on contamination from insects. This can be prevented with the help of insecticidal. Hence the FSSAI has mentioned specific guideline on the use of insecticidal spray having knock down effect.

In metros it was observed that there is about 2-3% likelihood of having insecticidal spray in the shops. However the general observation of the overall Indian markets is as along side

7. Personal Training

Prevailing situation in Indian Mkts: No personal Training



Ideal situation according to WUWM:

There should be training of all food handlers in food hygiene matters

There should be linking with the last point of personal hygiene.

8. Responsibility for Equipment

Prevailing situation in Indian Mkts

- The equipments (basically crates) are made of plastics which are not food grade.
- No cleaning or disinfection plan exists for equipments.
- The cleaning of the crates is solely the responsibility of the shop-owners or the traders.(give it a training and mention in the recommendation. World over there is a mechanical device which does the cleaning. Hence the training is required to give training)

Ideal situation according to WUWM:

- The equipments should be made of
 - a) Stainless steel
 - b) Food grade plastics
 - c) Ceramics
- There should be a cleaning and disinfection plan, moreover it should be in written form.

Ideal situation according to FSSAI

- all the equipment cleaned, washed, dried and stacked at the end of the day to ensure freedom from growth of mould/fungi and infestation.

9. Services and Responsibilities

Prevailing situation in Indian Mkts

- Maintenance of Drainage is mentioned in the contract.
- No checking of water quality is done.
- No usage of recycled water.
- There is storage of water in case of intermittent water supply.
- There is provision for disposal of refuse.

Ideal situation according to WUWM:

- Design of Drainage facilities and its management.
- Water quality is tested on an annual basis by an approved laboratory.
- Usage of Recycled water.

Ideal situation according to FSSAI

- Continuous supply of potable water.
- Storage arrangement in case of intermittent water supply.
- Efficient drainage system and provision for disposal of refuse.

10. Personal Hygiene

Prevailing situation in Indian Mkts

Negligible attention given towards personal hygiene in Indian wholesale markets.

Ideal situation according to WUWM/FSSAI:

A lot of steps including prohibition of ill people from entering the food premises, hot water facility, wearing of protective clothing like gloves, masks mentioned.

3. Global Food Safety Infrastructure

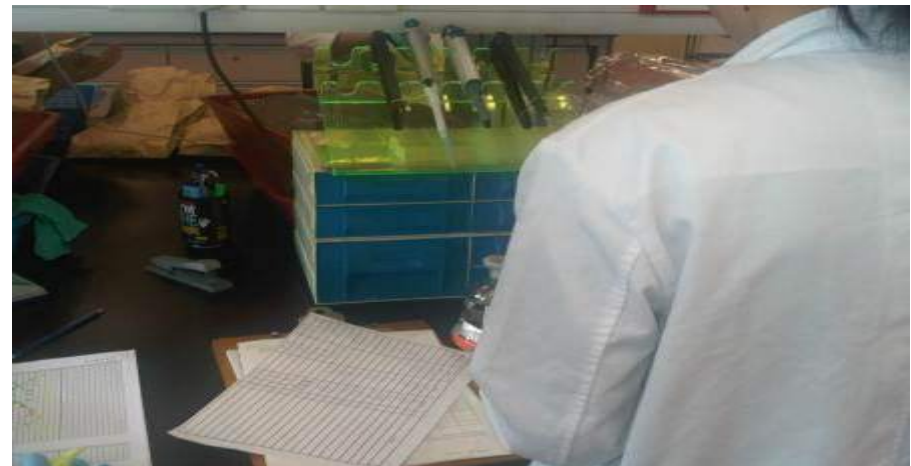
Instant Food Testing Laboratory – An example of VMO, Vegetable Market, Hongkong

- ❖ *All Vegetables supplied by Vegetable Marketing Organisation (VMO) must pass through stringent pesticide residue testing before being processed according to customers' specifications.*
- ❖ *Over Past six months, VMO has tested 8900 samples of local vegetables and has not found any unregistered pesticide. Only six samples were found to have pesticide residues exceeding permitted levels.*



Instant Food Testing Laboratory VMO, Vegetable Market, Hongkong

- ❖ *At the Wholesale and retail markets, the authorities also take samples from a variety of vegetables including leafy vegetables, pulses and rhizomes, for tests.*
- ❖ *VMO established a Premium Vegetable Section (PVS) in 1992, with an aim to assist local farmers to build up a network to sell their produce to upper class customers like hotels, restaurants, elderly homes, supermarkets and lunch box supplier, etc.*



A Case of Shenzhen (FQT) Agricultural Products Testing Tech Center Co., Ltd.

- *More efficient, convincing and fair food tests carried out by a professional third party testing agency which is independent from the commodity traders and the market operators.*
- *Owners of the goods are charged for the corresponding costs*
- *Testing capacity : 2000 samples per day*
- *More sustainable way to maintain the food safety & quality via wholesale markets*
- *One-stop food quality & safety solutions including testing, consulting, and training for wholesalers, purchasers, growers, processing and distribution businesses, and related companies*

4.. FOOD SAFETY Parametres Portable Food Testing Equipments

Pesticide Residue Testing Machine, Schenzhen China



It is an instant pesticide residue testing machine used in the market for testing fresh green produce brought by farmers.

Pesticide Detector



- Multichannel rapid detector for pesticide residue is a brand new food safety equipment which uses the enzyme inhibition ratio method according to National Standard(GB/T2009.199-2003) and Agricultural Standard (NY/T 448-2001), while combining with the fast test method.
- It's widely used in Agricultural System, Food and Drug System, Quality Surveillance System, Epidemic Prevention, Mobile Van for Food Safety Test, Production Base for Vegetables, Wholesale Base for Vegetables, Farmer Market, Food Market and so on.

Organic Waste Converter

M/s. Excel Industries Limited, Mumbai, the pioneers in Agro Chemicals and Industry Chemicals, have developed a cost effective technology for solid waste management.

Solid waste is treated by spraying a biological inoculum at the collection points.

The treated solid waste can be safely collected, transported and disposed off without creating health hazards.



KENT Vegetable and Fruit Purifier

Features

- Based on Ozone technology with an exceptional power to kill Bacteria, Viruses, Fungus and other Pathogens
- Effectively oxidizes residual chemicals and Bacteria from surface of vegetables & fruits
- Helps in cleaning antibiotics and hormones that invariably remain in meat, fish & other seafoods
- Sleek and modern design
- Does not require any service and change of parts



5. Global Waste Management Parametres

a case of SYDNEY MARKETS



ORGANIC

POLYSTYRENE

**CARDBOARD
AND PAPER**

TIMBER

GREEN MARKET ENVIRONMENTAL WASTE STREAM OVERVIEW

GREEN POINT

- **Designated on site Green Point Recycling Facility established in 2005.**
- **Eight distinct waste streams are managed on site.**
- **Currently 65% of the total waste generated is recycled.**
- **We will now go through the collection and separation processes for each of the waste streams.**

STEEL

CONCRETE

PLASTIC

**GENERAL
WASTE**

ORGANIC

POLYSTYRENE

[click here](#)

CARDBOARD
AND PAPER

TIMBER



GREEN POINT

- **50 tonnes of polystyrene collected and recycled annually. (500 truck loads)**
- **Polystyrene is recycled on site**
- **Product is reduced by 90 times from its original size.**
- **End product is exported to Korea and re-moulded into products such as picture frames, building products and kitchen cupboards.**



MEASURES IMPLEMENTED AT SYDNEY MARKET

- Introduction of Green Point Facility
- Expansion of Environmental Team and Equipment
- Water Saving Action Plan was completed
- Energy Savings Plan initiated and reviewed regularly
- Established Carbon Footprint
- Specific disposal mechanism for cardboard, steel and timber

- SML has special waste stream diversions for organic waste generated in their markets, it has contracted Veolia Environmental Services (Veolia) & Earthpower Technologies where *the organic waste is used in an anaerobic digestion process to convert the food waste to energy and fertilizer products.*

- *All these measures have led to increased resource recovery from 15% in 2005 to 55% in 2008, and*
 - ✓ Environmental Sustainability Award conferred by WUWM (2008)
 - ✓ 3 star rating for Sustainability Management Systems and Water Management Systems.

HOT ROT COMPOSTING SYSTEM

- *It is the proprietary technology of New Zealand based R5 Solution's Ltd.*
- It is the global supplier of specialty organic waste treatment technologies and services.
- The Hot Rot in-vessel composting system provides an efficient, cost-effective, aerobic composting process to the global issues of:
 - Large scale composting
 - Municipal waste composting
 - Food waste composting

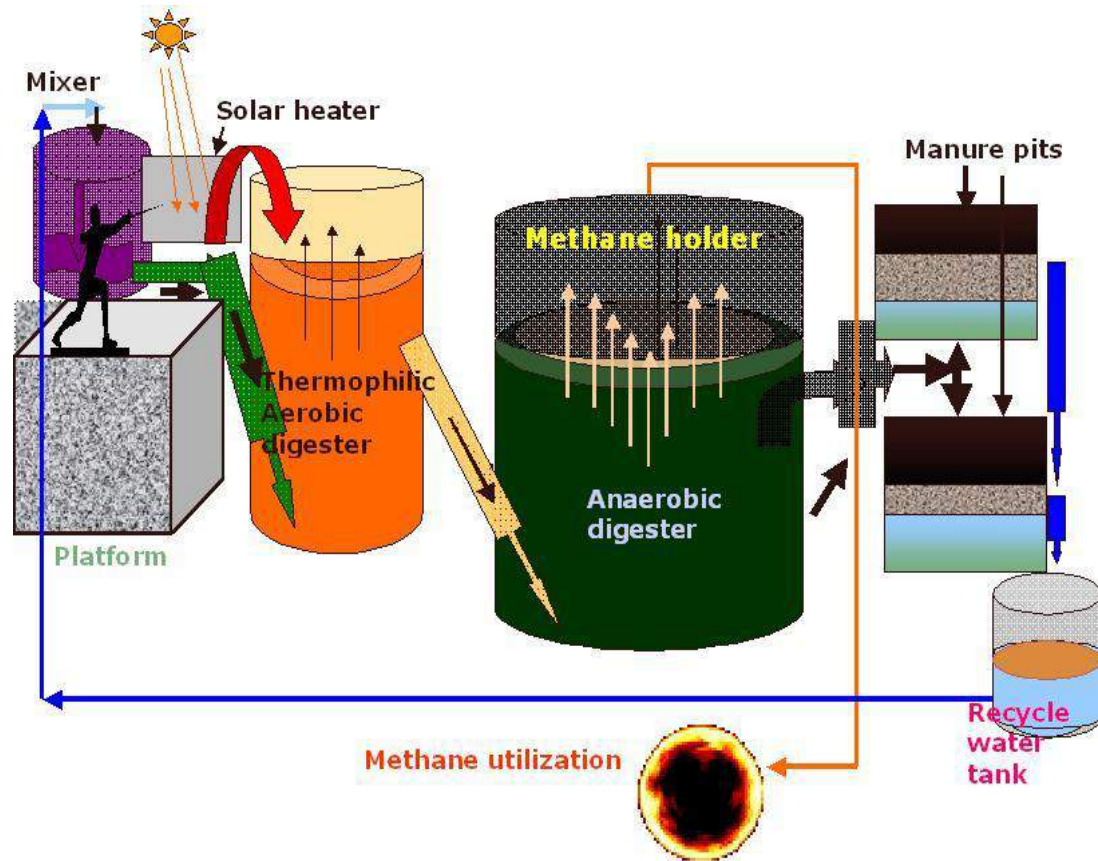
INDIAN SCENARIO

- The existing facilities for on-site storage of waste are quite inadequate throughout wholesale markets of fruits and vegetables (APMC's) of the states in India.
- Open dumping and landfilling are adopted for disposing off waste this leads to sub-soil water pollution which is due to leeching of harmful chemicals and minerals.
- Non – availability of appropriate infrastructure for handling of the organic market waste with the respective market authorities.



Promising solution

- The NISARGRUNA model is a biogas plant, based on biodegradable waste, and has been developed by the NA&BTD (Nuclear Agriculture & Bio-technology Division), BARC.
- NISARGRUNA offers a "Zero effluent" method for management of solid waste.
- The gas can be utilized for cooking, generation of electricity (7-8 KW through a dual-fuel based 10 KV A generator) or as fuel for vehicles.



BENEFITS OF NISARGRUNA MODEL

- The gas generated in this plant can be used for gas lights fitted around the plant, generate electricity.
- Odour free and high quality manure rich in organic content is produced.
- Water separated in the tank is acceptable for reuse.

Calculations as per BARC for 10000 kg waste/day to be treated in NISARGRUNA plant:

Items	Quantity
Waste	10000 Kg
Water	10000 L
Hot water (70-80°C)	1000 L
Gas generated (methane)	600-750 m ³
Manure output	500-600 Kg

•Methane is equivalent to LPG as fuel. The price may be taken as Rs. 7 per m³. Hence it would amount to saving of Rs. 4200 - 5200 per day.

•The manure cost can be taken as Rs. 2-3 per Kg.

•Five laborers are needed per day to operate the plant.

•The installation cost is Rs. 46 to 50 lakhs (excluding the land cost).

•The space required is 200m²

THANK YOU!