Volume : 2 | Issue : 4 | Apr 2013 • ISSN No 2277 - 8179

Research Paper

Implications of Authorized and Unauthorized Slaughtering on Health, Hygiene and Environmental Conditions in Agra

Environment

KEYWORDS : Labour Migration, Farm work, Agricultural Labour, Social status, Unemployment, Safety, Governance.

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ABSTRACT

This study attempts to find the impact of slaughtering on health, hygiene and environmental condition of Agra in view of current and future meat consumption in Agra. A survey of sample population of size 8764 was and total and per capita meat consumption was estimated for present (2011) and future. Future population was estimated by geometric mean method. Sample of waste water collected from the vicinity of an abettoir was collected and analysed for physiochemical characteristics. Estimated total meat consumption increased from 9437 tonnes in 2011 to 203530.15 tonnes in 2031. Only four authorized slaughter house are in Agra will not be sufficient to meet this demand which will give rise to illegal slaughtering. Illeagal slaughtering will result in improper hygiene, un aesthetics, degradation of land water and air quality and hinders the standard maintenance as prescribed. The processed water was found to be normally disposed to on-site drainage and into local watercourses or public drains without screening or treatment. Wastewater treatment facilities observed at a few slaughterhouses, were not in operation due to high operating costs. Physiochemical test of water indicated that water parameters are getting effected day by day (whether in Yamuna or simply the sewers or in the societies). Therefore there is need for more licensed slaughter houses in the city which would have proper waste disposal facilities and waste water treatment scheme. A treatment scheme is proposed which if implemented would not rather help maintaining parameters but also be cost effective by use of products manufactured during the process.

1. Introduction

India has a major share in the global population of livestock comprising of 18.52 crore cattle, 9.79 crore buffaloes, 6.15 crore sheep, 12.44 crore goats, 1.35 crore pigs and 48.90 crore poultry, which provides employment to over 300 million rural people. The total meat production in India during 2005-06 was 23.10 lakh tonnes and the number of cattle and buffalo slaughtered was 73.44 lakh. The number of poultry slaughtered was 21.26 crores; in which average yield rates per bird was 1.263 Kg, which makes total production from poultry to 2.69 lakh tonnes. The number of sheep, goat and pig slaughtered was 1.91, 5.41 and 0.72 crore respectively, and the average yield per animal was 12.59 Kg, 9.63 Kg and 32.23 Kg for the respective animals, which makes a total meat production of 2.41, 5.21 and 2.33 lakh tonnes. India is exporting the meats of buffalo, sheep and goat and poultry largely to the countries like Malaysia, Philippines and Saudi Arabia. During the year 2005-06, India exported a quantity of 0.82 lakh tonnes of buffalo meat; 0.49 lakh tonnes of sheep and goat meat and 0.41 lakh tonnes of poultry meat to these countries. The total export of meat from India during 2005-06 was 4.70 lakh tonnes (www.indiastat.com).

Demand for meat in India is ever increasing with increase in the population and awareness about its nutritional value. At present, there is acute shortage of slaughter houses to produce meat under sanitary conditions. Slaughter takes place both in authorized (2702 in number) and unauthorized places (more than 12000 illegal slaughter places). Due to Government control, religious beliefs and some more constraints the ante-mortem and post-mortem inspections cannot be done at inadequately equipped slaughter houses and therefore it leads to illegal slaughtering of animals at a very high level. Slaughter houses are regulated by the local bodies, which have been criticized for lack of interest. Attempts to relocate the existing slaughter houses, improve the slaughter houses and establish new abattoirs have met only with resistance from the local residents and persons opposing animal slaughter and meat consumption. Iillegal slaughtering at the door-step of the shops poses a great hazard to the local governments not only from public health point of view but also for the disposal of wastes in a scientific manner. Floor slaughter is practiced for large animals with poor hygiene and over crowded slaughter in anaesthetic premises is quite common. Alonge, 1991 defined meat hygiene as a system of principles designed to ensure that meat and meat products are safe, wholesome and processed in a hygienic manner and are fit for human consumption. Meat quality control is a system that regulates the measure of extrinsic materials such as chemical residues, toxins, pathogenic microorganisms and putrefied tissues, which could be present in meat and are deleterious to human health (Olugasa et al., 2000).

In India there is acute shortage of slaughter houses to produce meat under sanitary conditions at present. While the slaughtering of animals results in significant meat supplies, a good source of protein and production of useful by-products such as leather, skin and bones, the processing activities involved sometimes result in environmental pollution and other health hazards that may threaten animal and human health. The solid waste includes condemned meat, undigested ingesta, bones, horns, hairs and aborted foetuses. The liquid waste is usually composed of dissolved solids, blood, gut contents, urine and water. Animal food is always microbiologically contaminated by organisms living in it naturally or entering it from the surroundings, such as those resulting from processing operations (Lewicki, 1993). On going production quality control, washing and disinfection, are the main procedures of securing the hygiene of meat and meat products (Pezacki, 1970; Windyga et. al., 1996).

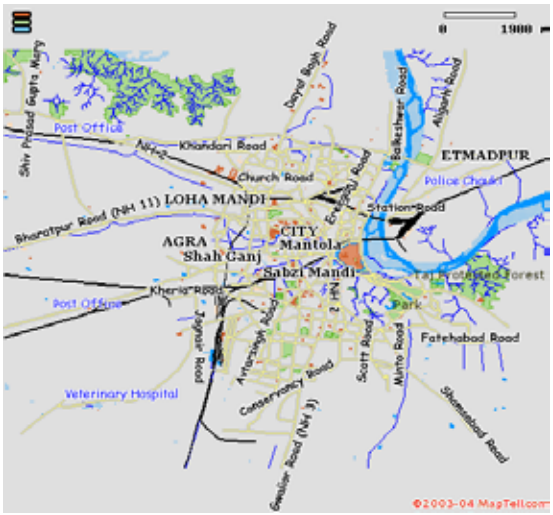
This study attempts to find the impact of slaughtering on health, hygine and environmental condition of Agra in view of current and future meat consumption in Agra. Some remedial measures are also proposed including a scheme of waste water treatment which solve the problem of water contamination. Detail methodology is discussed herewith.

2. Methodology

2.1. Study Area

The Agra district is situated in western U.P., between 27.11' degree Latitude North and 78°0' degree to 78°2' degree Longitude East. Its Altitude is 169 meters above sea level. On the North, it is bounded by Mathura District, On the South, it is bounded by Dhaulpur District, On the East, it is bounded by Firozabad District and On the West, it is bounded by Bharatpur. Agra is situated on the bank of Yamuna River. Normal slope land is towards river Yamuna, Contour Survey is attached indicate that south & western part is higher than to the remaining part. Most of watershed area has natural drains (known as Nallah) carries the rain runoff and wastewater towards river Yamuna towards North East and East.

Volume : 2 | Issue : 4 | Apr 2013 • ISSN No 2277 - 8179



2.2. Population Forecasting and Projection of Meat Consumption per capita for 2031

The design population were estimated with due regard to all the factors governing the future growth and development of the project area in the industrial, commercial, educational, social and administration spheres. Geometrical Increase Method of population forecasting in which growth and the average of the percentage increase is used to find out future increment in population were used to project the population for 2031. A sample population of 8764 was surveyed to find the per capita meat consumption at present and projected consumption in 2031.

2.3. Observation on Current Status of Waste Disposal Facilities: A general survey was done to know the status of waste disposal practices currently being followed in meat industries in Agra.

2.4. Collection of Waste Water Sample and its Quality analysis

Samples of water were collected on 23rd March 2011 from a drain in the vicinity of the abattoir sites located at Wazirpura, Mantola, Nai ki mandi and Nalband(Agra). The effluent was examined for physicochemical characteristics. All the chemical analysis was carried out in accordance with guidelines of the Environmental Protection Agency (2002).

3. Results and Discussion

3.1. Projection of Meat Consumption for 2031

Projection for population for year 2031

YEAR	POPULATION	POPULATION DIFFERENCE	GROWTH RATE %
1961	462000	129000	27
1971	591000	190000	32.15
1981	781000	197000	25.22
1991	978000	297000	30.37
2001	1275000	238000	18
2011	1513000		

Average growth rate (r)=26.548
Projection for year 2031 by geometrical mean method
Pn=p0 (1+average growth rate/100)
Pn (2031)=1513000(1+26.548/100)
=1513000(1+0.26548)^2
=2422978.16

Projection for per capita meat consumption per month

Meat type	Consumption according to survey (Kg/Month)	Per capita consumption
Goat	748.2	0.0854
Chicken	2051.55	0.234
Buffalo	1702	0.194
Pig	708.8	0.0808
Fish	509.85	0.0581

Monthly consumption of meat for the population of sample size of 8764 = 5720.4 Kg/month

Per capita consumption of meat for the population of 8764 = 0.6214 Kg/month

Meat consumption for total population of Agra i.e 1470000

Meat type	Ratio of total population to the population we have surveyed	Total consumption of meat (Kg/ month)	Per capita consumption
Goat	167.7	125473.14	0.0854
Chicken	167.7	344044.93	0.2340
Buffalo	167.7	285425.40	0.1941
Pig	167.7	118865.76	0.0808
fish	167.7	85501.845	0.0581

Average annual meat consumption in India is =5.5.Kg/Person/ Year

Per Capita Consumption surveyed =
12*0.6214=7.8264K.G/PERSON/YEAR
Error in survey=31.64%

So
7.8264*31.63/100=2.475
Consumption after correction =7.8264-2.475=5.35 Kg/Person/ Year Thus it is equal to national average consumption of 5.5 kg.

Projected Total population in 2031 is 2422978.
Thus total meat consumption(2031) 2422978*7*12=203530.15 tonnes

Total meat consumption at present(2011)=1470000*5.35*12=9437

3.2. General observations on Waste Collection and Disposal about Health, Hygine and environmental Conditions due to unauthorized Slaughtering

In Agra where there is extensive fifth-quarter processing (offal, hides/skins, head, feet, horns, etc.) the quantity of solid waste is typically low. Small-medium sized slaughterhouses often do not have a market for fifth-quarter products, thus they produce more waste for disposal. Solid wastes from slaughterhouses are typically collected by truck (municipal or private) for disposal with the municipal waste. Solid waste collection is generally a municipal function but the private sector is expanding, often encouraged through tax incentives. Collection vehicles are generally in good condition, in sufficient number and operate every day. Collected material is almost entirely disposed to landfill. Landfill facilities are typically open or controlled dumpsites. In some cases sanitary landfills have been constructed and in most cases they are being planned. Process water is normally disposed to on-site drainage and into local watercourses or public drains without screening or treatment. Contaminated runoff and wastewater from livestock markets is drained to local drains and watercourses without treatment. Wastewater treatment facilities were observed at a few slaughterhouses, but these were not in operation due to high operating costs. Municipal wastewater treatment facilities are not common place and where they do exist they do not generally receive slaughterhouse wastes.

3.3. Characteristics of effluent and parameter tested:

The typical characteristics of the effluent coming out from the slaughter house

are as follows:

Parameters	Characteristic
1. Quantity 2. Total solids 3. BOD 4. COD 5. Ph 6.O & G	2000 cum/day 4000 to 5000 mg/l 4000 mg/l 8000 mg/l 7.5 to 8.5 40

The typical characteristics of the effluent coming out from the slaughter after segregation of waste(blood and dung control)

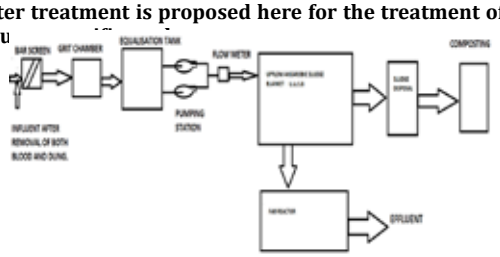
are as follows:

Parameters	Characteristic
1. Quantity 2. Total solids 3. BOD 4. COD 5. pH 6.O & G	1900cum/day 2796mg/l 378 mg/l 547mg/l 8.2 30

3.4. Measures Proposed to Improve The Slaughter House Waste management

Veterinary inspection and screening of raw materials will identify any sick or diseased animals and food hygiene standards will need to be considered in order to reduce the risk of microbiological contamination. Animals that die during transport and sick or dead animals from reception pens should be separated and transported to external facilities in separate containers for treatment and disposal Water may be used to hose down floors, machinery and containers. The effluent from slaughterhouses need to be treated. In urban areas it is normally discharged to municipal sewage treatment systems but in rural areas effluent may be treated on site and irrigated to land. All equipment should have safety guarding and workers should be issued with appropriate Personal Protective Equipment (PPE) to protect against unavoidable sharp items and edges. Emissions to Air Particulate emissions may arise during pigskin singeing processes and from dust in livestock handling areas. Hygiene standards should be addressed in treating, handling and storage of animals and meat in all stages of production process. Regular hygiene and animal health checks should be carried out at all stages of the process.

3.4.1. Proposed Scheme of Waste Water Treatment: A waste water treatment is proposed here for the treatment of the effl



The influent after removal of both blood and dung is firstly passed through a Bar screen which enables removal of particles bigger in size, thus by placing the screens in descending order (i.e.-1" ,0.5") for the best practice. Then is the Grit settling stage in which settling of heavy particles is allowed by gravitational method. This process can be used on a two way slot doors as per the dependency on the flow and efficiency required .After settling the influent is carried forward via Equalisation tank stage in which neutralization of raw material or influent is done, in simpler terms main motive is to neutralize the Ph, flow, colour and other parameters that are required for further treatment. To measure the flow the Electromagnetic flow meter ,these meters can be used because normal water meters face blockage. Then influent goes into U.A.S.B. which in turn is capable of reducing the BOD & COD by 60 % to 90 %, it achieves higher rate of pathogen reduction, odour removal and is better suited for industries such as slauughter houses, vegetable canning and distillery. Specifically depending on F/M ratio with a HRT of 6 to 7 days for best treatment. Then influent passes through FAB reactor for aerobic treatment after the anearobic treatment. In this process remaining parameters like COD & BOD are totally removed on best operation Practices .To create aerobic condition there is a need of diffusers to supply oxygen with the use of blowers up to an optimum level (2 ppm to 3ppm) for best survival of Bacteria's and to consume the food/organic loads/ BOD & COD content. Sludge produced in the system is converted into solid form and then it can be used as a manure or fuel purpose. On the other hand, the influent after the desired treatment may directly be allowed to reach any river body as per the standards prescribed.

CONCLUSIONS

Demand for meat consumption in Agra is projected to increase in future. Only four authorized slaughter house are in Agra which are not sufficient to feed nearly sixty seven percent of total non vegetarians in city thus leading to illegal slaughtering. These illegal operations ultimately results in improper hygiene, un aesthetics, degradation of land water and air quality and hinders the standard maintenance as prescribed. Though the solid waste disposal facilities are adequate but the processed water is normally disposed to on-site drainage and into local watercourses or public drains without screening or treatment. Wastewater treatment facilities observed at a few slaughterhouses, were not in operation due to high operating costs. Water parameters are getting effected day by day (whether in Yamuna or simply the sewers or in the societies). Therefore there is need for more licensed slaughter houses in the city which would have proper waste disposal facilities and waste water treatment scheme. A treatment scheme is proposed which if implemented would not rather help maintaining parameters but also be cost effective by use of products manufactured during the process

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