PRACTICAL MATERIAL

Introduction of Animal Housing and Sanitation

Government of Nepal
Ministry of Education, Science and Technology
Curriculum Development Centre
Sanothimi, Bhaktapur
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Technical and Vocational Stream

Practical Material

Introduction Animal Housing and Sanitation

(Grade 11)

Secondary Level

Animal Science

Government of Nepal

Ministry of Education, Science and Technology

Curriculum Development Centre

Sanothimi, Bhaktapur

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Preface

The curriculum and curricular materials have been developed and revised on a regular basis with the aim of making education objective-oriented, practical, relevant and job oriented. It is necessary to instill the feelings of nationalism, national integrity and democratic spirit in students and equip them with morality, discipline and self-reliance, creativity and thoughtfulness. It is essential to develop in them the linguistic and mathematical skills, knowledge of science, information and communication technology, environment, health and population and life skills. it is also necessary to bring in them the feeling of preserving and promoting arts and aesthetics, humanistic norms, values and ideals. It has become the need of the present time to make them aware of respect for ethnicity, gender, disabilities, languages, religions, cultures, regional diversity, human rights and social values so as to make them capable of playing the role of responsible citizens with applied technical and vocational knowledge and skills. This practical material for Animal Science has been developed in line with the Secondary Level Animal Science Curriculum so as to facilitate the students in their classroom based practicum and on the job training by incorporating the recommendations and feedback obtained from various schools, workshops and seminars, interaction programs attended by teachers, students and parents.

In Bringing out the practical material in this form, the contribution of the Director General of CDC Dr. Lekhnath Poudel and Prof. Dr. D.K. Singh, Dr. Shambhu Sah, Dr. Yam Bahadur Gurung, Dr. Shishir Bhandari, Dr. Asmita Subedi, Dr. Hari Prasad Panta, Dr. Bhumika Paudel, Dr. Mina Pun and Dr. Ganesha Gautam is highly acknowledged. The book is written by Dr. Binod Kumar Yadav and the subject matter of the book was edited by Badrinath Timsina and Khilanath Dhamala. CDC extends sincere thanks to all those who have contributed to developing this practical book.

This book is a supplimentary practical material for students and teachers. In addition they have to make use of other relevnt materials to ensure all the learning outcomes set in the curriculum. The teachers, students and all other stakeholders are expected to make constructive comments and suggestions to make it a more useful practical material.

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Experiment No. 1:

Acquaintance with Different Types of Animal and Poultry Housing

Objectives:

- To provide the knowledge and experience of different types of animal and poultry housing system
- To provide the knowledge about the method housing system

Introduction:

At different times in your life you may have slept in a cradle, a club or bed. You may have lived in town or village or apartment depending on where you were in your life stage. So just like people, animals live in different places depending on their stage of life. Read about some common farm animals and where they live as they mature.

Sheep/goat

Sheep housing depends on what kind of production system the farmer is using. In production farming systems the farmer may allow his sheep access to pasture during the day and keep his sheep in bran at night. During the winter session he may keep some sheep in bran only. These systems are usually found in eastern parts of United States, where farms are smaller.

Types of housing are necessary for the stage of sheep age. Because the producer has more contact with his sheep and more choice over where they are housed, this is more of an issue for farm flock. Usually female sheep (ewes) farmers call short day breeders, which mean that the days are short during fall and winter months. A ewe's pregnancies last around 147 days, so lambs from ewes breed in the fall are born in the spring. Management of animal housing depends on different stages of life.

Dairy cattle

Dairy cattle farming is the larger animal production systems, dairy cows tend to say in one place for most of their lives. When baby cows (calves) are born, they are separated from their mothers to prevent the spreading of diseases from cow to calf. They are fed colostrum from their mother as quickly as possible. Colostrum is the first milk from

the cow which has special antibodies to protect the calf from diseases. Calves are then fed milk replacer for six weeks in order to preserve their mother's milk for human consumption.

The female calves (heifer) are placed in individual pens, such as together in groups, where they are feed milk replacer, grain, water and hay. At about seven weeks, calves are weaned taken off milk they are moved into group of housing with other dairy heifers. These heifers then grow and once they have a calf they begin producing milk and move into a barn with other cows. The male's calves are either kept to grow into dairy bull or sold to other farms to be raised for beef or veal.

Adult dairy cows are usually kept in large open barns with free stalls, meaning that they have the freedom to walk around the barn at will. These stall are bedded with straw, sand, wood shavings and other beddings materials that make it comfortable for the cow to lie down. Some farms dairy cows are allowed to graze periodically throughout the day and are also provided with feed and water when they return to the barn. At least twice a day they are taken to the milking parlors, where their milk is collected and pumped into a large steel vat and held there until a milk truck takes it to be processed.

Pigs

Pig farming is gaining popularity in Nepal. When it time for baby pigs (piglets) to be born, their mothers are moved to farrowing (gestation) crates. These individual pens have metal bars that separate the mother from piglets when they are born. This allows the piglets to nurse from her but prevents the mother from accidentally laying on the baby pigs. Gestation crates also allow the farmer to better control the housing temperature. The separation allows the piglets to be in a warmer area and the mother in a colder area. Farrowing crate flour also helps to maintain a dry environment. This helps to prevent the spread of diseases. This is especially important as the piglets and mothers are more susceptible. Gestation crates are not only necessary to keep the piglets and mother safe. Pregnant sows display very aggressive behavior that can lead to injury. By using gestation crates farmer can assist during delivery, monitor the wellbeing of the young and keep for piglet and pigs safe.

Poultry

Poultry includes mainly two types of domestically kept chicken like broiler and layers. Broilers are chickens that are raised for meat. ***They are lives in several different places for farming*** (sentence not clear)..... On the special breeding farms fertilized eggs are laid by breeding hen. These eggs are taken to a hatchery and stored for up to 10 days before they are placed into incubators. These incubators keep the eggs at a temperature of 55-88 F before they are hatched into chicken at 21 days. After hatching the chick are taken to other farm where they will grow to market weight. When the chicks first arrive, farmers may choose to divide their long, ventilated chicken houses into smaller sections as the chicks are still very small and may have trouble finding their feed and water in a large space. Farmers may use brooding rings to keep the chicks close to the food, water and necessary essential elements to keep them healthy and warm. The chickens will be kept in this barn until they weight about six pounds and are ready to be supplied to the market.

Conclusion:

Experiment No. 2:

Cost Estimation of Large Animals Housing

Objectives:

- To know about easy assessment of large animal housing construction.
- To know the budgeting of animal housing.

Introduction:

Animal shelter/farm cares for animal birds needing protection, attempts to find shelter for houseless animals and reunits lost with their owners. Some shelters provide other service such as animal's health services, behavioral evaluations, training and human education. Expenditure on farm buildings is by its nature a long-term capital investment that needs careful planning, both from a financial and a technical point of view. Good workmanship and correctly specified materials are also essential if it is to stand the test of time and prove good value for money.

Planning farm buildings takes time as every farmyard is different and there is usually more than one suitable option. It is also good to visit other farmyards to gather ideas and feedback from other farmers. This pre-planning stage can take a number of months. It is important to engage with an agricultural adviser/consultant so that the farmer is happy that he/she has a plan to suit their needs while meeting requirements for labor efficiency, environment considerations, Targeted Agricultural Modernization Scheme (Tams) requirements etc. The planning permission process and approval for a Tams grant can take approximately 8 months. Arranging finance and builders to do the job will also be necessary.

Ideally significant building work should commence in the spring, so start planning at least a year earlier. After coming up with ideas for a farm building project, the first question on everyone's mind is, how much is it going to cost?

Generally, the best approach is to divide up the proposed structure into its parts and write a detailed schedule of costs item by item. This is the method used by farm building contractors when they are compiling a quotation. Having an itemized quotation is of benefit both to the farmer and the contractor. It helps to avoid disputes over what was or was not included in the price. In that way, charges for extras or for

modifications to the original plans won't come as a surprise.

Itemized Costs

Itemized costs for a dairy unit and a slatted cattle unit are outlined in Table 1. In order to write an itemized costing like this, it is essential to refer to detailed plans/drawings of the proposed development. These drawings will have to be prepared for grant purposes and planning permission. The drawings prepared can be used to accurately price the job by multiplying measurements from the drawings, e.g. roof area (m^2) by the cost of that item as shown in the second column in Table 1. Follow the same procedure for each element of the building. The total cost calculated can be compared with quotations you get from contractors.

Table 1: Itemized costs for a dairy and a suckler unit

Items	**Cost per item €**	**Dairy Unit costs, Figure 1(€)**	**Suckler unit costs Figure 2 (€)**
Roof	81 per m^2	95,823	34,749
Side-cladding	27 per m^2	7,614	1,539
Tank	*70 or 80 per m^3	55,790	27,120
Cubicles and beds	200 each	23,200	
Concrete floors	27 per m^2	17,955	6,642
External Walls	182 per linear m (143/m over tank)	16,942	10,186
Sliding doors	129 per m^2	15,222	8,785
	263 (diagonal)		1,578
Feeding barrier walls	30 per linear meter	2,016	864
Automatic scrapers	3,500 per passageway	14,000	
Pen divisions with drinkers, calving gates etc.			3,900

Water troughs	265 each	1,060	
	56 small drinkers		112
Electrical work	350 per bay	5,600	2,100
Cattle crush and holding pens (including concrete)			6,417
Miscellaneous (stanchion bases, beams, up and over gates etc.)		4,353	4,265
Total		273,367	109,206
Number of animals		116	50
Cost per animal		2,356	2,184
Roof, tank and cubicles for dairy unit (% of total)		55.5%	
Roof and tank for suckler unit (% of total)			57%

*Typically a single tank will cost €80 per m^3 while a double tank will cost €70 per m^3

Conclusion:

Experiment No. 3:

Cost Estimation of Piggery Housing

Objectives:

- To know about easy assessment of pig farming construction.
- To know the budgeting of pig housing.

Introduction:

Pig shelter/farm care for piggery needing protection, attempts to find shelter for houseless piggery and reunite lost with their owners. Some shelter provides other service such as piggery's health services, behavioral evaluations, training and human education.

Commercial pig farming cost estimation (16 Sows and 4 Boars)

S. N.	Particulars	Rs.
1	Types of equipment within the pig farm	20000
2	Cost of pigs (16 Sow and 4 Boars)	60000
3	Medicine and vaccine	150000
4	Marketing and transportation	10000
5	Cost of feed (vegetables and kitchen waste)	200000
6	Insurance cost	2000
7	Labour cost	20000
8	Bio-security and water management cost	40000
9	Miscellaneous	5000
	Total	517000

Expected income returns from commercial pig farming-

Expected income returns from pig farming are high.

The average weight of boar is 350kg.

The cost of 1kg pork is Rs 300, it may be variable.

Meat cost from 1 boar/sow= 350*300=Rs 105000

Average income from 20 boars/sows= 105000*20= 2100000

Net profit from 20 pigs Rs 2100000-517000= 1583000

Conclusion:

Experiment No. 4:

Cost Estimation of Sheep and Goat Housing

Objectives:

- To know about easy assessment of sheep and goat farming construction.
- To know the budgeting of sheep and goat housing.

Introduction:

Sheep/goat shelter/farm care for sheep/goats needing protection, attempts to find shelter for houseless animal and reunite lost with their owners. Some shelter provides other service such as animals' health services, behavioral evaluations, training and human education.

Well, in any farming, cost and profit depends on many factors and if somebody gets profits in one kind of business, it does not mean that you can get as well. Goat farming is one of the fastest growing businesses in as demand for goat meat (mutton) is increasing. Most of the people are showing interest to raise the goats or start commercial goat farming. First and foremost, you should be aware of initial investment and risks and other farm management practices before starting a goat farm. As a beginner you may not have an idea about cost and profit in goat farming.

Cost estimation of sheep and goat farming-

Capital cost:

S.N.	Particular	Number of animals	Cost in Rs	Total cost (Rs)
1	Capital cost	150 (pregnant sheep/goat)	5000 each	750000
		6breeding male	6000 each	36000
2	Shed for sheep's/goats	1	100000	100000
3	Feed room	1	32000	32000
4	Labor room	1	50000	50000
5	Cascader and ear tags		5000	5000

6	Cutter, tanks, mixer		5000	5000
7	Feed cutting machine/ chap cutter	1	10000	10000
8	Feeders	15	800	12000
	Total			1000000

Capital cost required (A) = 1000000 (Ten Lakhs rupees)

Running cost (yearly):

S. N.	Particulars	Numbers	Rate (Rs)	Total cost (Rs)
1	Labor	2	5000/month	120000
2	Fodder (156 sheep/goats)	156	5/day/goat	284700/year
3	Vaccinations	156	15/goat	2340
4	Electricity	1	2000	2000
5	Printing and stationary		1500	1500
6	Transport		10000	10000
	Total			430540

Running cost/year (B) = 420540, Round up to= 421000 (Four lakh Twenty one thousand rupees)

Total cost:

Capital cost (A) = 1000000

Running cost (B) = 421000

Total cost = A+B= 1000000+421000=1421000 (Fourteen lakh Twenty one thousand rupees)

Conclusion:

Experiment No. 5:
Cost Estimation of Poultry Housing

Objectives:

- To know about easy assessment of poultry construction.
- To know the budgeting of poultry housing

Introduction:

Poultry shelter/farm care for poultry birds needing protection, attempts to find shelter for houseless birds and reunite lost with their owners. Some shelter provides other service such as bird's health services, behavioral evaluations, training and human education.

Cost Estimation of Commercial Broiler Farming (Flock size: 1000):

A.	Raw Materials	Rs.	294,500
a.	Purchase of parent birds (1000 females at Rs 70 * 1 flocks)		70,000
b.	Feed cost(160gm/bird/day*40days*1000 birds*Rs 45/kg		202,500
c.	Medication cost (Rs 15 per bird per year*1000female*1flock)		10,000
d.	Packing materials? bedding (1000 chicks at Rs 0.5 per chick)		1,000
e.	Carriage outward (1000chicks at Rs 1.00 per chick)		1,000
f.	Chciks hatching cost (1000 chicks at Rs 1.00 per chick)		1,000
f.	Chciks hatching cost (1000 chicks at Rs 1.00 per chick)		4,000
g.	Housing rent (1000 per 4 sq feet each and Rs 4 per sq feet)		5,000
h.	Chciks vaccination cost (1000 chicks at Rs 10 per chick)		70,000

B.	Direct Labor					13,750
a.	Animal Nutritionist/Veterinarian	1	1	1000	1,000	
b.	Supervisor	1	1	1000	1,000	
c.	Skilled Labor	1	1	1000	1,000	
d.	General labor	1	1	8000	8,000	
	Sub total	4			11,000	
	Perks & incentives***	25% of above			2,750	
C.	Utilities				Rs.	5,000
a.	Electricity and Fuel Charges including brooding gas					
	i. Electricity				1,000	
	ii. Diesel, Petrol (for authorities & vehicles)				1,000	
	iii. Gas for brooding Rs.5 to 10 per parent				1,000	
b.	Lubricants & water treatments	lump sum			1,000	
c.	Plastics and false celing including wiring, bulb				1,000	
D.	Repair and Maintenance				Rs.	2,000
a.	On building 1.0% per annum				500	
b.	On Machinery & equipment 5% per annum				500	
c.	On Other assets 2% per				500	

	annum					
d.	On furnitures & fixtures 0.5% per annum				500	
	Variable Factory Cost (A+B+C+D)					315,250
E.	Interest on Short Term Loan		11%			
	Total Variable Costs				Rs.	315,250
	Total Fixed Cost					
	Total Variable Cost					315,250
	Total Annual Production Cost					315,250

Conclusion:

Experiment No. 6:

Cleaning and Sanitation of Animal Shed

Objectives:

- To know about the cleaning and sanitation
- To know the control of disease by cleaning and sanitation process.

Introduction:

Cleaning and sanitation is a process of killing of most of the microorganism present on the surface of the animal shed, on the surface of the equipments, materials and establishment. It is performed on the basis of approved house-keeping schedule to maintain animal health safety and quality of the meat and meat products and to safe guard the consumers' health.

Sanitizer

Sanitizers are those compounds which are used to kill all types of microorganisms that remain on the surface of equipment after it has been applied. More common sanitizers are:

1. Chlorine
2. Hydrogen peroxide
3. Amphoteric surfactants
4. Quaternary ammonium compounds

Detergents

Detergents are the mixture of chemicals that change the characteristic of dirt and soil so that they can be separated from the surface of the equipments with a solvent, usually water. Types of detergents:

1. Alkali detergents – emulsify the oil/ fat (calcium carbonate and Sodium carbonate (Very good), Sodium hydroxide (corrosive)
2. Acid detergents – to remove scales/ crests made by hard water (Tartaric acids, Citric acids, lactic acids, phosphoric acid (50%),

Hygienic measures of animal shed

- Spread calcium carbonate at the entrance of shed area to disinfect the shoes of

staff.

- Entry of worker of the other farms should be avoided.
- Dry dusting/sweeping is not recommended; dust will stay hanging in air and later on settle down. So moisten the area then sweep.
- Remove dung and use bedding completely.
- Construct manure pit for proper handling of manure.
- Prevent algae to grow in the water troughs.
- Use proper concentration of disinfectant/insecticides solutions to avoid any toxic poisoning.
- Construct hoof dip filled with CuSO4 on the way from animal shed.

Methods of applications

There are three methods of cleaning

1. Manual or hand cleaning
2. High pressure spray cleaning
3. Foam cleaning

Conclusion:

Experiment No. 7:

Compost Making / Biogas Production

Objectives:

- To know the process of compost making/ biogas production
- To know the importance of biogas production

Introduction:

Biogas is produced by the anaerobic digestion or fermentation of biodegradable materials from animal house like manure and animal waste. Biogas comprises primarily of methane (CH4) and carbon dioxide (CO2) which can be used for cooking and lighting. Biogas replaces fuels and other sources of nonrenewable energy. Better usage of manure because no longer polluting water and being burnt. It saves money and decrease greenhouse gas emissions and produces organic fertilizer.

Generating Methane Gas from Manure and adaptive measure-

1. Livestock manure contains a portion of volatile (organic) solids, which are fats, carbohydrates, proteins and other nutrients that are available as food and energy for the growth and reproduction of anaerobic bacteria.
2. The anaerobic digestion process occurs in two stages. The volatile solids in manure are initially broken down to a series of fatty acids. This step is called the acid-forming stage and is carried out by a particular group of bacteria, called acid formers.
3. In the second stage, a highly specialized group of bacteria, called methane formers, convert the acids to methane gas and carbon dioxide.
4. The anaerobic process depends on methane formers because they are more environmentally sensitive than acid formers.
5. Methane bacteria are strict anaerobes and cannot tolerate oxygen in their environment.
6. They function best at 95 degrees Fahrenheit; therefore to obtain maximum gas production, heat usually must be added to a digester.
7. Methane bacteria are slower growing than acid-forming bacteria and are

extremely pH-sensitive (pH 6.8-7.4 optimum).

8. The acid formers will grow rapidly if an excess of organic material is fed to a digester, producing an excess of volatile acids.
9. The accumulated acids will lower the pH, inhibiting the methane bacteria and stopping gas production.
10. To help buffer the system against increases in acids, high alkalinity must be maintained.
11. Lime has been added to digesters during start-up or periods of slug loading to maintain pH control.
12. A variety of materials can become toxic to anaerobic bacteria -- salts, heavy metals, ammonia and antibiotics.
13. Bacteria require minimum amounts of salts for optimum growth. However, if salts are allowed to accumulate beyond bacterial requirements, they can become toxic and inhibit digestion.
14. Soluble heavy metals (copper, zinc, nickel) may be toxic to digester bacteria.
15. Most heavy metals can be precipitated out with sulfides and will cause no problems in the sludge.
16. Livestock feeds containing significant amounts of heavy metals may require special attention.
17. Most livestock manure (particularly swine and poultry) contain appreciable amounts of nitrogen, which will be converted to ammonia in the digester.

Protocol of biogas from cow dung-

Cow dung which is considered as a waste or product is gaining value. Cow dung can produce methane gas in large quantity; methane gas is used for domestic cooking and production of electricity. Biogas is produced by the anaerobic digestion or fermentation of biodegradable materials such as cow dung (manure), sewage, municipal waste, green waste, plant material, and crops. But today we shall focus on the production of biogas using cow waste. To produce biogas the following materials are be needed:

Anaerobic Digester, Collector, Cow dung and Water Procedures-

(1) Step 1: Digester

Anaerobic Bio-digester simply means biological action on bio-degradable material in the absent of oxygen, constructed digester using 50 litter container a typical 50 liter drum usually have two lids, so use the bigger one as slurry inlet, attached gas-lock which connects to the smaller drum lid with a rubber hose to convey methane gas to the collector.

(2) Step 2: Gas collector

Many methods can be used to collect gas generated from the digester. Actually use a floating gas collector, two drums are involved in this case, one is 30 litters plastic and the other one is 20 litters metal drum. Remove the base of the 20 litters drum,. The 30 liters is for water and 20 litter drum is for gas. Attach a gas lock to the smaller lid which will convey gas coming from digester.

(3) Step 3:

This is final stage, since the digester is ready, mix cow dung that is already collected from a nearby cattle farm with water, Mixed 15 liters of water with 10 kg of cow dung, and pour the slurry into digester via the slurry inlet, After the next 15 days gas is ready, and flame test should be carried out .

Note: temperature is very important, as digester performs well in warmer region

Safety first! Since biogas is made mostly of methane, it is highly flammable, please keep in a safer place. Flames or any electrical gadget should be moved away from digester. Digester should be placed in a well-ventilated area. ***After handling the digester or pour slurry the digester,*** (not clear)..... Always wash your hand thoroughly with plenty of soap and water because it contains mostly Methanococus, Methanobacterium and other bacteria which are dangerous for your health

Conclusion:

Experiment No. 8:

Study of Water Quality

Objective:

- To know the properties/ composition of water.
- To know the standards and importance of water quality.

Introduction:

Water quality refers to the chemical, physical, biological and radiological characteristics of water. It is a measure of the condition of water relative to the requirements of one or more biotic species and to any human need or, purpose. It is most frequently used by reference to a set of standards against which compliance, gently achieved through treatment of water can be assessed. The most common standards used to assess water quality relate to health of ecosystems, safety of human contact and drinking water for human beings and livestock.

Categories

The parameters for water quality are determined by the intended use. Work in the area of water quality tends to be focused on water that is treated for human consumption, industrial use and domestic or, in the environment.

Drinking water indicator

The following g list is indicator of drinking water

1. Alkalinity
2. Color of water
3. Ph
4. Taste and odor
5. Dissolved metal and salt
6. Microorganism such as fecal coliform bacteria.
7. Dissolved metals and metalloids such as lead, mercury etc
8. Pharmaceuticals.
9. Radon

Physical indicators

1. Water temperature
2. Total dissolved solid
3. Conductivity of water
4. Odor of water
5. Transparency or turbidity
6. Color of water
7. Odor of water

Chemical indicator

1. Biochemical oxygen demand
2. Heavy metals
3. Ph
4. Chemical oxygen demand
5. Dissolved oxygen
6. Total hardness
7. Pesticides

Biological indicators

1. Coliform bacteria
2. Escherichia coli (E. coli)
3. Mollusca

Conclusion:

Experiment No. 9:

Comparative Study of Scientific and Locally Constructed Housing

Objectives:

- To know importance of locally made and scientific made housing.
- To know the difference of locally and scientific made animal housing.

Introduction:

Housing are generally living space, refer to the construction and assigned usage of houses or buildings collectively for the purpose of sheltering of animals. ***The planning or provision delivered by an authority. The social issue is of ensuring that members of society have a home in which to live, whether this is a house or some other kinds of loading or shelter. Comparative study of scientific and locally constructed housing based on traditionally or old model house verses science based housing.*** (not clear).....

Scientific based constructed housing has following point-

1. Selection of topography or site selection
2. Road assessment
3. Easily available labor or man power
4. Constructed based on number of animal and map
5. Market facilities

Locally constructed housing has following points-

1. Available land should made on housing
2. No any selection criteria
3. Constructed based on assumptions

Conclusion:

Experiment No. 10:
Study of Commonly used Summer and Winter Stress Amelioration Practices

Objectives:

- To know about summer and winter amelioration practice
- To know the effect and management of stress in farm animals

Introduction:

Heat stress

Stress is the nonspecific response of the body to any demand. Heat stress results from a negative balance between the net amount of energy flowing from the animal's body to its surrounding environment and the amount of heat energy produced by the animal. Environmental factors are- sunlight, thermal irradiation, air temperature, and humidity and air movement. Animal factors are:- species, metabolism and thermoregulatory mechanisms. When air temperature is greater than about 21°C and relative humidity is greater than 70% , cows begin to reduce their feed intake and milk production is reduced. Jersey cow are more tolerant of heat with production losses insignificant 25C. For healthy cattle the thermo natural zone line between 32F (0C) AND 77F (25C).

Symptoms-

- Increased breathing rate and sweating
- Increased water intake
- Decreased feed intake and milk production
- Change in milk composition e.g.-fat and protein% declines
- Change in blood hormone concentration e.g. increased prolactin
- Change behavior and seek head
- Crowed together to shade each other

Management-

- Reduce the walking distance and speed to the dairy
- Reduce the time spent in unshed yards

- Minimize handling stress
- Isolate cows most severely affected by heat stress and provide shade and cooling
- Milk earlier in the morning and later in afternoon or, consider once a day milking
- Cows reared under electric fan produce 1.2 kg/day more milk during early lactation
- Sprinklers on the roof

Cold stress

Cold stress occurs by driving down the skin temperature and eventually the internal body temperature. When the body is unable to warm itself, serious cold-related illness and injuries may occur and permanent tissues damage and death may result. Four factors contribute to cold stress- cold temperatures, high or cold wind, dampness and cold water. A cold environment forces the body to work harder to maintain its core temperature.

Effects of cold stress on cattle-

- Mild hypothermia occurs with a body temperature of 30C-32C (86F-89F)
- Moderate hypothermia at 22F-29F (71C-85C)
- Severe hypothermia 20C (68F)
- As hypothermia progresses, metabolic and physiological processes slow down and blood is diverted from the extremities to protect the vital organ.
- Teats, ears and testes are prone to frostbite. In extremes, respiration and heart rate drop, animal lose consciousness and die.
- Cold exposure may directly limit the synthetic capacity of the mammary gland by reducing mammary gland temperature or, may act indirectly affecting the udders blood supply.

Management-

- Protect animals from the wind- wind markedly reduces the effective temperature, increasing cold stress on animals
- Monitor the weather- monitor temperature and increase feeding in response to cold weather.
- Bed cow well- provide adequate dry bedding. It makes a significant difference in the ability of cattle to withstand cold stress.

- Keep cow clean and dry- wet coats have greatly reduced insulating properties and make cows more susceptible to cold stress. Mud-caked coats also reduce the insulating properties of their hair.
- Provide additional feed- feed more hay and grain. If wet feeds are feed, make sure they are not frozen.
- Provide water- make cows have ample water available at all times. Limiting water will limit feed intake it is more difficult for cows to meet their energy requirements. Frozen troughs and excessively cold water seriously limit water intake.

Conclusion:

Experiment No. 11:

Design of Commercial Dairy, Pig, Sheep, Goat and Poultry Farms

Objectives:

- To know the different design of commercial farming
- To know the space requirements for different types of animal farming
- To know the knowledge about the selection area of animal farming

Introduction:

Housing is generally living space. It refers to the construction and assigned usage of houses or buildings collectively for the purpose of sheltering of animals. ***The planning or provision delivered by an authority. The social issue is of ensuring that members of society have a home in which to live, whether this is a house or some other kinds of loading or shelter. (not clear, rewrite).....***

Points to be considered during selection area for farming are-

1. Topography and drainages
2. Soil type-loam soil
3. Exposure to sun and protection from wind-North-south direction
4. Accessibility
5. Easily water supply
6. Area should be away from household
7. Market accessibility
8. Electricity
9. Facility for storage of food particles or ingredients

Space requirements for the construction or design of animal housing-

Cattle/ buffalo

Types of animals	Floor space/animal (sq.fit)		Mange length per animal (Inch)
	Closed/covered area	Open area	
Cow	20-30	80-100	20-24
Buffalo	25-35	80-100	24-30
Young stock/ calf	15-20	50-60	15-20
Pregnancy	100-120	180-200	24-30
Bull pen	120-140	200-250	24-30

Sheep/goat

Types of animal	Covered/ closed area(m2)	Open area(m2)
Kid up to 3month	0.2-0.3	0.4-0.6
Adult	1-1.5	2-3
Pregnant	1.5-2	3-4
Buck	2.5-3	5-6

Pigs

Types of animal	Covered/closed area (m2)	Open area (m2)
Weaned piglet	0.9-1.8	0.9-1.8
Adult pig	1.8-2.7	1.4-1.8
Pregnant sow	7-9	9-12
Male pig	6-9	9-12

Poultry

Broiler – 1 square fit/bird

Layers- 2square fit/ birds

Note: - Above mention site selection and space requirement need for design or construction of animal housing

Conclusion:

Experiment No. 12:
Visit to Commercial Farm

Objectives:

- To know about different types of farming system
- To know the design or types of housing system

Introduction:

A visit to a farm is a great way to enlighten regarding the source of food. When children pick own fruit and vegetables from the farm, their motor skill are constantly being developed. When children have the opportunity to feed animals, it improves fine motor skill as well.

Livestock animals such as cows, sheep, goats and chickens have many roles in the farm ecosystem. They eat corn and hay grown on the farm, they provide milk, eggs, wool and meat for human consumption and their waste can fertilize the soil. Animal manure contains many nutrients that plants can use to grow.

Criteria of farm visiting-

1. Introduction or aim of visit
2. History
3. Types of farming
4. Ownership
5. Question aid

Conclusion:

References:

- Cattle and buffalo farming bulletin
- G.C. Banergee, Textbook of Animal Husbandry
- Livestock diary 2076
- Poultry farming bulletin
- Sheep and goat farming bulletin