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|  | **Amazee Global Ventures Inc - New York, USA** | | |  |
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|  | **CLAR TECHNOLOGIES** | |

**Supply Chain – Meat Industry**

Supply Chain governance in the food industry has been dramatically developed. Supply chains are one of the most prominent areas of block-chain pioneering applications; the Meat Supply chain plays one vital role.

The use case for the Meat Supply Chain :

1. Requirement Analysis

2. Prototype Design

3. Finalized Design and Development

4. Evaluation and Analysis

The process followed for the Meat Supply chain :

Farmer

(Register Details)

Consumer

(Access Details)

Grocery

(Register Details)

Distributor

(Register Details)

Producer

(Register Details)

Under each process, a detailed mechanism will be taken place.

While the Cattle are under farming period, the following are the steps taken to care for cattle by the herdsman.

Common Management Practise:

1. Colostrum feeding: Colostrum is the first milk secreted post-parturition. First half an hour to 12 hours of life, the calf should be given colostrum 5-8 % of body weight. Then 2nd and 3rd day should be 10% of their body weight.
2. Weaning: Separating calf and making it independent of its mother for food. Weaned calves will be weighed weekly, and the quantity of milk to be fed is calculated accordingly.
3. Dis-budding: Arresting the horn growth at an early age, when the horn root is in the bud stage. Disbudding should be done for the calf at 15-20 days.
4. Ear tagging: The popular method of identifying farm animals. The ear tag is applied to the ear by puncturing the ear with the applicator.
5. Castration: To render the animal docile, control indiscriminate breeding, and prevent certain genital diseases, castration is performed. This is performed in young animals within 2-3 months through the surgical method and elastrator method.
6. Vaccination schedule for adult animals:

* Foot and Mouth
* Abortion causing brucellosis
* Black quarter
* Haemorrhagic septicaemia
* Anthrax disease

1. Disinfection: The destruction of pathogenic microorganisms from a place so that the place becomes free from infection. Commonly available for disinfection of animal houses are Boric acid (4-6%), Sodium hydroxide (1, 2 and 5%) and Calcium hydroxide (lime water, slaked lime).
2. Quarantine: For cattle, a minimum period of 30 to 40 days is acceptable. In the case of diseases like rabies, this period is up to 6 months.
3. Isolation of sick animals: The segregation of affected and in-contact animals from the apparently healthy ones in the event of an outbreak of a contagious disease. The isolated animals are brought back to the healthy herd only after fully recovered, and the chance of passing on infection is removed.
4. Insuring the animals: Animals will be insured for a maximum (100%) of their current market value.
5. Record maintenance: Record keeping is an essential practice in animal husbandry by the herdsman. They will regularly be recording the details on the farm.
6. Breeding: Best time for breeding of cattle

* Animal body weight below 250 kgs - not suitable for breeding.
* Animal body weight above 250 kgs - fit for breeding.

Once the cattle are moved to the slaughter process, there are three main stages :

* Pre–Slaughter Handling
* Stunning
* Slaughtering

1. Pre–Slaughter Handling :

Pre-slaughter handling is a significant concern to the livestock industry. Stress applied to livestock before slaughter can lead to undesirable effects on the meat produced from these animals, including both PSE and DFD. Preslaughter stress can be reduced by preventing the mixing of different groups of animals, by keeping livestock cool with adequate ventilation, and by avoiding overcrowding. Before slaughter, animals will be allowed access to water but held off feed for 12 to 24 hours to assure complete bleeding and ease of removal of internal organs.

2. Stunning :

Animals are restrained in a chute that limits physical movement. Once restrained, the animal is stunned to ensure a humane end with no pain. Stunning also results in decreased stress of the animal and superior meat quality. The three most common methods of stunning are mechanical, electrical, and carbon dioxide (CO2) gas. The end result of each method is to render the animal unconscious.

3. Slaughtering :

After stunning, animals are usually suspended by a hind limb and moved down a conveyor line for slaughter procedures. They are typically bled by the insertion of a knife into the thoracic cavity and severance of the carotid artery and jugular vein. This method allows for maximal blood removal from the body. At this point in the process, the slaughtering procedures begin to differ by species.

There are three types of meat products produced as a result of slaughter:

* Fresh meat products
* Processed meat products
* Frozen meat products

Once the animals are slaughtered to meat , it will be transported to different places. The meat and meat products will be packaged and checked for leaker's, temperature, packaging etc. before transportation. They will be packed in packages, boxes or crates. Were Human contact will be limited with the products. Temperature: Before transportation poultry meat should be and kept at temperatures below 4˚C or 40˚F.

But during distribution of fresh meat to wholesale or distribution outlets, temperature may increase abruptly with little opportunity to re-cool. Temperatures within the container sometimes vary 15 to 20 degrees. Transportation Equipment, although probably capable of maintaining a cool environment, must be opened and closed frequently for deliveries. Processed meat products can either be fresh or frozen. With this being said, trucks are therefore the most common transportation method.

The ideal temperature for the storage of fresh meat is 28°F to 32°F. Meat should be stored in the coldest part of the refrigerator. As storage temperatures approach 40°F perish-ability increases. Rapid growth of bacteria begins at about 50°F.

The "Danger Zone" (40 °F-140 °F) the Meat and Poultry Hotline advises consumers to never leave food out of refrigeration over 2 hours. If the temperature is above 90 °F, food should not be left out more than 1 hour.

Once above process are successfully verified and passed through, the meat will reach the retailer. Then the consumer buys the meat. Where they can scan the QR in the packing box and let know the details of meat from farm to table steps taken over. These will be handled through the Blockchain, where this is immutable.

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