Dairy production

NTQF Level -II

Learning Guide 43

Unit of Competence: Assist dairy animal breeding procedure

Module Title: Assisting dairy animal breeding procedure

LG Code: AGR APR2 M12 L01 LG 43
TTLM Code: AGR APR2 TTLM 0919v1

LO 1: Assess breeding requirement

Instruction Sheet	Learning Guide 43

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

- Assessing and clarifying breeding requirements of dairy animals
- Resources to support breeding requirements of dairy animals are identified and arranged.
- Selecting breeding options to optimize results and consistency.
- Determining particular dairy animal mating plan /artificial breeding/.
- Formulating breeding program.

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

Specifically, upon completion of this Learning Guide, you will be able to –

- Assess and clarify breeding requirements of dairy animals
- Identify and arrange resources to support breeding requirements of dairy animals
- Select breeding options to optimize results and consistency.
- Determine particular dairy animal mating plan /artificial breeding/.
- Formulate breeding program.

Learning Instructions:

1. Read the specific objectives of this Learning Guide 43.
2. Follow the instructions described in number 1 to 5.
3. Read the information written in the “Information Sheet (**1, 2,3,4 and 5**) in page **2,5,7,12 and 15** respectively
4. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
5. Accomplish the **“Self-check 1, Self-check 2, Self-check 3” Self-check 4 and Self-check 5”** in page**, 4, 6,10,12 and 16** respectively.

Information sheet-1	Assessing and clarifying breeding requirements of dairy animals

Breeding is sexual reproduction that produces offspring, usually animals or plants. It occurs between male and female animals and plants.

Animal breeding involves the selective breeding of domestic animals with the intention to improve desirable (and heritable) qualities in the next generation.

Breeding contribute half of the performances gains in dairy herds. Genetic gain from good breeding decision is cumulative and permanent. Introduction of superior genetic material in to a herd will remain several generations and can be built up on.

Breeding requirement includes

- Infrastructures like road, electricity and telephone
- Accessibility of feed and water for breeding animals
- Records / a documents that hold information of breeding animals/
    - Breeding records would be certified record of a pedigree of animal, itself, parents , grand parts and great grand parents
    - It measure production ability of the animals and the farm
    - Indicator of fertility efficiency etc
- Breeding animals (male and female) or herd or flock
- Farmstead structure like different types of house, feed store, clinic and drug store, water tank, dipping path and etc…

In developing countries animal can be kept for multiple purpose

- To produce food
- Labor (traction power)
- Warmth
- For their hide and skin/wool
- Manure for fertilizing soil and fuel
- Wealth

Breeding is the most important for improvements of

- Production performance of animal's e.g. production milk, meat and wool
- Reproduction performances e.g. improve fertility,
- Increasing disease resistant ability
- Adaptability

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Define breeding (5 points)
2. Write the 4 important points of breeding (5 points)

Note: **Satisfactory rating - 10points** **Unsatisfactory - below 10 points**
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date: _____

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Information sheet-2	**Resources to support breeding requirements of dairy animals are identified and arranged**

Important resources used for breeding dairy animals are

- PPE: - Personal protective clothes and equipment May include but not limited to:
  - Boots
  - Overalls
  - Gloves
  - Sun protection (sun hat, sunscreen)

- Artificial insemination materials, tools and equipments gloves
  - insemination gun, semen straw, AI sheath and AI bag
  - liquid nitrogen containers ,thermos flask, scissors and canister
  - towel or tissue paper and forceps

- Dairy animals handling materials and equipment
  - Rope
  - Bull nose ring
  - Cattle crush
  - House
- Records
  - Production record it show production (milk, meat and wool) potential of individual animals.
  - Reproduction record: - reproduction performances of animals.
  - Health record: - show health status of animal in the farm.

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Mention four dairy animals handling materials and equipment (4 points)
2. Mention PPE (6 points)

Note: **Satisfactory rating - 10points** **Unsatisfactory - below 10 points**
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date _____

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Information sheet-3	**Selecting breeding options to optimize results and consistency**

Before selection of breeding option of dairy animal, knowing what means breed is the most important.

Breed refers to group animals within the same species which have a certain characteristics in common which make the individual of breed. They are

- Local /indigenous/ breed
- Exotic breed
- Cross breed

Local /indigenous/ breed is a native breed adapted the soil and climate conditions and sanitary environment of its own defined geographical area. Like Borena breed Arsi bale, shako breed and fogera breeds.

- They tolerate harsh environment condition
- Resistant for shortage of feed and water
- They have good disease resistant ability
- Their products have a good quality and more preferable
- Have small body size low in productive compared with exotic and cross breed

Exotic breeds are a breed they originated from Europe. E.g.Holstein Frisian and jersey.

- They have high production and reproduction potentials.
- They have large body size
- They are temperate breed
- Tropical environment affect their production and reproduction potentials.

Cross breed are breed crosses of two different breeds. E.g. local crossed with exotic breed. They have hybrid vigor

Common Breed system

The different pairing methods of the selected animals for improved performances are called breeding or mating systems.

- Puree breeding: - breeding activity that involves mating the same breeds. E.g. jersey cow mate with jersey bull. The outstanding advantage of pure breeding is for production bulls for breeding purpose.
- Out breeding is the mating of unrelated individual within the same breed.
- Cross breeding: - the mating of individual of two or more different breeds. E.g. mating of indigenous/local/ with exotic breed. The incentive for cross breed is the exploitation hybrid vigor or heterosis as a result of which performances of cross breed exceed the average of the parents. Cross breed important for genetic improvement, increased size, growth rate and fertility of the offspring.
- In breeding: - is mating of closely blood related animals. E.g. son mate with dam and daughter mate with sire. It decreases productivity and reproductive performance of animals. in breeding is used to concentrate desirable traits
- Line breeding:- this is a milder form of inbreeding in which the relationship of an individual is kept closes to some admired

There are two types of mating/ breeding

1. Natural mating:-
    - Use of bull
    - It is the most efficient in small herd but not in large herd

Advantage of natural mating/ breeding

- Conception is the most successful
- No need for heat spotting

Disadvantage of natural mating / breeding

- Not efficient in large herd
- Spread of disease

- ☞ High chance of dystocia
- ☞ May promote in breed

2. Artificial mating/ artificial insemination

AI is introduction of male reproductive cell/semen/ in to the female reproductive tract by artificial means.

Advantage of AI

- ➢ Decreases chances of injury/ the mating different size of animals without difficulty
- ➢ Evaluated semen can be used
- ➢ Semen can be collected from bull with problems like injury
- ➢ It helps to prevent the spread of contagious diseases ot genital organ
- ➢ Enhance the rate of conception
- ➢ The semen of elite bull can be used even after the death of sire

Disadvantage of AI

- ➢ Specialized equipment needed
- ➢ Technical expertise is needed
- ➢ In correctly practiced AI can cause problem

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. List down two type of mating? (2 pts)
2. Write the common breeding system (5pts.)

Note: **Satisfactory rating – 7 points** **Unsatisfactory - below 7points**
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date _____

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Information sheet-4	**Determining particular dairy animal mating plan /artificial breeding/**

Mating plan includes the required number of bulls, service interval, service length and replacement rate, heat detection skills, times of service, system of breeding to be used and mating record keeping. The size of the herd, amount of money available, and goals of the farmer are other factors considered when selecting a system of breeding.

4.1 Determining Mating ratio

4.1.1 Mating ratio for sires to dams

Under traditional method, in which dairy bulls run with the cows in one herd**,** 30-40 cows per bull is recommended. In temperate climates dual purpose bull serves on average 12 times a day over a period of several weeks. For hand mating system in which a bull is kept separated from the cows and mating is done at owner's discretion, a bull-cow ratio of 1: 50-60 is recommended. In case of beef cattle, the bull can mate with 25 estrus synchronized cows or 35t o 40 non –synchronized cows .under range condition, many ranchers use four bulls per 100cows.

4.1.2 Rams/bucks to ewes/does ratio

Maintaining the correct ratio of fertile rams/bucks and ewes/does (one ram/buck to 20–25 ewes/does or 3 per 100 ewes/does in a year-round mating) is important as it can affect the overall reproductive efficiency. The age of the breeding ram/buck, the length of the mating season and the environment in which the animals are kept may influence the ratio.

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. List out the Rams/bucks to ewes/does ratio (4 points)

Note: **Satisfactory rating - 4points** **Unsatisfactory - below 4 points**
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date _____

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Information sheet-5	**Formulating breeding program.**

A breeding program is the planned breeding of a group of animals, usually involving at least several individuals and extending over several generations. It can be commonly employed in several fields where human wish to change the characteristics of their animals' offspring trough careful selection of breeding partners.

The challenge to increase food production in developing countries lies in efficient exploitation of genetic diversity among and within breeds of different species. The most productive and adaptive animals for each environment must be identified for breeding purpose. Many breeding programs for different species have shown the opportunities increase the output per animal after few decades of selection. For the long term the subsequent breeding activities are carried out in a breeding

Program illustrated in the scheme below:

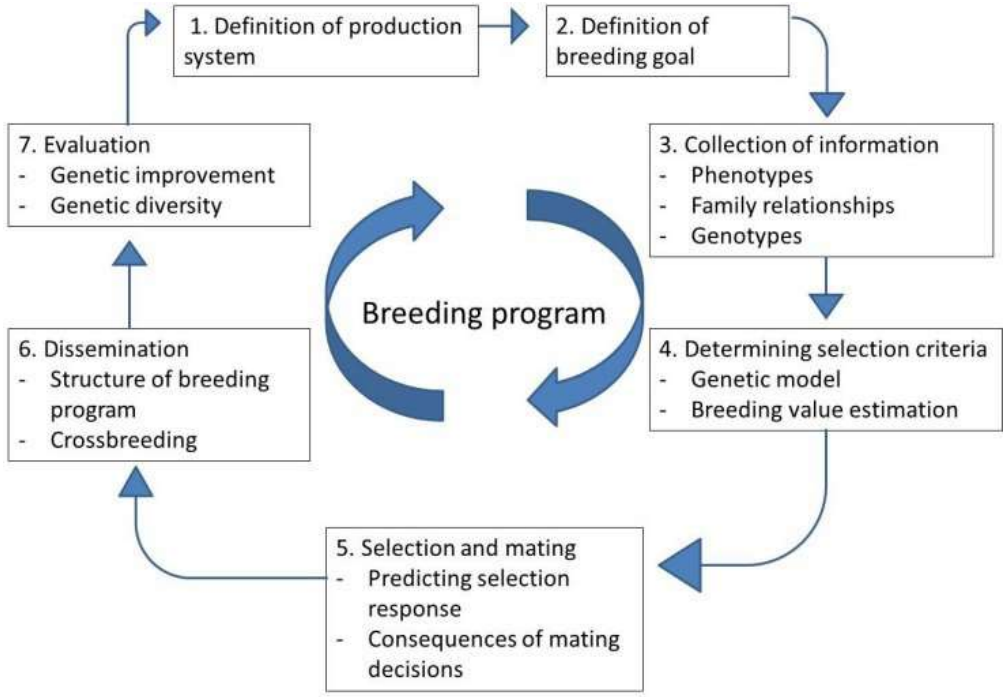

Fig: 1 breeding program illustration

Production system

Production system can be describe the following points

- The way we keep the animals like intensive, extensive or semi intensive production system
- For which purpose we made breeding program like milk, meat or wool
- What is relevant in this respect? Important resources availability.

Breeding goal

Breeding goals are defined improvements in traits of production, product quality, health and welfare traits, conformation traits, sport performance; fertility etc. breeding is only effective when a breeding goal is consequently maintained for many generations.
It can be answers

- Which traits should be improved in the next generations?
- What will be the goal(s) for breeding

Collection of information

Relevant information should be collected

- like pedigree, parent-offspring relationships records
- individual performance records
- Fertility and litter traits record

Breeding value estimation and selection criteria

The choice has to be made which animals will indeed be selected as parents and which animals are excluded for reproduction. Based on a genetic model, a statistical model including pedigree Information, a breeding value for a trait is estimated.

Selection and mating

The parents with a higher than average estimated breeding value will improve the breeding goal traits in the next generation. For example a group of dairy sires with the highest breeding value for milk yield is selected as sires for the next generations.

Dissemination of genetic gain

In cattle breeding artificial reproduction techniques, in particular artificial insemination techniques, give the opportunity to produce high numbers of offspring, disseminating the genes of the superior animals widely. Selection of a small number of animals may have a large impact on the traits of a population.

Evaluation of results

It can be answers

- Did we reach what we wanted?
- Is the new generation of animals better with respect to the breeding goal traits?
- Do we observe unwanted effects of selection?
- What has happened with the relatedness among the animals of the new generation?
- Are they more related to each other than their parents,
- Did we decrease the genetic diversity of the population?
- Do market requirements change, e.g. for pork of a different quality?
- Do production circumstances change, e.g. are milk production quota for dairy farms expected to be abolished in the next future?

Self-Check -5	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

3. Define breeding program (3points)
4. Define the breeding goal (3 points)

Note: **Satisfactory rating - 6points** **Unsatisfactory - below 6 points**
You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

Name: _____ Date _____

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