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Operational Facilities and Sanitary Practices in Abattoir : A Case Study of Hyderabad, Pakistan

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ABSTRACT

The Slaughterhouse located at a suburban area of Hyderabad, Sindh, underwent an evaluation of its operational facilities and hygienic standards using a descriptive cross-sectional survey. In addition to conducting observational studies on the facilities and hygienic practices in the slaughterhouse semi-structured questionnaires were given to the personnel, in order to gather the data regarding the skills & training facilities of workers at slaughterhouse. An observational evaluation of abattoir facilities was conducted to get hands on data regarding the size & sitting of slaughterhouse, along with its accessibility to the livestock market or livestock facility within the slaughterhouse. The lack of several facilities including basic appropriate water supply along with lairage, evisceration section, guttery and tripper section, cold room, detained meat section and condemned meat section shows the unhygienic side of slaughterhouse. The majority of the solid waste including bones, horns, and undigested food, were put in sacks and taken outside the slaughterhouse for by-products. Cleaning was done manually using brooms and water waste was supposed to dumped into a drainage system that opened into a local stream. After the animals were slaughtered, all of their blood was directly drained into gutters. Every day, the floors, premises, and slaughter slabs were cleaned, and the wastewater and its effluents were diverted into drainage systems. This research aims to suggest that certain facilities be renovated, that sanitary areas be provided with adequate amenities, and that bins and dumpsites to be provided for appropriate waste disposal system.

Introduction

Slaughterhouse is a space where animals are slaughtered for human consumptions (Bello and Oyedemi, 2009; Lawan et al., 2013). Goats, sheep, cattle, fowls & pigs are slaughtered commonly for human consumption, this provides by products along with meat supply to restaurant or daily usage (Komba et al., 2012). An abattoir is identified as a place, must be registered for slaughtering along with dressing of animals (human consumption), therefore must have equipment's for slaughtering, processing, storing & distributing the meat. (Dandago et al., 2009). However, these facilities are neglected by most of the local authorities who are the sole manager of abattoirs in Hyderabad, which results in deplorable condition of slaughterhouse that includes sanitary system, inappropriate meat inspection, inadequate hygienic process of slaughtering & Dressing, which directly or indirectly have effects on health of workers or residents near abattior. (Nwanta et al., 2008; Ezeohaa and Ugwuishiwu, 2011). Lairage, slaughter hall, slabs, gut, detained meat section, offal section, condemned meat section, tripe section & cool room are some of the elements essential for a standard

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abattoir. The veterinarian office, laboratory, waste disposal facilities, sanitary department, veterinary inspection section, hide and skin section, and others are also included. Inappropriate slaughterhouse facilities have an impact on day-to-day operations, which results in the production of meat and meat products that are dangerous and unfit for human consumption. In order to produce and supply wholesome meat for human consumption, adequate and proper abattoir processes are necessary. These include ante mortem inspection, slaughtering, bleeding, evisceration, post-mortem inspection, and waste disposal. (Alhaji and Bawa, 2015; Richard et al., 2015). This can be achieved by providing adequate operating facilities that fulfills the international & national standards of abattoir facilities. (Alhaji and Bawa, 2015). These facilities are important in preventing diseases transmission through the consumption of contaminated meat (Dandago et al., 2009). Appropriate drainage system, solid & liquid waste management along with hygiene practices can be taken into consideration in order to control meat contamination (Komba et al., 2012; Richard et al., 2015). This research is conducted in order to assess the functional standing of abattoir along with the available facilities & infra structure of slaughterhouse at local slaughterhouse situated at Hyderabad.

Materials & Methods

Hyderabad Cow Slaughterhouse (Bara Qamaila)

Hyderabad is the Head quarter of Sindh, serve several areas regarding export-import, historical capital of Sindh, faces several eras of globalization from Islamic conquest up to postmodern age, but the overall impact is hub of business. The livestock import is the main business of several areas of Hyderabad which include Paretabad, links several interior Sindh areas which are rich in livestock growth of 2.9% / day, it is located in Sindh, has a length of 3.71km having Government Administrative Slaughterhouse locally known as Qamaila which serve approximately 60% of Hyderabad population and some areas directly linked with Paretabad i.e. Kanoot. It took 30 min to reach Paretabad from main autobahn road which is then linked with sheikh bhirkio road, which lead towards Paretabad, after crossing Pakistan chowk it took 20 min more to reach at slaughterhouse.

It covered an area of 10000 sq ft but the legal boundaries is extended up to 20000 sq ft. On daily basis slaughtering of cow is done in two shifts. The timing of process is different in summer and winter season:

Table : 4.1

SERIAL #	SEASON	TIMMING
1.	SUMMER	4am - 9am
		6pm - 10pm
2.	WINTER	6am – 11am
		4pm – 8pm

Source: Modified from Data Collected

Slaughtering generally starts from purchasing live stock up to transporting the body to the butcher's shop. Live stock is purchased from the cattle market from all over the Pakistan that include Bhawalpur, Tandoadam, Degree, Tandoalahyar. After purchasing they are brought to the slaughter house through truck. Each truck carry 20-30 animals and after reaching at the slaughterhouse the care takers bought them to the lairage where they are kept for one day, care takers provide them feed and made anti-mortem through naked eyes in order to check that either the animal is fulfilling all the requirements of slaughter-able animal, then taken to the slaughterhouse. After slaughtering the Man wait for complete bleeding, after bleeding the skinning process is done and the waste product is gathered on the floor, By-products are also collected on the floor in order to sale them too. Number of slaughtering / days is 40-50 animal / shift. The average weight of animal is 150-170kg. They provide those carcasses up to butcher's shop, Restaurants and some butchers personally come to purchase it. In last few years due to zoonotic diseases and Physician's recommendation the ratio of meat consumption reduces, there was a time when slaughterhouse produces 500-600 carcasses/ day, due to provision of hygienic food the trend of BARAY KA GOSHT lost its superiority. On Tuesday, Wednesday for saving production of livestock the slaughterhouse remains close.

Being a traditional slaughterhouse, it lacks all the modern facilities and machines but the basic facilities too. On entrance a door of approximately 10'-0" wide is provided which approaches up to slaughter area, It is an open to sky area having a boundary wall of 7'-0" height, area measures 75'-0" x 150'-0" having an area of 10000 sq ft. It bears 30 columns; there are two types of columns, 1 which serve animal to stand away from the other, the other column bears hanging rails in between which is use to hang the carcasses through hooks. There is a water tank on left hand side at the top of washrooms. This water tank was serving the carcasses to be wash down, for cleaning of slaughtering area and for the labor working there, there was an open drain of 1'-0" wide which serve bleeding of animal and drain this blood directly out of slaughter house to the manhole. The floor of slaughterhouse posse's two different features regarding material, Cement flooring and other was polished concrete. The area where slaughtering was going, was made of concrete and the area

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where staff was placing the by-products and waste material was of cement. Slaughterhouse bears a light slope having a ratio of 1':20' on entrance.

Far away from the noise and pollution of city make it convenient for the labor to slaughter animal in a peaceful area which is totally devoted for livestock growth. The slaughterhouse fulfills the daily meat consumption demand of Hyderabad and some fast-food franchise and restaurants.

Bara qamaila, being the major means of supplying meat to the 80% areas of Hyderabad, must be reconsidered in term of technology & basic services, one can easily identify by visiting that it's the most neglected industry of Hyderabad, as it lack electricity, drainage, it's playing part in polluting water & air, It lack all the spatial, physical and architectural features, as in evening time when the night shift of slaughtering starts due to load shedding labor have to wear head torches and in that dim light they have to slaughter which is a great risk.

BARA KAMAILA is a traditional slaughterhouse hence lacks the modern facilities, but the issue is something beyond modern facilities, it must have a proper covered area to ensure the hygiene and desired temperature for animals, carcasses & labor. It must have efficient natural lighting and ventilation in order to facilitate the staff. The staff must be aware of all the rules and regulations regarding the slaughtering. There must be a doctor who check and verify anti-mortem and post- mortem in order to ensure the consumer's demand of fresh and hea lthy meat.

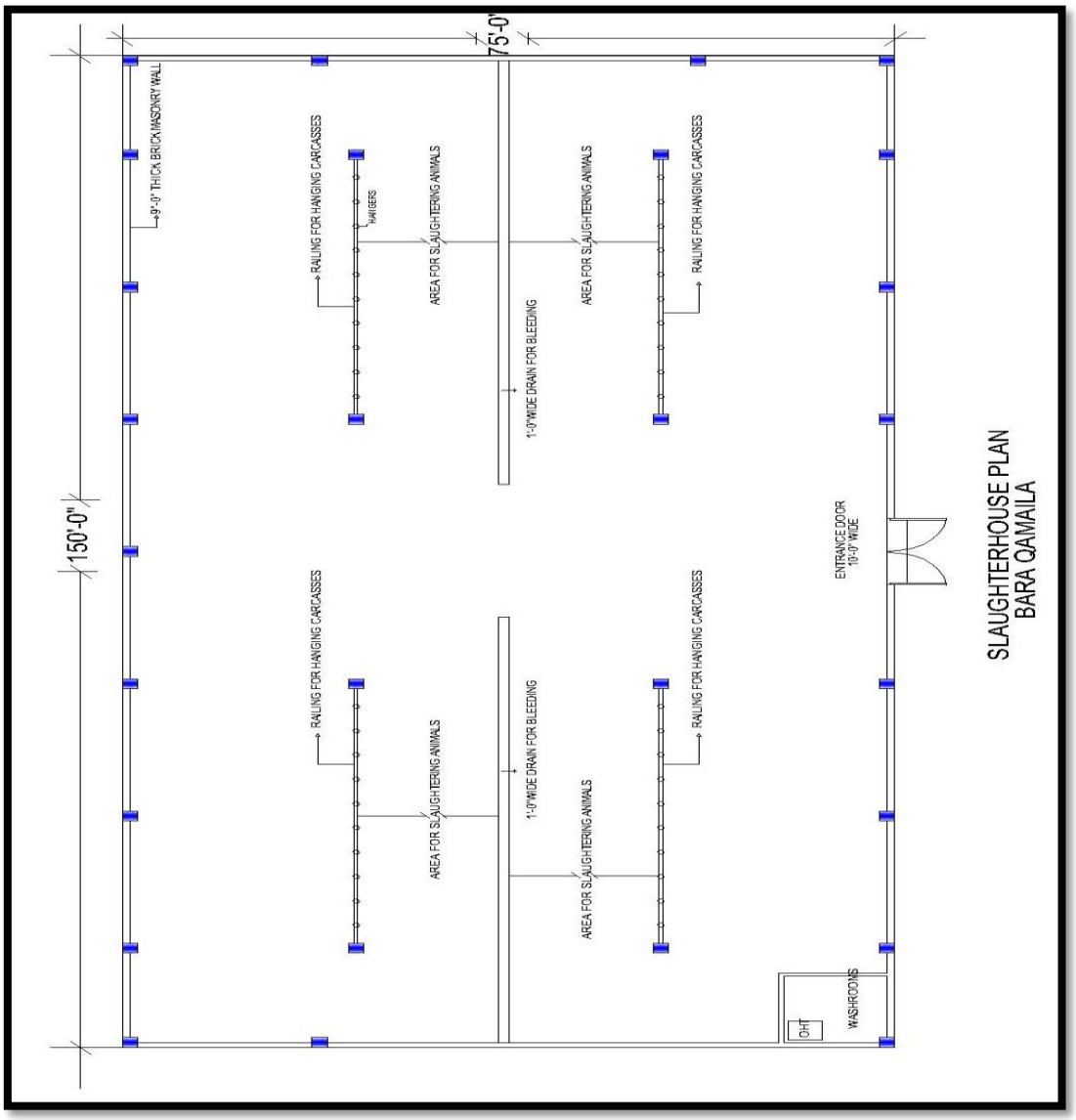

FIG # 1
PLAN OF BARA QAMAILA
SOURCE: SKETCH BY AUTHOR

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Hyderabad Goat Slaughterhouse (Chota Qamaila)

Being a populated city of sindh, Hyderabad's population strike 5.5 laces line on graph, due to increase in population daily by 7%, the demand of per capita meat is increasing. 20% of populations due to age factor or physician recommendation are prohibited to consume meat, so they divert their desire from meat to mutton. Due to several nutritional facts, which include sodium, fat, potassium etc the trend and demand of mutton is increasing day by day by 5.5%.

Existing slaughterhouse is adjacent to phuleli canal covered an area of 4800 sq ft. On daily basis slaughtering of Goat is conducted in two shifts. The timing of process is different in summer and winter season:

Table : 4.2

SERIAL #	SEASON	TIMMING
1.	SUMMER	1am - 8am
		11pm - 5pm
2.	WINTER	7am – 11am
		5pm – 9pm

Source: Modified from Data Collected

The whole process of slaughtering starts from purchasing of desired animal up to transporting the body to the butcher's shop or retailers. The animals are purchased from the cattle market and some butchers bring their animal themselves. After purchasing they are brought to the slaughter house through means of Suzuki or Mazda. Each vehicle carries 10-15 animals and after reaching at the slaughterhouse the servants bought them to the lairage where they are kept and provide them feed and made anti-mortem through naked eyes in order to check that either the animal is fulfilling all the requirements of slaughter-able animal. Then it is taken to the area where it is going to be slaughter. After slaughtering the Man wait for complete bleeding, after bleeding the skinning process is done the whole process is done on floor and the waste product is gathered on the floor and throw down into canal, By-products are also collected on the floor in order to sale them too. Number of slaughtering / days is 400-500 animal / shift. The average weight of animal is 40-70kg. They provide those carcasses up to butcher's shop, Restaurants and some butchers personally come to purchase it. On Tuesday, Wednesday for saving production of livestock the slaughterhouse remains close.

Being a traditional slaughterhouse, it lacks all the modern facilities and machines but the basic facilities too. On entrance a door of approximately 6'-0" wide is provided which approaches up to slaughter area, the plinth of slaughterhouse is 3'-0" from road level, it is an open to sky area having a boundary wall of 8'-0" height, area measures 45'-0" x 100'-0" having an area of 4500 sq ft. It bears 12 columns the columns are made up of burnt bricks having height of 8'-0", measures 1'0" x 1'-6", between columns run hanging rails that are use to hang the carcasses through hooks. There is a water tank in front of main gate at the top of washrooms. This water tank was serving the carcasses to be wash down, for cleaning of slaughtering area and for the labor working there, there was an open drain of 1'-0" wide running throughout the slaughterhouse which serve bleeding of animal and drain this blood directly out of slaughter house to the phuleli canal. The floor of slaughterhouse is of Cement flooring. It bears two gates. One is for animals and other for the labor or visitors.

Direct link of slaughter house with farming area makes it convenient for the labor to slaughter animal and most of the labor lives near slaughterhouse, is a good factor to consider for the labor. CHOTA KAMAILA fulfills the daily mutton consumption demand of Hyderabad including fast food franchise, restaurant and wholesale retailers.

Chota Kamaila lack hygiene related facilities along with health standards, It lack services including electricity, drainage etc. It is directly linked with phuleli canal which serve as wastage bin, the waste is directly drown into canal which make the canal polluted and make it inconvenient for the public living near canal, it lack all the spatial, physical and architectural features, anti-mortem and post-mortem facility was absent, no check and balance regarding slaughtering outside the slaughterhouse is there. Several butchers for their convenience slaughter their animal at their houses without legal stamp and sold it in market.

Paretabad have up to 100+ butchers shop serving the whole area, these 100+ shops are served by these slaughterhouses. 75% butchers' shop of Hyderabad and Qasim Abad are served by these administrative slaughterhouses and Noor mehal is another main area of meat market having 25+ shops serving not only the adjacent area but interior Sindh too.

It is a traditional slaughterhouse which lack all the desired and basic facilities having undesired, unhygienic and un-wanted temperature for animals, carcasses and for labor. The meat market must not only fulfill he local public demand but it must also have a significant figure regarding frozen meat production and exporting which will help in growth of economy of country on national and international level.

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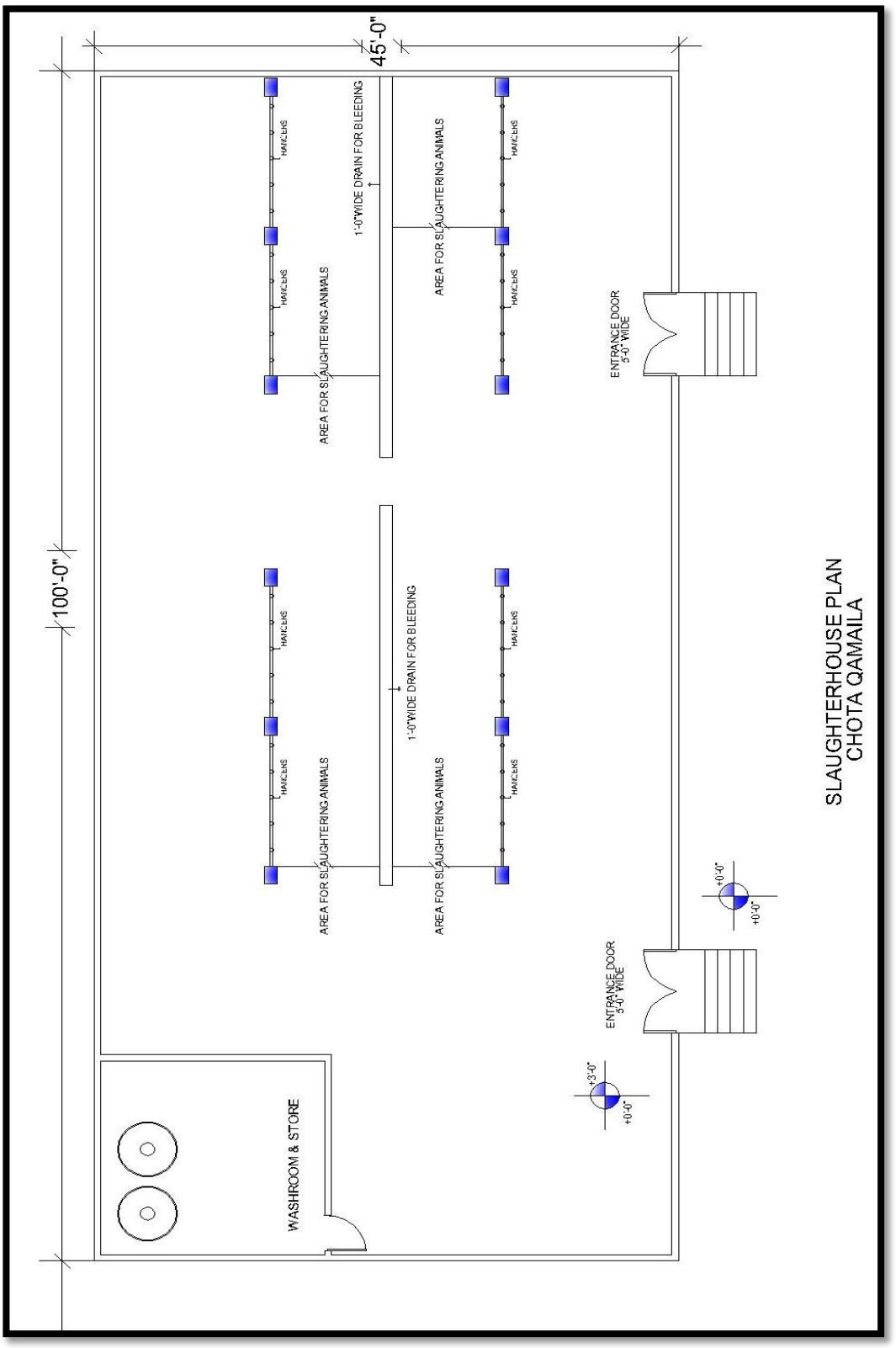

FIG # 2 a
PLAN OF CHOT AQAMAILA
SOURCE: SKETCH BY AUTHOR

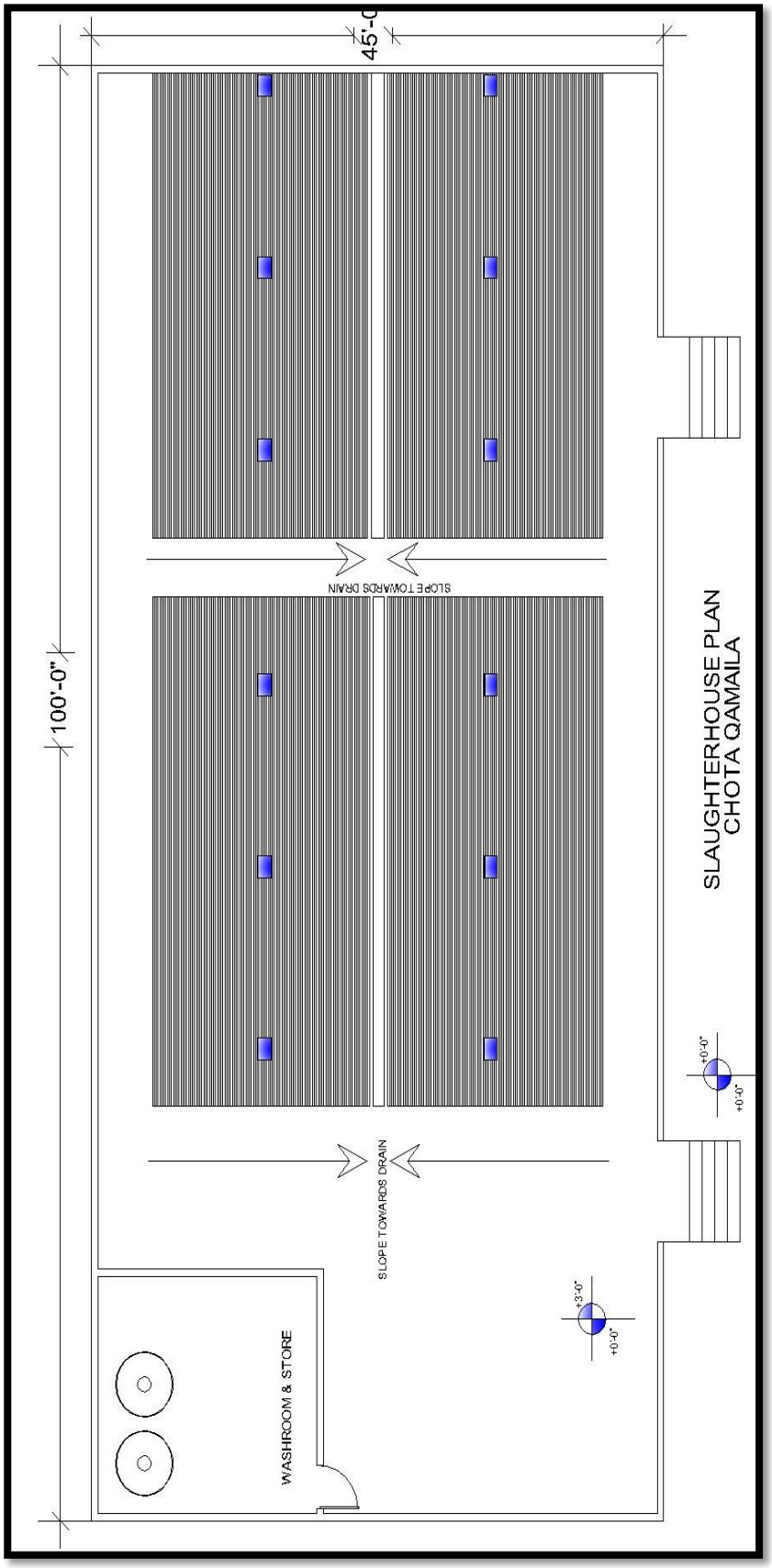

FIG # 2 b
FLOOR LEVELS CHOTA QAMAILA
SOURCE: SKETCH BY AUTHOR

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Un-Structured Veterinary Interview

Initially we prepared some questions related to cattle or live stock; other questions were driven by the response that we get from the concern person, which allows to develop a series of questions during interview. Veterinary survey includes a physician and a skilled person who was dealing with cattle since more than 5 years hence have a good experience regarding health of cattle and ethology. The result of veterinary unstructured interview provides a description of the problems which are increasing in cattle due to vaccination for dairy production. Most of the animal which is slaughter for daily usage feed upon the garbage due to which several infections and diseases are transfer in cattle but the workers couldn't find any symptoms hence these infections when we consume meat is transfer in public. In this regard the veterinary physician suggested keeping the slaughtering animals under high observation and their feed must be fresh, as they eat healthy food will also healthy for public, they must vaccinate properly if have any infection. A small laboratory is proposed to assemble where we can perform several tests for the health of cattle in the premises of slaughterhouse which will help to maximize the health of cattle and consumer. Doctor also suggests to take care of equipment's from which animal is going to slaughter because the infectious or corroded equipment's are harmful for animals and the workers, the sterilization of equipment is necessary, the health of worker is considered so that worker should not possess any of the disease which can be transfer from them to the cattle. The workers are recommended to wear mask, gloves and boot for the sake of prevention from air-borne disease.

Literature Review

Appropriate infrastructure along with adequate sanitary system are major factors that help in production of carcasses along with its distribution. It helps in preventing spreading of animal & human diseases, slaughterhouse in 3rd world countries is designed & constructed in a way that lack all the necessary utilities including meat inspector, proper sanitary system. (Biu et al., 2006). The proper infrastructure would impact on public health as it can be a potential disease transmitter from & to human & animal. (Tassew et al., 2010). This research highlights the operational facility of Bara Qamaila & Chota Qamaila at Hyderabad, the field survey shows that people who were linked with slaughterhouses, 20% were butchers, running their meat shops & others were linked only with the slaughterhouse and business of livestock. Slaughterhouses in Hyderabad cover all the area regarding delivery of carcasses to the butchers shop, The management team of slaughterhouse is not facilitated regarding any injury or other danger through their authorities, and the 95% workers have inherited skills, no formal education regarding techniques of slaughterhouse is provided, they just inherit and learn from ancestors, Safety measures as told by management was their but no sign of safety was seen by author, regarding hygienic question the workers told they just clean the knives and other equipment's with a cloth after each animal slaughter and before the 1st animal slaughtering and after last animal's slaughtering they rinse off all the equipment's with water. In this regard author not only suggest to construct a slaughterhouse but also facilities for their worker's safety measures, check and balance regarding the slaughtering of animal which will discourage slaughtering outside the boundary of slaughterhouse & proper water supply for washing off all the equipment's hence making the slaughterhouse efficient for the provider and consumer of meat. Studies shows that inappropriate handling practices of butchers caused unnecessary losses to meat along with secondary products from slaughtering (Adetunji and Awosanya, 2011; Bafanda et al., 2017). Unavailability of sanitation in the slaughterhouse, inappropriate sterilization systems. Using same knife without washing, direct contact with contaminated & dirty surfaces and lack of bifurcation between dry & wet zone yields unhygienic meat (Adetunji and Awosanya,2011) sufficient quantity of drinkable water must be available in order to process cleaning procedures hygienically, working hours must be planned in order to streamline the water consumption, as the whole process requires ample amount of water, in this way we can reduce the pollution & ensure the international standards for hygienic operations. Slaughterhouses with adequate operational activities will require electricity during dressing of carcasses & storing it (Akinro et al., 2009; Lawan et al., 2013). The abattoir which is fully or semi-automatic will require energy efficient systems for automatic cleaning or other automated process, this can be achieve by biogas, windmills or energy efficient solution. After the availability of all the energy supplies it's the management that make the supply usage sufficient throughout the process in order to perform the process hygienically. (Adeyemo, 2002; Lawan et al., 2013). Keeping in mind that lairage plays vital role in the whole process of slaughtering, where animal is supposed to rest & where the vet performs ante-mortem inspection prior to slaughtering, the field survey shows the lacking of lairage in both Bara Qamaila & Chota Qamaila. The survey of both slaughterhouses examined the sanitary practices in slaughterhouses & it was revealed that waste dumping within the premises of abattoir was the practice the commonest method for solid waste dumping while liquid waste was indiscriminately discharged into nearby streams and drainage. Research shows major process of slaughtering can be the reason of airborne disease & microbial contamination

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(Abdalla et al.2009). We couldn't experience the meat inspection system in both slaughterhouses, there was no check & balance or veterinary record of diseases as ante mortem examination or post mortem inspection system was absent. Among all these basic facilities, sanitation was also un satisfactory not only for animal waste (before & after slaughtering) but the cleaning & sanitation process was manual, that was alarming for workers too. For keeping the Hygiene of slaughterhouse appropriate, hand washing, bathing & changing for the workers along with the adequate quantity of toilets must be present, there must be adequate hand washing points, sterilizers tools, hoses & cleaning equipment.

Result & Discussion

Serial #	Facility	Observation	
		Bara Qamaila	Chota Qamaila
1	Site & Vicinity	Site of slaughterhouse is adequate as it is away from major residential areas, but its near the canal, due to which the solid waste become the part of water body, playing part in water & air pollution.	Site of chota qamaila is near the residential area of 80% workers, so they can easily access the slaughterhouse.
2	Size	Size was adequate but need upgradation due to increase supply & demand	Size was adequate but need upgradation due to increase supply & demand
3	Infra structure	Poor infrastructure, need to get reconstruct in term of material & facilities.	Poor infrastructure, need to get reconstruct in term of material & facilities.
4	Services	Electricity, water supply, Drainage needs to be redesign in order to get these services appropriately to conduct the process smoothly.	Electricity, water supply, Drainage needs to be redesign in order to get these services appropriately to conduct the process smoothly.
5	Planning & zoning	Technical Planning & zoning was lacking, but workers sub consciously working within their premises	Technical Planning & zoning was lacking, but workers sub consciously working within their premises
6	Safety	Slaughterhouse lack safety gear for workers & animals that's going to be slaughter	Safety gears for workers, for before & after slaughtering were lack.
7	Education	Most of the workers lack systematic education regarding process & handling but they are Butchers from 3 generations that's why have hands on the whole process.	Most of the workers lack systematic education regarding process & handling but they are Butchers from 3 generations that's why have hands on the whole process

Rethinking Slaughterhouse

Basic Infrastructure Upgradation

Slaughterhouse is one of the major facilities in food industry, it must be up to date in order to minimize the unhygienic factor from our food, it needs to be synchronized & canalized in order to formulize the whole process from purchasing of livestock up to delivering the carcasses & meat to the consume, here are some of the basic infrastructure upgradation list, that needs to be reassure in order to make this facility up to the mark of international market & food standards.

Water Supply & Reclamation

- Authorities & Municipal bodies must ensure ample amount of water in order to meet the demand of processing of slaughtering.
- Water conservation & water reclamation must be introduced in slaughterhouse to make the process ecofriendly.

Sanitation Facilities

- Adequate toilets, hand washing & Showering stations installation at slaughterhouse can ensure the hygiene of workers
- Regular Maintenance & repair of sanitation & sewerage system within the slaughter must be install in order to not only hygienically appropriate for the workers but also to reduce the viral & disease factor in meat.

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1. Process Enhancement

UpToDate Equipment

- Investment in process & slaughtering equipment can improve the safety of workers along with increasing the efficiency of process.
- Installing the semi-automated systems where a possible (financially) to minimize contamination & human error.

Standard Operating Procedures (SOPs)

- Regular trainings & workshops conduction can promote the hygiene practices
- Development & enforcing SOPs for complete process of slaughtering can help in managing the whole system.

2. Regulatory Adherence and Oversight

Adherence Standards

- Slaughterhouse must meet the local & international food safety measures along with the staff health.
- Slaughterhouse management must conduct regular inspections through independent bodies to ensure observance.

Continuous Monitoring

- Installing a monitoring system for continuous surveillance of sanitation, water along with overall hygiene.
- Utilizing the monetize data to decide about facility upgradation & maintenance.

3. Health & Safety of Staff

Health Programs

- Initiating health programs for staff, that may include time to time checkups & accessibility of workers towards medical care facility.
- Providing protective gear for safety & security of staff in order to reduce injuries & health risk

Educational Training

- Periodic educational & skill related training session on safety, hygiene & safety measures can result in proper handling of animals & equipment.

4. Environmental Considerations

Waste Management

- Planning an appropriate water & solid waste management system in order to reduce the waste related disease
- Research regarding the waste recycling process within the slaughterhouse in order to minimize its impact on our environment.

Sustainable Practices

- Minimizing water usage, energy efficient process & adopting renewable energy resources would help in sustainable development of slaughterhouse.
- Exploring the use of by products in order to not only reduce the waste but also increasing the revenue generation for the betterment of industry.

5. Research and Development

Innovation

- Collaboration with institutions & industrial experts along with investors can help in growing the overall revenue of slaughterhouse along with staying at the forefront of industrial advancement.

Pilot Programs

- Exploring pilot programs to assess new approach of conserving water, waste management and process efficiency can be help full before going to full scale adoption.

Conclusion

From the research & Field survey it can be concluded that major facilities were not present at the abattoir, it was not an updated slaughterhouse in term of infrastructure the daily waste disposal was below satisfaction & hygiene level. The need of basic education & knowledge of slaughtering process & handling of livestock along with by products must be provided to the workers in order to attempt the whole process relevantly.

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