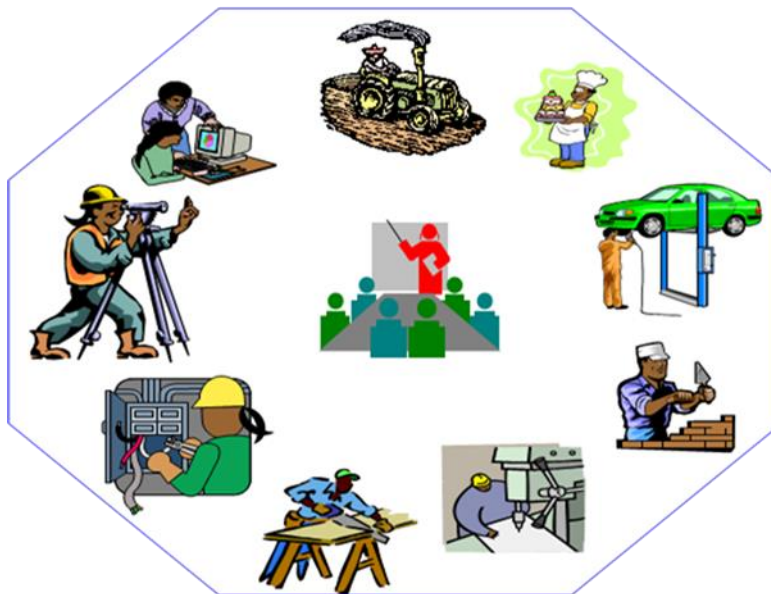




ANIMAL HEALTH CARE SERVICES LEVEL- IV
BASED ON MARCH 2018, VERSION 3 OCCUPATIONAL STANDARDS



**MODULE TITLE : CONDUCTING ANIMAL HEALTH EXTENSION
SERVICE DELIVERY**

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LG 90

LO 2 LO1: Perform awareness on locally prevailing livestock disease

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying information needs and expectations on veterinary extension
- Conducting awareness of the community
- Delivering information on disease sources and transmission
- Explaining importance of animal health care and early reporting of disease occurrence
- Describing economically important and zoonotic local livestock diseases

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identify information needs and expectations
- Conduct awareness of the community
- Deliver information on disease sources and transmission
- Explain importance of animal health care and early reporting of disease occurrence
- Describe economically important and zoonotic local livestock diseases

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If your performance is satisfactory proceed to the next learning guide,
7. If your performance is unsatisfactory, see your trainer for further instructions.



Information Sheet 1- Identifying information needs and expectations on veterinary extension

1.1 Introduction

"Livestock production in today's world has emerged from a rural occupation to a highly specialized industry; as social and economic reforms progress, a transition from subsistence to commercial agriculture will gain momentum; small uneconomic units will be consolidated into viable units by virtue of market forces, if not by government policies; the planning of animal production systems to achieve optimum returns, requires a full understanding of the biological principles influencing animal production efficiency, and the associated human interests and expectations."

The main goal of agricultural development should be to increase sustainable farming productivity and welfare of the farming communities and stakeholders. However, resource-poor farmers living in marginal areas are faced with conditions that are unsuitable for improvement. Such conditions include

- Unfavourable soils and climate
- Lack of credit facilities,
- Under-developed or non-existent markets for inputs and agricultural products,
- Weak or incipient farmers' organizations,
- Irrelevant research and subsequent lack of adoption of relevant available technologies.

There is an increasing need for consideration of the entire farming system, more involvement of the farmers in the problem identification and testing of the new technology. State agricultural and veterinary extension service delivery in general, has considerable expenses, such as purchase and maintenance of subsidized vehicles, salaries of personnel, extension equipment and materials, staff refresher courses.



State agricultural extension service delivery is a resource-base for community development. Any community development endeavor should be based on participation by the community.

Botha *et al.* (2000) reported the following in their research regarding implications for veterinary training and research:

- “That there is a demand by farmers for visual and written extension material
- That farmers wanted extension training to be conducted using their own herds
- That there were infrastructure limitations in conducting extension and that this problem be addressed by the stakeholders collectively
- That cattle and poultry were the most important animal species and should be the focus points of extension, but the need to curb zoonotic diseases should not be disregarded.”

1.2 Agricultural extension

Agricultural extension as "an on-going process of getting useful information to the people and then assisting those people to acquire the necessary knowledge, skills and attitude to utilize effectively this information or technology to build a better life for themselves, their families and their communities"

Agricultural Extension as "the sources of research-based, unbiased information and expertise that links higher education with the people who are not on campus. The extension educators/agents encourage the application of research-generated knowledge and leadership techniques to individuals, families and communities."

Extension is defined a “Process that helps farmers become aware of improved technologies and adopt them in order to improve their efficiency, income and welfare”

1.3 Definitions of Veterinary Extension

Veterinary Extension as “practical and understandable advice given to individuals, groups, communities or populations about livestock diseases, and includes their



prevention, treatment and ways in which they influence the well-being, health and productivity of both humans and animals".

Veterinary Extension could also be defined as imparting relevant, practical, and focused elementary veterinary knowledge and skills to farmers and other members of the communities (upon consulting and agreeing with them on the extension program), so that at the end of a specific extension period they shall have learned knowledge and skills in a manner that can be measured. Veterinary Extension (VE) is part of the overall Agricultural Extension (AE) and almost all of the main principles that apply to Agricultural Extension apply to Veterinary Extension.

Livestock extension involves systematic and organized communication with livestock owners with a view to helping them in such a way that the livestock owners to help them form sound opinions and make good decisions. Livestock extension is poorly developed in developing countries and its strengthening is a major issue so various public and private organization involved in livestock extension should be studied and their short coming should be improved.

1.3 Cardinal principles of Agricultural Extension service delivery

- Extension campaigns must be based on conditions that exist (local, regional and national)
- Extension workers must involve the people in actions that promote their welfare
- They must aim basically at people's interests and needs using democratic methods
- They should keep programs flexible
- They should work through understanding of culture
- They should use local leaders
- They should use existing agencies
- They should use trained specialists
- They should work with all members of the family and not just the animal owner
- They should make programs as broad as the needs of the people



- They should continually evaluate the effectiveness of extension
- They should keep in line with national policies
- They should use a community approach, and
- They should help people recognize their needs.

1.4 Prerequisites to effective agricultural extension

The following as major prerequisites for an effective and efficient agricultural extension service:

- Collective extension needs assessment of stakeholders for a set period;
- Co-operation of stakeholders in collective planning of extension activities;
- Effective and efficient implementation of plans;
- Effective co-ordination of extension activities; and
- Effective and efficient monitoring and evaluation of all extension activities by knowledgeable and unbiased people.

Some reasons for the failure of agricultural extension service delivery

The following as some of the reasons for Agricultural Extension failure:

- The heterogeneity of farmers being served;
- The lack of effective communication between senior and junior extension workers;
- Extension educators who have very different backgrounds;
- The urban or non-farming backgrounds of extension educators (they can therefore only advise and cannot "do");
- The fact that for many staff, a job with agriculture was not the first choice but was more the result of the lack of alternative job opportunities;
- Inadequate training of extension educators serving farmers (staff were trained in situations that were frequently academically weak and which tended to discredit local and traditional knowledge);
- Lack of clear vision and mission by state personnel;
- Lack of transport to do "field work" by state employees;

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- The poor state of offices that demoralizes and demotivate extension educators;
- Insufficient fund allocation to extension budgets, under-spending and appropriation of funds initially intended for Agricultural Extension to other activities that receive priority over extension,

Stakeholders on veterinary extension issues

Stakeholders in the domesticated animal health sector form distinctive groups whose service provision and service requirements differ. Service recipients are broadly divisible into three key sectors categorized as companion animal owners, equine owners or keepers and livestock farmers. Each sector contributes in a unique but meaningful way to modern societal norms and the appreciation of differences between these client groups is proposed within this investigation to be crucial to the delivery of service quality.

- Livestock owners
- Elders
- Religious leaders
- Women
- Traditional healers
- Drug vendors
- Livestock traders
- Government veterinary
- Personnel
- Veterinary Services Support Projects
- International and local NGOs
- Minister of Agriculture
- Federal and regional veterinary laboratories
- Research centers

Dairy extension services

Extension and advisory **services** also play an important role in enabling application of new knowledge by livestock producers. **Dairy**/livestock extension services can help to assist milk producers at every stage of production, from improved animal husbandry through to better quality milk and increased production. However, compared to its contribution in the economy, livestock sector has received much less resources and institutional support. Livestock extension remains grossly neglected.



Problems in livestock extension

Livestock production extension has in the past faced institutional problems, being marginal to both agricultural extension and animal health services. Livestock Production did not exist as a department in the Ministry and neither fitted in the department of agriculture, nor in that of Veterinary Services. The institutionalization of livestock extension was also affected by repeated changes of policy over the existence of a separate livestock ministry, which resulted in frequent separation and merging of the Ministries of Livestock Development and that of Agriculture. Dairy farmers therefore benefited more from special projects than the general government extension service

Dairy extension and importance dairy

Employment:

The dairy sector can play an important role in providing jobs for rural communities. Dairy production and processing provide employment, not only to people who work on dairy farms or in dairy plants, but also to the whole sector, from upstream (inputs and services providers) to downstream (marketing of finished products).

Trade: In 2011 world trade of dairy products, namely butter and butter oil, skim milk powder, whole milk powder, condensed milk and cheese, amounted to 58.2 million tonnes in milk equivalents (excluding trade within the European Union). This represents 7.8% of world milk production.

Production: In 2011, milk production was estimated at 748.7 million tonnes, of which 620.7 million tonnes was cow's milk, produced by 260 million cows. The number of dairy farms greatly depends on the countries and on the farming systems.

Poultry extension services

Extension education services for women Poultry extension messages do not reach the majority of the women in the agricultural sector. While there is a growing awareness to contact women farmers, agricultural extension services are generally geared toward male farmers. Like in many other countries, agricultural extension services programs in Turkey is also focused on male farmers leaving the women outside the mainstream of information even when they are engaged in the activity covered. To avoid an economic invisibility of women, clearly reflects the supremacy of men in agricultural extension.

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Information need of women in agriculture

Poultry is the sub sector of Agriculture. Female farmers require appropriate and timely information to improve their crop production technologies, management, and marketing of the poultry production as well as, increase of their income. Many constraints on poultry production are common to men and women; in other words, are gender unbiased. However, in many countries, women in poultry production operate under greater constraints than men. Since any extension system must target particular categories of clients to meet their needs, gender specific problems with specific solutions: women in poultry production need special help

Constraints faced by women in poultry sector

To design and provide extension programs of effective services for women, it is essential to understand the roles of men and women in production practice, their information desires, the nature of the special constraints faced by females, and the implications of these constraints for extension. The common constraints that women in poultry sector faces are the following:

- Time,
- Lack of education,
- Limited access to credit and inputs,
- Land availability and tenure,
- Lack of suitable farm and
- Household technology,
- Training centers,
- Job availability etc.

Economic importance of poultry extension services

Poultry makes a substantial contribution to household food security throughout the developing world. It helps diversify incomes and provides quality food, energy, fertilizer and a renewable asset in over 80 percent of rural households.



Self-Check 1 – Written Test

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Write true if the statement is correct/False if it is incorrect for the following questions (5 point each).

1. Extension is defined a “Process that helps farmers become aware of improved technologies and adopt them in order to improve their efficiency, income and welfare”.
2. Veterinary extension could be defined as imparting relevant, practical, and focused elementary veterinary knowledge and skills to farmers and other members of the communities.

Test II. Choose the best answer for the following questions (3 point).

1. Which one of the following is the stakeholders on veterinary extension issues
 - A. Veterinary Services Support Projects
 - B. International and local NGOs
 - C. Minister of Agriculture
 - D. Federal and regional veterinary laboratories
 - E. All of the above

Test III. Short Answer Questions (5 point)

1. What are the reasons for the failure of agricultural extension service delivery?

Note: Satisfactory rating - 9 points Unsatisfactory - below 9 points

You can ask your teacher for the copy of correct answers



Information Sheet 2. Conducting awareness of the community on locally prevailing disease

2.1 Introduction

Ethiopia has the largest livestock population in Africa, making a considerable contribution to the livelihood of Ethiopian people and to the wider economy. However, zoonotic diseases threaten the performance and potential benefits of this vast livestock sector. Emerging zoonotic diseases, such as

- Bovine tuberculosis,
- Brucellosis and
- Anthrax that have acquired global significance seriously affect the livestock sector in the country. A number of policies and regulations have been designed in order to prevent and control the transmission of animal and zoonotic diseases in Ethiopia.

The prevalence of many endemic diseases in farm animals is too high and shows little sign of reduction over time. This situation must be challenged and not allowed to become normal. Preventive healthcare should aim to minimize the risk of disease on a farm, in a region or within a population. This applies to both exotic and endemic diseases. National bio-security to prevent ingress of exotic disease is the responsibility of Governments and industry. Prevention of endemic diseases is considered in the context of elimination through national programmes and consideration is given to the complexity of the task and the effectiveness of these programmes; focusing on the correct targets and ensuring that the necessary will, co-operation and facilities are in place to achieve the objective. In some cases it may be better to control than eliminate.



In the area of cattle disease, the Ethiopian livestock master plan indicates different priorities for different actors. Overall,

- Foot-and-mouth disease (FMD),
- Contagious bovine pleuropneumonia (CBPP) and
- Brucellosis appear to be considered the three most important diseases

For market actors,

- FMD,
- Lumpy skin disease (LSD), and
- Brucellosis were identified as the top three priorities, but

For farm households, the ranking was

- FMD,
- CBPP and
- Bovine tuberculosis (bTB).

In the case of intensive farming

- Brucellosis,
- FMD and
- bTB were the top three diseases

Much of the attention given to improving the delivery and governance of veterinary services has focused on good veterinary legislation, and on getting the 'right' veterinary system, to ensure a strong chain of command in veterinary services delivery. The role of farmers and livestock producers has either been ignored or received little attention. Yet their role is of particular importance, as a result of the paradigm shift in veterinary services delivery from the public to the private sector, or to private–public partnerships. Having strong veterinary legislation with good enforcement and effective veterinary systems is necessary to improve the delivery of veterinary services, but it is not enough. It is also necessary that farmers be able to participate in the animal health market to ensure the sustainability of the veterinary system.



Common bacterial diseases

- a) Contagious bovine pleuropneumonia (CBPP) and
- b) Brucellosis
- c) Bovine tuberculosis (bTB)
- d) Anthrax
- e) Leptospirosis
- f) Salmonellosis

Common Viral diseases

- a) Foot-and-mouth disease (FMD)
- b) Rabies
- c) Lumpy skin disease (LSD)

Common parasitic diseases

- a) Echinococcosis
- b) Taeniasis
- c) Trichinellosis



Self-Check 2 – Written Test

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Write true if the statement is correct/False if it is incorrect for the following questions (4 point each).

1. Zoonotic diseases threaten the performance and potential benefits of this vast livestock sector.
2. Anthrax that have acquired global significance seriously affect the livestock sector in the country.
3. The prevalence of many endemic diseases in farm animals is too high and shows high sign of reduction over time.

Test II. Choose the best answer for the following questions (4 point).

1. According to the Ethiopian livestock master plan which one of the following diseases does not included in the three most important diseases
 - A. Foot-and-mouth disease (FMD),
 - B. Contagious bovine pleuropneumonia (CBPP) and
 - C. Brucellosis appear
 - D. Rinder pest

Test III. Short Answer Questions (10 point)

1. Describe the most important diseases for farm households in Ethiopia.

Note: Satisfactory rating – 13 points Unsatisfactory - below 13 points

You can ask your teacher for the copy of correct answers



Information Sheet 3. Delivering information on disease sources and transmission

3.1 Livestock extension delivery institutes

Delivery of livestock related information concerning production, management, marketing, deworming, vaccination, prevention and control of disease etc. through livestock extension system should be made a prime concern by federal and state government. As livestock has become an integral part of livelihood and living of rural and urban population this information is very much needed in present scenario. A sense of business should be developed among the beneficiaries so that they think of acquiring livestock related enterprises as business and excel in them. Livestock health service delivery in many developing countries is undergoing privatization as part of an international restructuring for economic development. One widely publicized initiative to refocus livestock health service delivery has been the introduction of community-based animal health workers (CBAHWs). This initiative involves training community-selected representatives in basic animal health care and livestock production techniques. The following are some responsible institutes for the delivery of animal health information.

3.1.1 Public delivery institutes

- Department of Animal Husbandry, Dairying and Fisheries
- Veterinary Drug and Feed Administration and Control Authority (VDFACA)
- National Animal Health Institute
- National Tsetse fly and Trypanosomiasis Investigation and Control Centre
- National Animal Health Diagnostic and Investigation Centre (NAHDIC)
- National Artificial Insemination Centre.
- Extension Education Institutes
- Agricultural Technology Management Agency
- Animal Disease and Feed Quality Control
 - ✓ Epidemiology Directorate;

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- ✓ Disease Prevention and Control Directorate
- ✓ Export Abattoirs Inspection and Certification Directorate
- ✓ Quarantine, Import and Export Inspection and Certification Directorate
- ✓ Veterinary Public Health Directorate, and
- Livestock Identification and Traceability Control Directorate
- Community-based animal health workers

3.1.2 Private extension services

Private Extension Service is defined as the services rendered in the area of veterinary, agriculture and allied sectors by extension personnel working in private agencies or organizations for which farmers are expected to pay a fee and it can be viewed as supplementary or alternative to public extension services.

3.1.3 Non-governmental Organization in Livestock Services

3.2 Source and method of transmission of diseases

Disease is not a random event, and whether disease occurs depends upon interactions between the host, the agent and the environment in which they exist. Disease occurs when an agent capable of causing disease (for example, a virus or bacteria) meets a host that is vulnerable (susceptible) to the agent and in an environment that allows the agent and host to interact. For an outbreak to occur there must also be a chain of transmission for the agent to pass from one host to another. Whether a disease outbreak occurs will depend on factors relating to the host, the agent and the environment. The interaction between these three components is known as the disease triad.

A host is a living organism in which agents of disease can survive. Examples of hosts are domestic livestock such as cattle, buffalo, pigs, sheep, goats and poultry. The agent may or may not develop and reproduce in a particular host and may or may not cause disease in that host. The following host factors can determine whether disease will occur:

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- Age
- Sex
- Genotype
- Behaviour
- Nutritional status
- Health status
- Immunity

An agent is the biological pathogen, such as a virus, parasite, fungus or bacterium that causes disease in the susceptible host. An agent is primarily interested in where it can live, grow and reproduce. Some agents can survive and even multiply away from the host population (in other animals, in their products, or in the physical environment), while others must remain within the host to survive. For example, FMD virus only affects cloven-footed animals such as cattle, buffalo, sheep, goats and pigs. CSF, on the other hand, only affects pigs. The following factors determine whether an agent causes disease in a particular host:

- Infectivity
- Pathogenicity
- Immunogenicity
- Antigen stability
- Survival

The environment describes the conditions or influences that are not part of either the host or the agent, but influence their interaction. The following environmental factors can influence the occurrence of disease, provided that both the susceptible host and agent are present:

- Weather
- Housing
- Geography
- Air quality

Transmission pathways: the chain of transmission is the process by which an agent can be transmitted from a source to a susceptible host, and subsequently from one host to another. For successful transmission to occur the following factors must exist:

1. A source of the agent: This is often the place where the agent originates, lives, grows and multiplies. The source (sometimes called the reservoir) of an agent can be any of the following:

- A symptomatic animal
- An asymptomatic infected animal



- An animal incubating disease
- A convalescent animal
- Another animal species
- The environment

2. A portal of exit: The pathway by which the agent leaves the source.

3. A mode of transmission: The method by which the agent passes to a susceptible host. This transmission can be either direct or indirect and, for some agents, both pathways can be used.

4. A portal of entry: The pathway into the host, which gives the agent access to tissues where it can multiply and cause disease.

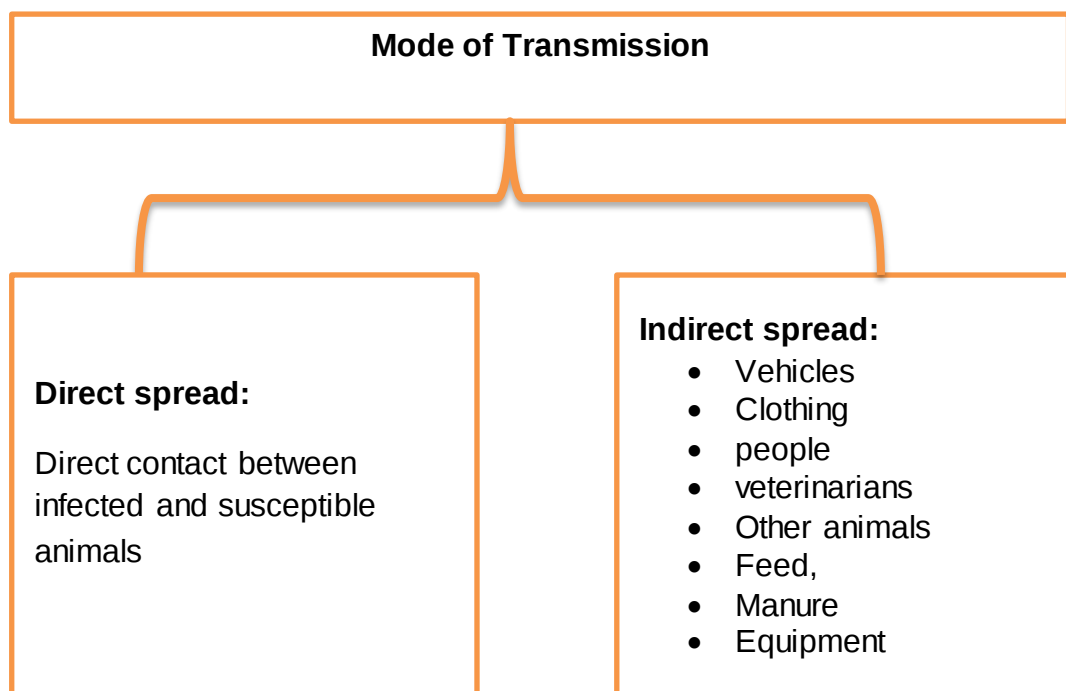


Figure 1. Mode of transmission of diseases



Self-Check 3 – Written Test

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Write true if the statement is correct/False if it is incorrect for the following questions (5 point each).

1. Delivery of livestock related information concerning production, management, marketing, deworming, vaccination, prevention and control of disease.
2. Private Extension Service is defined as the services rendered in the area of veterinary, agriculture and allied sectors by extension personnel working in private agencies
3. Environment is the biological pathogen, such as a virus, parasite, fungus or bacterium that causes disease in the susceptible host.

Test II. Choose the best answer for the following questions (5 point).

1. Which one of the following is not public delivery institutes for extension services?
 - A. National Animal Health Institute
 - B. National Tsetse fly and Trypanosomiasis Investigation and Control Centre
 - C. National Animal Health Diagnostic and Investigation Centre (NAHDIC)
 - D. National Artificial Insemination Centre.
 - E. None of the above

Test III. Short Answer Questions (10 point)

1. Describe and discuss source and transmission path ways of diseases.

Note: Satisfactory rating – 15 points Unsatisfactory - below 15 points

You can ask your teacher for the copy of correct answers



Information Sheet 4. Explain importance of animal health care and early reporting of disease occurrence

4.1 Introduction

Disease may not always be apparent especially in the early stages and there are many ways disease can be introduced and spread. Farm animal and bird diseases are mainly spread through:

- Animals moving between and within farms and, in particular, the introduction of new animals
- Direct or close contact with neighbors' animals
- Sharing vehicles, machinery, equipment, feed and bedding between farms
- Movement of people, especially workers, between and within farms
- Farm visitors people, pets, equipment and vehicles
- Contamination by wildlife, vermin and wild birds
- Animals drinking from contaminated rivers and streams

4.2 Benefit of animal health care

Along with the suffering of animals themselves, animal diseases devastate some of the world's poorest communities and damage international trade. Preventing and controlling diseases

- Grows economies,
- Bolsters local communities, and
- Improves the health of vulnerable populations, especially the young and elderly.
- Securing a safe, sufficient and nutritious food supply at a time of rapidly increasing population depends on healthy, productive animals.
- Increase animal production

The diseases that affect animal health also affect human. Tackling them while they are present in animals not only safeguards our health, it is easier, more effective and less expensive to address.

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Global disease prevention, management and control efforts must recognize the interdependent relationship between animal and human health an approach known as 'One Health.' This ensures healthcare researchers and practitioners in both areas work hand-in-hand to prevent disease outbreaks across species and address the root cause of their spread. This has led to the successful management of deadly diseases like avian flu, and is being used to eliminate others in the future.

4.3 Importance of early reporting of disease occurrence

Surveillance comprises monitoring the whole population (national, sector specific or herd/flock), or a representative sample, to identify the occurrence, incidence and prevalence of disease. When **assessing** the level of disease in a population, prevalence describes the number of animals affected with a disease at any one time, while incidence is the number of new cases which occur in a given time period. These two measures are linked by the duration of the disease event. **Monitoring** each animal in the shelter is an important support to the daily rounds process and dramatically improves the likelihood that signs of problems will be identified early. For example, inappetance, vomiting, or diarrhea could possibly all be missed if no note is taken prior to morning cleaning. Timely detection and rapid appropriate response to newly emerging diseases, changing endemic diseases and incursions of trans-boundary diseases that will:

- Minimize the effect of these diseases on livestock production systems
- Strengthen rural economies by minimizing the effect of these diseases
- Enhance food security by minimizing the effect of unintentional and intentional (agro-terrorist) introduction or emergences of these diseases
- Improve access to markets for animals and their products
- Improve public health
- Improve consumer confidence in the safety of animal derived food products resulting in enhanced markets for these products and strengthened rural economies



- Improved security of food production continuums by mitigating the risk of the introduction of bio-terrorist agents
- Reduce the occupational health risk to farmers, animal handlers, veterinarians and others working directly with farmed animals
- Development of risk assessment to support trade in animals and animal products
- Development of informed, evidence based disease control policy
- Development of epidemiological models that facilitate predictions of the location and likelihood of future outbreaks of endemic diseases
- Development of informed Foreign Animal Disease emergency response plans

Daily monitoring

Care staff who work with the animals early in the morning may be best able to pick up on signs of problems before cages are cleaned and food is replaced. Appetite and food intake monitoring is best done during feeding. Monitoring sheets, filled out by direct care givers, can then be consulted by those doing rounds even if signs of possible illness have been cleaned away.

Provide caretakers with guidance on what to do if an animal with possible signs of infectious illness is identified prior to cleaning (e.g. clean that animal last after caring for healthy animals in the area, make a note on the veterinarian's log, move the animal to an isolation area if appropriate).

To implement monitoring by care staff:

- Provide training for care staff in recognition of clinical signs of disease and behavior concerns.
- Utilize daily monitoring forms for each animal in the shelter and provide training for care staff in utilizing these forms for recording all daily observations
- Look for urine/fecal output before beginning cleaning and any signs of vomit
- Record attitude prior to feeding in the morning
- Monitor appetite during feeding
- In general housing areas, if an animal appears sick, mark the cage so others are alerted



- Unless an animal requires immediate intervention, cleaning staff should not enter the cage of an ill animal until feeding and cleaning of the general population has been completed
- Follow appropriate procedures to notify veterinary staff or supervisors of problems or concerns
- Include weekly weight checks as part of a complete monitoring program (have weighing as part of the intake process as well)
- When animals remain in the shelter for longer than one month, perform a full physical exam including weight and body condition score by trained staff on a monthly basis
- Make sure veterinary examinations are performed at least biannually for all animals, more frequently if problems are identified
- Although implementation of daily monitoring before cleaning and during feeding can seem daunting at a busy shelter, this has been accomplished even at shelters with very modest resources.

Early detection or diagnosis of a disease has great importance in the life of any animal/person. If diagnosed at an early stage some diseases can be cured fully or certain disease state can be reversed. Treatment also becomes easier, the quality of life is preserved, and the risks associated with the disease are prevented. Early detection of infectious diseases plays a crucial role in all treatment and prevention strategies. The key to success in handling animal disease epidemics is early detection. If a disease can be detected very early in the phase of epidemic development, the possibility exists that it can be arrested and eliminated before it actually inflicts damage. Early detection presupposes that there is a surveillance system in place that will bring infection to light when it is first seen. The country's veterinary authorities are then placed in the position of being able to manage the problem before it becomes uncontrollable, thus protecting the local livestock industry and ensuring food security for those closely dependent upon livestock. Early detection enables early warning and an early reaction. Surveillance is the primary key to effective disease management.



Self-Check 4 – Written Test

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Write true if the statement is correct/False if it is incorrect for the following questions (5 point each).

1. Disease not always be apparent in the early stages and there are many ways disease can be introduced and spread.
2. Surveillance comprises monitoring the whole population (national, sector specific or herd/flock).

Test II. Choose the best answer for the following questions (4 point).

1. Farm animal and bird diseases are mainly spread through:
 - A. Animals moving between and within farms
 - B. Direct or close contact with neighbors' animals
 - C. Sharing vehicles, machinery, equipment, feed and bedding between farms
 - D. All of the above

Test III. Short Answer Questions (10 point)

1. Briefly discuss the importance of early detection of animal diseases.
2. What are the benefit of animal health care?

Note: Satisfactory rating - 12 points Unsatisfactory - below 12 points

You can ask your teacher for the copy of correct answers



Information Sheet 5. Describing economically important and zoonotic local livestock diseases

5.1 Introduction

Ethiopia has the second largest human population in Africa and the largest livestock population on the continent. About 80% of Ethiopians are dependent on agriculture and have direct contact with livestock or other domestic animals. As a result, the country is vulnerable to the spread of zoonotic diseases. As the first step of the country's engagement in the Global Health Security Agenda, a zoonotic disease prioritization workshop was held to identify significant zoonotic diseases of mutual concern for animal and human health agencies. Committee members individually ranked the importance of each criterion to generate a final group weight for each criterion. Forty-three zoonotic diseases were evaluated. Criteria selected in order of importance were:

- 1) Severity of disease in humans,
- 2) Proportion of human disease attributed to animal exposure,
- 3) Burden of animal disease,
- 4) Availability of interventions, and
- 5) Existing inter-sectoral collaboration.

Based on the results from the decision tree analysis and subsequent discussion, participants identified the following five priority zoonotic diseases:

- Rabies,
- Anthrax,
- Brucellosis,
- Leptospirosis, and
- Echinococcosis.

Discussion Multi-sectoral collaborations strengthen disease surveillance system development in humans and animals, enhance laboratory capacity, and support implementation of prevention and control strategies. To facilitate this, the creation of a One Health-focused Zoonotic Disease Unit is recommended. Enhancement of public health and veterinary laboratories, joint outbreak and surveillance activities, and

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intersectoral linkages created to tackle the prioritized zoonotic diseases will undoubtedly prepare the country to effectively address newly emerging zoonotic diseases.

Economically important animal diseases

Economic evaluations can be very useful in animal health management, including adopting control and prevention measures based on financial and data analyses.

Diseases can impact the production of livestock considerably through, e.g.

- Treatment costs,
- Prevention cost
- Technical assistance,
- Lowered performance and/or quality of feedstock.

Economically important diseases of dairy animals

- Mastitis is a costly and important disease for dairy animals.
 - ✓ Common causes include
 - ❖ Staphylococcus,
 - ❖ Streptococcus, and
 - ❖ Escherichia coli.
- Parturient Hemoglobinuria
- FMD is the most contagious, trans-boundary, animal disease
- Ticks on a global scale, about 80 percent of cattle population is at risk of tick infestation and tick- borne diseases.



Self-Check 5 – Written Test

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Write true if the statement is correct/False if it is incorrect for the following questions (5 point each).

1. About 80% of Ethiopians are dependent on agriculture and have direct contact with livestock or other domestic animals.
2. Economic evaluations is not useful in animal health management.

Test II. Choose the best answer for the following questions (4 point).

1. Diseases can impact the production of livestock and economy of the country through:
 - A. Treatment costs,
 - B. Prevention cost
 - C. Technical assistance,
 - D. Lowered performance and/or quality of feedstock.
 - E. All of the above

Test III. Short Answer Questions (6 point)

1. What are the five main concern zoonotic diseases in Ethiopia? Discuss their selection criteria.

Note: Satisfactory rating - 10 points Unsatisfactory - below - 10 points

You can ask your teacher for the copy of correct answers



LG 91

LO2. Perform community based disease control program

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Conducting community participation
- Controlling disease transmission of animals at grazing and watering points
- Using pictorial, post card and diagram to indicating harmful effects of the disease on animal health and economy of the farmers
- Carrying out mobilization of community in national disease surveillance program

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Conduct community participation
- Control disease transmission of animals at grazing and watering points
- Using pictorial, post card and diagram to indicating harmful effects of the disease on animal health and economy of the farmers
- Carry out mobilization of community in national disease surveillance program

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If your performance is satisfactory proceed to the next learning guide,
7. Perform “the Learning activity performance test” which is placed following “Operation sheets” ,
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.



Information Sheet 1. Conducting community participation

1.1 Definition of terms

Participation is the empowerment of people to find solutions to their own development challenges. It is both an attitude and a philosophy that encourages learning, discovery and flexibility.

Participatory appraisal (PA) is a family of approaches and methods that enable people to present, share and analyze their knowledge of life and conditions, to plan and to act. It is participatory, flexible, lightly structured, adaptable, exploratory, empowering and inventive. Types of participatory appraisal include rapid rural appraisal, participatory rural appraisal (PRA), farming systems research and participatory impact assessment.

Key principles of participatory appraisal

- **Behaviour and attitude:** Listen, learn and respect. Be open-minded. Be a facilitator, not an expert.
- **Co-learning:** Share knowledge, experience and analysis. Combine local and professional knowledge for effective, acceptable action. Be prepared to unlearn.
- **Understanding:** People make rational decisions based on the information available to them. If it appears that people are not behaving rationally, it is probably because we have failed to understand some key factors in the situation.
- **Existing knowledge:** People accumulate a body of knowledge on subjects that are important to their livelihoods. Certain individuals have unique and very valuable perspectives on situations
- **Optimal ignorance:** Do not need to know every possible detail of a problem in order to solve it.
- **Action-oriented** rather than data-driven.

In communities where livelihoods depend on domestic animals and their products, such as the pastoral rangelands of South Western Uganda, human-animal interaction is intimate. There is therefore a need to greatly recognize that animal and human health are closely linked and that veterinary and public health sectors share the common goal

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of protecting, promoting and improving the health and wellbeing of human populations. Closer co-operation between human and animal healthcare providers can also lead to financial savings in the two sectors. In resource poor countries, control measures targeting zoonotic diseases at the human-domestic animal-wildlife interface could work provided that they are designed and adopted by the local population. There are few studies of integrated human and veterinary health care intervention focusing on integration at both activity and actors levels. Those commonly described often deal with delivery of health care under special circumstances such as human disease outbreak necessitating both local and international funding.

Animal vaccination underpins the prevention and control of many major animal diseases, including zoonoses, and is an area of animal health where the contribution of CAHWs has been widely advocated to support global elimination strategies for diseases such as peste des petits ruminants (PPR), foot and mouth disease and rabies. In the case of rabies, the limited availability of professional and paraprofessional veterinarians across the majority of rabies endemic countries means that lay animal vaccinators could be a critical human resource to support scaled up mass dog vaccination campaigns towards achieving the global goal of zero human deaths from rabies by 2030. The discovery of thermostable properties of the Nobivac rabies vaccine and the feasibility of storing these vaccines in locally made cooling devices makes it possible for these vaccines to be stored and used in remote settings by trained community volunteers.

Role of community animal health workers

Community animal health workers (CAHWs) provides basic services and give husbandry advice to livestock keepers. They are in charge of disseminating certain farming techniques and methods in order to optimize animal production and play an important role in epidemiological surveillance.



The primary role of community animal health workers are the following:

- 1) Create a baseline of animals in the area
- 2) Manage livestock registers (annual counting of randomized sample)
- 3) Give advice regarding medicines and vaccines
- 4) Bulk buy medicines and sell to farmers
- 5) Maintain the vet kit for that particular dip
- 6) Maintain a recording system of treatments, dosage and interventions
- 7) Keep farmers updated on vaccination calendars and strategic medicinal interventions (e.g. anthrax, blackwater vaccination campaigns)
- 8) Provide basic animal health care at dip-tank level
- 9) Assist in disease surveillance (early detection)
- 10) Promote Animal identification through tattoos, ear tagging and branding
- 11) Provide grazing management skills towards feeding during winter bottlenecks
- 12) Provide support around breeding and selection skills
- 13) Provide the service of castration and dehorning
- 14) Mobilize farmers around marketing and value adding
- 15) Mobilize farmers to provide animals at times of sales or auctions
- 16) Surveillance and reporting of controlled diseases
- 17) Provide supportive role to Departmental Technicians on dip days and veterinary campaigns
- 18) Provide theme day trainings at dip days and other gatherings

CAHW Training Curriculum cover the following main points

- Role of CAHW
- Conducting Baselines
- Monitoring and Record Keeping
- Cost Recovery and Record Keeping
- Coordination with Government Services

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Self-Check 1 – Written Test

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Write true if the statement is correct/False if it is incorrect for the following questions (6 point each).

1. Participatory appraisal is the empowerment of people to find solutions to their own development challenges.
2. Animal vaccination underpins the prevention and control of many major animal diseases.

Test II. Choose the best answer for the following questions (6 point).

1. Which one of the following is not the types of participatory appraisal?
 - A. Rapid rural appraisal,
 - B. Participatory rural appraisal (PRA),
 - C. Farming systems research and
 - D. Participatory impact assessment.
 - E. None of the above

Test III. Short Answer Questions (10 point)

1. Describe and discuss the key principles of participatory appraisal.

Note: Satisfactory rating 14 points Unsatisfactory - below 14 points

You can ask your teacher for the copy of correct answers



Information Sheet 2. Controlling disease transmission of animals at grazing and watering points

2.1 Introduction

The use of shared common water points (WPs) and grazing points (GPs) individual GPs provide more contact opportunities for animals. Watering points are critical for the potential transmission of infectious diseases, intervention at GPs in the Ethiopian Highlands may have greater impact on contacts and thereby opportunities for transmission of infectious diseases between flocks. Some villages appear naturally at much lower risk of introducing disease.

Grazing tends to be communal during the dry season and individual during the rest of the year with owners grazing the animals on their own land. Little is known about the contact structure of the farming population in developing countries, but it is likely to be complex and heterogeneous as a result of the need for continuous adaptation to variable environmental, socioeconomic, and institutional conditions. Management practices that favour contacts between animals from different origins in regions situated between the two parallels of 40° latitude north and south, are often used to explain the persistence of a number of directly transmitted diseases. Mixing at watering points (WPs) or grazing points (GPs) has been identified as a key factor for transmission of diseases such as rinderpest, peste des petits ruminants (PPR) or foot-and-mouth disease (FMD). Social network analysis allows a description of the topology of the contact structure of livestock populations. The impact of network structures on the potential routes of transmission of infectious diseases can be investigated, provided that the network links are associated with known risk factors for disease transmission.

2.2 Controlling disease transmission at grazing and watering points

Control programmes using animal movements in intensive farming systems. However, the characterization of networks of animal contacts in settings without registered animal movements and structured animal contacts remains a challenge in terms of field

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network data collection and knowledge about the husbandry system. The widespread movements and herd contacts reflect potentially high disease transmission risks among traditionally managed livestock in East Africa because of their reliance on shared resource areas. Therefore, disease prevention and control at grazing and watering point achieved by the following methods:

- Use separate and clean watering area for animals
- Control the movement of animals
- Use separate grazing area for different animals
- Separate diseased animal early from the rest healthy flock/herd
- Minimize the population of animal at watering points
- Check the quality of water
- Create awareness to the community about the risk of common watering and grazing areas
- Avoid shared routes within and between villages during going to watering and grazing points.
- Reduce high livestock congregations
- Vaccination at these key points.
- Mobility of infected animals may be impacted in ways that change contact risks,



Self-Check 2 – Written Test

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Write true if the statement is correct/False if it is incorrect for the following questions (5 point each).

1. The use of shared common water points (WPs) and grazing points (GPs) individual GPs provide more contact opportunities for animals.

Test II. Choose the best answer for the following questions (5 point).

1. Which of the following diseases is not transmitted at watering points (WPs) or grazing points (GPs)?
 - A. Rinderpest,
 - B. Peste des petits ruminants (PPR)
 - C. Foot-and-mouth disease (FMD)
 - D. Tetanus

Test III. Short Answer Questions (10 point)

1. Discuss how to prevent and control transmission of diseases at grazing and watering points.

Note: Satisfactory rating 10 points Unsatisfactory - below 10 points

You can ask your teacher for the copy of correct answers



Information Sheet 3. Using pictorial, post card, diagram or other demonstrable materials

3.1 Definition of terms

A pie chart (or a circle chart) is a circular statistical graphic, which is divided into slices to illustrate numerical proportion. In a pie chart, the arc length of each slice (and consequently its central angle and area), is proportional to the quantity it represents. While it is named for its resemblance to a pie which has been sliced, there are variations on the way it can be presented

A histogram it indicates the frequency of a class interval. The class interval or the range of values is known as bins or classes with reference to histograms. A bar indicates the number of data points within a specific class. That means the higher the frequency of a particular class, higher the bar.

A diagram is a symbolic representation of information using visualization techniques. Sometimes, the technique uses a three-dimensional visualization which is then projected onto a two-dimensional surface. The word graph is sometimes used as a synonym for diagram.

Pictorial: pertaining to, expressed in, or of the nature of a picture. Illustrated by or containing pictures: a pictorial history of or relating to the art of painting and drawing pictures, the pictures themselves, or their makers: the pictorial masterpieces of the Renaissance.

3.2 Using different types of diagrams/other to indicate economic and public health effects of the disease

In cattle systems, an infected animal will either die, be culled or salvage slaughtered or survive but suffer from production decrease. Both the value of the animals lost as well as the decreased production should be estimated to calculate the total loss due to occurrence of a disease in animals. Figure 4 depicts a flowchart that highlights the



different cattle-related variables the protocol data allows estimating, including the value of animals lost due to the disease (in red) and the value of production decrease in survivors (in dark orange). The cost of treating sick animals are not accounted for as data on farmers' expenses on veterinary goods and services by disease are not available. However, a small proportion of farmers have usually access to animal health services and their expenses on veterinary services are typically negligible.

Brucellosis in Cattle

The economic impact of brucellosis measured as value of animals lost and value of production lost by production system. According to FAO 2018, brucellosis causes an estimated economic loss of 377.93 million USD per annum in cattle despite the perceived low prevalence. The mixed crop livestock and urban/peri-urban production systems suffer the most compared to the other production systems. The economic losses caused by the disease appear to be due more to reduced or foregone production rather than death of the infected animals.

Bovine TB in Cattle

The value of animals lost and the value of production lost due to bovine tuberculosis by production system. There is high prevalence of the disease in the dairy commercial and urban/peri-urban production systems that usually keep exotic, grade or crossbred animals. Bovine tuberculosis causes significant economic losses both in terms of animals' lost and foregone production. The highest loss is due to reduced and foregone production rather than to mortality. According to FAO 2018, total economic losses in the urban/peri-urban and dairy commercial systems are estimated at USD 1.5 and 1.2 billion, respectively, and ~USD 3.5 billion overall in Ethiopia. This is a huge economic loss representing about 18 percent of the contribution of livestock to GDP and 1.96 percent of total GDP.

Anthrax in Cattle

Even though the overall prevalence of anthrax based on expert opinions is generally low, the total economic cost of the disease reaches USD 162.86 million of which two-

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third is from the mixed-crop livestock system. Much of the loss (~90 percent) is attributed to immediate death of the affected animals. The total losses as percent of contribution of livestock to GDP and total GDP are 0.85 percent and 0.09 percent, respectively.

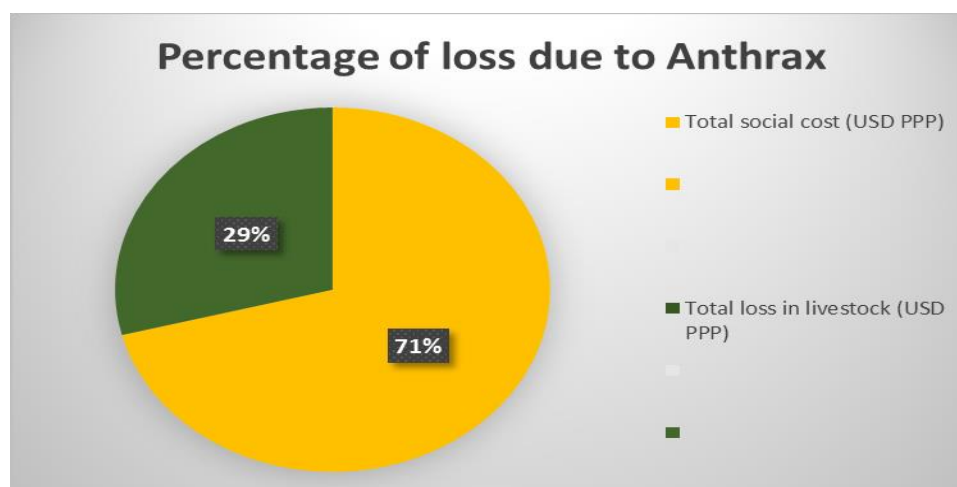


Figure 2. Economic loss due to anthrax indicated by pie chart

Salmonellosis

The estimated prevalence of salmonellosis is relatively high in the commercial dairy and urban/peri-urban production systems whereas it is low in the mixed crop-livestock production system. The total economic impacts of the disease, in fact, is highest in the urban/peri-urban and the mixed crop-livestock systems at ~242 and ~229 million USD respectively. The total loss as percentage of the contribution of livestock to GDP and total GDP are 3.29 percent and 0.36 percent, respectively. The public health costs of the disease in humans and losses in animals are the highest in the mixed crop-livestock systems followed by the pastoral/agro-pastoral systems. These costs are relatively low for the urban/peri-urban and dairy commercial systems. They were inestimable for the feedlot system. Much of the total cost of salmonellosis, about four-fifths of all costs, is due to its negative impacts on cattle production and productivity rather than on public health (Figure 5).

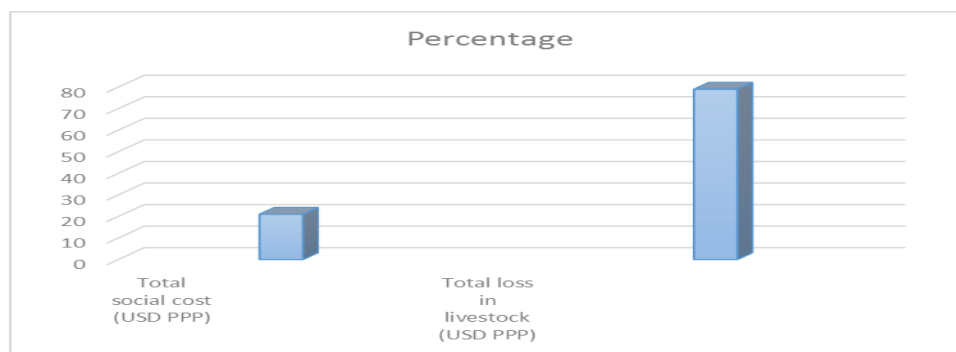


Figure 3. Economic loss due to Salmonellosis indicated by bar graph

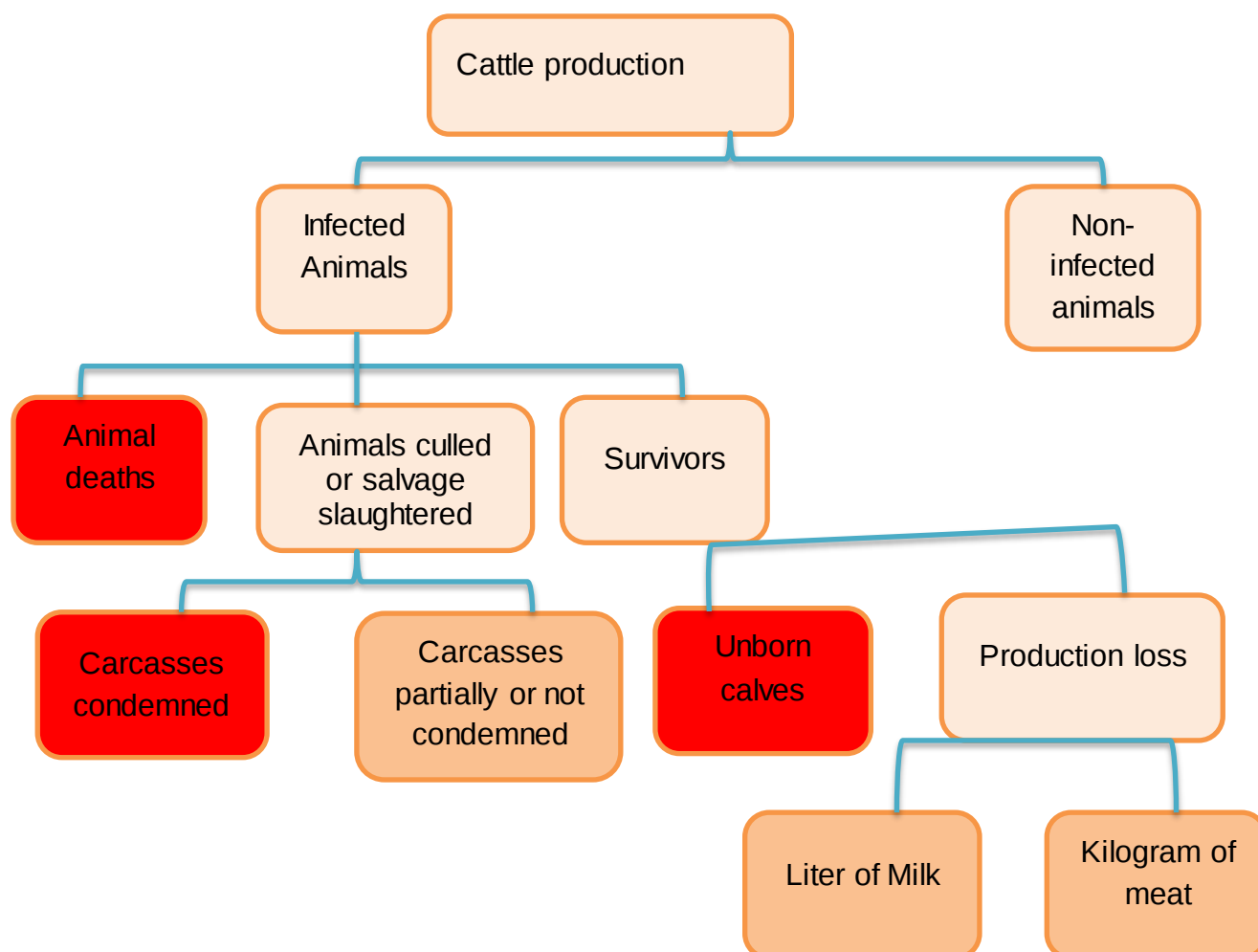


Figure 4. Flow diagram of Cattle-related variables shows loss due to animal diseases

Human

Zoonoses are transmitted from animals to humans through direct and indirect contact, vectors and food consumption. Different categories of people, therefore, face different risks of contracting zoonotic diseases. To estimate the impact of morbidity and mortality of zoonoses in humans, we have split the population at risk in three broad groups:

- Non-livestock keepers and non-consumers of animal source foods
- Non-livestock keepers and consumers of animal source foods;
- Livestock keepers and consumers of animal source foods.

Figure 2 depicts a flowchart that highlights the different human-related variables the protocol data allows estimating, including the number of infected people, as well as survivors and deaths, by category of people. We assume there are no infections among the non-livestock keepers and non-consumers of animal source foods.

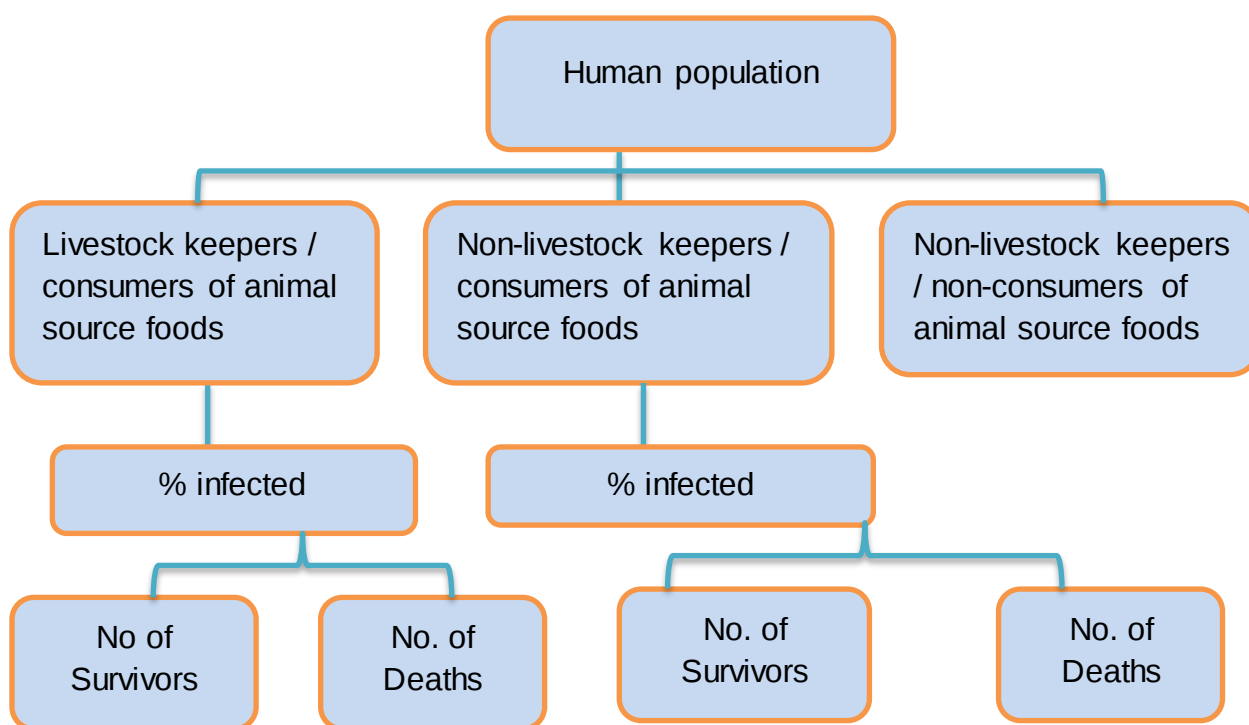


Figure 5. Diagram show the effect of disease on human health



Brucellosis in human

Cattle keepers who are in frequent contact with the animals and are also potentially consuming cattle source products, and individuals who are not livestock keepers but might be infected largely through consumption. In 2017 in Ethiopia 1 521 cattle keepers died of Brucellosis, on average at age of 23.60 yrs. According to the World Bank, the expected life span of an individual in the country is 65 yrs.

Bovine Tuberculosis in human

The estimated total public health costs of the disease among livestock keepers in all production systems and consumers high. The public health costs are higher in mixed crop livestock and pastoral/agro-pastoral cattle production systems, largely due to their sheer sizes. Presents the shares of the monetary costs of bovine tuberculosis in animals and humans (livestock keepers and consumers). The estimated monetary cost of the disease in animals accounts for 98 percent of the total loss caused by the disease.

Anthrax in human

The social costs are the highest in the mixed crop-livestock system followed by the pastoral/agro-pastoral system. Comparing the total public health costs (in both livestock keepers and consumers) to the value of loss in animals shows that more than two-thirds of the economic impact of anthrax is on public health.



Self-Check 3 – Written Test

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Write true if the statement is correct/False if it is incorrect for the following questions (3 point each).

1. A pie chart (or a circle chart) is a circular statistical graphic, which is divided into slices to illustrate numerical proportion.
2. The estimated total public health costs of bovine tuberculosis among livestock keepers in all production systems and consumers is low.

Test II. Choose the best answer for the following questions (4 point).

1. Among the following listed diseases one is not negatively affect the economy and public health of the country.
 - A. Salmonellosis
 - B. Anthrax
 - C. Bovine Tuberculosis
 - D. Brucellosis
 - E. None of the above

Test III. Short Answer Questions (10 point)

1. Describe and discuss diseases which have economic and public health importance with their impact on economy and public health.

Note: Satisfactory rating 10 points Unsatisfactory - below 10 points

You can ask your teacher for the copy of correct answers



Information Sheet 4. Carry out mobilization of community in national disease surveillance program

4.1 Definition of terms

A community mobiliser is an individual or leader who interacts with various groups of people (such as households, school children, community groups, community-based organizations, and religious groups) to influence knowledge, attitudes, and practices.

Specific types of community mobilisers include:

- Community Development Officers/Workers
- Parish Development Committees
- Functional Adult Literacy Instructors
- Group Promoters
- Community-Based Facilitators
- Village Health Teams
- Any other influencer

Participation: this principle requires that every member of a community gets the chance, directly or through representation, to participate in the design, implementation, and monitoring of community-level initiatives. When this happens, there is a higher likelihood that such initiatives accurately reflect the community's real needs and interests. Participation takes into consideration the different experiences, needs, and capabilities of various groups in a community women and men, youth and the elderly, persons with disabilities and the able-bodied, and ethnic/religious/language minorities and majorities. With community mobilization, participation is about meeting the interests of the whole community.

Accountability: is the process of sharing information about actions or intentions. Groups and individuals in relationships, such as in communities, are accountable to each other when they honor their commitment to communicate plans and are responsible for what they actually do. In the context of community mobilization, community members are held accountable to each other. Individuals that are assigned

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certain roles in food and nutrition security initiatives are accountable to the entire community, which is counting on them to fulfil their responsibilities in everyone's best interest.

4.2 Community mobilization

In this phase, the mobiliser uses the agreed upon approach to engage the audience to discuss the manifestation, causes, and consequences of food insecurity and malnutrition. The outcome of the mobilization activity should be a community action plan that:

- Identifies the problem
- Determines tasks to address the problem
- Assigns responsibility for respective tasks
- Sets a timeframe for each task
- Determines signs of success

4.3 Community based disease surveillance

Participatory disease surveillance is a method of disease surveillance where PA approaches and methods are used to combine local veterinary knowledge with conventional methods to establish the presence or absence of a specific disease in a particular area. In community animal health outreach (CAHO) the method of sampling is usually purposive rather than random. The investigator uses outbreak reports and risk factors to determine the target areas for participatory disease surveillance (PDS); areas most likely to harbor the disease are chosen. As the PDS is carried out and information is gathered, the investigator will follow the information to places that are likely to have the disease of interest. The investigator makes contact with livestock keepers, farmers and key informants who are likely to know about the local disease situation. Livestock keepers and the investigator discuss together about animal health issues. Livestock keepers' knowledge and experience (existing veterinary knowledge) is listened to and respected. A range of tools and methods are used that are open-ended and flexible, and can be used to crosscheck information gathered.

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Integrated Surveillance Methods

Effective surveillance systems are sensitive, specific, timely and representative. No one surveillance activity can meet all these requirements. Only an integrated system of complementary methods can. Participatory epidemiological methods and community animal health networks are beginning to be integrated as part of routine disease reporting systems. But so far, the potential benefit of these approaches in terms of enhancing the sensitivity of event detection has only been exploited in the most superficial manner. Community animal health project staff routinely debrief community animal health workers as to their activities and the types of diseases they encounter. Up to the present, conventional veterinary services have made little use of the information. The reservation is frequently expressed that international authorities would not recognize the data obtained through participatory methods. One of the objectives of the present paper is to advance the discussion and begin to solicit the opinion of the international community regarding methods adapted to traditional production systems.

Participatory epidemiology (PE) is the use of participatory methods to collect epidemiologic data. The participatory approach utilizes and compares all available information through a process called triangulation. Triangulation refers to the confirmation of information using multiple methods and multiple sources. Participatory epidemiology makes full use of sampling, laboratory testing and analytical techniques. Participatory studies provide the proper background for the design of statistical studies and the contextual information that is essential to the correct interpretation of laboratory results.

In order to fully integrate participatory methods in surveillance systems three important activities are required:

- Discussion of the value of participatory data leading to a consensus on its appropriate use,
- Training courses in participatory methods for veterinary staff and
- Workshops to develop comprehensive frameworks for disease reporting that mobilize

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Self-Check 4– Written Test

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Write true if the statement is correct/False if it is incorrect for the following questions (5 point each).

1. A community mobiliser is an individual or leader who interacts with various groups of people

Test II. Choose the best answer for the following questions (5 point each).

1. Which one of the following are the types of community mobilisers?
 - A. Community Development Officers/Workers
 - B. Parish Development Committees
 - C. Functional Adult Literacy Instructors
 - D. Community-Based Facilitators
 - E. All of the above
2. The outcome of the mobilization activity should be a community action plan which includes:
 - A. Identifies the problem
 - B. Determines tasks to address the problem
 - C. Assigns responsibility for respective tasks
 - D. All of the above

Test III. Short Answer Questions (10 point)

1. What is participatory epidemiology?

Note: Satisfactory rating 12.5 points Unsatisfactory - below 12.5 points

You can ask your teacher for the copy of correct answers



Operation Sheet: Undertaking community extension services

Purpose: Community empowerment and identify problems

Materials: (Pen, paper, cooperatives MSE, Logistics)

Procedures:

Step 1. First student will be asked to present three topics with justification for providing extension services for the community.

Step 2. Using the set criteria, one topic will be selected from the three and the student shall be notified

Step 3. A team assigned by a trainer and approves the topic for each group.

Step 4. Coordinator to be assigned from the team and the instructor should be supervise the community extension service undertaken by the trainees.

Step 5. The instructor will guide and supervise the progress of the trainees.

Step 6. The trainee should be identify the gap encountered at any level during undertaking community services.

Step 7. The trainees should submit their final report both in hard and soft copy to their instructors.

Step 7. The trainees should be present their final findings and the whole activity performed during the extension services.



LAP TEST:

Name _____ ID _____ Date _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 2 week. The project is expected from each student to do it.

During your work: You can ask all the necessary tools and equipment

Lap Test Title: Procedure for Ante mortem Inspection

Undertaking ante mortem Inspection

Task: Perform community extension services



LG 92

LO3. Build a strategy to minimize risk of disease spread to new areas

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Empowering the community in prevention of disease spread to new area
- Using Participatory Rural Appraisal (PRA) strategy in disease prevention

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Empower the community in prevention of disease spread to new area
- Use participatory rural appraisal (PRA) strategy in disease prevention

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If your performance is satisfactory proceed to the next learning guide,
7. If your performance is unsatisfactory, see your trainer for further instructions.



Information Sheet 1. Empowering the community in prevention of disease spread

1.1 Introduction

The animal disease prevention and control activities of Veterinary Services throughout the world are a Global Public Good. These activities have major benefits for agricultural production, food security and safety, public health, animal welfare, access to markets and alleviation of rural poverty. The effectiveness of prevention and control policies depends on the good governance and quality of the Veterinary Services.

1.2 Training the community in prevention of disease spread

Educational and community-based programs play a key role in:

- Preventing disease and injury to animals
- Improving health of animals and human
- Enhancing quality of production
- Boost the economy of the farmers

Animal health status and related health behaviors are determined by influences at multiple levels: personal, organizational/institutional, environmental, and policy. Because significant and dynamic interrelationships exist among these different levels of health determinants, educational and community-based programs are most likely to succeed in improving animal health and wellness when they address influences at all levels and in a variety of environments/settings.

Ensuring that women and herdsmen have access to livestock extension services

Although women, children and young people the world over are known to play a key role in livestock production, including animal healthcare, they have limited access to extension services. Most extension programmes, especially in pastoral livestock production systems, mainly reach out to men or 'household heads', leaving out herdsmen, women and children, despite the fact that they play an influential role in the provision of veterinary services. Veterinary extension services should focus not only on

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household heads, but must also take into account all those involved in livestock management, nutrition and animal healthcare

Farmers field school (FFS)

The FFS approach represents a paradigm shift in agricultural extension and can be viewed as a capacity-building investment in the sector of education, information, and training. The training program utilizes participatory methods ‘to help farmers develop their analytical skills, critical thinking, and creativity, and help them learn to make better decisions’. Essentially, the FFS model provides an opportunity for a group of individuals that share similar livelihood challenges and to engage in a process of learning-by-doing, based on principles of non-formal education.

This approach reflects the four elements of the ‘experiential learning cycle’:

- Concrete experience
- Observation and reflection
- Generalization and abstract conceptualization, and
- Active experimentation

The FFS approach is particularly adapted to field study where specific hands-on management skills and conceptual understanding of complex livelihood environments is required

Aim of training of the community or farmers

- Build farmers’ capacity to analyses their production systems
- Identify problems, test possible solutions and eventually adapt the practices most suitable to their farming system.
- The knowledge acquired during the learning process enables farmers to adapt their existing technologies to be more productive, profitable, and responsive to changing conditions, or to test and adopt new technologies through a process of participatory technology development.
- They interact on a more demand-driven basis with the researchers and extension workers

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Farmers should be given extension specific on how disease prevented and controlled and the application / implementation of the learned extension knowledge. Considering extension given by the state employees regarding parasites should include the following:

- How to recognize the different parasites disorders associated with high worm burdens,
- Types of anthelmintic used to control worms
- How to read, understand and follow the instructions on stock remedies,
- When to treat cattle for internal worms and the various methods used;
- Side effects of incorrect use of anthelmintic in cattle, namely toxicity and drug resistance;
- Methods of disease prevention and control
- Advantage of hand and personal hygiene
- Training on animal husbandry system
 - ✓ Feeding and watering
 - ✓ Housing
 - ✓ Ventilation
 - ✓ Geography
- Proper record keeping.
- Importance of fencing animal environment
- Importance of biosecurity
- Importance of monitoring and surveillance of animal diseases



Self-Check 1– Written Test

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Write true if the statement is correct/False if it is incorrect for the following questions (5 point each).

1. The animal disease prevention and control activities of Veterinary Services throughout the world are a Global Public Good.

Test II. Choose the best answer for the following questions (5 point).

1. What are the four elements of farmer's field school approach?
 - A. Concrete experience
 - B. Observation and reflection
 - C. Generalization and abstract conceptualization
 - D. Active experimentation
 - E. All of the above

Test III. Short Answer Questions (10 point)

1. Describe aim of empowering of the community or farmers.

Note: Satisfactory rating 10 points Unsatisfactory - below 10 points

You can ask your teacher for the copy of correct answers



Information Sheet 2. Using Participatory Rural Appraisal (PRA) strategy in disease prevention

2.1 Introduction

The Rapid Rural Appraisal (RRA) approach is the largest contributor, for both principle and techniques developed by the Participatory Rural Appraisal (PRA). Farmers are a rich bank of practical veterinary knowledge. It is expected that traditional communities, who are entirely dependent on farming, should make it their priority and business to gather and preserve all information about breeds, production methods and diseases. The depth of the knowledge and skill are usually related to the degree of socio economic dependence a society has on livestock farming. The best source of traditional livestock knowledge is from a combination of livestock-pastoral and agro-pastoral systems with large component of animal husbandry. This kind of knowledge so sourced, is termed existing veterinary knowledge or ethno-veterinary knowledge.

In recent times, collection of existing veterinary knowledge through surveys became an important method of identifying and prioritizing animal health problems within communities, particularly for rural development. Very often, these ethno-veterinary surveys have been carried out as part of a baseline study for an animal health project. Therefore, beyond more accurate epidemiologic analysis, the inclusion of livestock owner information in project design and disease control strategies will insure appropriateness of animal health interventions and lead to better acceptance of disease control interventions by the animal-owning public.

It is in this light that the participatory rural appraisal (PRA) which evolved out of rapid rural appraisal is now used as a general project design and monitoring tool, which has shown to be very timely, accurate and a cost effective means of collecting essential information for project formulation. Participatory rural appraisal is an effective qualitative tool for researchers to collect data at the community level and places more emphasis on the empowerment of the community to process and utilize the information on their own. This information can be used to design better animal health projects and delivery

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systems, more successful, timely and sensitive surveillance and control strategies or as new perspectives for innovative research hypothesis in ecological epidemiology.

2.2 Basic principles of PRA

The focus on more participative process is the paradigm of PRA. This paradigm will become obvious by understanding the following basic principles of PRA. There are at least 11 basic principles that must be referred to in the implementation of PRA, they are:

- Offsetting biases (spatial, project, person-gender, elite etc, seasonal, professional, courtesy)
- Rapid progressive learning- flexible, exploratory, interactive, inventive
- Reversals- learning from, with and by local people eliciting and using their criteria and categories
- Optimal ignorance and appropriate imprecision not finding out more than is needed, not measuring more than the needed, and not trying to measure what does not to be measured.
- Triangulation- using different methods, sources and disciplines and a range of informants in a range of places and cross checking to get closer to the truth through successive approximations
- Direct contact, face to face, in the field
- Seeking diversity and differences
- Critical self-awareness about attitudes and behaviour; doubt; embracing and learning from error; continuously trying to do better; building learning and improvement into every experience
- Changing behaviour and attitudes, from dominating to facilitating, empowering and enabling them to conduct their own analysis
- A culture of sharing- of information, of methods, of food, of field experience
- Commitment to equity



Approaches and Methods

PRA entails shift of emphasis from:

- Dominating to empowering
- Closed to open
- Individual to group
- Verbal to visual
- Measuring to comparing, ranking and scoring and of experience from
- Reserve to rapport
- Frustration to fun

Various approaches and methods applicable to PRA

- Offset
- Find and review secondary data
- Observe directly
- Seek out the experts
- Semi-structured interviewing
- Transect walks:
- Key probes:
- Case studies and stories
- Groups
- Local people
- Do-it-yourself
- Time lines and trend and change analysis
- Participatory mapping and modelling
- Local analysis of secondary sources
- Counting, estimates and comparisons
- Seasonal calendars
- Daily time use analysis
- Institutional or "chapati"/Venn diagramming institutions
- Linkage diagrams
- Wellbeing grouping
- Matrix scoring and ranking
- Local indicators
- Team contracts and interactions
- Shared presentations and analysis
- Contrast comparisons
- Role plays
- Alternatives to questionnaires
- Listing and card-sorting



Applications and Uses of PRA

Participatory rural appraisal has become the new development buzzword in every aspect of community development around the world. These techniques are now being used in almost every field where people are involved. Some of the more important and common applications include:

- Natural resources and agriculture
- Watersheds and soil and water conservation
- Forestry (especially joint forest management) and agro forestry
- Fisheries and aquaculture
- Biodiversity and wildlife reserve management
- Village resource management planning and action
- Integrated pest management
- Crops and animal husbandry, including farmer participatory research/ farming
- systems research and problem identification by farmers
- Irrigation
- Marketing

Scoring matrices. Scoring system is a set of values for qualifying the set of one residue being substituted by another in an alignment. It is also known as substitution matrix. Scoring matrix of nucleotide is relatively simple. A positive value or a high score is given for a match and negative value or a low score is given for a mismatch.

The rank of a matrix cannot exceed the number of its rows or columns. If we consider a square matrix, the columns (rows) are linearly independent only if the matrix is nonsingular. In other words, the rank of any nonsingular matrix of order m is m .



Table 1. Analysis of Various approaches and methods applicable to PRA

Analysis	Analysis	PRA tools
Space	Social and Resource Mapping	Mapping
Time	Time Line Changing Trends Seasonality	Focus group discussion (FGD) Mapping Seasonality Analysis Seasonal calendar Time trend
Flow	Venn Diagram Livelihood analysis	Chappati Diagram/Triangulation Matrix Ranking
Decision	Choice Ranking Problem Ranking Preparation of intervention Matrix	Matrix Ranking Triangulation
Gender	Gender Disaggregated Activity Analysis	Matrix marking Matrix scoring Matrix ranking
Group Identification	Well-Being Ranking	Semi structured interview FGD
Preference Analysis	Scoring and ranking	Matrix scoring Matrix ranking Vector scoring
Valuation of resources	Scoring and Ranking	Matrix scoring Matrix ranking Vectoe Scoring



Self-Check 2 – Written Test

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Write true if the statement is correct/False if it is incorrect for the following questions (5 point each).

1. The Rapid Rural Appraisal (RRA) approach is the largest contributor, for both principle and techniques developed by the Participatory Rural Appraisal (PRA).
2. The best source of traditional livestock knowledge is from a combination of livestock-pastoral and agro-pastoral systems with large component of animal husbandry.

Test II. Choose the best answer for the following questions (5 point).

1. What are the more important and common applications techniques of PRA?
 - A. Forestry (especially joint forest management) and agro forestry
 - B. Fisheries and aquaculture
 - C. Biodiversity and wildlife reserve management
 - D. Village resource management planning and action
 - E. All of the above

Test III. Short Answer Questions (10 point)

1. Describe approaches and methods of participatory rural approach.

Note: Satisfactory rating 12.5 points Unsatisfactory - below 12.5 points

You can ask your teacher for the copy of correct answers



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LO 4. Advocate new technology

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Explaining disadvantage of large number livestock rearing on small area of land
- Explaining advantage of integrated and small scale farming
- Integrating community indigenous knowledge in transfer of new technology
- Delivering information on adding value chain to livestock and livestock product

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Explain disadvantage of large number livestock rearing on small area of land
- Explain advantage of integrated and small scale farming
- Integrate community indigenous knowledge in transfer of new technology
- Deliver information on adding value chain to livestock and livestock product

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If your performance is satisfactory proceed to the next learning guide,
7. If your performance is unsatisfactory, see your trainer for further instructions.



Information Sheet 1. Explaining disadvantage of large number livestock rearing on small area of land

1.1 Introduction

Intensive farming is the latest technique used to yield high productivity by keeping large number of livestock indoors and using excessive amount of chemical fertilizers on a tiny acreage. It is carried out to meet the rising demand for cheap food and prevent future shortages. Elaborated below are its pros and cons.

Intensive farming is an agricultural system that aims to get maximum yield from the available land. This farming technique is also applied in supplying livestock. Under this technique, food is produced in large quantities with the help of chemical fertilizers and pesticides that are appropriately used to save such agricultural land from pests and crop diseases. Products, such as eggs, meat, and other agricultural items that are easily available in many supermarkets today are produced using modern intensive farming methods. It is practiced widely by many developed economies of the world. Sustainable intensive farming, intensive aquaculture, intensive livestock farming, and management-intensive grazing fall under this farming category.

Advantages

- One of the major advantages of this farming technique is that the crop yield is high.
- It helps the farmer to easily supervise and monitor the land and protect his livestock from being hurt or hounded by dangerous wild animals.
- With the introduction of intensive farming, farm produce, such as vegetables, fruits, and poultry products have become less expensive. It also aids in solving the worldwide hunger problems to a great extent. This means that common people can now afford a balanced and nutritious diet.
- Many opine that organic food can be afforded only by the elite strata of the society. Apart from that, large farming spaces are required to cultivate organic



crops using natural manure. However, with the introduction of intensive farming, the space, equipment, and other requirements for farming are less and more economical.

- The EPA (Environment Protection Agency) has set certain rules and regulations on how livestock, pesticides, and animal manure are to be maintained. The farmers, who follow these set rules help to provide an affordable, safe, and healthy produce to all alike.
- Another advantage is that large productivity of food is possible with less amount of land. This leads to economies of scale and directly contributes towards meeting the ever-growing demand for food supplies.

Disadvantages

- Intensive farming involves the use of various kinds of chemical fertilizers, pesticides, and insecticides. Apart from this, it is also associated with farms that keep livestock above their holding capacity, which in turn leads to pollution, various diseases, and infections brought about by overcrowding and poor hygiene.
- Reports and studies reveal that intensive farming affects and alters the environment in multiple ways. Forests are destroyed to create large open fields, and this could lead to soil erosion. It affects the natural habitat of wild animals. Use of chemical fertilizers contaminates soil and water bodies, such as lakes and rivers.
- Pesticides sprayed on crops not only destroy pests and contaminate the crops, but also kill beneficial insects. Heavy use of pesticides and chemical fertilizers also affects the workers (who spray the pesticides) and the people residing nearby. Eventually, these chemicals are passed on to human beings, who consume the agricultural produce.
- Fruits and vegetables purchased from farms that promote intensive farming are covered with invisible pesticides. These cannot be washed off easily. Exceeding the use of pesticides affects the health of human beings severely, leading to skin allergy, physical deformity, and congenital disease.
- Statistics show a direct relation between the consumption of food procured from intensive farming sites and an increase in the number of cancer patients and



children born with defects. Researchers opine that consumption of inorganic poisonous vegetables, fruits, poultry, and meat could probably be one of the reasons for causing such damage in the human body.

- There are many hybrid varieties of livestock, plants, and poultry available today. The livestock and poultry are injected with hormones and other chemicals to increase the yield.

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Self-Check 1 – Written Test

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Write true if the statement is correct/False if it is incorrect for the following questions (5 point each).

1. Intensive farming is the latest technique used to yield high productivity by keeping large number of livestock indoors.
2. Intensive farming is an agricultural system that aims to get low yield from the available land.

Test II. Choose the best answer for the following questions (4 point).

1. Which one of the following is not the advantage of large number of livestock rearing on small land?
 - A. Farming technique is that the crop yield is high.
 - B. Farmer easily supervise and monitor the land and protect his livestock from hurt
 - C. Reduce the production
 - D. All of the above

Test III. Short Answer Questions (10 point)

1. Describe disadvantage of large number livestock rearing on small area of land.

Note: Satisfactory rating 12 points Unsatisfactory - below 12 points

You can ask your teacher for the copy of correct answers



Information Sheet 2. Explaining advantage of integrated and small scale farming

2.1 Introduction

Modern farmers are trying to minimize costs and achieve maximum results. For this reason, it is important to carefully analyze and understand how to properly manage a farm. There are many successful cases where cattle breeding and crop production have been combined in such a way that productivity was increased in both areas. Let's look at such examples including the advantages and disadvantages of integrated farming.

2.2 Integrated farming system

Integrated farming system (IFS) is a cross-linked farming system where farmers use high-quality organic food and renewable energy. The main principle of such system is to reduce pollution and increase income by combining different types of farming. For example, we can talk about fields that are plowed by animals. Pigs can be used to dig up the earth in preparation for planting, and animal manure (like cow waste) can be used to fertilize crops and increase harvest. Another factor to consider are water-based systems that promote efficient utilization of nutrients and fuel production. In aquaculture, fish breeding can be mixed with livestock care, as well as growing vegetables

2.3 Advantage of Integrated farming system

- Integrated farming system increases production to meet the demands of people
- Proper processing of waste and related substances increases the profit of farmers.
- Intensification of crops growth maximizes income in relation to area, time and efforts.
- Soil remains fertile for a long time due to the correct use of organic waste.
- Most of the waste is converted, has a value and used within the framework of the integrated system.

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- Integrated farming system ensures influx of income. This means that within a year it will be possible to make profit constantly from different agricultural sectors with separate seasons.
- The main thing is to choose the right spheres for work so that there are no idle times and pauses without income.
- The use of by-products makes the system more stable. The potential of the soil, which plays the role of an industrial base, is preserved.
- Produce all kinds of healthy foods on just one farm; the products will be fully enriched with various useful components that the human body needs. This method of improving agricultural productivity is absolutely safe and environmentally friendly.
- The amount of waste is minimized. In such a setting, there is little decaying waste and pollution in comparison to other production methods.
- There is no need for excessive use of chemical fertilizers and pest control agents, so the water, soil and air remain clean



Figure 6. Integrated farming system

- Alternative sources of energy can be used, reducing dependence on minerals. Utilization of organic substances is an efficient way of producing biogas. Thanks to this, it will be possible to postpone the crisis in the energy sector.

- When all plots of land are used rationally, livestock is always provided with food. New jobs will appear, minimizing the problem of unemployment; human labor will be needed throughout the year.

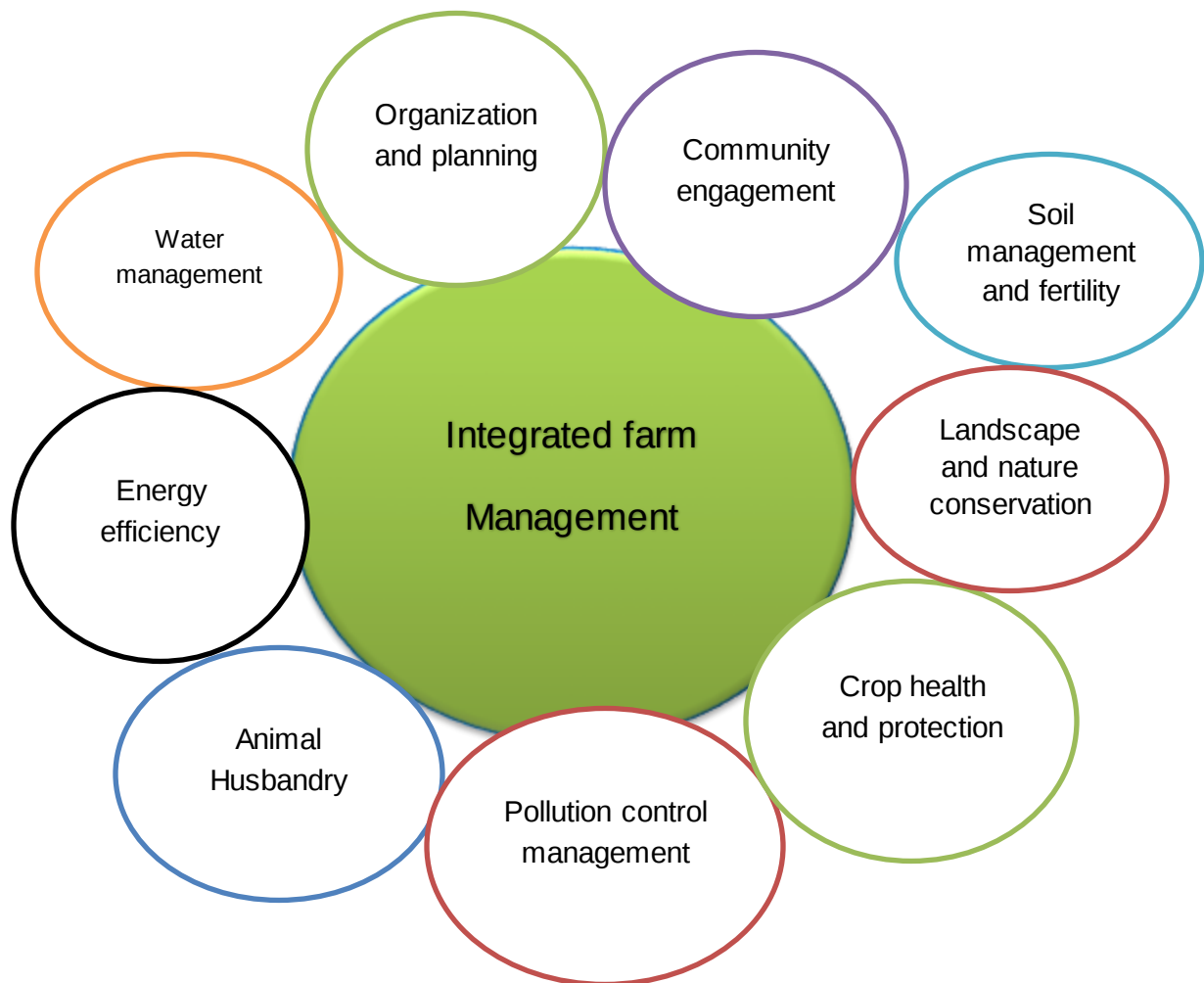


Figure 7. Integrated farm management system



Advantage of small scale farming

Farming systems can be roughly divided into on the one hand large scale, highly mechanized and energy intensive systems managed as corporate agri-businesses and on the other hand small-scale farms, which employ family labour and use limited external inputs. In the small systems, a closer integration of the different components, recycling and optimized use of local resources can enhance productivity. This approach aims to imitate the functioning of natural ecosystems, which are sustainable, primarily because the inputs are provided by nature. Intensive subsistence farming is the growing of crops and rearing of animals on small scale for subsistence purpose for example growing cereal crops like cassava and beans for domestic consumption.

- Source of employment opportunities leading to high standard of living development of infrastructure that is rural feeder roads
- Source of government revenue through taxation
- Use of family labour which is cheap
- Use of small piece of land
- Leads to promotion of economic diversification reducing the problem of over depending on economic sector
- It need low capital and low skills to manage
- Provide market for industrial products e.g fertilizers, pesticides and hoes environmental protection by providing habitats for plant and animal species
- Development of tourism sector for example rice growing in India and china
- Source of food for the farmers families
- It can lead to development of agro based industries like maize milling plants and dairy industries
- Source of foreign exchange through export of crops like coffee and cotton

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Self-Check 2– Written Test

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Write true if the statement is correct/False if it is incorrect for the following questions (5 point each).

1. Modern farmers are trying to minimize costs and achieve maximum results.
2. The main principle of integrated farming system is to reduce pollution and increase income by combining different types of farming.

Test II. Choose the best answer for the following questions (5 point).

1. Which one is the advantage of integrated farming system?
 - A. Soil remains fertile for a long time due to the correct use of organic waste.
 - B. Integrated farming system ensures influx of income.
 - C. The amount of waste is minimized
 - D. All of the above

Test III. Short Answer Questions (10 point)

1. Discuss the advantage of small scale farming.

Note: Satisfactory rating 12.5 points Unsatisfactory - below 12.5 points

You can ask your teacher for the copy of correct answers



Information Sheet 3. Integrating community indigenous knowledge in transfer of new technology

3.1 Introduction

More and more communities and organizations around the world are realizing the value and significance of Indigenous knowledge and the importance of preserving it for future generations. The capture and preservation of Indigenous knowledge is being used to revitalize endangered cultures, improve the economic independence and sustainability of Indigenous communities and to increase community-based involvement in planning and development. In parallel with the increasing recognition of the value and relevance of Indigenous knowledge to today's world and the need to preserve it, is recognition of the role that information technologies (IT) can play in its capture, management and dissemination.

3.2 Indigenous Knowledge Capture

Indigenous knowledge, also referred to as traditional or local knowledge, refers to the large body of knowledge and skills that has been developed outside the formal educational system. IK is embedded in culture and is unique to a given location or society. It is the basis for decision-making of communities in food, security, human and animal health, education and natural resource management.

Indigenous knowledge encompasses many forms. It includes cultural heritage in the form of traditional stories, songs, dances and ceremonies that reflect beliefs related to spirituality, family, land and social justice. It includes potentially patentable knowledge about traditional medicines, foods, farm practices, architecture and construction, handicrafts, artwork and folk music. It includes knowledge about people, places, plants, animals, and historical events associated with a particular community.

Digital Libraries of Traditional Medicine A number of countries are using information technologies to develop digital libraries of traditional knowledge both to use the knowledge in current community projects and also to prevent misappropriation of the

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knowledge through commercial patents. It will provide a uniform system for organizing, disseminating and retrieving traditional knowledge seamlessly across regions or countries. Accessible via the internet, the library will initially contain information on traditional medicine including:

- Materials used for treatment, eg plants, animal products, minerals
- Their generic or specific method of preparations or designs
- Their dosage, mode and time of administration, and
- Their therapeutic action or application.

Local knowledge bases

Many Indigenous communities are developing local Indigenous Knowledge Bases either informally or within Indigenous Knowledge and Cultural Centers (IKCs) established specifically for this task. The digital content being assembled and presented within these IKCs is either captured locally, donated or repatriated from external private and public collections belonging to museums, church archives, community members, anthropologists, missionaries, and others. Determining the optimum software solutions to support such knowledge bases requires an analysis of the communities' needs and objectives.

The IKM software system

The IKM (Indigenous Knowledge Management) system was designed as a low cost, simple robust system to enable Indigenous communities to manage their own digital collections within local Indigenous knowledge bases.

3.3 Indigenous animal husbandry practices

Traditional livestock husbandry is of great socio-economic importance for farmers and pastoral populations. Indigenous knowledge is characterized as the sum of experience and knowledge for a given ethnic group, which forms the basis for decision making in regard to familiar and unfamiliar problems and challenges. It can play key role in designing of sustainable farming systems including animal husbandry practices thereby

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increasing the livelihood that rural populations would accept, develop and maintain innovations and interventions.

For ages, human beings, in particular, the resource poor farmers and marginal societies around the world, have been utilizing locally available plant resources for formulating a wide range of plant based herbal medicines for treating animal diseases as an economical, accessible, efficacious and ecologically sustainable means to animal health care practices. It is hardly surprising that due to these reasons, the domain of traditional veterinary knowledge has attracted a considerable amount of interest amongst scientific community, extension workers and development agencies in recent times.

In case of traditional societies, the local indigenous individual is the major actor. In many cases, the indigenous communities are not well aware of the value of their indigenous knowledge which has been passing from generation after generation. Actors such as scientific institutions and NGOs could play crucial role in this regards for capacity building among the indigenous community and popularization of traditional methods and techniques. In today's context, there is an urgent need to evaluate and popularize indigenous innovation. Government schemes and Research and Development activities should reach the indigenous users and scientific rationale behind these indigenous technologies should be studied for patenting the same.

Indigenous Knowledge in Veterinary medicine

The application of indigenous knowledge to treat animal diseases is also known as **ethno-veterinary medicine**, defined as an indigenous animal healthcare system that includes the traditional beliefs, knowledge, skills, methods and practices of a given society. The study of traditional Ethiopian cures is of major importance. Such treatment is culturally preferred by large sections of the population. Thus its development on modern scientific lines is desirable to:

- Understand Ethiopian medical history;
- Seek useful cures;
- Foster national dignity and self-reliance;

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- Develop local initiative and industry generating rural wealth; and
- Provide access to medicines accepted by the rural communities.

The Afar people are one of the major ethnic groups raising camels in Ethiopia. The paper discusses Afar camel herders ethnoveterinary practices limited to gastrointestinal diseases that plague camels: diarrhoea, constipation and bloat. Livestock keepers have well-established traditional veterinary practices often neglected and considered 'primitive'. In parts where conventional veterinary practices are limited, the traditional healers are consulted. A survey in central Ethiopia, where conventional animal health is relatively better, indicated that 41% of the farmers have frequently utilized traditional veterinary medicine. A Chinese veterinary team from Bahir Dar regional veterinary laboratory between 1974 and 1976 reported 22 kinds of traditional preparation used to treat 33,384 animals. The report also indicated the effectiveness of **metere** (*Glinus lotoides*) against *Moniezia*, sheep tapeworm. The effectiveness of **pumpkin seeds** against sheep tapeworm (*Moniezia expansa*). In recent years, ethnoveterinary medicine research is well recognized among different institutions such as the Faculty of Veterinary Science in Bishoftu, the National Animal Health Research in Sebeta and the Biodiversity Institute.



Self-Check 3– Written Test

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Write true if the statement is correct/False if it is incorrect for the following questions (6 point each).

1. The capture and preservation of Indigenous knowledge is being used to revitalize endangered cultures, improve the economic independence and sustainability of Indigenous communities.
2. IK is embedded in culture and is unique to a given location or society.

Test II. Choose the best answer for the following questions (6 point).

1. The IK library initially contain information on traditional medicine including:
 - A. Materials used for treatment, eg plants, animal products, minerals
 - B. Their generic or specific method of preparations or designs
 - C. Their dosage, mode and time of administration, and
 - D. Their therapeutic action or application.
 - E. All of the above

Test III. Short Answer Questions (10 point)

1. Write the methods of preserving indegiounous knowdlege.

Note: Satisfactory rating 14 points Unsatisfactory - below 14 points

You can ask your teacher for the copy of correct answers



Information Sheet 4. Delivering information on adding value chain to livestock and livestock product

4.1 Definition of terms

“Value added” means adding value to a raw product by taking it to, at least, the next stage of production. This can be as simple as retaining ownership of calves and wintering them on wheat pasture or placing them in a feedlot. Value can be added through membership in a cooperative that processes the products, such as a cooperative cotton gin. Or, adding value may be as elaborate as going all the way to the consumer with a “case-ready” food product.

“Customer value” reflects the relationship between the benefits customers receive from and the price they pay for a product. The more benefits relative to the price, the higher the customer value. This does not necessarily mean that greater value results from a low price. The price of a particular product may be high, but if the associated benefits are high as well, the customers perceive value in the product. This interaction creates customer value and, thus, the opportunity to add value to your product. Creating customer value is critical in building a profitable and substantial business. However, one must bear in mind that it is the customers’ perception of value, not the producers’, that is critical. Consider the case of pre-conditioning calves. Does the cattle buyer perceive the pre-conditioning program as adding value? That is, will the buyer pay more for preconditioned calves (enough to cover the added costs) than for other calves.

An animal product: is any material derived from the body of an animal. Examples are fat, flesh, blood, milk, eggs, and lesser known products, such as isinglass and rennet.

Animal by-products: Animal by-products (ABPs) are defined as entire bodies or parts of animals, products of animal origin or other products obtained from animals which are not intended for human consumption. Animal by-products are a potential source of risks to public and animal health.

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Creates added Value

Value-added agriculture generates several billion dollars in economic impact for the state of Texas each year. In fact, the economic impact of adding value beyond the farm gate is usually several times the value of agricultural production at the farm gate alone. Agricultural producers receive a much smaller portion of the consumer's dollar than do food processors, especially those who produce brand name items for “commodity” products, such as beef, the farm-to-retail price spread indicates that those further up the supply chain earn much more than producers at the ranch or farm level. This leaflet defines value-added activities, outlines the economic forces that make adding value important, and provides guidelines for starting your own value added business

“**Value**” is usually created by focusing on the benefits associated with the agribusiness product or service that arise from:

- **Quality:** Does the product or service meet or exceed customer expectations?
- **Functionality:** Does the product or service provide the function needed of it?
- **Form:** Is the product in a useful form?
- **Place:** Is the product in the right place?
- **Time:** Is the product in the right place at the right time?
- **Ease of possession:** Is the product easy for the customer to obtain?

Driving Value Added

Agribusiness, particularly the food sector, is rapidly consolidating and increasingly responding to the changing tastes and preferences of consumers. Consumers have higher incomes than ever before. They are focusing more on convenience, quality, variety, service, health, and social consciousness. They are also faced with the increasing value of (and demands on) their time. In a nutshell, consumers are more value conscious than ever. The factors of rising disposable incomes and market fragmentation caused by retail consolidation exacerbate competition, but at the same time leave many niche markets to be exploited and create opportunities for producers to add value to their products.

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Creating a Value-Added Product

To take advantage of value-added opportunities, one must know and understand customers.

- What consumer segments might want your product?
- What are the benefits desired by these potential customers?
- What criteria are they looking for when purchasing?
- Writing these down as part of a business plan is an important first step in beginning a value-added agribusiness.

Steps to Success in Value Added

Building a new business is difficult and takes hard work (nothing new for farmers and ranchers). But, for all the uncertainty, there are ways to craft a successful value-added business strategy. The key factors in a detailed business plan are:

- **Operations plan:** flow of the business, quality and cost control
- **Personnel plan:** needs, skills and training
- **Sales plan:** including challenging but realistic goals
- **Management plan:** evaluate strengths, weaknesses and resources
- **Investment and financial plan:** cash flow planning

Advantages of value-added processed livestock products

It prevents the risk of spoilage of raw produce and can be stored at room temperature for prolonged period of time

- Can provide a variety of convenient, ready to prepare and ready to eat products which can satisfy the need of the present-day consumers at reasonable price.
- Provides opportunities for better utilization of different by-products.
- During period of excess production versus reduced selling of fresh perishable livestock produce like meat, milk and egg, the same can be processed for value addition to less perishable products, store them, and sell them later in greater quantities.

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- Processed livestock products can be sold at markets present at a greater distance.
- Contribute to efficient marketing of milk, meat and egg
- Promotes employment and entrepreneurship development
- Enhances the export potential and can compete with imports.
- Provides sufficient return to the farmers.

Development of a value-added product depends mainly on three major inputs –

- Technical knowledge about the development of the product.
- Market demand of the product.
- Economics of the preparation of the product.

Besides these the farmer should follow the **four “P” concept** i.e. **product, place, price** and **promotion** to become successful in getting sufficient profit by selling the value-added products. Before deciding to prepare any value-added product, the farmer has to survey the market where he is going to sell his produce. He should collect the information about the consumers for his product, their purchasing capacity, the demand for the products, their literacy status, the existing sellers of the proposed production that area etc. Accordingly, the farmer has to decide the type of product to be prepared by him.

Value addition to milk

Dairy farmers can produce a wide variety of processed milk products to add value to their raw milk. They can process the raw milk to prepare the following items. These include:

- They can ferment the milk to produce curd.
- Milk fat can be separated from other milk solids to produce skim milk, butter and ghee.
- Milk can be fermented to produce cheese with whey as a byproduct.
- Whey can be used to prepare whey drink.
- Milk can be pasteurized which has a great demand by the consumers rather than fresh and raw milk.

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- Flavored milk can be prepared.
- Milk can be processed to prepare khoa, chhana, paneer, ice cream, lassi etc.

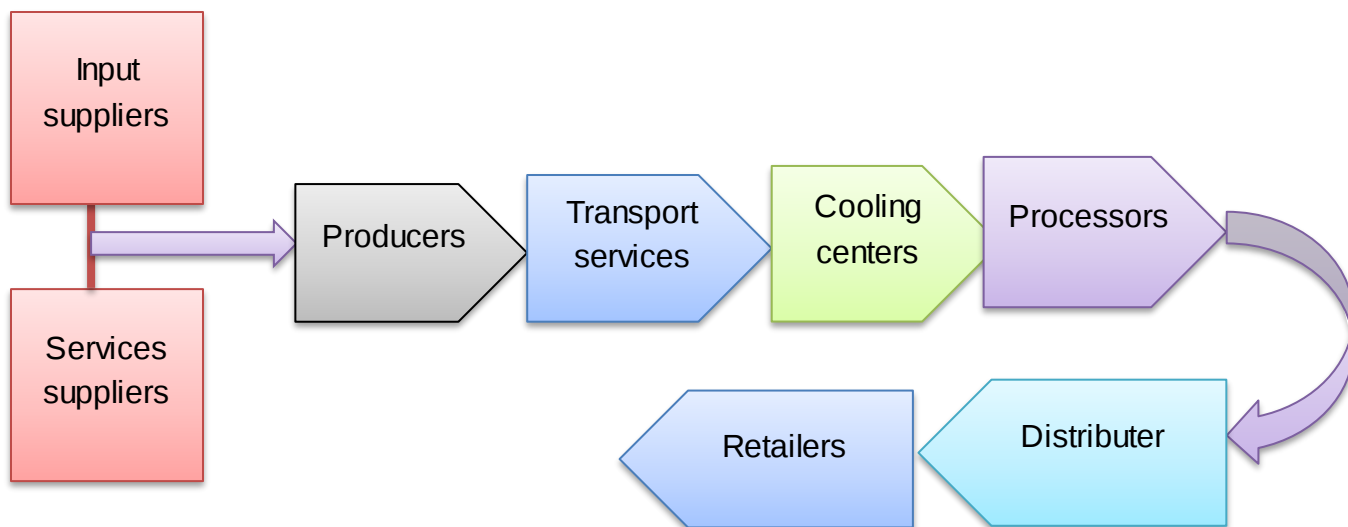


Figure 8.The Dairy Value Chain

Value addition to meat

In different developed countries, nearly 60% of the meat is processed for value addition and capturing the export market while in India, it is around 2% only which signifies a great scope for this sector in our country.

The purpose of value addition in meat are as follows:

- To provide a variety of consumer-based meat products in market
- To sustain increased demand from consumers in market meeting lifestyle requirement
- To efficiently use animal carcasses with proper and economic utilization of different by-products
- To combined and complement different meats with advantage
- To incorporate several ingredients of non-meat origin for enhancing quality and economy
- To facilitate export of quality meat products and compete with imports



- To promote various start-up entrepreneurship ventures and employment.

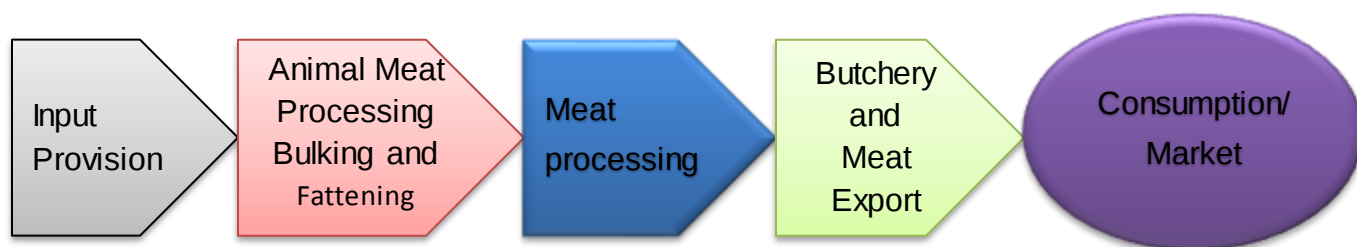


Figure 8. Value chain of meat



Self-Check 4 – Written Test

Name _____ ID _____ Date _____

Directions: Answer all the questions listed below. Examples may be necessary to aid some explanations/answers.

Test I. Write true if the statement is correct/False if it is incorrect for the following questions (5 point each).

1. Value added means adding value to a raw product by taking it to, at least, the next
2. stage of production.
3. Value is usually created by focusing on the benefits associated with the agribusiness product or service

Test II. Choose the best answer for the following questions (5 point).

1. Value is usually created by focusing on the benefits associated with the agribusiness product or service that arise from:
 - A. Quality
 - B. Functionality
 - C. Form
 - D. Place
 - E. All of the above

Test III. Short Answer Questions (10 point)

1. Discuss briefly the advantages of value-added processed livestock products.

Note: Satisfactory rating 12.5 points Unsatisfactory - below 12.5 points

You can ask your teacher for the copy of correct answers



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