



Food and Agriculture  
Organization of the  
United Nations

# SHEEP FARMER FIELD SCHOOLS: **A FACILITATORS' GUIDE**

Development and application of sustainable sheep  
production and food value chains

UTF/AZE/009/AZE

With the technical and financial support of



Ministry of Agriculture  
of the Republic of  
Azerbaijan

© Unsplash



# **SHEEP FARMER FIELD SCHOOLS A FACILITATORS' GUIDE**

Development and application of sustainable sheep  
production and food value chains

UTF/AZE/009/AZE

**Jurjen Draaijer**  
**Livestock and Dairy Consultant**  
**Johannesburg, South Africa**

# Disclaimer

Required citation:

FAO. 2022. *Sheep farmer field schools – A facilitators' guide. Development and application of sustainable sheep production and food value chains – UTF/AZE/009/AZE*. Baku. <https://doi.org/10.4060/cb7424en>

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the author(s) and do not necessarily reflect the views or policies of FAO.

ISBN 978-92-5-135231-1

© FAO, 2022



Some rights reserved. This work is made available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo/legalcode>).

Under the terms of this licence, this work may be copied, redistributed and adapted for non-commercial purposes, provided that the work is appropriately cited. In any use of this work, there should be no suggestion that FAO endorses any specific organization, products or services. The use of the FAO logo is not permitted. If the work is adapted, then it must be licensed under the same or equivalent Creative Commons licence. If a translation of this work is created, it must include the following disclaimer along with the required citation: "This translation was not created by the Food and Agriculture Organization of the United Nations (FAO). FAO is not responsible for the content or accuracy of this translation. The original English edition shall be the authoritative edition."

Disputes arising under the licence that cannot be settled amicably will be resolved by mediation and arbitration as described in Article 8 of the licence except as otherwise provided herein. The applicable mediation rules will be the mediation rules of the World Intellectual Property Organization <http://www.wipo.int/amc/en/mediation/rules> and any arbitration will be conducted in accordance with the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL).

**Third-party materials.** Users wishing to reuse material from this work that is attributed to a third party, such as tables, figures or images, are responsible for determining whether permission is needed for that reuse and for obtaining permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

**Sales, rights and licensing.** FAO information products are available on the FAO website ([www.fao.org/publications](http://www.fao.org/publications)) and can be purchased through [publications-sales@fao.org](mailto:publications-sales@fao.org). Requests for commercial use should be submitted via: [www.fao.org/contact-us/licence-request](http://www.fao.org/contact-us/licence-request). Queries regarding rights and licensing should be submitted to: [copyright@fao.org](mailto:copyright@fao.org).

Cover photograph: ©Unsplash

# Contents

|   |             |
|---|-------------|
| <b>Abbreviations and acronyms</b> .....                                   | <b>vii</b>  |
| <b>Acknowledgements</b> .....   | <b>viii</b> |
| <b>Chapter 1: Background</b> .....  | <b>1</b>    |
| 1.1 Introduction .....  | 1           |
| 1.2 Introduction to this guide .....                                      | 2           |
| <b>Chapter 2: Design of FFS programs</b> .....                            | <b>3</b>    |
| 2.1 Introduction .....  | 3           |
| 2.2 Steps in FFS implementation .....                                     | 4           |
| 2.3 AESA .....  | 8           |
| <b>Chapter 3: Special topics</b> .....                                    | <b>10</b>   |
| 3.1 Introduction .....  | 10          |
| 3.2 General sheep husbandry .....   | 11          |
| 3.2.1 Activity SP1: Discussion topics .....                               | 11          |
| 3.2.2 Activity SP2: Practical session – General sheep signals .....       | 12          |
| 3.2.3 Activity SP3: Practical session – Herding and flight distance ..... | 13          |
| 3.2.4 Activity SP4: Discussion - Introduction to climate change .....     | 14          |
| 3.3 Animal identification and Record keeping .....                        | 15          |
| 3.3.1 Activity ID1: Animal identification .....                           | 15          |
| 3.3.2 Activity ID2: Record keeping .....                                  | 16          |
| 3.4 Feed and water .....  | 17          |
| 3.4.1 Activity FW1: Discussion topics .....                               | 17          |
| 3.4.2 Activity FW2: practical session - Body condition scoring .....      | 18          |
| 3.4.3 Activity FW3: practical session - Dung signals .....                | 19          |
| 3.5 Pasture and grazing management .....                                  | 20          |
| 3.5.1 Activity PG1: Discussion topics .....                               | 20          |
| 3.5.2 Activity PG2: Haymaking .....                                       | 22          |
| 3.5.3 Activity PG3: Silage making .....                                   | 23          |
| 3.6 Sheep breeding .....  | 23          |
| 3.6.1 Activity SB1: Discussion topics .....                               | 23          |
| 3.6.2 Activity SB2: Breeding planning .....                               | 25          |
| 3.6.3 Activity SB3: Practical session - Castration .....                  | 26          |
| 3.6.4 Activity SB4: Practical session - Lambing .....                     | 26          |
| 3.7 Animal health .....   | 27          |
| 3.7.1 Activity AH1: Discussion topics .....                               | 27          |
| 3.7.2 Activity AH2: Practical session - Drenching .....                   | 29          |
| 3.7.3 Activity AH3: Practical session - FAMACHA .....                     | 30          |
| 3.8 Marketing and business skills .....                                   | 31          |
| 3.8.1 Activity MB1: Market dynamics .....                                 | 31          |
| 3.8.2 Activity MB2: Cost–benefit analysis .....                           | 31          |
| 3.9 Additional topics .....   | 33          |
| <b>Chapter 4: FFS comparative experiments</b> .....                       | <b>34</b>   |
| 4.1 Introduction .....  | 34          |
| 4.2 General steps in designing experiments .....                          | 34          |
| 4.3 Examples of experiments .....   | 36          |
| 4.3.1 Experiment FW-E1: feeding concentrates .....                        | 36          |
| 4.3.2 Experiment FW-E2: Minerals and vitamins .....                       | 37          |
| 4.3.3 Experiment PG-E1: Electric fencing – rotational grazing .....       | 38          |
| 4.3.4 Experiment PG-E2: Fodder production .....                           | 39          |

|                                       |  |           |
|---------------------------------------|--|-----------|
| 4.3.5                                 | Experiment AH-E1: Drenching                      | 40        |
| 4.3.6                                 | Experiment AH-E2: Comparing vaccination practice | 41        |
| <b>Chapter 5: Participatory tools</b> |  | <b>42</b> |
| 5.1                                   | Introduction                                     | 42        |
| 5.2                                   | Exercises for group dynamics                     | 42        |
| 5.2.1                                 | Introduction                                     | 42        |
| 5.2.2                                 | Clapping   | 43        |
| 5.2.3                                 | Say "Sheep"                                      | 43        |
| 5.2.4                                 | Fruit and animals                                | 43        |
| 5.2.5                                 | Knotty problem                                   | 44        |
| 5.3                                   | Oral methods                                     | 44        |
| 5.3.1                                 | Semi-structured interviews                       | 44        |
| 5.3.2                                 | Focused group discussions                        | 45        |
| 5.3.3                                 | Change or success stories                        | 45        |
| 5.3.4                                 | Transect walks                                   | 45        |
| 5.4                                   | Visual methods                                   | 45        |
| 5.4.1                                 | Seasonal calendar                                | 45        |
| 5.5                                   | Ranking and scoring                              | 46        |
| 5.5.1                                 | Pair-wise ranking                                | 46        |
| 5.5.2                                 | Matrix scoring                                   | 47        |
| 5.5.3                                 | Group assessment checklist                       | 48        |
| 5.5.4                                 | SWOT analysis                                    | 49        |
| <b>References</b>                     |  | <b>50</b> |
| <b>Glossary</b>                       |  | <b>52</b> |
| Annex 1:                              | Handout SP1: Sheep signals                       | 54        |
| Annex 2:                              | Handout SP2: General Sheep Parameters            | 56        |
| Annex 3:                              | Handout SP3: Herding and Flight Distance         | 58        |
| Annex 4:                              | Handout SP4: Body Condition Scoring              | 59        |
| Annex 5:                              | Handout SP5: Righting a cast sheep               | 60        |
| Annex 6:                              | Handout SP5: Climate-Smart Sheep Production      | 61        |
| Annex 7:                              | Handout ID1: Animal identification               | 63        |
| Annex 8:                              | Handout ID2: Record keeping                      | 65        |
| Annex 9:                              | Handout FW1: Nutrient requirements               | 67        |
| Annex 10:                             | Handout FW2: Minerals and Vitamins               | 69        |
| Annex 11:                             | Handout FW3: Dung Signals                        | 70        |
| Annex 12:                             | Handout PG1: Grazing strategies                  | 71        |
| Annex 13:                             | Handout PG2: Electric fencing                    | 73        |
| Annex 14:                             | Handout FW1: Haymaking                           | 75        |
| Annex 15:                             | Handout FW2: Silage making                       | 76        |
| Annex 16:                             | Handout SB1: Overview of sheep breeds            | 77        |
| Annex 17:                             | Handout SB1: Sheep breeding                      | 79        |
| Annex 18:                             | Handout SB2: Gestation table                     | 82        |
| Annex 19:                             | Handout SB3: Castration                          | 83        |
| Annex 20:                             | Handout SB4: Lambing                             | 84        |
| Annex 21:                             | Handout AH1: Overview of common sheep diseases   | 87        |
| Annex 22:                             | Handout AH2: Internal parasites                  | 90        |
| Annex 23:                             | Handout AH3: The FAMACHA method                  | 92        |
| Annex 24:                             | Handout MB1: Marketing                           | 94        |
| Annex 25:                             | Handout MB2: Sheep farming as a business         | 96        |
| Annex 26:                             | Example of an FFS implementation cycle           | 99        |
| Annex 27:                             | Example of a group assessment checklist          | 100       |

# Figures

|                  |  |    |
|------------------|--|----|
| <b>Figure 1</b>  | Project target districts.....                                      | 1  |
| <b>Figure 2</b>  | Typical Farmer Field Schools (FFS) session.....                    | 7  |
| <b>Figure 3</b>  | Illustration of AESA format.....                                   | 9  |
| <b>Figure 4</b>  | Supplementary feeding: example of a stepwise trial.....            | 35 |
| <b>Figure 5</b>  | Single treatment experiment on deworming.....                      | 41 |
| <b>Figure 6</b>  | Pairwise ranking - illustration.....                               | 47 |
| <b>Figure 7</b>  | Illustration of matrix scoring.....                                | 48 |
| <b>Figure 8</b>  | Example of a SWOT analysis.....                                    | 49 |
| <b>Figure 9</b>  | Determining the age of sheep by their teeth.....                   | 57 |
| <b>Figure 10</b> | Point of balance for herding sheep.....                            | 58 |
| <b>Figure 11</b> | Herding sheep – zigzagging.....                                    | 58 |
| <b>Figure 12</b> | Body condition scoring.....  | 59 |
| <b>Figure 13</b> | Condition scores – causes and potential action.....                | 59 |
| <b>Figure 14</b> | A cast sheep.....  | 60 |
| <b>Figure 15</b> | Righting a cast sheep.....   | 60 |
| <b>Figure 16</b> | Correct positioning of ear tags.....                               | 63 |
| <b>Figure 17</b> | Sample basic record sheet.....                                     | 65 |
| <b>Figure 18</b> | Illustration of the different types of feed in the daily diet..... | 68 |
| <b>Figure 19</b> | Tear stains (cobalt deficiency).....                               | 69 |
| <b>Figure 20</b> | Dung signals.....  | 70 |
| <b>Figure 21</b> | Sheep with dags.....   | 70 |
| <b>Figure 22</b> | Grass height suitable for grazing.....                             | 71 |
| <b>Figure 23</b> | Potential grazing strategies.....                                  | 72 |
| <b>Figure 24</b> | Example of a rotational grazing system.....                        | 72 |
| <b>Figure 25</b> | Electric fence - mesh.....   | 73 |
| <b>Figure 26</b> | Electric fence – strand heights.....                               | 73 |
| <b>Figure 27</b> | Electric fence - voltage check.....                                | 73 |
| <b>Figure 28</b> | Selection criteria – ewes.....                                     | 79 |
| <b>Figure 29</b> | Ram with a harness and raddle.....                                 | 80 |
| <b>Figure 30</b> | Breeding calendar.....   | 81 |
| <b>Figure 31</b> | Mating process.....  | 81 |
| <b>Figure 32</b> | Elastrator and Burdizzo.....                                       | 83 |
| <b>Figure 33</b> | Normal lambing process.....  | 85 |
| <b>Figure 34</b> | Elbow lock position.....   | 86 |
| <b>Figure 35</b> | Head back position.....  | 86 |
| <b>Figure 36</b> | Breech positions.....  | 86 |
| <b>Figure 37</b> | Early-stage foot rot – inflammation.....                           | 88 |
| <b>Figure 38</b> | FAMACHA card.....  | 92 |
| <b>Figure 39</b> | FAMACHA card in use.....   | 92 |
| <b>Figure 40</b> | Variable and fixed costs.....                                      | 96 |
| <b>Figure 41</b> | Stock inventory.....   | 97 |

## Abbreviations and Acronyms

|                      |  |
|----------------------|--|
| <b>AESA</b>          | Agro-ecosystem analysis  |
| <b>COP</b>           | Cost of Production   |
| <b>DM</b>            | Dry Matter   |
| <b>F<sub>1</sub></b> | First generation in crossbreeding                                |
| <b>FAMACHA</b>       | FAffa MAlAn CHArt (method to determine anaemia in animal health) |
| <b>FAO</b>           | Food and Agriculture Organization of the United Nations          |
| <b>FAOAZ</b>         | Azerbaijan (FAO)   |
| <b>FFS</b>           | Farmer Field School  |
| <b>FMD</b>           | Foot and Mouth Disease   |
| <b>GDP</b>           | Gross Domestic Product   |
| <b>IM</b>            | Intramuscular  |
| <b>IPM</b>           | Integrated Pest Management                                       |
| <b>KPI</b>           | Key Performance Indicators                                       |
| <b>M&amp;E</b>       | Monitoring and Evaluation  |
| <b>PFS</b>           | Pastoralist Field Schools  |
| <b>PV</b>            | Photo-Voltaic (Solar power)                                      |
| <b>ROA</b>           | Return On Assets   |
| <b>SWOT</b>          | Strengths, Weaknesses, Opportunities and Threats                 |
| <b>ToF</b>           | Training of Facilitators   |
| <b>ToR</b>           | Terms of Reference   |
| <b>ToT</b>           | Training of trainers   |
| <b>UTF</b>           | Unilateral Trust Fund (FAO)                                      |

## Symbols and Units

|            |                      |
|------------|----------------------|
| <b>Bpm</b> | Beats per minute     |
| <b>°C</b>  | Degrees Celsius      |
| <b>Ca</b>  | Calcium              |
| <b>Co</b>  | Cobalt               |
| <b>Cu</b>  | Copper               |
| <b>Ha</b>  | Hectare              |
| <b>kg</b>  | Kilogram             |
| <b>m</b>   | Metre                |
| <b>mm</b>  | Millimetre           |
| <b>P</b>   | Phosphorus           |
| <b>Se</b>  | Selenium             |
| <b>USD</b> | United States Dollar |
| <b>µm</b>  | Microns              |

# Acknowledgements



The full and active support of FAO Azerbaijan and Namig Mammadov, Matanat Gahramanova, and Ulkar Abdullazada is very much appreciated. Thank you to Eran Raizman, Senior Animal Health & Production Officer, FAO Regional Office for Europe and Central Asia, Giacomo de Besi (FAO, NSAG) and Clarisse Ingabire (FAO, NSAG) for their technical support. A special thanks goes to Matanat Gahramanova, Yaqub Ismayilov and Khalil Khalilov.



# Chapter 1: Background

## 1.1 Introduction

This facilitator's guide for sheep-related Farmer Field Schools (FFS) has been developed for the FAQ project UTF/AZE/009/AZE, "Development and application of sustainable sheep production and food value chains", in Azerbaijan. In Azerbaijan, small ruminant production plays an essential role in the livestock sector as it provides income for rural families and contributes to many households' livelihood. Section 12 of this guide provides some background information on the sheep sector in Azerbaijan.

The three-year UTF/AZE/009/AZE project targets three distinct pilot sites (see Figure 1), with different value chains (sheep meat, milk and wool). The project's first objective is the characterization of the value chains and identification of possible constraints and opportunities of the various stakeholders. The second objective is the implementation of good feed and management practices at the farm level. The third objective is supporting farmers through different types of training and other activities. The fourth and final objective is the development of different breeding strategies for local sheep breeds.

A needs assessment informed this facilitator's guide. It was carried out under the project in September 2020 to explore sheep farmers' training needs in marketing, feeding/watering, record keeping, breeding, and animal health. The assessment was done to inform the Farmer Field School (FFS) component within the project on sheep production. This FFS training needs assessment was carried out by interviewing 182 farmers, from villages with a sheep farming tradition.

Figure 1. Project target districts



1 = Beylagan, 2 = Aghjabadi and 3 = Zaqatala district

Source: FAO, 2021

## 1.2 Introduction to this guide

This guide is developed for facilitators of sheep Farmer Field Schools (FFS) for Azerbaijan sheep production systems. A brief overview of the contents of this guide follows below.

**Chapter 2** provides steps in setting up FFS programs. This chapter can be used for project managers as a guide to set up FFS programs. This section also includes details of the Agro Eco-System Analysis (AESAs) process, a vital tool within FFS, often used to assess the results of FFS experiments.

The special topics in **chapter 3** are a guideline for some of the issues that can be discussed within an FFS. Still, facilitators can be flexible, and new topics can be introduced at the request of FFS participants. The section contains discussion topics, which can be done in a classroom setting and practical sessions, which are generally done on the farm, and animals are required during the practical session. However, it is recommended to limit the discussion topics, and to include as many of the practical sessions as possible, as 'learning by doing', is often a better training strategy.

**Chapter 4** contains guidelines on how to set up comparative experiments in the context of sheep FFS and provides some examples of possible experiments. The comparative experiments will have to be adjusted to the local context. It is often recommended to get a professional's assistance in designing the experiments so that the learning by the participants can be optimized. Facilitators are encouraged to design their own experiments together with the FFS. They should be based on the needs and priorities of the FFS participants.

The participatory tools in **chapter 5** can be used throughout the FFS process and will assist in the full participation of all participants.

The handouts in the **annexes** provide technical information related to each topic. It is recommended to give these handouts only after each FFS session, apart from a few activities, where information from the handouts is needed beforehand.

This document borrows heavily from several key publications (see references), including:

- The project's FFS training needs assessment.
- Publications developed under the project on hay and silage making.
- Several FAO publications on FFS and livestock, including the FAO Pastoralist Field Schools ToF manual and the livestock FFS guidelines for facilitation.
- Glorie, 2016: Sheep signals (roodbont.nl).
- Sheep101.info, and
- Several other publications, see Annex I: References.

## Chapter 2: Design of FFS programs

### 2.1 Introduction

The FFS approach was developed in the late 1980s by FAO in Southeast Asia. Rice farmers used the approach to understand the Integrated Pest Management (IPM) practices better. In the meantime, the approach has been spread to many other countries in Asia, Africa and Latin American. In more recent years, the approach has been adapted for livestock farmers.

Research and extension institutions have traditionally seen capacity building of rural households as a mechanism to transfer technologies. However, many issues in production systems are complex and location-specific and require changes in behaviour and practices.

Sheep production systems are complex, based on rich experience and culture. FFS platforms are helpful for farmers education and empowerment that assist them in achieving sustainable food production and livelihoods improvements through testing, validating, and adopting good agricultural and marketing practices. In addition, sheep farmers need to increase their knowledge and methods due to changing conditions, for example, climate change and new diseases. This knowledge and new methods can be acquired through methods like the FFS approach.

In contrast to most extension methods, the FFS approach aims to strengthen the capacity of local farmers, analyse their production systems and identify the main constraints. The FFS facilitates possible solutions, and these can be tested and adapted within the FFS experiments. Traditional knowledge is merged with external expertise and practices, and farmers can choose and adopt the most suitable practices and technologies. These can be modified to suit their local conditions and needs, to improve their resilience and livelihoods.

The specific objectives of sheep FFS are to:

- Empower sheep farmers with knowledge, skills and critical decision-making abilities.
- Increase the resilience of sheep farmers' production systems to be less vulnerable to any external shocks.
- Facilitate sheep farmers to learn innovative problem-solving ways and to be able to adapt to change.
- Promote collective group action, strengthen groups and decision-making as a group.
- Provide opportunities for farmers and extension and research workers to jointly discuss, test and adapt solutions for the specific local production systems.

The concept of livestock FFS is a new and innovative approach in Azerbaijan. The FFS approach is, in most contexts, a noteworthy change in the way extension services are being organised. Whereas traditionally, extension services have been based on a “top-down” theoretical approach, the FFS approach focuses on participatory and practical training. This means that it is crucial that FFS facilitators and trainers have the correct attitude for the FFS approach, as they need to take on the role of “facilitator” rather than that of a “teacher”.

## 2.2 Steps in FFS implementation

The following steps are applied when implementing FFS and can be used as a guideline for the setting up of a sheep FFS. Annex 25: Example of an FFS implementation cycle shows an implementation schedule, but it should be noted that participants decide on the final activities and experiments.

### Step 1. Understand pre-conditions

A pre-condition assessment should be carried before initiating an FFS program in a new area. The **participatory tools** in chapter 5 will be valuable tools that can be used for this assessment. Using these tools will allow the project team to decide whether the context of the target area is suitable for the FFS approach. The tools will also give a first indication of the critical issues and challenges in the sheep production systems and villages where FFS can be established. The survey will also be helpful to determine local practices and opportunities, identify stakeholders, and any FFS specialists in the region.

As the FFS approach is relatively new for the livestock sector in Azerbaijan, and many lessons are being learned while implementing, it is recommended to emphasise quality rather than quantity at this point. The project team will also need to decide whether there is sufficient time to train master trainers fully or whether this needs to be combined with the facilitators' training.

### Step 2: Decide on the total duration

For sheep production systems in the context of this specific project, FFS groups ideally meet for an entire year for at least 20 sessions. This is different from crop FFS, which could, for example, last for one cropping season. This longer duration enables implementing experiments related to sheep production issues that might have a longer duration. It also ensures different activities take place in different seasons, as each season has its challenges.

It should be noted that the type and problems to be addressed also affect the duration and frequency of FFS sessions. For example, if the focus of the FFS is on selective breeding, the duration will be much longer, and sessions could take place less frequently.

If it is necessary to shorten the duration of the FFS, then make sure that at least two different seasons are included (e.g., the rainy and the dry season) and that the key experiments that take a few months (see chapter 4), for example, on feeding, can be implemented.

### Step 3. Identification and training of FFS Master Trainers

Usually, in FFS implementation, long-term training for FFS master trainers is planned. These master trainers, in turn, can train the FFS facilitators. The shortage of master trainers is, in general, a significant constraint in FFS implementation. As there are very likely no existing master trainers within the project context, and there might not be sufficient time to carry out a master training, the project might have to compromise on this. It is recommended that at least some very experienced trainers are recruited, if necessary, from abroad.

### Step 4. Identification and training of FFS Facilitators

The identification and training of FFS facilitators need to be completed before the FFS activities can start. Ideally, a long-term master training will need to be organised, but there might not be sufficient time within the project to do this. Ideally, facilitators should be living in or close-by the venue where the FFS sessions are being held.



**The competence and availability of sheep FFS facilitators** will determine the quality of the FFS, so it is essential to make sure the right facilitators are selected based on sound criteria. Facilitators will have to be available regularly during the implementation of the FFS. It is possible to assign two facilitators to the FFS to ensure there is always a facilitator available.

These **selection criteria** should be drafted for the trainers and facilitators. It is vital to follow these criteria in the field situation, as otherwise, this can lead to a loss in the quality of the FFS approach. Facilitators can be selected from highly respected livestock producers, staff of producer organisations, CAHWs and other community members. Ideally, facilitators speak the local language, live close by, have a good understanding of the local livestock and sheep production, and have a dynamic and confident personality.

The **training of facilitators (ToF)** is an essential first step in establishing an FFS program. An example in the Azerbaijan project would be a ToF would be a training of 22 days, with the first phase of, for example, 12 days, followed by the second phase of 10 days (as described in, e.g., FAO PFS manual, see references). It is recommended to have somewhere between 15 and 30 participants within the ToF. This will ensure that all participants can fully participate in the practical elements of the training. Extension staff and project staff should also ideally attend the training. During the ToF, it would be instrumental in organising field visits to ongoing FFS sites, preferably to livestock FFS or sheep FFS sites.

Throughout the training, **participatory methods** are a crucial element to ensure the full participation of all participants. All training sessions should focus on what could be done within the context of the FFS in the actual target area.

A **mentoring program** can be set up in which experienced facilitators mentor other facilitators, and facilitators can be exchanged between different groups to learn from each other.

### **Step 5. Conduct general groundwork**

The trained facilitators and project staff should determine the needs of the targeted sheep farmers. The needs assessment carried out in September 2020 will form the general basis for this step, but some local specific information might have to be collected. To determine these needs, the following steps are recommended:

1. **Contact the targeted communities:** The specific context of the targeted sheep farmers needs to be understood first. Community leaders can be approached as a first step to get feedback on the approach and get authorisation to work in the specific communities.
2. **Organise a meeting to raise awareness:** This meeting is important to introduce the concept of FFS to the targeted sheep farmers. The meeting aims to provide clarifications on the FFS approach so that the approach is clearly understood. It is also essential that the targeted sheep farmers are clear about what they can expect from being involved in the FFS.
3. **Identify FFS group members:** Around 30 to 40 FFS group members can be identified with the assistance of local leaders. Most of the time, after a few FFS sessions, this number will reduce to around 30 group members, which would be an ideal number. Attention should be given to gender-related and cultural issues during the selection of the group members. A mix of men and women and members of different age groups would be ideal. The criteria for selecting participants are:
  - a. A shared interest in improving their sheep production
  - b. The sheep enterprise is one of the main livelihoods
  - c. The participant is a decision-maker within the household
  - d. Members have the same socioeconomic status (FFS can, in principle, be dominated by, e.g., village leaders).
  - e. All members should reside in the neighbourhood where the FFS is being organised
  - f. No current conflicts between members should exist
  - g. Members are willing and able to attend all FFS sessions
  - h. Members are open to sharing ideas and teamwork
  - i. Members are ready to contribute financial, time, or material inputs
  - j. Members are keen on learning
  - k. Members do not expect any benefits, either financial or material.
  - l. Farmers that will participate in the FFS experiments with their farm and animals must be willing to allow visitors to their farm and be ready for experiments on their animals and farm.

4. **Identify the FFS location:** The location for conducting the FFS sessions will be selected by the group. A field and a flock of sheep are also needed for running the experiments. Selection criteria are:
  - a. The site must be accessible.
  - b. All group members agree on the site selection.
  - c. The meeting area should provide sufficient space for all group members.
  - d. The meeting area should preferably be shaded.
  - e. The host should be present most of the time and be friendly, reliable, and accommodative.

**Step 6. Establish the FFS:** At least two preparatory meetings of around 2 hours will be necessary before the learning and experimentation within the FFS group can start. During the initial meetings, the following items are discussed:

5. Ensure that all members know each other, ideally through a participatory introduction (see Chapter 5).
6. To assist the learning and ensure there are no future disappointments, all members must have similar expectations. Participatory planning of FFS activities:
  - a. Establish the FFS: The official launch of the FFS will take place through:
    - i. Choosing an FFS name.
    - ii. Choosing an FFS slogan.
    - iii. Rule setting for the FFS, similar to a constitution.
    - iv. Electing an FFS chairperson, secretary and treasurer.
    - v. Official group registration, e.g., with a government department.
    - vi. Opening a bank account (if appropriate) for members' contributions.
    - vii. Sourcing funds to finance activities, e.g., through a grant provided
  - b. Formation of the host team can be done on a rotational basis. This team is the host for the FFS session and will assist the facilitator in organising the activities and taking on additional responsibilities as needed.
  - c. Analysis and ranking of key issues: During the first few FFS sessions, key issues and challenges can be discussed and analysed. The ranking and analysis of these issues will determine the key topics of the FFS program. The participatory tools addressed in chapter 5 can be used to identify problems, in particular, the mapping, transect walk and seasonal mapping. The different ranking tools described in chapter 5 can be used to rank the perceived issues.
  - d. Identification of solutions: After the thorough problem analysis and ranking, the group organises brainstorming sessions to develop possible solutions to test and evaluate within the FFS program.
  - e. Develop the FFS program: As a next step, the facilitator, in close collaboration with all group members, develops the FFS program for the duration of the FFS sessions. This program is based on the main problems and solutions identified earlier. The group will decide for which sessions outside expertise is needed. All FFS sessions include AESA, comparative experiments and special topics. Exchange visits to other FFS groups or other interesting farms and sites can be motivating and helpful. The facilitator draws up an FFS schedule with dates and topics for each FFS session. The schedule should be written on a flip chart and displayed at each session.
  - f. M&E plan: A participatory monitoring and evaluation plan needs to be set up to evaluate whether the objectives of the FFS are met and whether there is any progress.

### **Step 7: Implement FFS Sessions**

The starting date of the FFS program is agreed upon between the members and the facilitator, as well as the total duration and the number of FFS meetings. In a typical FFS program, the FFS sessions last for around half-day, and they are being held once a week. The duration of the FFS program should be sufficient to enable the implementation of the comparative experiments (e.g., the deworming trials, feed experiments and other experiments and learning sessions that would take a few months to complete, as described in the section on experiments. The duration should cover a complete production cycle (for example, 'lamb to lamb'), giving hands-on experience at all stages.

Participation can be enhanced through visual methods, practical sessions, demonstrations and other participatory methods. The local language should be used in all sessions to ensure everybody can fully participate. The FFS host team is a small subgroup chosen on a rotational basis. This host group takes on several responsibilities, including assisting the facilitator when needed, preparing the venue and the program for each session, and assisting in conducting the group dynamics. In addition, they take care of visitors or outside experts, keep the time and keep attendance records. A typical FFS session is illustrated in the figure 2.

Figure 2. Typical Farmer Field Schools (FFS) session

| Time          | Activity   | Objectives  | Responsible                              |
|---------------|--|---|--|
| 07:30 - 07:45 | <ul style="list-style-type: none"> <li>Opening</li> <li>Roll Call</li> <li>Brief overview of last session</li> </ul> | <ul style="list-style-type: none"> <li>Alert members session is starting</li> <li>Attendance recording</li> <li>Reinforce learning</li> </ul> | Host team                                |
| 07:30 - 08:30 | AESA – systematic observation and analysis of experiments  | Improve observation, and analysis of problems, monitor progress   | All, in short groups                     |
| 08:30 - 09:00 | AESA analysis & discussion in groups   | Sharpen analytical skill and data analysis  | Subgroups                                |
| 09:00 - 09:30 | Presentation of AESA results   | All outcomes of the AESA groups are shared in plenary   | Facilitator, host team                   |
| 09:30 - 09:45 | Group dynamic exercises  | <ul style="list-style-type: none"> <li>Energise the FFS members</li> <li>Team building</li> <li>Improve participation</li> </ul>              | Host team, Facilitator                   |
| 09:45 - 11:45 | Special topic session  | <ul style="list-style-type: none"> <li>Improve learning on key issues</li> <li>introduce innovations</li> <li>Increase discussions</li> </ul> | Facilitator or specialist if appropriate |
| 11:45 - 11:55 | Review of day's activities, participatory M&E  | <ul style="list-style-type: none"> <li>evaluate achievements</li> <li>reinforce learning process</li> </ul>                                   | Facilitator                              |
| 11:55 - 12:10 | Follow-up planning   | <ul style="list-style-type: none"> <li>Activities outside FFS session need to be planned</li> <li>Planning of next FFS session</li> </ul>     | Host team                                |
| 12:10 - 12:20 | <ul style="list-style-type: none"> <li>Roll call</li> <li>Announcements</li> <li>Thank you and close</li> </ul>      | <ul style="list-style-type: none"> <li>record late comers</li> <li>share news and announcements</li> </ul>                                    | Host team                                |

Source: FAO, 2021

### Step 8. Plan visits.

Visits include visits to specific sites for technical learning, e.g., to a farmer with good practices in silage making. **Exchange visits** can be organised to neighbouring FFS groups. These visits encourage FFS groups to exchange experiences, see how other groups carry out the activities and are often a tool to increase the group's motivation. Short videos and photos can assist with briefing the members that could not attend.

**Step 9: Plan for graduation.** FFS members that have, e.g., attended over 75 percent of all the sessions can be selected to graduate for the FFS activities carried out throughout the FFS program. The graduation is an official ceremony organised by the facilitator and the group, and other farmers and officials can be invited to attend the ceremony. A certificate can be handed out to recognise the efforts of the FFS members. This ceremony will also demonstrate the successes of the FFS and possibly lead to the establishment of other FFS groups in the area.

### Step 10: Conduct follow-up of FFS activities

The graduation of the FFS groups is not necessarily the end of the learning process. The FFS can continue after graduation and, the group can develop an action plan for future activities in collaboration with the facilitator. FFS groups can start activities related to sheep production that generate income after graduation. It may be necessary to find finance for these income-generating activities.

### Step 11. FFS networks .

FFS networks can be developed in areas where there are several FFS groups. These networks can assist in supporting any future activities that the sheep farmers want to embark upon, can assist in fundraising and coordination of the FFS groups. They will also assist in developing new FFS groups.

### Step 12. Setting up 2<sup>nd</sup> generation FFS groups

If several FFS group members are identified as willing to take on the facilitator's tasks in new FFS groups, training can be organised for these new facilitators. They can assist existing facilitators in learning more about facilitation, and they can set up their groups in the future.

## 2.3 AESA

### Introduction

The AESA (Agro Eco-System Analysis) is an analytical tool that enables FFS group members to analyse, observe, and assist in decision-making. During AESA, information is collected by observations, often during experiments. The tool is used in each FFS session. The AESA observations will facilitate decision-making concerning the management of the flock or experiment.

### AESA steps

These are the steps in carrying out the AESA:

1. Data collection through observation: Farmers observe the specific activities, for example, the ongoing experiments. They watch, for example, the grass or sheep and look at particular indicators that the group agrees upon in advance.



**Annex 2:** Handout SPI: Sheep signals can be used as a tool to assist with AESA and make sure all sheep signals are looked at. Below are essential steps on how to implement these AESA sessions.

2. The FFS group is divided into smaller subgroups, and each subgroup goes to the experimental area to do their observations and collect data. This step can take around half an hour.
3. Each subgroup then sits down to analyse the observations and data collected; this step can take around 20 minutes. The group prepares the agreed-upon AESA format (see Figure 3). The data can be transferred to a flip chart, which is used for the presentation in the plenary session.
4. In a plenary session, each subgroup presents its findings. After each presentation, feedback is given by other subgroups. It is crucial to ensure that each FFS member makes a presentation during the FFS sessions.
5. The findings by each subgroup are compared, and the whole FFS group reaches a consensus on what the critical conclusions are and what the actions will be to make changes.
6. The AESA session can then be wrapped up by summarising the key points and emphasising the key learning points of the AESA session. This session can last around 10 minutes.

The illustration of the AESA format (see Figure 3) can form the basis for carrying out the AESA.


7. **Data analysis:** Each subgroup records its findings, each in a similar format. This format can include specific data but can also include pictures, photos, and drawings. The form also includes key conclusions, decisions, and recommendations of the subgroup.
8. **Presentation of findings:** Each subgroup can present their findings in a plenary session. These kinds of presentations are a critical element of an FFS group, as it strengthens the confidence of FFS members and improves their communication skills.
9. **Discussions and conclusions:** The conclusions of each subgroup are analysed during a plenary session. Based on this, actions are taken for the field activities.

### Example of an AESA session (90 minutes)

Below are essential steps on how to implement these AESA sessions.

1. The FFS group is divided into smaller subgroups, and each subgroup goes to the experimental area to do their observations and collect data. This step can take around half an hour.
2. Each subgroup then sits down to analyse the observations and data collected; this step can take around 20 minutes. The group prepares the agreed-upon AESA format (see Figure 3). The data can be transferred to a flip chart, which is used for the presentation in the plenary session.
3. In a plenary session, each subgroup presents its findings. After each presentation, feedback is given by other subgroups. It is crucial to ensure that each FFS member makes a presentation during the FFS sessions.
4. The findings by each subgroup are compared, and the whole FFS group reaches a consensus on what the critical conclusions are and what the actions will be to make changes.
5. The AESA session can then be wrapped up by summarising the key points and emphasising the key learning points of the AESA session. This session can last around 10 minutes.

Figure 3. Illustration of AESA format

|   |   |   |
|---|---|---|
| Name of FFS .....<br>Location .....<br>PESA number .....<br>Sub-group name .....<br>Date .....<br>Problem addressed/Objective .....<br><b>General Information</b><br>Weather conditions .....<br>Time of Observation .....<br>Breed .....<br>Name .....<br>Birth date and age .....<br>Date of last mating .....<br>Pregnancy status.....<br>Number of off springs .....<br>Types of treatment given(drug, feed, grazing, supplement etc) ..... |  | <b>Weekly recording</b><br>Body weight .....<br>Body measurement .....<br>Daily milk yield .....<br>Feeding routine .....<br><br><b>Observations</b><br>Hair/coat condition .....<br>Name .....<br>Movement .....<br>Date of last mating .....<br>Presence of parasites/insects .....<br>Injuries .....<br>Activity level .....<br>General health condition ..... |
| Rcomendations: .....<br>.....   |   |   |

Source: FAO, 2021

Annex 2: Handout SPI: Sheep signals, can be used during the AESA as a reference for healthy and non-healthy animals.

## Chapter 3: Special topics

### 3.1 Introduction

This chapter on special topics includes **discussion topics** and **practical sessions**. Special topics are addressed by FFS experiments, inviting a specialist, or through group work and discussion. Links are provided to potential experiments, which can be prepared by the group during the discussion topics. Throughout the document, several **icons** are used to mark specific issues and these icons are explained below.



This icon indicates a reference to a handout, which is handed out to all participants. Please note that some handouts can be provided before a session, but it is important for most handouts to be handed out after the session only.



This icon indicates a practical session, on a farm with sheep. It is important to prepare the practical sessions well, and farms should be visited beforehand.



This icon indicates a calculation exercise. These exercises can be done individually, to ensure each farmer is able to do the calculations.



FFS experiments related to the technical topics can be found in chapter 4, and in each technical topic. The experiments are indicated with this icon.



This icon indicates the potential for including a special topic in the FFS if a local expert is available, to go more in-depth in a particular topic. Try to keep these special sessions short, for example one hour.



An extremely important point of attention, please follow this advice.



This icon indicates links to relevant videos that are available online, as well as other online training resources.

## 3.2 General sheep husbandry

### 3.2.1 Activity SP1: Discussion topics

#### Introduction

This section on general sheep husbandry can be used at the beginning of the FFS as a general introduction. These discussion topics can be carried out with the whole group in a plenary session using questions and answers. The activities in the subsequent sections include practical sessions on the farm, where sheep and equipment might be needed.

#### Objectives:

- Familiarise participants with starting to discuss sheep production issues
- Introduce several topics that will be discussed in detail later on in the course of the FFS

#### Materials:

- Paper and pen for participants to use in taking notes.
- Flip chart, whiteboard or blackboard for the facilitator to make notes.
- Time-keeping device.

**Location:** In a quiet location, can be indoors, e.g., in a classroom setting.

**Remarks:** You can potentially introduce additional topics, but make sure the entire classroom / plenary session does not exceed two hours.

#### Discussion SPI - 1: Importance of sheep (20 minutes)

The facilitator can form small groups of around four to five people. The facilitator asks the subgroups to list the essential functions and importance of sheep in the area of the FFS group. Ensure they continue with as many functions as they can think of to ensure they exhaust all the elements they can consider. A few groups can then present their findings in plenary, and other members can supplement this with their findings.

#### Discussion SPI - 2: Livestock challenges and opportunities (30 minutes)

Ask group members to list the **challenges** for sheep production systems in the area and list them on a flip chart. Continue asking ('probe') for additional challenges until it appears all issues are listed. You can now request a few members to rank the most critical challenges from the list. You can ask other members whether they agree with this ranking or not. Use one of the ranking exercises as outlined in chapter 5. Once the challenges are listed, you can continue with the opportunities for sheep production. Again, make sure all opportunities are listed on a flip chart and continue asking until there are no more opportunities mentioned. One or two members can list the most critical opportunities, and the group can provide their feedback as to whether they agree with this conclusion or not.

#### Discussion SPI - 3: Sheep production practices (40 minutes)

The group can be divided into subgroups; you can ask the subgroups to list all different management practices they can think of (see list below). Ask them to present in plenary. Following this, make a list of all practices that have been named plus any that were missing from the list below. Then, ask the participants which of the practices they currently carry out and add the number of the farmers with each practice. The second question can be: "which practice would you like to carry out in the future?" Keep this information for discussions in subsequent FFS sessions when decisions are made regarding the experiments, and special topics will be prioritised. There are several practices related to sheep production which are considered key to good management:

1. **Feed and water:** Ensuring that sheep have sufficient access to feed (either through grazing or barn-feeding) and water is essential. Feed and water are the critical elements for sheep production. Ideally, sheep have access to water throughout the day. Specific practices within feed and water are:
  - a. **Pasture management:** e.g., reseeding, fertiliser
  - b. **Feed conservation** refers to the preservation of feed for the dry season/winter, for example, by making hay or silage.
  - c. **Grazing strategies:** Sheep production can be improved by grazing management practices, like rotational grazing, strip grazing, electric fencing, transhumance grazing, etc.
  - d. **Feed supplementation:** Supplementation is the provision of additional feed supplements to livestock. There is a difference between mineral/vitamin supplementation (e.g., providing minerals or salt) and energy or protein supplements like maize, cereals, cottonseed or beet pulp.
2. **Weighing animals:** Farmers can use, e.g., weighing scales to determine whether animals are ready for the market and give them a bargaining position when selling animals.
3. **Animal identification:** Identification markings can be by colour marking, ear notches or ear tags.
4. **Castration** is carried out as a way to control breeding. Inbreeding can be prevented by castrating animals that have insufficient production parameters.
5. **Deworming** aims to reduce the internal parasite load in sheep, which will improve production.
6. **Vaccinations** can prevent specific, mainly viral diseases, in sheep.
7. **Housing:** Animal housing can be an essential element in sheep production; the animal barns should protect against weather conditions and theft and be hygienic and well-ventilated.
8. **Selection:** Selection refers to selecting breeding stock based on performance or other wanted signals in the flock.
9. **Culling:** Culling refers to removing livestock that is under-performing, that have unwanted characteristics or injuries, or are sick, old or weak.

#### Discussion SPI -4: Righting a cast sheep (15 minutes)



##### Annex 6: Handout SP5: Righting a cast sheep

Prepare this session by reading the handout. Ask the participants whether they know what a cast sheep is and what to do about it. Ask participants how frequently they have seen a cast sheep, and what can be done to prevent it. Depending on the answers, discuss the technical information from the handout and discuss the technique of righting a cast sheep. Distribute the handout. If you have the opportunity to demonstrate this technique in a practical session in future FFS sessions, please do so.

### 3.2.2 Activity SP2: Practical session – General sheep signals

#### Objectives:

- Introduce basic parameters for sheep
- Get farmers used to measuring parameters with equipment provided, for future use

#### Materials:



- Paper and pen for participants to use in taking notes.
- Instruments to measure parameters including a stopwatch, thermometer, weighing scale or spring balance; it would be good to have several of each for use in the subgroups.
- Time-keeping device
- Annex 2: Handout SPI: Sheep signals
- Annex 3: Handout SP2: General Sheep Parameters

**Time:** One and a half hours

**Location:** In the farm, with a range of animals, preferably with different types, sizes and breeds of sheep, including youngstock.

**Steps:**

1. The week before the activity, visit the farm that you want to use for this activity and look for different signals as per the handouts.
2. Divide the group into subgroups of around four to five people.
3. Ask every group if they know the basic parameters of sheep, ask them to estimate and note them down, e.g.:
  - Temperature
  - Weight
  - Age
  - Heart rate
  - Breathing rate
  - Colour of mucous membranes
  - Rumen contractions
  - Chews per cud
  - Any other parameters you can think of.



Obviously, the **weight of the animals** will vary, but it is a good exercise to weigh the animals, to see if the farmers are close to their estimates. It will also be a useful exercise for the upcoming experiments, as weighing the animals is an important factor in many of the experiments. Every now and then, use a known weight (e.g., a 50 kg bag) to make sure your scale is indicating the correct weight, and calibrate your scale if necessary.

4. Ask all the groups to call out their estimates for each parameter, also ask whether they see any other signals, e.g., of disease.
5. Introduce the group to determining the age by looking at the teeth (see background information).
6. In the subgroups, use the weighing scale, thermometer, or any other instrument to determine the different parameters and estimate the age of the animals by their teeth. Weighing scales can be used to weigh a person holding a (young) sheep, and then deduct the weight of the person.
7. Each subgroup can present their conclusions in plenary and discuss whether they were correct or incorrect in their estimates.
8. Conclude by summarizing the key lessons learned and why it is important to monitor the flock based on these signals. Explain that the signals will be used during future sessions.
9. Distribute handouts to farmers.

### 3.2.3 Activity SP3: Practical session – Herding and flight distance

**Objectives:**

- Introduce the topics of stress-free herding and flight distance
- Enhance farmers' practice in using flight distance as a tool for stress-free herding

**Materials:**

- Paper and pen for participants to use in taking notes.
- Flip charts with pens / to show the figures of the background information (or use paper prints of the figures).
- Time-keeping device.
- You can use a measuring tape for reference so participants can estimate distance more accurately.
- Annex 4: Handout SP3: Herding and Flight Distance.

**Time:** One and a half hours.

**Location:** In the farm, with several small flocks of sheep.

**Steps:**

1. The week before the activity, visit the farms that you want to use for this activity and look for different signals as per the handouts.
2. Divide the members into subgroups of four to five people.
3. Ask every group to approach a particular sheep slowly and calmly, one person at a time, and estimate the distance that the sheep can be approached without reacting to the approach and walking away ('flight'). Ask the groups to check difference in where the head of the sheep are pointing while approaching. Ask them to note any other differences, e.g., stamping of feet.
4. Briefly come back to plenary and ask the group for feedback (10 minutes).
5. Introduce the topic of using this **flight distance** as a tool for herding the sheep. Explain the 'point of balance' (see background information below). Also introduce walking speed and zigzagging behind the sheep to make sure they continue in the same direction.
6. Ask the small groups to practice herding with small flocks, using the information received in the background information below (point of balance, flight distance, zigzagging, walking speed).
7. Come back to a plenary session and ask each group for feedback.
8. Conclude by summarizing the key lessons learned and why it is important to monitor the flock based on these signals. Explain that the signals will be used during future sessions.
9. Ask the farmers to practice at home and ask for feedback on their experiences during the next FFS session.
10. Distribute the handout.

### 3.2.4 Activity SP4: Discussion - Introduction to climate change

**Objectives:**

- Introduce the topic of climate change in relation to sheep production
- Understand climate change issues related to sheep production
- Know several adaptation and mitigation solutions for sheep farmers

**Materials:**

- Paper and pen for participants to use in taking notes.
- Flip charts with pens / to show the figures of the background information (or use paper prints of the figures).
- Time-keeping device.
- Annex 7: Handout SP5: Climate-Smart Sheep Production.

**Time:** 60 minutes

**Location:** In a quiet location, can be indoors, e.g., in a classroom setting.

## Steps:

1. Using the background information from the handout, explain climate change and its effects on sheep production in Azerbaijan. Ask participants: “have you experienced any long-term climate change effects / changes in climate?”. Refer to rainfall, temperature, droughts, animal disease changes, changes in pasture growth, etc.
2. Explain difference between adaptation and mitigation.
3. In subgroups ask participants if they can think of any mitigation and adaptation solutions, make a list and have them present the findings back to plenary:
  - a. Do you know any specific adaptation solutions?
  - b. Do you know any mitigation solutions?
4. Elaborate on key adaptation solutions and on key adaptation solutions including fodder preservation, water, etc, using the list of possible measures from the handout.
5. Explain: Some solutions can also be both mitigation and adaptation related. All these solutions are “Climate Smart”, and we should aim for climate smart sheep farms.
6. Distribute the handout.

## 3.3 Animal identification and Record keeping

### 3.3.1 Activity ID1: Animal identification

#### Introduction

Several records can be kept concerning sheep production, and they form an essential basis for monitoring and evaluation of the sheep production systems. Monitoring performance helps decide which lambs have reasonable growth rates and should be kept in the flock, which ewes are performing well, or which rams should be used for tupping.

Record keeping starts with animal identification. Animal identification can assist in breeding and monitoring growth, health, drug application and vaccinations. The perfect identification method for sheep is easy to read, can be applied easily, provides all information about the sheep, and cannot be torn or lost easily. Use the technical information from the handout to assist with the discussion.

#### Objectives:

- Farmers to be aware of all existing animal identification methods, their positive aspects and their drawbacks.
- Demonstrate identification materials and their uses and application.

**Time:** 45 minutes

**Location:** Quiet location, classroom. Or: If you have the opportunity to practically demonstrate the application of, e.g., ear tags, on a farm with sheep nearby.

#### Materials:



- For demonstration, any equipment related to animal identification; ear tags and applicators, ear notch applicators, photos of sheep with identification marks, colour markers, paint, or any other materials used for identification. Do not show the equipment beforehand to the group.
- Timekeeping device.
- Flip chart or board and pens.
- Annex 8: Handout ID1: Animal identification.

### Steps:

1. Introduce the subject briefly, without discussing any technical aspects.
2. Make small subgroups of four to five people.
3. Ask the subgroups to discuss animal identification: what they use, when, which methods they are familiar with. Ask them to list the positive aspects and drawbacks of each method, as well as reasons for not using any identification. (10 minutes)
4. Ask the subgroups to report back to plenary and briefly report the group work.
5. Only show the identification materials now and explain the uses, using the information from the handout. Refer to the use of identification methods concerning breeding, marketing, and disease control.
6. Practically demonstrate, if you have the opportunity, the application of some of the identification methods with several sheep.
7. Brainstorm session: Ask the group to list all the positive elements and drawbacks for each method and list them on a flip chart or board.
8. At the end of the session, the handout can be distributed.

### 3.3.2 Activity ID2: Record keeping

#### Introduction

Several records can be kept concerning sheep production, and they form an essential basis for monitoring and evaluation of the sheep production systems. Monitoring performance helps decide which lambs have reasonable growth rates and should be kept in the flock, which ewes are performing well, or which rams should be used for tupping.

If a farmer keeps records in a recommended manner, it might be worth organizing a visit to their farm or asking for a demonstration of the records. The farmer can then explain to the others how records are kept and why it is considered important.

#### Objectives:

- Increase awareness of the importance of record-keeping
- Familiarize farmers with some of the essential records that can be kept and the reasons why.
- Encourage farmers to decide for themselves what the key records are that they would like to keep.

#### Materials:



- Timekeeping device.
- Flip chart or board and pens.
- Annex 9: Handout ID2: Recordkeeping.

**Time needed:** 45 minutes

**Location:** quiet location, classroom

#### Steps:

1. Prepare by reading the handout.
2. Briefly introduce the topic of record-keeping and make subgroups of four to five people.
3. Ask the subgroups to discuss record keeping, what they use, when, which methods they are familiar with. Ask them to list the positive aspects and drawbacks of each method. (10 minutes)
4. Ask the subgroups to report back to plenary and briefly report the group work. List the parameters mentioned by the group on a flip chart.

5. Double-check the handout and add some of the parameters that might not have been mentioned. Summarize the information from the handout and discuss the information with the group. Show the basic record sheet from the handout and distribute the handout.
6. Back in the subgroups, ask the farmers to list all the parameters they would like to monitor and why. (10 minutes)
7. Ask the subgroups to report back to plenary briefly.
8. Conclude the session and make sure all information from the handout is discussed.

## 3.4 Feed and water

### 3.4.1 Activity FW1: Discussion topics

#### Discussion FW1 - I: Basic principles of feeding

##### Introduction

Quantity and quality of feed, as well as water supply, are often the most limiting factors in sheep production. The quality and availability of feed often varies during the seasons, and this affects sheep production. Very often, feed supplements are expensive and instead, local feed sources can be used to make a complete feed ration. Both humans and animals need different types of feed and food ingredients. For animals, in general carbohydrates are required for energy, fibre is needed for the rumen bacteria, body tissues need protein, fat provides energy in a concentrated form, and vitamins and minerals are very important for fertility, milk production and to avoid illness.



The chapter with experiments includes trials on feeding concentrates and on mineral and vitamin supplementation, see sections 4.3.1 and 4.3.2.

##### Objectives:

- Introduce basic feeding principles
- Understand nutrient requirements of different type of sheep
- Understand the importance of feeding sheep a balanced diet

##### Materials



- Different types of animal feed
- Flip chart and pens
- Time-keeping device
- Annex 10: Handout FW1: Nutrient requirements

**Time:** 60 minutes

##### Steps:

1. Ask farmers to bring some samples of the preferred feed materials for their feed sheep.
2. Prepare by reading about the purpose of different feed ingredients: carbohydrate, protein, fat, fibre, minerals and vitamins, and the nutrient requirements of sheep (see handout) and understanding the different need for the needs of different types of sheep in terms of age, breed, production levels, reproductive levels and sex.
3. Split the farmers into subgroups of four to five participants. Ask them to describe the 'perfect' feed ration and to describe the reasons for choosing that particular ration. Discuss the differences of the types of feed they brought and sort them according to similarities.
4. The subgroups can now present their results in plenary.

- Analyse the findings in plenary. Has each subgroup been able to specifically mention each of the feed types? (Fibre, carbohydrate, fat, protein, fat, minerals and vitamins)? Has water been mentioned? Using the background information, the purpose of each feed type can be discussed in the group.
- Discuss the proportions needed for a balanced ration. How can the acceptability of feed be enhanced? How can farmers mix a balanced ration to ensure that the feeding goals are met? (For example, high-protein rations for high-producing sheep, and lesser quality feed for animals that are less productive?)
- In a brainstorm session, discuss the differences in nutrient requirements in lambs, pregnant ewes, lactating ewes, etc. and note down the responses. Briefly share the information from the handout.
- Distribute the handout.

### Discussion FW1-2: Water (20 minutes)

- Prepare by reading technical information on water from the handout.
- Use plenary discussions to ask how often farmers water their sheep. What is their opinion on the quality of the water provided? Is there a difference between males, breeding animals, young stock? Ask what would be the water intake of an adult sheep and how often this animal normally would like to drink?
- Then discuss how the current water supply could be improved and how to make sure sheep have continuous access to water.
- Support the discussion with the information from the handout.
- Distribute Annex 10: Handout FW1: Nutrient requirements, if not done already.



Introduce the **experiment described in 4.3.1** Experiment FW-E1: feeding concentrates, and design the experiment together with the participants. Decide which type of concentrates to use for the experiment, what type of sheep should be tested, and when to start the experiment. Plan the experiment and include it in your program.

### Discussion FW1-3: Mineral and vitamin supplementation (30 minutes)



Use the information from Annex 11: Handout FW2: Minerals and Vitamins to prepare this session and distribute the handout after the session. Use a plenary discussion to introduce the importance of mineral and vitamin supplementation.

Ask the group if they have any experience in feeding minerals and vitamins. What is their view on using these supplements? In what form are they being used, e.g., powder, blocks, local resources, etc? Are there any local remedies they use at home? Which and how do they work? Use additional information from the handout to assist with the discussion. Does anybody know whether the supplements are tested in a laboratory to check the actual contents? Distribute the handout.



Introduce the **experiment described in 4.3.2**. Experiment FW-E2: Minerals and vitamins, and design the experiment together with the participants. Decide which type of minerals and vitamins to use for the experiment, what type of sheep should be tested, and when to start the experiment. Plan the experiment and include it in your program.

## 3.4.2 Activity FW2: practical session - body condition scoring

### Introduction

The body condition of a sheep will tell you something about the nutritional status of the animal, and how much meat and fat the animal has. This practical session will teach farmers to use body condition scoring as a tool for assessing the health of the flock, and to judge whether any adjustments are needed in feed supply.

**Objectives:**

- Introduce basic concept of body condition.
- Teach farmers how to recognize problems and solutions related to body condition.

**Materials:**

- Bring pictures showing different body condition (see background information).
- Paper and pen for participants to use in taking notes.
- Time-keeping device.



- Annex 5: Handout SP4: Body Condition Scoring.
- If you have the possibility of watching an online video (duration: 9 minutes) together with the group, you can use the following link: <https://www.youtube.com/watch?v=iKgtVWy8gf6M>

**Time:** One hour

**Location:** In the farm, with a range of animals including rams, ewes and lambs, preferably with different body conditions; ideally you would visit several farms in this session.

**Steps:**

1. In the days before the activity, visit the farms that you want to use for this activity and look for different body conditions; make sure the farm has a range of animals, including rams, ewes and lambs.
2. Briefly explain the concepts of body condition in a plenary session and demonstrate body condition scoring with one or two animals.
3. Split the farmers into subgroups of four or five. Ask them to score as a group at least four or five animals for body condition.
4. Each subgroup can now present their results.
5. Analyse the presented; there is no perfect answer, but it will hopefully create a debate. Use the table below to discuss actions that can be taken to improve the situation.
6. To conclude, encourage farmers to score their animals at home and bring the results to the next session.

### 3.4.3 Activity FW3: practical session - dung signals

**Introduction**

Dung signals will tell you something about the nutritional status of the animal, and how much meat and fat the animal has. This practical session will teach farmers to use dung signals as a tool for assessing the health of the flock, and to judge whether any adjustments are needed in feed supply.

**Objectives:**

- Introduce the basic concept of dung signals.
- Teach farmers how to recognize problems and solutions related to dung signals.

**Materials:**

- Bring pictures showing different dung signals collected beforehand (see also handout).
- Paper and pen for participants to use in taking notes.
- Time-keeping device.
- Annex 12: Handout FW3: Dung Signals.
- Flock showing different dung signals.

**Time:** 45 minutes

**Location:** In the farm, with a range of animals including rams, ewes and lambs, preferably with different dung signals; ideally you would visit several farms in this session.

**Steps:**

1. In the days before the activity, visit the farms that you want to use for this activity and look for different dung signals. Select the farm with animals that show a range of different signals. Take photos or collect samples, in case the same signals cannot be found during the session.
2. Briefly explain the concepts of dung signals in a plenary session.
3. Look around for a few samples with the group and explain what you see. Look for dung consistency, blood, dags, and sometimes you can see worms.
4. Split the farmers into subgroups of four or five. Ask them to take a group of sheep and look for dung signals. Look out for diarrhoea, blood, consistency, colour, dags and worms.
5. Ask each subgroup to present their results.
6. The results can be analysed now. What different signals did the farmers see? There is no perfect answer, but it will hopefully create a debate. Use the information from the handout to discuss measures related to the dung signals observed.
7. To conclude, encourage farmers to look out for dung signals in their own farm and bring the results to the next session.
8. Distribute the handout.

## 3.5 Pasture and grazing management

### 3.5.1 Activity PG1: Discussion topics

**Objectives:**

- Using the technical information below, familiarize participants with starting to discuss pasture management and grazing strategies
- Introduce several topics to be used later on, in the course of the FFS

**Materials:**

- Paper and pen for participants to use in taking notes
- Flip chart, white board or blackboard for facilitator to make notes
- Time-keeping device
- Handouts, where indicated

**Location:** in a quiet location, can be indoors, e.g., in a classroom setting.

**Remarks:**

You can potentially introduce additional topics, but make sure the total classroom / plenary session does not exceed two hours at a time.

**Discussion PGI - I: Fodder varieties (40 minutes)**

1. First, make sure you have a complete list with all local and scientific names of all fodder species available in the area
2. You can potentially ask the farmers to bring samples of all fodder species and grasses they can find on their farm, particularly the varieties that the sheep prefer
3. Make subgroups and ask each subgroup to list fodder species that are common in the local area (10 minutes)
4. Ask each subgroup to present their findings
5. List all the preferred species on a flip chart and let the farmer rank them according to their preference, using one of the ranking techniques in chapter 5
6. Once the varieties are ranked, start a final discussion with the group on why they ranked in the way they did

### Discussion PGI -2: Pasture management (30 minutes)



1. Discuss whether pasture improvement, as described in the technical information below, is possible in the particular areas the farmers are using.
2. Use the findings from PGI-I to ask how the preferred species from the ranking exercise can be multiplied/promoted for pasture improvement.
3. Ask which varieties could be used for reseeded.
4. Ask the farmers if they use any kind of fertilizer on their pastureland, other than the dung and urine from their sheep. If the answers are positive, ask for specifics.



Introduce the **experiment described in 4.3.4** Experiment PG-E2: Fodder, and design the experiment with the participants. Decide which type of fodder to use for the experiment and when to start the experiment. Plan the experiment and include it in your program.

### Technical information

Sheep are outside almost all year round, so good pasture management is critical. When pasture management is done well, additional feeding is often unnecessary, apart from minerals and vitamins. Ideally, the grass needs to be young, relatively short and leafy. Young grass contains more energy per kilogram of dry matter than grass at a later growth stage. It is important to have a regular critical look at the pasture, focusing, for example, on grass density and composition of pasture. **Pasture improvement** can be done through reseeded. Reseeded should be considered when the percentage of good grasses is below 60 percent. This can be done by overseeding or additional seeding can be a good alternative. Sowing an additional 10–15 kg of grass seed per hectare every year helps maintain a good grass cover. When reseeded grassland, it is also worth combining grass seed with clover and herbs. Some herbs are a delicious, healthy snack for sheep. Using specific types of fertilizer can also change the composition of the pasture.

### Discussion PGI -3: Grazing needs (30 minutes)



1. Ask the group to calculate the following individually:
  - You have four different paddocks of two hectares, each available for grazing.
  - An adult ewe eats roughly 1.5 kg of dry matter daily.
  - Grazing land of around 1 hectare has about 750 kg of dry matter available.
  - How many days can 50 adult sheep graze on one paddock before they have to be moved to the next paddock?
2. Discuss the outcome of the results in plenary and compare with the below information.

### Technical information

An adult ewe weighing 65-70 kg will eat roughly 1.5 kg of dry matter daily. One hectare of good grazing land has around 750 kg of dry matter available per hectare. One paddock of two hectares, therefore, has 1,500 kg of Dry Matter (DM) available. If you put 50 sheep on the paddock, together they will eat 75 kg of dry matter a day. They will finish the 1,500 kg in  $1,500 / 75 = 20$  days. So those 50 sheep will be ready for a new 2-hectare paddock after **twenty days**. Farmers need to perform calculations like this to determine how long the sheep can stay in a field before they are ready for a new field or to determine when to provide additional feed and how much.

### Discussion PGI -4: Grazing strategies (30 minutes)

Divide the group into small subgroups of around four to five people. Each subgroup lists the kind of grazing techniques they can think of. Probe, if necessary, and mention some of the methods from the handout. Once the subgroups are finished, a few subgroups can present their findings in plenary, and a discussion can follow, with additional points added if needed.



Distribute Annex 13: Handout PG1: Grazing strategies and discuss the similarities/differences with what the participants presented. At the end of the session, provide the technical information as a handout.

### **Discussion PG1-5: Electric fencing (30 minutes)**

1. Prepare by bringing electric fence equipment if available.
2. Ask the participants whether they are aware of electric fences and whether they have used it /are using them. Ask them for their experience and what the positive and negative aspects of electric fences are.
3. Demonstrate the equipment and how to use the fence.
4. Briefly link the use of the electric fence to the grazing strategies discussed earlier.
5. Discuss the information from the handout.
6. Distribute Annex 14: Handout PG2: Electric fencing



Introduce the **experiment described in 4.3.3** Experiment PG-E1: Electric fencing – rotational grazing, and design the experiment together with the participants, using the information from the handouts on grazing strategies and electric fencing. Decide when to start the experiment. Plan the experiment and include it in your program.

## **3.5.2 Activity PG2: Haymaking**

### **Objectives:**

Each participant should, by the end of the session, be able to:

- Understand basic methods of fodder conservation
- Be able to describe appropriate forages and fodder for hay making
- Be able to describe the basics and processes of and hay making.

### **Materials:**



- Paper and pen for participants to use in taking notes
- Flip chart, white board or blackboard for facilitator to make notes
- Time-keeping device
- Samples of hay
- Annex 15: Handout FW1: Haymaking

**Time:** 45 minutes, half a day for farm visit

**Remarks:** If you have the opportunity to practically demonstrate these interventions, that would be the best, you can then change this theory lesson into a practical demonstration session.

### **Steps:**

1. Prepare by reading the handout.
2. (5 minutes) - Methods and importance of fodder conservation: introduce the topic of fodder conservation and the importance of supplying a continuous amount of high-quality fodder in order to sustain sheep production throughout the year.
3. (20 minutes) – Hay making: Ask which of the participants make hay and ask them the precise method, including the steps for making the best quality hay. Compare the different responses and agree on the best way of making hay, including species, time of harvest, and storage. Refer to the background information below. Show available samples of fodder varieties for hay making.

4. (15 minutes) – Fodder quantity: In subgroups, let the participants decide on how much hay is required for e.g., 3 months for a flock of 30 sheep to survive.
5. Conclusion: Discuss advantage and disadvantages of hay and silage in dry season, summarize the topic using the key background information below.
6. Distribute the handout.

### 3.5.3 Activity PG3: Silage making

#### Objectives:

Each participant should be able to:

- Understand basic methods of fodder conservation
- Be able to describe appropriate forages and fodder for silage making
- Be able to describe the basics and processes of and silage making

#### Materials:



- Paper and pen for participants to use in taking notes
- Flip chart, white board or blackboard for facilitator to make notes
- Time-keeping device
- Samples of silage
- Annex 16: Handout FW2: Silage making

**Time:** 45 minutes, half a day for a farm visit

**Remarks:** If you have the opportunity to practically demonstrate these interventions, that would be the best, you can then change this theory lesson into a practical demonstration session.

#### Steps:

1. Prepare by reading handout and collection samples of silage
2. (5 minutes) - Methods and importance of fodder conservation: introduce the topic of fodder conservation and the importance of supplying a continuous amount of high-quality fodder in order to sustain sheep production throughout the year.
3. (20 minutes) – Silage making: Ask which of the participants make silage and ask them the precise method, including the steps for making the best quality hay. Compare the different responses and agree on the best way of making silage, including species, time of harvest, and storage. Refer to the background information below. Use question and answers to increase participation. Show available samples of fodder varieties for silage making.
4. (15 minutes) – Fodder quantity: In subgroups, let the participants decide on how much silage is required for e.g., 3 months for a flock of 30 sheep to survive a dry period.
5. (10 minutes) – Conclusion: Discuss advantage and disadvantages of hay and silage in dry season, summarize the topic using the key background information below.
6. Distribute the handout.

## 3.6 Sheep breeding

### 3.6.1 Activity SB1: Discussion topics

#### Objectives:

- Familiarize participants with starting to discuss sheep breeding issues
- Introduce several topics that will be discussed in detail later on in the course of the FFS

## Materials:



- Paper and pen for participants to use in taking notes.
- Flip chart, white board or blackboard for facilitator to make notes.
- Time-keeping device.
- Annex 17: Handout SBI: Overview of sheep breeds.

**Location:** In a quiet location, can be indoors, e.g., in a classroom setting.

**Remarks:** You can potentially introduce additional topics, but make sure the total classroom / plenary session does not exceed two hours.

### Discussion SBI - 1: Sheep breeds (45 minutes)

1. Prepare by reading the handout and familiarizing yourself with the different breeds in Azerbaijan, both local and exotic breeds.
2. (15 minutes) Form subgroups of around four to five people. Ask each subgroup to list the breeds they know. Once they have exhausted this list, ask them to list the differences among the breeds, positive aspects and drawbacks.
3. Each group can now present their results and make a list of the breeds on a flip chart. Discuss the differences between the breeds.
4. Use one of the ranking exercises in # and ask farmers to rank the breeds according to different criteria, e.g., growth of lambs, milk production, wool yield, hardiness, etcetera.
5. Discuss the results of the ranking.
6. In future (practical) FFS sessions, use this information to point out different breeds and to keep the discussion on the differences in breeds going.
7. Distribute the handout.

### Discussion SBI -2: Breeding objectives and selection (45 minutes)

The objectives of this discussion activity are to enhance knowledge of the farmers in regard to breeding objectives, to help them develop and improve their own breeding objectives, and to enable them to select breeding ewes and rams according to these breeding objectives.



Annex 18: Handout SBI: Sheep breeding



**Remarks:** If you have access to a sheep breeding specialist, these topics will benefit from inviting a specialist to discuss sheep breeding, in a short, one hour session where the different breeding topics can be covered.

1. Prepare by reading the handout and familiarizing yourself with the aspects of breeding objectives and selection of ewes and rams.
2. Divide the farmers into subgroups of around four to five people. Ask each subgroup to discuss breeding objectives. Pointers here are: milk, meat or wool, reproduction and fertility, disease resistance, resistance to climatic conditions, growth rate, etc. Ask farmers to define what would be their own breeding objectives and write these down.
3. Each subgroup can now briefly present their results in plenary.
4. Discuss the findings and reflect on how similar and how different the criteria are.
5. In the same subgroups, ask them what the main selection criteria for breeding ewes are, and what the main selection criteria for breeding rams are.
6. Ask each group to briefly present their findings.

7. Discuss the different finding and reflect on how similar / different the criteria are. Use all the information from the handout to discuss all aspects in relation to breeding apart from breeding planning and lambing, which will be discussed later.
8. Distribute the handout.

### 3.6.2 Activity SB2: Breeding planning

#### Objectives:

- Enhance knowledge of breeding planning
- Encourage participants to develop and improve their own breeding planning

#### Materials:



- Paper and pen for participants to use in taking notes.
- Flip chart, white board or blackboard for facilitator to make notes.
- Time-keeping device.
- Annex 18: Handout SB1: Sheep breeding (if not provided already).
- Annex 19: Handout SB2: Gestation table.

**Location:** In a quiet location, can be indoors, e.g., in a classroom setting.

**Time:** Two sessions, first session of 30 minutes and a second session of 60 minutes, one or two weeks apart, depending on the FFS session frequency.

#### Steps:

1. Prepare by reading the handout and familiarizing yourself with planning for breeding.
2. In plenary, ask participants what the normal breeding and lambing season is (try to be precis in specific months or even weeks), what the usual time is between mating and lambing, and what the duration of a pregnancy is. Note all the answers on a flip chart and discuss differences and similarities.
3. Reflecting on the answers, ask participants what the ideal lambing season is. Ask: What are the months that sheep are naturally fertile? Ask: What is the period that feed quality and availability is best during this period? Try to decide within the group what the ideal time for lambing would be, try to be as specific as possible.
4. Introduce the information and data from the handout: heat period of 17 days, ideal tupping period (34 days or two heat cycles), time that the ewe allows herself to be covered by the ram (20 to 30 hours), gestation period (146 – 148 days, or 5 – 5, 5 months minus 5 days).
5. Provide handout on sheep breeding (if you have not done so already) and the handout with the breeding calendar.
6. Ask the farmers to reflect on the handouts and all the information provided, so far, on breeding at home. Ask the group members to prepare, at home, a breeding plan for their sheep flocks. If some farmers think they have similar breeding plans, they can also work in small groups. The plan needs to have the following information:
  - Breeding objectives
  - Planned mating time
  - Planned lambing time
  - Specific feeding plan related to this breeding plan.

#### Next FFS session (60 minutes)

7. In the next FFS session, ask farmers to present their breeding plan.
8. After the presentation, discuss similarities and differences.

### 3.6.3 Activity SB3: Practical session - castration

#### Objectives:

- Discuss importance of castration
- Demonstrate castration practices
- Let farmers practice castration practices

#### Materials required:



- Several lambs, ready to be castrated.
- Paper and pen for participants to use in taking notes.
- Flip chart, white board or blackboard for facilitator to make notes.
- Time-keeping device.
- Burdizzo, elastrator and rubber rings, disinfectant, other castration materials.
- Annex 20: Handout SB3: Castration.

**Location:** On a farm, with rams that need to be castrated.

**Time:** 60 minutes

#### Remarks:



- It is recommended to get the assistance of a professional with experience in castration techniques.



- If you have the opportunity to watch an online video together with the group, this video is a demonstration of castrating a lamb with an elastrator (duration: 2:13): <https://www.youtube.com/watch?v=SGgA4jauSfg&list=PLZmB5mkIVHSd8INirFLY3qL4QsqpFpnjq>

#### Steps:

1. Before conducting this activity, check if there are any animals to be castrated, the activity can then be done including a practical demonstration and ideally there will be an opportunity for farmers to practice themselves as well.
2. Source a burdizzo, elastrator, rubber ring and other materials required.
3. In a plenary, discuss the use of castration, what reasons for castration can the farmers come up with?
4. Ask the farmers what methods of castration they know?
5. Once their answers are exhausted, share additional information from the handout and show the video of you have the opportunity to do so.
6. Demonstrate the different techniques, and let farmers practice themselves. Ensure proper techniques and disinfection methods are followed.
7. Lead a discussion on the plusses and minuses of the different techniques, including costs.
8. Distribute the handout

### 3.6.4 Activity SB4: Practical session - lambing

#### Objectives :

- Understand all aspects of lambing
- Demonstrate and practice lambing procedures
- Understand all aspects of providing assistance during lambing

### Materials required:



- Paper and pen for participants to use in taking notes.
- Flip chart, white board or blackboard for facilitator to make notes.
- Time-keeping device.
- Annex 21: Handout SB4: Lambing.

**Location:** On a farm with ewes about to lamb, if possible, otherwise classroom session.

**Time:** 60 minutes

### Remarks:



Ideally, this is a practical session in a season, where some sheep are about to lamb. If this cannot be organized, you can keep it a classroom session only. It is recommended to get the assistance of a professional with experience in lambing.

If you have the opportunity to watch **online videos** with the group:



- Lambing difficulties: attach lambing ropes or head guide:  
<https://www.youtube.com/watch?v=JU7Tvy7823o> (2:30 minutes)
- Lambing top tips: <https://www.youtube.com/watch?v=LLrRCq7j-CY> (1 minute)
- Basic lamb care: <https://www.youtube.com/watch?v=YEIgo72tGDM&list=PLZmB5mkIVHSd8INlrFLY3qL4QsqpFpnjq> (2:38 minutes)

### Steps:

1. Before conducting this activity, check if there are any animals about to lamb. Although this might be difficult to organize, ideally the FFS session takes place during lambing, so participants can observe lambing signals, and practice procedures. The assistance of an experienced professional is highly recommended.
2. If a practical session is not possible, use this activity as a classroom session.
3. In a plenary, discuss lambing procedures, and note the answers on a flip chart. Ask: what signals do you see when a sheep has to lamb? Are there different signals when lambing is about to happen? What to do in case of lambing difficulties?
4. Divide the group in small subgroups of four to five participants. Ask them to describe a normal lambing process, and also their experiences with difficult births. What different lamb positions have they encountered and what can the farmer do to assist with the birth?
5. Ask the subgroups to report back on their findings.
6. Use the information from the handout to discuss all aspects of lambing. Ask farmers if they prefer the lambing outside or in pens.
7. Distribute the handout.

## 3.7 Animal health

### 3.7.1 Activity AH1: Discussion topics

#### Objectives:

- Familiarize participants with starting to discuss sheep health and disease issues
- Introduce several topics that will be discussed in detail later on in the course of the FFS in animal health

#### Materials :

- Paper and pen for participants to use in taking notes
- Flip chart, white board or blackboard for facilitator to make notes
- Time-keeping device
- Handouts where appropriate

**Location:** In a quiet location, can be indoors, e.g., in a classroom setting.

**Remarks:**



You can potentially introduce additional topics, but make sure the total plenary session does not exceed two hours.

You can invite an animal health expert to provide additional technical background. Make sure the expert stays close to the topic of the day and the context of the FFS, and keep these sessions limited to less than one hour only and try to maintain the participatory nature of the FFS sessions.

**Discussion AHI - 1: Overview of sheep diseases (60 minutes)**



Annex 22: Handout AHI: Overview of common sheep diseases

1. Prepare by reading the handout and familiarizing yourself with the local disease situation and the seasonal calendar.
2. Divide the farmers into subgroups of four to five people. Ask each subgroup to list the different diseases they know and describe them based on symptoms. Ask each subgroup to indicate which months of the year these particular diseases are common (15 minutes).
3. Each subgroup can now present their findings and make a list of the disease on a flip chart.
4. Use one of the ranking exercises outlined in chapter five. Ask farmers to rank the diseases (separately for each parameter) according to mortality (e.g., how many animals die) and how frequent the disease occurs.
5. Discuss the results of the ranking.
6. For the five highest-ranked diseases (for each parameter), start a short discussion on treatment and prevention measures. Keep this session short.
7. Ask the subgroups to make a seasonal calendar, indicating the different diseases (see 5.4.1)
8. Each subgroup can now present its calendar.
9. Initiate a discussion on whether there are recent changes in the occurrence of diseases and whether they think this is related to climate change, see also 3.2.4.
10. Distribute the handout.

**Discussion AHI - 2: disease control (60 minutes)**



Annex 22: Handout AHI: Overview of common sheep diseases

1. Prepare by reading the handout and familiarizing yourself with the local disease situation, mandatory vaccinations, the seasonal calendar, and disease control, including the technical information below.
2. Split the farmers into subgroups of four to five people. Based on the list of diseases from the previous section, ask them to list the cause of each disease and indicate methods to control the disease, whether this is prevention or cure. (15 minutes)
3. Discuss which vaccinations are mandatory and what proof of vaccination is required before purchasing new animals.
4. Each subgroup can now present their findings and list their findings on a flip chart.
5. Using the information from the handout, check whether the group members have indicated viruses, bacteria, internal and external parasites, and add the information where appropriate. Check whether disease control measures include treatments, vaccinations, quarantine, grazing strategies, and other control measures. Include a discussion on whether these measures are inexpensive, easily accessible and easy to implement.
6. Distribute the handout.

**Technical information**

Purchasing new animals is a potential way to introduce diseases into a flock of sheep. To lessen the risk of the

introduction of new diseases, any new animal or animals that have been exposed to sheep from other farms can be isolated for a certain period. This is called a **quarantine** period and is usually a period of two to three weeks. This is an excellent time to deworm the sheep in quarantine. While the sheep are in quarantine, pay special attention to their behaviour and any signals or disease symptoms. They can be released once they are in good health and you don't observe any issues.



Introduce the **experimentt described in 4.3.6** Experiment AH-E2: Comparing vaccination practice, and design the experiment together with the participants, using the information from the handouts. Decide when to start the experiment. Plan the experiment and include it in your program.

### 3.7.2 Activity AH2: Practical session - Drenching

#### Objectives:

Demonstrate the correct drenching methods.

#### Materials:



- Paper and pen for participants to use in taking notes.
- Flip chart, white board or blackboard on which facilitator can write notes.
- Timekeeping device.
- Several sheep that are ready to be dewormed.
- Drenching gun or other deworming equipment and a weighing scale. Additional drenching guns will allow the farmers to practice.
- Annex 23: Handout AH2: Internal parasites.

**Location:** On a farm with sheep that need to be dewormed.

**Time:** 60 minutes

#### Remarks:



- If you have the possibility of watching an online video (duration: 3:30) together with the group, this video will give specific information on the use of a drenching gun: <https://www.youtube.com/watch?v=inE8aWA8rR4&list=PLZmB5mkiVHSd8INlrFLY3qL4QsqpFpnjq>



- Only drench sheep that need treatment. Before drenching, make sure you know the weight of the sheep in order to administer the correct amount of deworming, as over- or underdosing is a common problem during administration of dewormers.

#### Steps:

1. Prepare by reading the technical information, visiting the farm to be used for this activity to select the sheep to be dewormed, and ensuring that you have all the materials needed; watch the video if applicable.
2. Gather the group in a quiet location near the sheep.
3. Refer to the previous discussion activity on internal parasites (see 3.7.1) and ask the group to give a brief summary of the discussion.
4. Explain the smart drenching methodology, as outlined in the handout.
5. Show the video if you have the opportunity.
6. Go through the proper procedures of drenching and demonstrate each step:
  - a. Make sure you drench only the animals that need treatment.
  - b. Weigh each animal prior to deworming. If there are very many sheep to be dewormed, you can weigh the heaviest animal and use this dose for all animals.

- c. Calculate, together with the group, the correct dose of dewormer to be used.
  - d. Administer the dewormer in the back of the throat of the sheep, over the tongue. You can use a drench tip or drench gun for administering the dewormer.
  - e. Demonstrate the use of other equipment if available.
7. Ensure that as many farmers as possible practice the drenching methods.
  8. Initiate a short discussion on the drenching method and the farmers' experience.
  9. Distribute the handout.



Introduce the **experiment described in 4.3.5** Experiment AH-E1: Drenching. Design the experiment together with the participants using the information from the handouts. Decide when to start the experiment. Plan the experiment and include it in your program.

### 3.7.3 Activity AH3: Practical session - FAMACHA

#### Objectives:

- Become familiar with the FAMACHA procedure.
- Using the FAMACHA procedure, be able to determine whether a sheep has anaemia.
- Based on the FAMACHA results, be able to make strategic deworming decisions.

#### Materials:



- Paper and pen for participants to use in taking notes.
- Flip chart, white board or blackboard on which the facilitator can write notes.
- Time-keeping device
- FAMACHA cards and guide
- If you have the opportunity to watch a YouTube video as a group, these videos can provide background information:
  - <https://www.youtube.com/watch?v=RL3SBRlqlX0> (duration: 7:00), or <https://www.youtube.com/watch?v=BAdeVez5yyc> (duration: 4:50)
- Annex 24: Handout AH3: the FAMACHA method



**Location:** on a farm with sheep (ideally with anaemic sheep).

**Time:** 60 minutes

#### Remarks:



Ideally, this is a practical session that can benefit from the assistance of a professional with experience in internal parasite control. Always use the FAMACHA guide (see references) and official FAMACHA cards when using the FAMACHA method.



Because FAMACHA scores are based on colour, you should **not attempt to make your own FAMACHA card** using a colour printer or use your smart phone for scoring.

#### Steps:

1. Before conducting this activity, check whether there are any sheep in different anaemic stages, to demonstrate the differences in FAMACHA scoring.
2. Briefly explain the FAMACHA method and objectives, as outlined in the handout.
3. Watch the video together as a group if possible.

4. Make small subgroups of four to five participants and provide each subgroup with a FAMACHA card.
5. Go to the sheep and request each group to score a number of sheep, preferably in different anaemic conditions. Provide guidance where needed.
6. In a plenary, let the groups present their findings.
7. Discuss the FAMACHA method, including: How easy is it to use? What are the findings? Which animals should be treated?
8. Use the information from the handout to discuss all aspects of the method.
9. Distribute the handout

## 3.8 Marketing and business skills

### 3.8.1 Activity MB1: Market dynamics

#### Objectives:

- Introduce marketing for sheep farmers.
- Develop strategies for marketing for sheep farmers.
- Improve FFS members' understanding of marketing.

#### Materials required:



- Paper and pen for participants to use in taking notes.
- Flip chart, white board or blackboard on which facilitator can write notes.
- Timekeeping device.
- Annex 25: Handout MB1: Marketing.

**Location:** In a quiet location. Can be indoors (e.g., in a classroom setting).

**Time:** 30 minutes.

#### Steps:

1. Prepare by reading the handout.
2. Distribute the handout.
3. Briefly explain the marketing strategies and objectives, as outlined in the handout.
4. Make small subgroups of four to five participants. Provide each subgroup with a specific main production goal, e.g., one group has lambs for slaughter, another group wool, another milk and the last group breeding stock. Ask them to take a participant's farm as an example, ideally with a similar production goal. Ask each group to design a marketing plan for the farm. For lambs, for example, include age and weight of sale, month of sale, which buyer to market the lambs to, estimated prices, etc. Apart from the existing marketing mechanism, ask the members to include all improvements they can think of, including things such as marketing as a group.
5. In a plenary, let the groups present their findings.
6. Ask the other groups for feedback on the presentation. What can be improved? Is there a marketing channel with better prices? Are all costs included in the plan? Are all options explored?
7. Use the information from the handout to discuss all aspects of marketing.

### 3.8.2 Activity MB2: Cost-benefit analysis



There are not many farmers that record their specific expenses. For this reason, they do not know the relation between expenditures and income and might not realise that they are earning very little money from their sheep production enterprise. In some cases, they might even lose money. For these reasons, it is essential to keep records of all income and expenditures systematically. These records will assist in doing a cost-benefit analysis.

**Objectives:**

- Understand the importance of record-keeping.
- Encourage farmers to carry out a cost-benefit analysis to evaluate their sheep enterprise.

**Materials:**

- Annex 26: Handout MB2: Sheep farming as a business.
- Samples of costings, revenue and profit calculations from other farms.
- Flip chart, whiteboard or chalkboard.
- Flip chart stand.
- Markers.
- Calculator.
- Paper and pen for participants to use in taking notes.

**Location:** A quiet location. Can be indoors (e.g., in a classroom setting).

**Time:** One hour.

**Remarks:** Ask participants if they want to bring some financial records from their farm for analysis during this session.

**Steps:**

1. Distribute the handout.
2. Initiate the activity by asking group members how much profit they have made from their sheep production enterprise during the last six months. The perceived profits can be listed on a flip chart.
3. Now start a discussion on how the farmers have calculated these profits. What methods have they used to determine these profits?
4. Divide the group into subgroups. For the last six months, ask each subgroup to write down all expenses related to sheep production. This can be done for one volunteer subgroup member. Make sure that family labour is listed as wages. All income generated from sheep production is listed as well for the same period. All expenditures are subtracted from the gross income, which determines the net income.
5. Start a discussion in the group on what the most important income streams are. How long should records be kept? How can the farmer increase his income? Are there any expenditures that can be reduced? This can also be an excellent time to discuss gender issues and see whether both men and women have the same negotiation powers regarding negotiating with buyers and what can be improved.
6. Ask all group members to record all income streams and costs related to their sheep enterprise for a minimum of six months during the implementation of the FFS sessions. Each month, one member can present their results in a plenary session. You can come back to this in future FFS sessions and have farmers present their findings.
7. Additional topics

## 3.9 Additional topics

There are many topics that can be included in a sheep FFS program; a lot depends on what problems farmers have within their production system, their level of knowledge and experience, and their interest in learning.



Below follows a list of additional topics that can be included in an FFS program. If there is a particular interest in one of these topics, you could always invite an expert to discuss the topic during one of the sessions. Additional information needed for these topics can be found in the documents listed in the references.



1. Proper sheep shearing techniques, see e.g., this video: <https://www.youtube.com/watch?v=PpUTaIfyZt8>
2. Housing of sheep
3. Hoof trimming
4. Flushing (providing more / better feed before and during tugging)
5. Preparation of complete rations from locally available feedstock
6. Crossbreeding
7. Oestrus synchronisation
8. Artificial insemination
9. Lamb management
10. Weaning
11. Ectoparasites
12. Liver fluke cycle
13. Meat and / or milk processing
14. Slaughtering
15. Meat quality
16. Business plans
17. Finance for sheep farming
18. Gender and youth
19. Nutrition
20. One health
21. Antimicrobial resistance, etc.

# Chapter 4: FFS comparative experiments

## 4.1 Introduction

FFS experiments can be used to test and adapt technologies and innovations to solve local problems. In sheep FFS, farmers go through a learning process during these experiments, which will assist them in validating and adopting new practices. The focus is on improving the production, productivity, or sustainability of sheep production systems. The experiments will empower FFS participants to observe and analyse the major constraints to their sheep production and determine their causes and effects. These experiments are often called **comparative experiments**, as the new practices are compared to existing or other innovative practices.



**FFS group members** are the key actors during the implementation of the FFS experiments. The FFS facilitators and possibly researchers play a supplementary role in the experiments. The FFS members should decide upon the focus of experiments to encourage ownership of the activities. The experiments should be based on real perceived problems by the farmers. FFS members should also be involved throughout the design process.

Some examples of experiments are listed in this chapter. Depending on the interest of FFS members and the constraints encountered, many additional topics can be the subject of an experiment. Below a general design for experiments is listed, which can be used for designing experiments for different topics, as required by the FFS and the local context.

Livestock experiments can have higher risks than experiments in crops due to the higher economic value of sheep and the risk of production losses. The FFS group should take no risks when dealing with sheep experiments, the experiments should be ethically acceptable, and animal health risks should be monitored closely. It is essential to ensure that any experiment involving sheep is checked by a veterinarian or a local livestock expert. The main goal of FFS experiments is to create a **learning process** and is not primarily a research experiment.

## 4.2 General steps in designing experiments

FFS experiments should ideally focus on new technologies that are compared to local knowledge and skills. It is important to plan the experiments as best as possible, following the steps below:

### Step 1: Prioritising problems

The main issue that is the topic of the experiment has to be understood clearly. These issues will have been prioritised in the early phase of the FFS implementation. A comparative experiment is an excellent option to select when comparing new practices to current technologies and practices. The experiment is set up together with the farmers.

### Step 2: Experimentation principles

The goal is to make sure that all FFS group members understand the principles of experimentation clearly. Ensure that the farmers have all the tools they need to design their sheep farming experiments.

### Step 3: Plan and design experiments

As discussed previously, risks in sheep farming experiments should be avoided. You can design the experiment together

with the group members, using the following steps:

1. Using the problems that have been identified previously, define the key objective of the experiment.
2. Using the key objective, list the different treatments that will be included in the experiment, for example, comparing local practices with innovative practices.
3. It is vital to limit the experiment to a maximum of four treatments and to focus only on one particular aspect that is the topic of the experiment. Having more treatments or more topics makes the experiment too complex and challenging to analyse.
4. Also, make sure that the different treatments are significantly different from each other to observe apparent differences at the end of the experiment. Ensure that for each treatment, only the topic of the experiment is different and that all other aspects are kept the same. Additional replications of each treatment make the final results more valid but do not include more than three replications
5. Treatments should be allocated **randomly** in terms of the animals used or the site of the experiment. Randomisation can be done by writing treatments on a note, putting the notes in a bag, and picking the notes one by one. This will then be the order the treatments will be set up in the experiment.
6. The **duration of the experiments** should be focused and as short as possible. Once the difference between the two approaches is clear, and the farmers are convinced of the results, the experiment can be stopped. Other experiments can now be started if appropriate, as it is important to include as many experiments as possible within the FFS sessions. Adopting a whole cycle in livestock FFS (e.g., “lamb to lamb”) is recommended; for some experiments focusing on breeding, additional FFS cycles might be required. Many experiments can be conducted within a much shorter duration.

FFS experiments can be designed either in a **stepwise manner** or as a **single-factor** experiment. When using a single-factor experiment, different solutions are looked at, for example, the growing of different types of fodder or different ways of grazing management. These solutions are compared to a control treatment.

Experiments can also be designed in a stepwise manner. In this case, specific treatments are added gradually, for example, different levels of fertiliser application to a fodder production trial.

In the example below (see Figure 4), the control group cannot be compared with the second treatment, but the control group can be compared to the first treatment, and the two treatments can be compared to each other.

Figure 4. Supplementary feeding: example of a stepwise trial

| Control   | Treatment 1   | Treatment 2   |
|---|---|---|
| Sheep group no. 1 is kept with the farmers' flock under normal management | Sheep group no. 2 is kept with the farmer's flock under normal management (1) + this group is also receiving locally made supplements in the evening. | Sheep group no. 3 is kept with the farmer's flock under normal management (1) + this group is also receiving locally made supplements in the evening. |
|   |   | (2) + this group is also receiving commercial supplements in the evening.   |

*All management practices of all the groups remain the same, e.g., grazing, housing, treatments etc.*

Source: FAO, 2021

FFS experiments whereby current practices are compared with either **past experiences** or with other practices could be implemented by non-FFS group members. One example of such an experiment is when all the current FFS group members receive, for instance, a vaccination against a specific disease. During discussions in the FFS sessions, this treatment is compared either to the experience of the FFS group members or with neighbouring farmers that have not received this vaccination.

Another type of experiment is the **'stop and go' experiment**. In such an experiment, a treatment is carried out for a certain period, after which it is stopped and then started again. The repetition of this treatment allows for a proper comparison between the treatments. AESA observations between periods when the treatment is stopped are compared to periods when the treatment is stopped.

#### **Step 4: Evaluation and record-keeping**

Keeping records of the performances during the experiments is very important. Keeping track of any observed changes, for example, during AESA sessions, allows for the evaluation of the experiment. Systematically evaluating the experiment stimulates the learning process and allows the farmers to make well-informed decisions. Group members are responsible for keeping the records of the experiments based on indicators that are previously agreed upon by the whole FFS group.

#### **Step 5: Implement and organise the experiment**

Once the experiment has been designed by the FFS group and is understood by all group members, the duration of the experiment can be discussed. Following the decision on the duration of the experiment, a budget for the experiment can be developed. All materials and inputs that are needed are listed and costed. The group can now decide on which roles and responsibilities each of the group members should have. Ensure that all group members are assigned roles and that certain group members do not dominate the group process. Each member of the group will take part in the recording and assessment of the experiment. When an experiment includes several treatments, subgroups can be formed that are assigned a particular treatment. Each subgroup will report back in plenary about their findings.

#### **Step 6: Analysis of results and way forward**

It is crucial to **analyse** the data derived from the experiment. Facilitators should encourage discussion to ensure all data are correctly analysed, enabling farmers to adopt the new technologies. The treatments are compared by the group based on the previously agreed indicators. It is important also to include a cost-benefit analysis, as specific treatments might be too expensive for farmers to adopt. The group can evaluate the experiment by using participatory monitoring and evaluation methods. The perception of farmers on the results of the experiment can be listed. Based on these perceptions, the farmers can be asked whether they would adopt any of the interventions. If farmers indicate that they would not adopt the practice or change any of their management practices, the reasons for this can be listed. These results can be discussed in a plenary session; there might be reasons for non-adoption that could be solved by group activities, which can be addressed. Results of experiments can be shared in a broader context, so that other sheep farmers can also benefit.

### **4.3 Examples of experiments**

#### **4.3.1 Experiment FW-E1: feeding concentrates**

##### **Introduction**

In this 'stop and go' experiment, supplementary feeding is being evaluated. When the quality of pasture is lacking, supplemental feeding can be provided to high producing sheep to maintain production.

**Objective:** Demonstrate effects of supplements on sheep production.

**Uniform situation:** Only one group of sheep is required.

**Replication:** 2 to 3 times.

**Time frame:** 2 months.

**Materials:**

- Growing lambs
- Weighing scales or balances.
- High-quality supplements (can be locally made or commercial supplements).

**Record-keeping**

The weight of the lambs and lamb growth rates should be measured around two weeks before the start of the experiment. During the first two weeks, the concentrates can be fed, and the weights of the lambs recorded. After these two weeks, stop feeding the concentrates for a similar period, e.g., two weeks, and keep recording the weight of the lambs. Then start again with feeding the concentrates for two weeks and keep weighing the lambs. The results can now be presented, and a chart can be compiled to show the growth of the lambs over time. It is now also important to look at the concentrates costs and compare any weight gain with the expenses. The findings are now discussed in a plenary FFS session.

**Recommendations**

The value of the supplements can be evaluated in this stop-and-go experiment. An additional benefit to weight gain is that the body condition of the sheep is improved and that the disease resistance has been increased.

### 4.3.2 Experiment FW-E2: Minerals and vitamins

**Introduction**

To remain productive, healthy, and function normally, sheep need a range of minerals and vitamins. Local resources are often available for salt and other minerals, and farmers' knowledge of this is beneficial. These local resources can include salty water, forage that is salty, and some pasturelands have soils with high mineral content. There are, however, a range of different minerals and vitamins, and not all of these might be available locally. The experiment below is a comparative experiment based on feeding minerals and vitamins.

The discussion activity in section 3.4.1 has introduced this experiment. It has allowed the group to decide what mineral and vitamin supplementation to use and what type of sheep to use. Suppose the group is already fully aware of the benefits of mineral and vitamin supplementation. In that case, the experiment can also be set up to compare two different supplements, e.g., using three groups of animals, where one of the groups is a control group for comparison.

**Objective:** Explore the effects of mineral and vitamin supplementation on the health and weight of sheep.

**Uniform situation:** Two or three groups of sheep are required.

**Time frame:** Four periods of four weeks (a total of four months).

**Materials:**

- Groups of growing lambs.
- Mineral and vitamin supplements.
- Measuring containers.
- Weighing scales or bands.

**Steps:**

1. Select several sheep for the experiment, for example, a group of growing lambs, including some that do not appear to be completely healthy.
2. Manage the sheep exactly as the farmer usually would and manage all sheep in the same way. The weight of the

sheep is measured for a period of **four weeks**. The AESA sessions are used to observe the sheep, and the condition of the animals is noted, as well as the general health situation.

3. The flock of sheep is then divided into two randomly. Make sure that the two groups can easily be distinguished from each other. One group continues under the same regular animal management practices. The other group of sheep is given mineral and vitamin supplementation for a minimum of two hours a day. The FFS members continue to measure weights, health and body condition for the two groups. This period is also four weeks.
4. Once this period of four weeks has passed, the treatments for the two groups are reversed for another four weeks. This means that the group receiving supplements will not receive any supplements for four weeks and the other way round. Continue with the observations and the record keeping.
5. The treatments can potentially be switched again for an additional four weeks.
6. If the treatment differences are apparent at some point, and if the group indicate that they would like to stop, the experiment can be stopped, and another experiment can be started.

Now the experiment is finished, it is time to analyse the findings. The facilitator can ask the group about the differences. Was there any positive effect following the supplementation? Do these effects outweigh the costs? Do these effects outweigh the time and labour involved? Which group members will adopt the use of the supplements? Or perhaps change anything in the practice?



**If a local expert** is available with knowledge on this topic, you could introduce a special topic during the course of the FFS. The expert can explain the quality of the different mineral and vitamin supplementation available, ideally backed up by laboratory results, and can also explain, in general, what minerals the soil is lacking in the particular geographical areas is lacking.

### 4.3.3 Experiment PG-E1: Electric fencing – rotational grazing

#### Introduction

This experiment will introduce both electric fencing and rotational grazing. Use farmers' knowledge in this experiment in relation to how long the sheep would be able to stay in a specific paddock. You can either use this experiment for strip grazing or rotational grazing. Make sure you visit the farm before the experiment and agree with the participants on which pasture paddocks to use, which group of sheep and for what period.

This experiment will need to be appropriately designed, as the design will depend on the size of the electric fence, the number of sheep and the paddocks available. Be flexible with the number of sheep and duration to ensure the experiment will demonstrate the desired results.

#### Objective:

- Demonstrate the proper use of an electric fence.
- Demonstrate the solar-powered fence (if available).
- Demonstrate effects on rotational grazing strategy,

#### Materials:



- Groups of sheep.
- Two equal paddocks, sufficiently large for the experiment and the number of sheep, ideally closely located to the venue of the FFS.
- Electric fence system, ideally solar powered.
- Annex 14: Handout PG2: Electric fencing.
- Annex 13: Handout PG1: Grazing strategies.
- Weighing equipment to monitor the weight of sheep.
- Voltmeter.

**Time period:** Four periods of two weeks (eight weeks in total).

**Steps:**

1. Select two groups of sheep and paddocks for the experiment in close consultation with the FFS members.
2. Take sufficient time with the FFS to demonstrate the use of the electric fence, the need to train the sheep using the information from the handouts.
3. Take sufficient time with the FFS to explain different grazing strategies, using the information from the handout.
4. Determine, with the group, what size of paddock would be sufficient for the group of animals to use for six weeks. Use the calculation exercise in 3.5.1 to assist with this.
5. One of the paddocks will be used for continuous grazing for a total period of eight weeks.
6. The other (equal-sized) paddock is divided into four equal sizes, and one of these four parts is fenced with the electric fence, where one group of sheep is kept for two weeks.
7. Every two weeks, an FFS session is held. Carry out an AESA on the grass and the sheep and weigh the sheep (in both locations). Move the sheep in the rotational grazing experiment to the next paddock by moving the electric fence.
8. If differences are evident at some point, and the group/farmer indicates that they would like to stop, the experiment can be stopped, and another experiment can be started.

When the experiment has finished, the results are analysed based on the AESA records and observations. Was there any benefit in using rotational grazing? Are the labour and costs involved worth using this practice? Which farmers will take this practice? Are they going to adapt the practice in some way?



If a **local expert** is available with knowledge on this topic, you could introduce a special topic during the course of the FFS. The expert can explain various potential grazing strategies and can explain, in general, the types of electric fences available in the country and how to use the fences.

#### 4.3.4 Experiment PG-E2: Fodder production

##### **Introduction**

Fodder, and grass, in particular, is a critical input in any sheep production system. There are, however, many different varieties of grass that can be used.

**Objective:** Evaluate different grasses.

**Treatments:** Three grass varieties.

##### **Uniform situation**

Specific grassland paddocks will be used with the same soil and conditions. Each paddock must have an equal size. As an example, 10-metre by 10-metre plots can be used. If manure or fertilizer are applied, then make sure that each paddock receives the same treatments. Other management practices should be kept the same as well. Make sure that each treatment is assigned randomly to the plots.

**Replication:** Two replications for each variety.

**Materials:** Three different varieties of grass. Fertilizer or manure can be applied for each plot the same application. You would also need a measuring tape, farm implements for working in the field, labour, and weighing scales.

##### **Record keeping**

Observations and records will be noted down during the AESA sessions. Growth rate, yield, cost of production and all basic observations of the grass should be noted, including colour, size of leaves, etcetera.

## 4.3.5 Experiment AH-E1: Drenching

### Introduction

Sheep farmers are generally aware that internal parasites, including worms, affect the condition and production of their sheep. Worm infestation significantly affects production and the profit for the farmer. The meat of animals infected by worms is often not suitable for sale or consumption. The experiment in this section compares methods of internal parasite control.

### Objectives:

- Compare different internal parasite control options.
- Demonstrate how to use dewormers correctly.
- Demonstrate the effects of dewormers.

### Materials needed:



- Three groups of sheep.
- Drenching gun.
- Different types of dewormers (e.g., commercial and traditional).
- Notebooks and pens.
- Weigh bands or weighing scales.
- Refer to the section in 3.7.1.
- Annex 23: Handout AH2: Internal parasites.

**Time allocated:** Weekly observations for three to four months

### Steps:

1. You should have discussed the experiment already during the session outline in 3.7.1.
2. Using information collected beforehand, decide the type of animal to be treated (e.g., growing lambs). Also, decide on the time of the year of the treatment and which type of internal parasites are the major constrain in sheep production. Once these parameters are available, decide on the specific dewormer to be used for the experiment.
3. Design the indicators for the **AESA sessions** and note down the cost of each treatment.
4. In a plenary FFS session, a discussion can be organized to discuss farmers' experiences with internal parasites, the issues, and how they use different dewormers. Do farmers use different types of dewormers? Are they used in specific seasons?
  5. In an FFS session, an animal health expert can be invited to provide advice. The experiment below includes the comparison of a commercially available dewormer with local treatment against internal parasites.
  6. Seek expert advice regarding the amount of dewormer to be used and the frequency that the dewormer has to be applied. Apply the treatments to the flock of sheep accordingly. There are many methods for minimizing the impact of internal parasites, and all procedures can be applied to all groups, including cleaning the barns, pasture rotation, etcetera.
7. The FFS group designs the experiment according to the needs of the farmers. Ensure that the separate groups of sheep are as similar as possible in terms of conditions, breed and age. Select the different groups in a random manner. The minimum experimental period should be around four months, for example, eight weeks in the dry season and eight weeks during the rainy season.
8. Decide on the indicators to use during the AESA sessions. The sheep should be weighed during the experiment, and many other indicators should be included, including observation of faeces, health, condition, etcetera.
9. Record the weight and AESA indicators for each sheep weekly.
10. In a plenary discussion, determine whether the deworming methods are cost-effective. Initiate a general discussion on the use of dewormers.



Figure 5. Single treatment experiment on deworming

| Control                   | Treatment 1                            | Treatment 2                                  |
|---------------------------|--|--|
| Group no. 1: No deworming | Group no. 2: Local deworming treatment | Group no. 3: Commercial de-worming treatment |

---

*Other management practices remain the same: Feeding, grazing, housing, treatments. The control group could be animals not belonging to FFS members that are not treated.*

Source: FAO, 2021

- Once the experiment has finished, organize an FFS session to analyse the overall outcomes. What was the difference between the groups? Which group showed the best results? What would be the cost of the treatment per sheep? How did the local treatment compare to the commercial dewormer? Looking at the costs of the treatments, which treatment do the group think is the most cost-effective? What treatment option will the farmers use in the future?

### 4.3.6 Experiment AH-E2: Comparing vaccination practice

#### Introduction

This vaccination experiment uses participatory methodologies to compare the treatments. All the sheep of the FFS group receive a specific treatment, for example, vaccination against a particular disease, after close consultation with the veterinary services. Other farmer groups can join in the vaccination campaign.



A local veterinarian can be invited to provide expert advice.

**Objective:** Understand the benefits of vaccinations

#### Uniform situation:

All the sheep of the FFS group are vaccinated.

Each FFS group member records any disease symptoms and the cost of the treatments.

#### Randomisation:

During the FFS sessions, specific farmers can be visited, selected randomly, and an AESA can be carried out on the farmer's sheep. All members are encouraged to carry out their AESA.

**Materials:** Vaccines, sheep, vaccination records.

#### Observations and record-keeping:

- AESA records for the FFS sheep.
- All FFS members report disease outbreaks.

# Chapter 5: Participatory tools

## 5.1 Introduction

Participatory tools are a crucial element within the FFS approach. The FFS focuses on the needs of the farmers and starts with the existing knowledge and capacity of the group of farmers that form the FFS. This chapter gives an overview of participation principles and elaborates on specific participatory tools and methods. These methods and tools strengthen farmers' communication and understanding and are often used in monitoring and evaluation within the FFS context. The following principles are important in the use of participatory tools:

1. **Multiple perspectives:** Everyone is different, and every opinion is important. **Leading to change:** The group will jointly analyse the results and create a discussion. The analysis and discussion strengthen the farmers' capacity to make changes.
2. **Context-specific:** All production systems are different, and the methodology should suit the local conditions.
3. **Experts as facilitators:** Outside facilitators can assist the group of farmers in carrying out experiments and help the group in decision-making.

## 5.2 Exercises for group dynamics

### 5.2.1 Introduction

The objectives of group dynamics are to create a pleasant environment. They can also be used to strengthen learning, leadership, problem-solving and communication. They are ice-breaks and increase participation. The fact that these exercises are easily remembered can be used to include messages. The following aspects are essential when using these exercises:

- Choose an appropriate moment for the exercise, e.g., when people are tired or when there is a conflict.
- Keep the exercises short.
- Carefully prepare the exercise beforehand.
- The objective of the exercise should be clear.
- Make sure all group members participate.
- Make sure that the exercises are acceptable in the local cultural context.
- Use different energisers as much as possible.

Below are a few examples of group dynamic exercises; many books and manuals contain additional examples (see references).

## 5.2.2 Clapping

**Introduction:** The clapping exercise is a short exercise that mainly originates from Kenya.

**Objectives:** Energise participants or to say 'welcome' or 'thank you.'

**Time needed:** Between one and three minutes.

### Examples:

1. *The praise clap:* Stamp three times on the floor, clap two times fast, and stretch the arms.
2. *The rain clap:* Raise the arms above your head; the fingers move fast as if rain was coming down. The group now all together lowers the arms slowly in a wide circle. Once the arms are lowered, a loud clap follows.
3. *The FFS clap:* Two times three fast claps and then one loud clap.
4. *The energy clap:* Spin the right arm around, similar to a helicopter. Start slowly and then turn up the speed. Once the maximum speed is reached, a loud clap follows.

## 5.2.3 Say "Sheep"

**Introduction:** The participants stand up and write the word S-H-E-E-P, using their bodies. You can use other words as well.

**Objectives:** Energise the group.

**Time:** Five minutes.

## 5.2.4 Fruit and animals

**Introduction:** A fun exercise that will require attention from the whole group and will energize the group.

**Time:** Between five and ten minutes.

### Steps:

1. Ask the group members to stand up and form a circle.
2. Ask the group to clap three times, then say the name of a fruit.
3. The group now claps three more times, and the farmer to the left says the name of an animal.
4. The group now claps another three times, and the next person says the name of a fruit.
5. Keep going like this, alternating between fruits and animals.
6. A person should sit down if they say the name of a fruit when it's time to say the name of an animal (or the other way around) when they cannot think of another fruit or animal, or if they mention a fruit or animal that has already been mentioned.
7. The winner is the last person standing.

## 5.2.5 Knotty problem

**Objectives:** Demonstrate that group members can solve their problems and do not necessarily need outside assistance.

**Time:** Ten to fifteen minutes.

### Steps:

1. Select a few group members. The number will depend on the size of the group, as “FFS facilitators”. Ask them to leave the room and instruct the rest of the group following the steps below.
2. Ask the group to form a circle, holding hands.
3. Once the circle is formed, the members can move around and create a knot while continuously holding (the same) hands at all times.
4. After completing the knot, ask the ‘facilitators’ to come back to the group and ask them to untie the knot within three minutes. They have to keep their hands behind their back and are only able to use verbal communication.
5. The group members that form the knot should follow the instructions carefully and literally. Ask them not to make it easier for the facilitators by doing something that is not said.
6. Most of the time, the facilitators will not be able to untie the knot, and often even a more complicated knot is produced.
7. The exercise is now repeated with all group members participating, and the members are asked to untie the knot themselves, which is generally much faster.
8. Let the group reflect on the differences between untying the knot the first and the second time. Why was it different? When was the untying the most successful, and why?

## 5.3 Oral methods

### 5.3.1 Semi-structured interviews

#### Introduction

One of the first activities in participatory approaches is informal communication and interviews. Having the correct skills in interviewing is important and these skills will improve the more somebody practises. It’s important to plan the interview well, and to select a convenient time and a comfortable venue for the interviewees. When interviews take place close to the sheep farm, the interview can be combined with observations as well. Guidelines for interviewing skills follow below.

**Objectives:** Information collection.

**Time:** One hour.

#### Steps:

1. Before the interview, prepare important points to be covered during the interview, and do not stick to pre-defined questions. These points can be used as a checklist during the interview, and at the same time they allow the interview to be flexible. Farmers will be able to express themselves in a way that is most comfortable for them. This is an example of a checklist that can be used for semi-structured interviewing:
  - Introductions.
  - Number of sheep.
  - Activities of the farmer within the sheep farm.
  - Management system.
  - Where are sheep grazed?

- Issues and challenges in the sheep farm.
  - Ranking of key issues.
  - Ranking of diseases.
  - Any other observations?
2. Make sure you properly introduce yourselves and explain the reasons for the visit. Make sure no expectations are raised in regard to future projects.
  3. Make sure you note the names of the farmers, and any group memberships as well.
  4. Use **open-ended** questions as much as possible by using questions that begin with who, what, where, why, etc.
  5. Any questions that can only be answered with “yes” or “no” are closed questions and should be avoided.
  6. Try to **probe** as much as possible to get to the bottom of issues, by continuing asking questions about a particular topic of interest.

### 5.3.2 Focused group discussions

A focus group discussion is the interview of a small group of farmers, for example, four to eight people. The aim is to collect information from the group about a particular topic and note down the group members' opinions. You can let the group discuss an issue for a certain amount of time. You observe the group during this time and make sure they stay on topic.

### 5.3.3 Change or success stories

Change or success stories can identify significant changes that happened concerning a specific topic. These stories highlight the perceptions and impact they have had on a group or individual group members and explain how people have dealt with change in the past and inform the group about any experience that certain members might have.

### 5.3.4 Transect walks

A transect walk is a walk in a certain way, for example, in a zigzag manner, through a selected area. Key issues that have to be considered need to be defined before the walk. A facilitator can carry out a transect walk and observe any environmental characteristics or any activities taking place at that particular time. A picture can be drawn with all the observations.

## 5.4 Visual methods

### 5.4.1 Seasonal calendar

#### Introduction

Many issues in sheep production are different over the seasons, for example, diseases, fodder availability, lambing, weather, etcetera. Doing seasonal analyses assist group members in visualising when specific problems happen and helps them plan their activities.

#### Objectives:

- Understand seasonal variations.
- Assist in planning.
- Facilitate recording, analysing and feedback.
- Strengthen decision-making.

**Materials:** Locally available materials like stones, flip charts, cards, pens, notebooks and markers.

**Participants:** Group of up to twenty farmers.

**Time:** 45 - 75 minutes.

**Location:** Enough space on the ground.

**Steps:**

1. Before the exercise, prepare the pieces of cards (see below).
2. Start by preparing the **timeline**. A horizontal line of around one metre indicates a year, and this line can be divided, e.g., in months or seasons, which can be labelled.
3. Introduce a particular topic to the group, for example, fodder availability and how this changes over the months and seasons. Explain the meaning of the cards.
4. Now ask the group to add **climatic events** to the calendar. Rainfall patterns can be added, for example, by placing a certain number of stones in the calendar, representing a certain amount of rain in a given month (or season). The same can be done for, for example, temperature or any other criteria that is useful to know.
5. Now ask the farmers to add **events** related to the topic of discussion (e.g., different types of fodder throughout the year). Each type of fodder can be either pictures, actual fodder, or labels, whereby the number of stones again represent the total availability in the different months or seasons.
6. Ask the farmers to explain what the different numbers mean. Make sure you ask sufficient follow-up questions to be able to analyse the differences.
7. The calendar can be transferred to a flip chart; make sure notes are taken to be referred to in the future.

## 5.5 Ranking and scoring

### 5.5.1 Pair-wise ranking

**Introduction**

When there is a lot of information available, pair-wise ranking can be used to prioritise items.

**Objectives:** Rank items as a group and gain consensus on the ranking results.

**Materials:** Flip charts, markers and small objects to be used for ranking.

**Participants:** Whole group.

**Time:** The time depends on the number of items to be ranked. For example, for ten items, around one and a half hours is needed.

**Location:** This can be done either inside or outside.

**Steps:**

1. Before the exercise begins, the **items to be scored** are identified. The items can be noted on separate pieces of cards. Local language can be used or pictures to make sure that all participants understand the meaning of each card.
2. A **pair-wise comparison** can now be carried out for the items. Choose two of the items, for example, “lack

of fodder” and “internal parasites”.

- Ask the group to discuss and decide which of these issues is the most important.
  - Once the decision is made, ask for an explanation of this choice.
  - Ask how these two issues can be recognised and list these criteria.
  - Ask the farmer what can be done when these issues occur.
  - Ask when the last time was these issues occurred.
3. Make sure all responses are recorded. These pair-wise comparisons will provide a long list of indicators in the end. The issue that was the most frequently selected is the issue that is ranked highest.

Figure 6. Pairwise ranking - illustration

| Problems                   | Inadequate Livestock Feeds | Animal Deseas              | Lack of water | Lack of good diary breeds  | Score | Rank |
|----------------------------|----------------------------|----------------------------|---------------|----------------------------|-------|------|
| Inadequate Livestock Feeds |                            | Inadequate Livestock Feeds | Lack of water | Inadequate Livestock Feeds | 2     | 2    |
| Animal Deseas              |                            |                            | Lack of water | Animal Deseas              | 1     | 3    |
| Lack of water              |                            |                            |               | Lack of water              | 3     | 1    |
| Lack of good diary breeds  |                            |                            |               |                            | 0     | 4    |

Source: FAO, 2021

## 5.5.2 Matrix scoring

### Introduction

Matrix scoring is used to understand the local problem analysis and facilitates communication.

### Objectives:

The objective of matrix scoring is to come up with the relationship between selection criteria and the items that are being evaluated. An example could be to understand how the farmers see the relationship between observed symptoms and specific diseases.

### Materials:

Small items for ranking, for example, stones, any other locally available materials, cards, markers and flip charts.

**Participants:** Maximum eight participants. Divide into subgroups if the number is higher.

**Time needed:** 45 - 75 minutes.































**Location:** Inside or outside, on the ground.

### Steps:

1. Decide what the topic of discussion is. An example could be animal diseases. Then write down each disease on a

- card. These cards can be placed on the ground in a row.
- Pick a criterion for ranking, for example, “calf mortality”, and write this criterion on a card.
  - Ask the farmers to use the stones (you need five stones per disease) to indicate the strength of the relationship between “calf mortality” and the diseases listed on the ground. Make sure they use all the stones.
  - Once all the stones have been placed, ask the farmers to look at the final scores. Allow the farmers to re-distribute the stones if they wish. Make sure you record the number of stones for each disease.
  - Repeat these steps now with a new criterion. Keep going until all the criteria have been scored.
  - A matrix should now be made, similar to the illustration below (See Figure 7).
  - Now discuss this matrix with the farmers. Make sure you continue asking questions until the topics are exhausted and all elements are analysed.
  - The matrix can be copied to a flipchart, which can be used for future reference.

Figure 7. Illustration of matrix scoring

|   | ECF<br> | TRYPS<br> | ANTHRAX<br> | MASTITIS<br> | DIARRHEOA<br> |
|---|--|--|--|---|--|
| CALF MORTALITY<br>   |         |  |             |   |               |
| ADULT MORTALITY<br>  |         |           |             |   |               |
| LOSS OF MILK<br>   |       |         |  |            |             |
| LOSS OF INCOME<br> |       |         |           |            |             |
| LOSS OF WEIGHT<br> |       |         |  |            |             |

Source: FAO, 2021

### 5.5.3 Group assessment checklist

#### Introduction

An essential element for the success of an FFS is the appropriate use of evaluation and monitoring activities. The participation of all group members in evaluation increases ownership of the results of this evaluation. The “group assessment checklist” can assist you in this evaluation. The checklist can be filled in by outside advisors or by the groups themselves.

#### Objectives:

To assess the strength of a group and to evaluate progress.

**Materials:** The group assessment checklist (see Annex 28: Example of a group assessment checklist) and pens.

**Time:** 40 minutes

**Location:** Can be done either inside or outside

**Remarks:** The checklist can be modified according to the need of the group.

**Steps:**

1. Fill in the list yourself, for example, during an interview, or let the group fill in the list themselves.
2. Record the scores in the grey squares. You can either have individuals fill in the scores and then discuss the outcomes in plenary, or you can give one checklist to small groups (e.g., of four) and discuss the results in plenary later.
3. Ask the group, for each topic, to add the scores.
4. Discuss the outcomes of the exercise.

### 5.5.4 SWOT analysis

**Introduction**

SWOT stands for Strengths, Weaknesses, Opportunities and Threats. The SWOT exercise identifies a group's strong and weak points and identifies outside threats and opportunities.

**Objectives:** Analyse the Strengths, Weaknesses, Opportunities and Threats of an FFS group and use the findings to improve the group's strength.

**Materials:** Flip chart, markers in different colours, tape.

**Participants:** Maximum 15 members. Divide the group into subgroups if there are more members.

**Time:** Around 60 - 90 minutes.

**Location:** Can be done either inside or outside.

**Steps:**

1. List the strengths and weaknesses of the group, for example, during a brainstorming session. You can use a ranking exercise to indicate which of these are the most important to the group.
2. Repeat this for the opportunities and threats. Opportunities and threats focus on external group factors that are not under the control of the group.
3. Display the list on a flip chart. (See Figure 8 for an example of a SWOT analysis).
4. Discuss the outcomes with the group, probe to get the real issues out, and develop strategies to follow up on the exercise results.

Figure 8. Example of a SWOT analysis

|   |   |
|---|---|
| <b>STRENGTH</b><br><ul style="list-style-type: none"><li>- Knowledge about total issues</li><li>- Good contacts with local community leaders</li><li>- Good offices</li></ul> | <b>WEAKNESS</b><br><ul style="list-style-type: none"><li>- Lack of shifts in participatory tools</li><li>- No computers</li><li>- Lack of transport</li></ul> |
| <b>OPPORTUNITIES</b><br><ul style="list-style-type: none"><li>- Co-operation with EU funded programs</li></ul>  | <b>THREATS</b><br><ul style="list-style-type: none"><li>- Poor phone lines</li><li>- Low salaries</li></ul>   |

Source: FAO, 2021

# References

## General

1. FAO Azerbaijan, project document, project UTF/AZE/009/AZE, “Development and application of sustainable sheep production and food value chains”
2. Draaijer, Jurjen (2020), FAO Azerbaijan project UTF/AZE/009/AZE, Farmer Field School – Training Needs Assessment, available from FAO Azerbaijan.
3. Punjabi, M. (2020). Developing the sheep value chain in Azerbaijan – Vision 2025. Rome. FAO.  
<https://doi.org/10.4060/cb0288en>

## Livestock / sheep production

4. Glorie, Frank (2016), *Sheep signals, a practical guide to animal-focused sheep husbandry*, Roodbont Publishers, available from: [www.roodbont.nl](http://www.roodbont.nl)
5. Draaijer, Jurjen (2020), *FAO Silage making for small holders*, <http://www.fao.org/3/ca9937en/CA9937EN.pdf>
6. Draaijer, Jurjen (2020), *FAO Hay making for small holders*, <http://www.fao.org/3/ca9936en/CA9936EN.pdf>
7. NCAT, (2008), *An Illustrated Guide to Sheep and Goat Production*,  
<https://attra.ncat.org/product/an-illustrated-guide-to-sheep-and-goat-production/>
8. NCAT (2014), *Small Ruminant Resource Manual*, <https://attra.ncat.org/ruminant/#manual>
9. Britannica.com, sheep: <https://www.britannica.com/animal/sheep>
10. FAO, *Pastoralists and Farmers Manage the Landscapes*, <http://www.fao.org/3/i1687e/i1687e07.pdf>
11. <http://www.fao.org/3/a1250e/annexes/CountryReports/Azerbaijan.pdf>
12. Yami and Merkel (2008), *Sheep and Goat Production Handbook for Ethiopia*, Ethiopia Sheep and Goat productivity Improvement Program (ESGPIP).
13. FAMACHA information guide:  
<http://www.fao.org/docs/eims/upload/agrotech/1906/FAMACHA%20InfoGuideFEB04v4final.pdf>
14. FAO. 2021. *Climate-smart livestock production. A practical guide for Asia and the Pacific region*. Bangkok.  
<https://doi.org/10.4060/cb3170en>

## Livestock FFS

15. FAO. 2018. *Farmer field schools for small-scale livestock producers – A guide for decision makers on improving livelihoods*. FAO Animal Production and Health Guidelines No. 20. Rome, FAO. 56 pp
16. Groeneweg, K. et.al. (2006). *Livestock farmer field schools: guidelines for facilitation and technical manual*. International Livestock Research Centre: Nairobi, Kenya.
17. Minjauw, B. and McLeod, A. (2003). *Tick-borne Diseases and Poverty: The Impact of Ticks and Tick-borne Diseases on the Livelihoods of Small-scale and Marginal Livestock Owners in India and Eastern and Southern Africa*. Research report, DFID- AHP, Centre for Tropical Veterinary Medicine (CTVM), University of Edinburgh, UK. 116 pp.
18. Minjauw, B. and Romney, D. (2002). *Integrated livestock management using participatory methodology: the example of livestock farmer field schools*. Paper presented at the Annex A International Workshop organised by the EU Concerted Actions, Integrated Control of Pathogenic Trypanosomes and their Vectors (ICPTV) and the International Consortium on Ticks and Tick-Borne Diseases, Phase II (ICTTD-2), 10-12 April 2001, Antwerp, Netherlands. Newsletter 6, p. 29-30.
19. Minjauw, B., Muriuki, H.G. and Romney, D. (2002). *Adaptation of the farmer field school methodology to improve adoption of livestock health and production interventions*. In: Responding to the Increasing Global Demand for Animal Products, Proceedings of the British Society of Animal Science International Conference, Merida, Mexico, 12-15 November 2002.
20. Minjauw, B., Muriuki, H.G., and Romney, D. 2002: *Adaptation of the Farmer Field School methodology to improve adoption of livestock health and production interventions*. In: Responding to the Increasing Global Demand for Animal Products, BSAS Conference, 12-15 Nov. 2002, Merida, Mexico.

See more at: <http://www.agriculturesnetwork.org/magazines/global/learning-with-farmer-field-schools/field-schools-for-kenyan-dairy-farmers#sthash.tip4AYQo.dpuf>

21. Poultry FFS: <http://www.share4dev.info/ffsnet/documents/3180.pdf>
22. *Curriculum for Farmer Field School on Local Chicken Production (Egg to Egg Programme)*, July 2004, Khisa S Godrick
23. Pastoralist Field School – facilitators’ manual
24. Makori, J.A.; *Influence of Farmer Field School extension approach on smallholders’ knowledge and skills of dairy management technologies in Molo division, Nakuru district of Kenya*, Egerton University, 2007
25. Minjauw, B; *Development of a Farm Field School Methodology for Smallholder Dairy Farmers*, ILRI Kenya, 2004
26. Minjauw, B., Muriuki, H.G. and Romney, D. (2002). *Development of farmer field school methodology for smallholder dairy farmers in Kenya*. International FFS Workshop, Yogyakarta, Indonesia, 21-25 October 2002. <http://www.eseap.cipotato.org/UPWARD>
27. Vaarst, M; *Participatory Common Learning in Groups of Dairy Farmers in Uganda (FFS approach) and Danish Stable Schools*, Faculty of Agricultural Sciences Dept. of Animal Health Welfare and Nutrition Tjele, Denmark, 2007

### General FFS

28. Sones, K.R., Duvesktog, D. and Minjauw, B. (eds) (2003). *Farmer Field Schools: The Kenyan Experience*. Report of the Farmer Field School Stakeholders’ Forum held 27 March 2003 at ILRI, Nairobi, Kenya. Food and Agriculture Organization of the United Nations (FAO), Kenya Agricultural Research Institute (KARI) and International Livestock Research Institute (ILRI), Nairobi, Kenya. See <http://www.ilri.org>
29. Action Research for Disaster Risk Reduction - *Experiences with Farmer Field School (FFS) and Village Community Banks (VICOBA)*  
<http://www.fao.org/disasterriskreduction/east-central-africa/documents/detail/en/c/2775/>
30. FFS 5-min video: [https://www.youtube.com/watch?v=9rqZUEVF\\_kA](https://www.youtube.com/watch?v=9rqZUEVF_kA)
31. FAO, Farmer Field School Guidance Document, 2016: Planning for quality programmes,  
<http://www.fao.org/3/a-i5296e.pdf>
32. Good Practice Principles: FFS, November 2011  
<http://www.fao.org/disasterriskreduction/east-central-africa/documents/detail/en/c/1517/>

# Glossary

|                        |  |
|------------------------|--|
| <b>Abortion</b>        | Premature loss of a pregnancy  |
| <b>Afterbirth</b>      | Placenta and foetal membranes expelled from the uterus after lambing |
| <b>Anaemia</b>         | A condition where the blood doesn't have sufficient red blood cells. |
| <b>Bloat</b>           | Accumulation of rumen gases.   |
| <b>Breech</b>          | Backwards position of lamb during lambing                            |
| <b>Brisket</b>         | Underside of chest   |
| <b>Burdizzo</b>        | Clamp used during castration   |
| <b>Cast sheep</b>      | A sheep that has fallen on its back and cannot get up                |
| <b>Castrate</b>        | Removal of testicles or influence of testicles.                      |
| <b>Colostrum</b>       | First milk an ewe gives after birth                                  |
| <b>Concentrate</b>     | Type of feed, low in fibre and high in energy                        |
| <b>Conception</b>      | The fertilization of an egg by sperm (sheep breeding)                |
| <b>Conformation</b>    | Shape or structure of a sheep  |
| <b>Crimp</b>           | Natural waviness or bend of the wool fibre                           |
| <b>Crossbreeding</b>   | Mating of animals of different breeds                                |
| <b>Cud</b>             | Feed that is swallowed first and then brought up again by a ruminant |
| <b>Culling</b>         | Removal of unwanted livestock  |
| <b>Dags</b>            | Wool contaminated with faeces, adhering to the posterior of sheep    |
| <b>Dam</b>             | Female parent  |
| <b>Drenching</b>       | Method of giving a form of dewormer orally                           |
| <b>Elastrator</b>      | Instrument used for castration                                       |
| <b>Ewe</b>             | Female sheep   |
| <b>Farm-gate price</b> | Price of item delivered to the farm, including transportation, etc.  |
| <b>Fineness</b>        | Measurement of the thickness of the wool fibre                       |
| <b>Fixed costs</b>     | Farm costs independent of the number of sheep                        |
| <b>Flehming</b>        | Typical sound of a ram during mating                                 |
| <b>Flock</b>           | A group of sheep   |
| <b>Foot rot</b>        | Foot condition of sheep caused by bacteria, contagious               |
| <b>Gestation</b>       | Pregnancy  |
| <b>Heat</b>            | Also called oestrus, fertile period of the female                    |
| <b>Heterosis</b>       | Higher than expected increase in performance after crossbreeding     |
| <b>Inbreeding</b>      | Mating or crossing of sheep that are closely related                 |
| <b>Intramuscular</b>   | Into a muscle  |
| <b>Intravenously</b>   | Entering through a vein  |
| <b>Lactation</b>       | Milk secretion   |
| <b>Lamb</b>            | Sheep that is less than one year old                                 |
| <b>Legume</b>          | Plant that can capture atmospheric nitrogen.                         |
| <b>Mastitis</b>        | Inflammation of the mammary glands.                                  |
| <b>Oestrus</b>         | Heat (Sheep breeding)  |
| <b>Offspring</b>       | Young of sheep   |
| <b>Paddock</b>         | Enclosed area for grazing animals.                                   |
| <b>Photovoltaic</b>    | Solar power  |
| <b>Placenta</b>        | Afterbirth   |
| <b>Pneumonia</b>       | Infection in the lungs (Animal health)                               |
| <b>Probing</b>         | Repeated questioning to ensure all responses are received            |

|                           |   |
|---------------------------|---|
| <b>Quarantine</b>         | Period of isolation to monitor sheep for diseases, to ensure they don't infect others |
| <b>Raddle</b>             | Colour pigment used to mark females by the ram  |
| <b>Ram</b>                | Male sheep that is not castrated  |
| <b>Revenue</b>            | Income  |
| <b>Rotational grazing</b> | Grazing strategy where sheep are moved between paddocks.                              |
| <b>Roughage</b>           | Feed that is high in fibre, with low digestibility                                    |
| <b>Silage</b>             | Fermented green fodder in a silo.   |
| <b>Sire</b>               | Male parent   |
| <b>Trait</b>              | Genetically determined characteristic (animal breeding)                               |
| <b>Tupping</b>            | Mating (in sheep)   |
| <b>Vaccine</b>            | Injection for the prevention of certain diseases.                                     |
| <b>Variable costs</b>     | Farm costs which vary according to the number of sheep                                |
| <b>Vigour</b>             | Physical strength and good health   |
| <b>Vulva</b>              | Female sex organ  |
| <b>Weaning</b>            | Taking away young mammals from their mother's milk                                    |
| <b>Wether</b>             | Ram that is castrated.  |
| <b>Yearling</b>           | one- to two-year old sheep  |
| <b>Zoonoses</b>           | Diseases transmissible between humans and animals                                     |

## Annex 1: Handout SP1: Sheep signals

© Glorie

### A healthy sheep

#### SLEEPING/WAKING

Approximately 4 hours' sleep. Several hours spent resting. When stands up, defecates and stretches.

#### MUCOUS MEMBRANES

Pale pink

#### APETITE

Good appetite. Several hours a day spent ruminating, spread over 4-6 periods. Approximately 60 chews per cud.

#### CHEST

Spacious, lots of room for lungs and intestines.

#### BREATHING

12-15 times per minute, calm, even breathing

#### JOINTS

Not thickened, easy to flex

#### HOOVES

Dry, straight, one (compact) whole

#### BEHAVIOUR

Alert, curious

#### EARS

Alert, warm

#### FLEECE

Supple, curly, greasy, closed, no loose tufts or abrasions.

#### PARAMBULAR FOSSA

Full, 2 rumen contractions per minute

#### TEMPERATURE

38,5-40 °C  
(101,3-104 °F)

#### SKIN

Unblemished, pink.

#### DUNG

well-formed droppings.

#### HEART RATE

The heartbeat should be regular and strong, with a heart rate of 60-80 bpm in adult sheep. Heart rate in lambs should be 115-140 bpm.

#### UDDERS

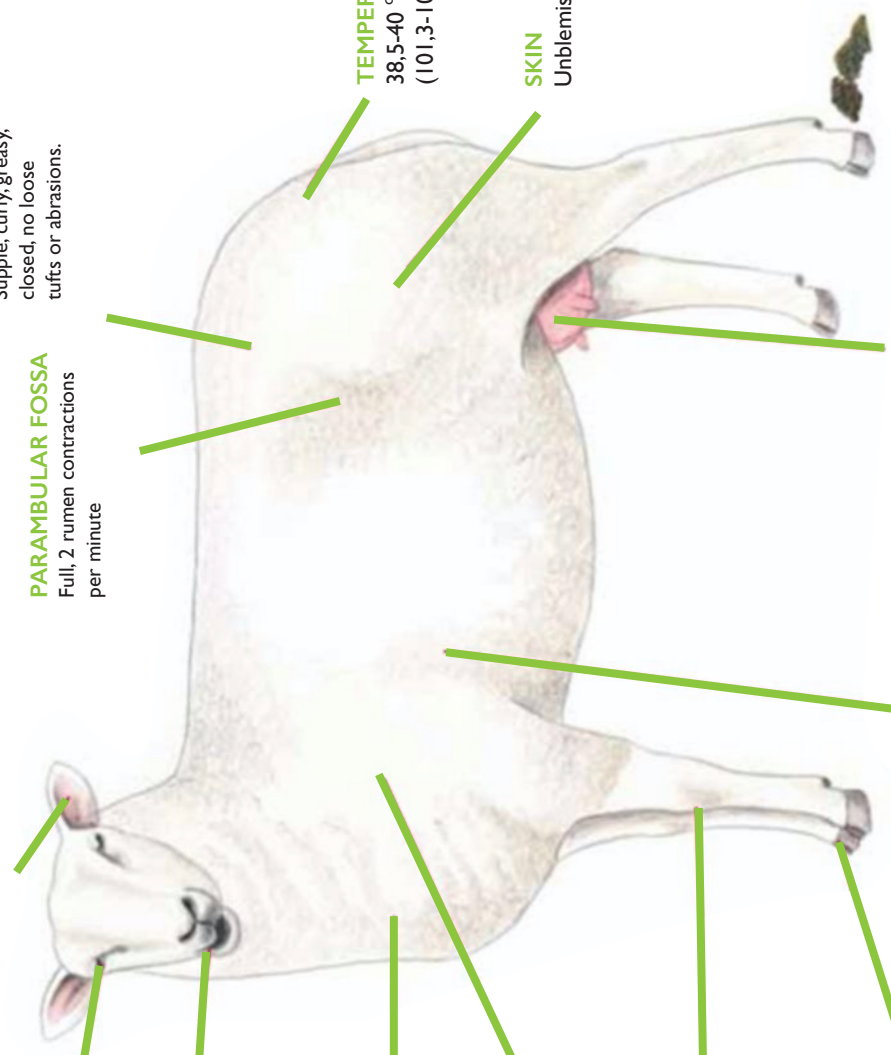
Smooth, no hard lumps.

#### POSTURE/STANCE

All legs taking weight properly.

#### SHEEP SHOULD HAVE:

- A mouth that closes well
- A broad forehead, with bright, alert eyes
- A straight back with wide lumbarvertebrae
- Wide, flat, gently sloping rump
- Long curved ribs
- A broad, deep abdomen
- Straight pasterns
- Sturdy, straight front legs
- A neck tapering upwards
- Straight parallel hocks



**SLEEPING/WAKING**

Does not like standing up, takes a long time to lie down. Unable to settle.

**MUCOUS MEMBRANES**

Purple = oxygen deficiency  
Yellow = liver condition  
Red = excessive blood viscosity  
White = anaemia

**NOSE**

Warm nose, discharge.

**APETITE**

Poor appetite, little rumination, dribbling, slobbering, allowing food to fall from the mouth. The teeth-grinding indicates pain.

**CHEST**

Front legs close together, little space for lungs and intestines.

**BREATHING**

Superficial, mouth open, panting, coughing, pumping, stuttering. Breathing with a clear abdominal push or with constant head bobbing.

**JOINTS**

Thick, swollen, stiff, painful.

**EARS**

Drooping, cold.

**BEHAVIOUR**

Lethargic, agitated, uninterested.

**PARAMBULAR FOSSA**

Visible, less than 2 rumen contractions per minute.

**FLEECE**

Matted, open, dry, no curl, abrasions.

**TEMPERATURE**

Too high or too low.

**SKIN**

Dry, flakes, crusts.

**DUNG**

Diarrhoea, worms, compact, no dung.

**HOOVES**

Deformed, divergent, wet.

**POSTURE/ STANCE**

Favouring legs, rounded back.

**UDDERS**

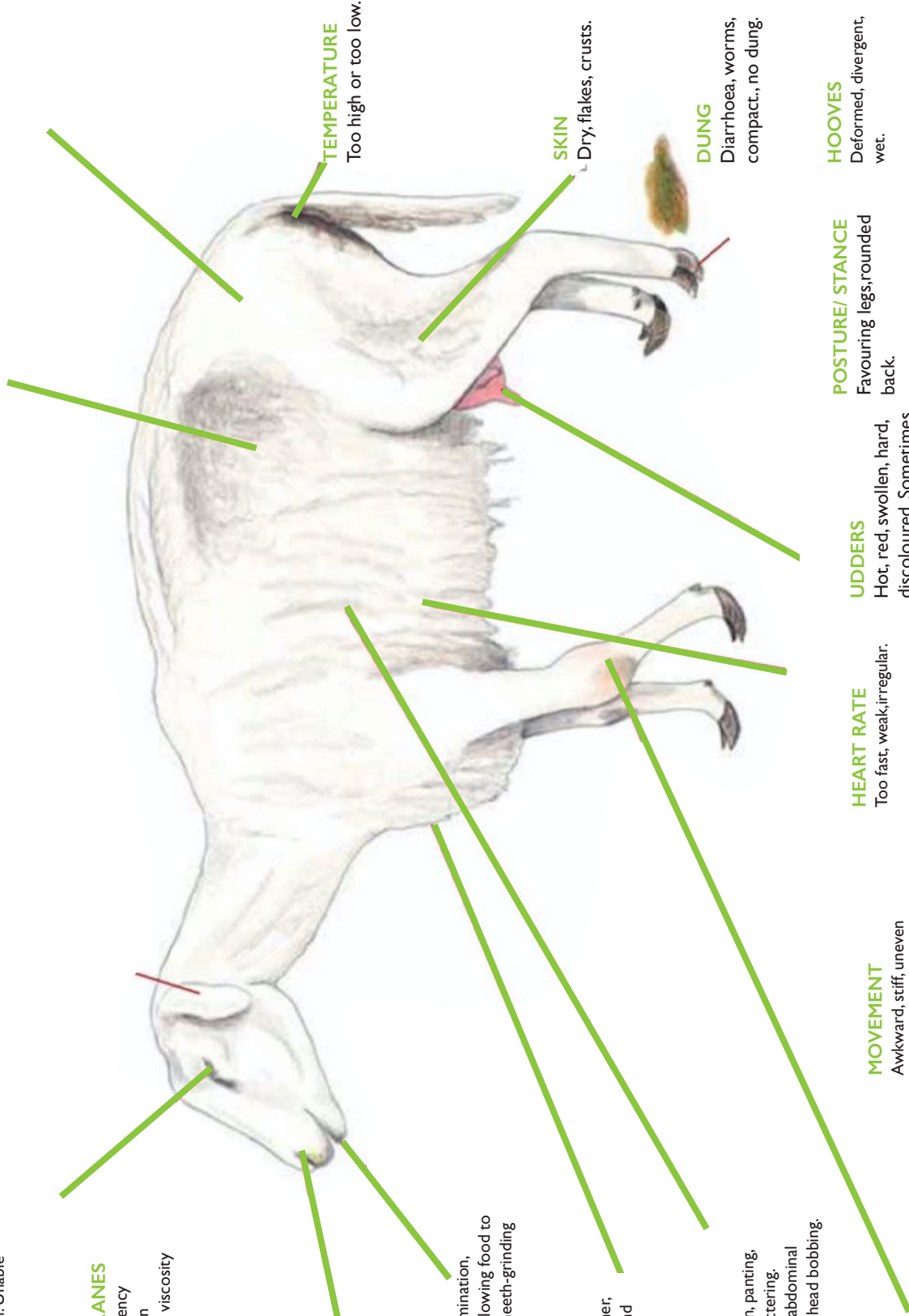
Hot, red, swollen, hard, discoloured. Sometimes even black (necrotic).

**HEART RATE**

Too fast, weak, irregular.

**MOVEMENT**

Awkward, stiff, uneven



## Annex 2: Handout SP2: General Sheep Parameters

Some sheep parameters that can either be measured, or are interesting to know and share:

- Breathing rate: 12 – 15 times per minute, breathing should be even
- Heart rate: 60-80 Bpm (beats per minute, adults), 115 – 140 Bpm for lambs
- The weight of the animals will vary
- Growth rate of the animals will vary, up to 300 g per day
- Temperature: 38.5 – 40.0 °C
- Colour of mucous membranes: Pale pink, if purple – oxygen deficiency, yellow – liver condition / copper poisoning, red – excessive blood viscosity, white – anaemia / copper deficiency.
- 2 rumen contractions per minute
- A sheep sleeps approximately 4 hours per 24 hours.
- A sheep grazes 6 to 9 hours a day, divided into 5 or 6 grazing periods.
- A sheep ruminates around 8 to 10 hours a day
- 60 chews per cud when ruminating.
- Age: Can be estimated by teeth
- Lambing age: From 12 to 14 months
- Lambs per year per ewe: Up to 1.8 – 2 lambs per year
- Lamb birth weight: 2.5 – 5.0 kg
- Lamb weaning age: 80 days
- Lamb weaning weight: 12.0 kg
- Oestrus interval: 17 days
- Gestation length: 147 days (5 months minus 5 days)
- Milk production: 0.6 – 1.5 kg / day
- Lactation length: 180 to 220 days

It's important to know the **weight of the sheep**. It is important to weigh sheep regularly to see whether they are growing well. You can e.g., select a few lambs at random and weigh them every few weeks to monitor progress. Weighing can be done by a bucket on a spring balance (only for very young lambs) or on a set of bathroom scales (you can stand on the scales holding a lamb and then deduct your own weight). Commercial farmers often use weigh crates or walk-through platform scales for sheep. Growth rate varies from breed to breed. With fast-growing breeds (or crossbreeds), an average growth of more than 300 g per day can be achieved. Growth in the first few weeks after weaning is usually slightly lower: 250 g per day is no cause for concern.

A **sheep's age** can be estimated from its teeth. A new-born lamb already has four to six small milk teeth. This increases to eight over the first year of life. Milk teeth are narrower and slightly more tapered than adult teeth. The first permanent teeth are the incisors, which develop at the age of 1½ years. At the age of 2, another adult tooth appears on both sides. By the age of 2½ there are six adult teeth. Sheep have their full set of eight adult teeth by roughly the age of three. Sheep do not have any incisors in their upper jaw, only molars. Sheep often start losing teeth from the age of six. Once a sheep loses teeth, it will not be able to eat and chew as well, meaning that its performance will decline. These animals should be culled. Sheep can live to the age of 14 or 15.

Figure 9. Determining the age of sheep by their teeth



*½ year, two adult teeth.*



*± 1½–2 years, 4 adult teeth.*



*2½–3 years, 6 adult teeth.*

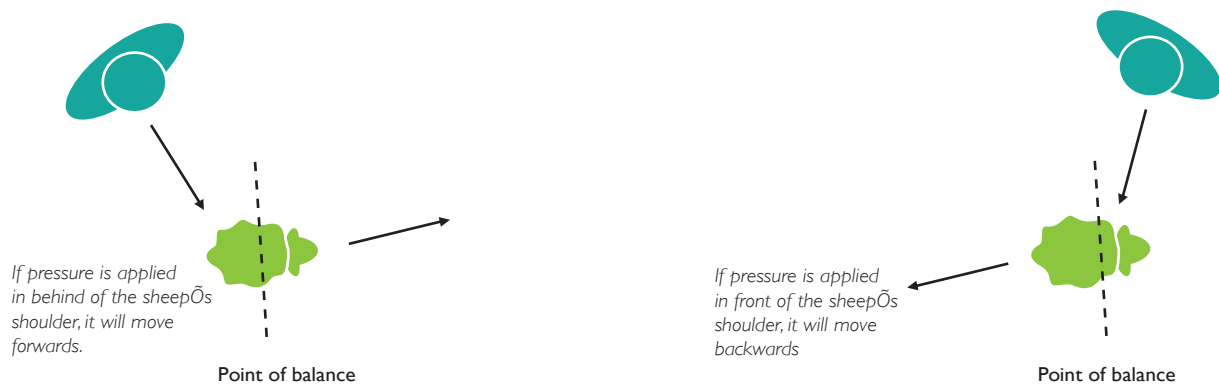


*+ 3½ years, 8 adult teeth.*

### Annex 3: Handout SP3: Herding and Flight Distance

Sheep are flock animals and like to stay together; they have a flight instinct for all things that approach them. This **flight instinct** can be used as a tool for herding sheep without causing stress to the animals. You can use this to direct sheep in exactly the desired direction. A farmer that is calm and quiet and handles his or her sheep very well, will have sheep with smaller flight distances, as the sheep will have gotten used to being close to people. A flight distance of less than 2 metres can indicate stress-free, trusting sheep, and when the flight distance is over 3.5 metres, the sheep are likely to be nervous and stressed. The **point of balance** (see figure below) can be used for herding and can be found around the animal's shoulder. If you want to move the sheep forward, pressure should be applied behind the shoulder, and for a backwards direction, apply pressure in front of the shoulder. You can change the speed of the sheep by increasing or decreasing your walking speed.

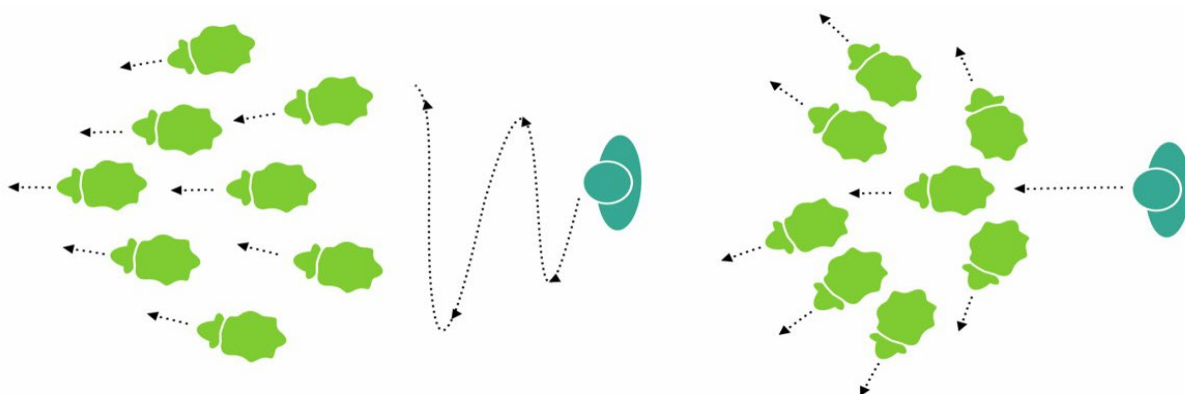
Figure 10. Point of balance for herding sheep



Source: Glorie, 2016

To make sure sheep continue in the same direction, you can **zig-zag** behind the sheep. This will make sure the flock is calm and stays bunched together. Walking in a straight line behind the flock can make the sheep nervous, as they do not see the herder all the time. Make sure you can see the sheep's eyes, in that way, the sheep can see you as well.

Figure 11. Herding sheep – zigzagging



Source: Glorie, 2016

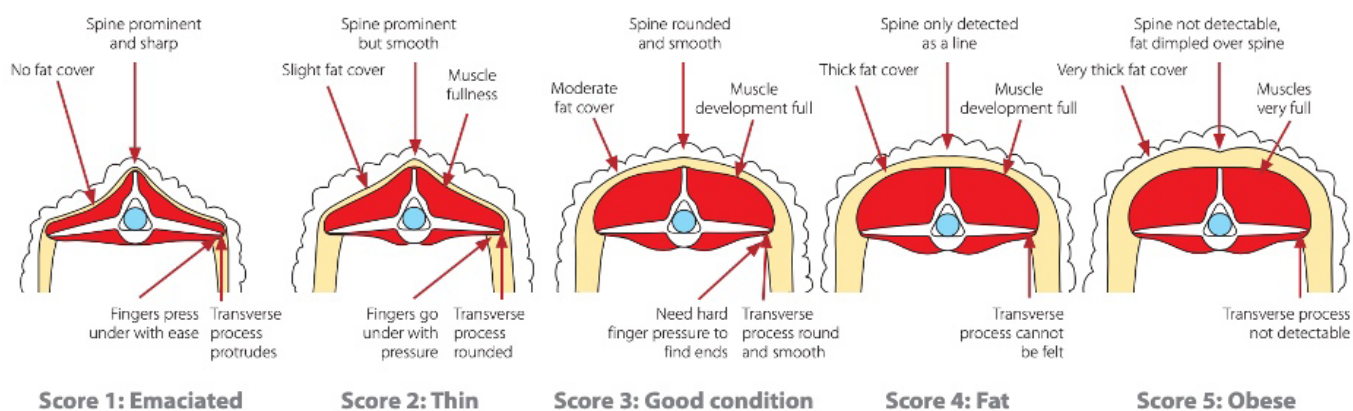
Make sure the sheep see you as the **leader** of their group. This will allow you to move a flock by walking at the head. Train them to “follow” using a reward incentive by giving a treat from the bucket or from your hand. Once the sheep are used to being given this treat, you can combine this with blowing on a whistle. They will associate the whistle with coming to you. Later you can use this whistle to call them to you, even if you have not got any treats with you. Underline your position as leader by always walking at the head and do not allow any of the sheep to pass you.

## Annex 4: Handout SP4: Body Condition Scoring

The body condition of a sheep will tell you something about the nutritional status of the animal, and how much meat and fat the animal has. As wool often makes it impossible to see the body condition of sheep, you can touch the loin of the animal. There are often differences between breeds, so body condition will always have to be judged within specific breeds of sheep.

A sheep is not supposed to have a ridge down its back, if there is a ridge (after you have parted the wool to the left and to the right), this indicates that the sheep is too thin. The figure below can be used to evaluate the body condition of the sheep. In general, too thin is not good and too obese is not good as well; a condition score of around 3.5 is in general the best score.

Figure 12. Body condition scoring



Source: Glorie, 2016

The table below gives an overview of the different scores, the potential causes for ewes, rams and lambs, and the actions the farmer can take to improve the situation.

Figure 13. Condition scores – causes and potential action

| Score | Ewe   | Ram   | Lamb                               | Action   |
|-------|---|---|------------------------------------|--|
| 1     | Long-term problems or deficiencies              | Long-term problems or deficiencies              | Long-term problems or deficiencies | Check for diseases                                       |
| 2     | Physical problem<br>Insufficient energy in feed | Physical problem<br>Insufficient energy in feed | Problem or deficiency              | Check for diseases<br>Allow recovery and give extra feed |
| 3     | Healthy<br>Pre-tupping condition                | Healthy   | Healthy                            | none   |
| 3.5   | Healthy<br>Pre-tupping condition                | Healthy<br>Pre-tupping condition                | Finished (slight fat cover)        | none   |
| 4     | Healthy   | Healthy<br>Pre-tupping condition                | Healthy                            | none   |
| 5     | Obese   | Obese   | Obese                              | Reduce weight  |

Source: Glorie, 2016

## Annex 5: Handout SP5: Righting a cast sheep

Sometimes sheep get stuck on their backs and are unable to get back up, called a “cast sheep”, and meat breeds are more prone to this than other breeds. A thick heavy fleece, a progressed pregnancy, and rough grazing land with dips and hollows all contribute to increased chances of sheep getting cast. If a cast sheep is not helped in time, the rumen will swell up with gas and the intestines will exert increasing pressure on the lungs. The sheep will start to have trouble breathing and will eventually suffocate within a few hours.

Figure 14. A cast sheep



One of the tell-tale signs of increased danger of cast sheep is when your sheep are constantly rubbing against the ground, fence or trees, especially heavily pregnant ewes. They need to be checked for sheep scab and treated if necessary. The rubbing will increase the risk of getting stuck on their backs.

### Righting a cast sheep

Go and stand at the sheep's head; grab hold of the sheep near its armpits and roll it up onto its backside and then onto its hind legs. The hind legs should touch the ground first, see also the figure below. If the sheep is helped up in time, it will recover quickly and will often be grazing again after 10 minutes. You should **never roll the sheep onto its side**. If you do so, its sheep's intestines may will become entangled. This can lead to coma and ultimately death.

Figure 15 Righting a cast sheep



## Annex 6: Handout SP5: Climate-Smart Sheep Production

### Introduction

Current temperatures are increasing in many areas globally, there are more extreme weather events, and rainfall patterns are less predictable. This climate change threatens sheep production systems as well. Not only does climate change affect livestock production, but livestock production also affects climate change carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O), and methane (CH<sub>4</sub>). Estimations conclude that the livestock sector emits around 7.1 giga-tonnes of CO<sub>2</sub> equivalent (CO<sub>2</sub>eq.). Of the total anthropogenic greenhouse gas (GHG) emissions, this is approximately 18 percent (FAO, 2006). Rumen fermentation and manure emissions form the leading share of GHG.

Climate-Smart solutions either relate to climate change adaptation or climate change mitigation.

### Adaptation to climate change

Sheep farmers will have to adapt to climate change, as rainfall unpredictability and increasing temperatures affect their production system. Increased temperatures cause heat stress, affecting sheep production and feed, and water availability is also reduced. New livestock diseases emerge, and distribution patterns of existing livestock diseases change as well. Dwindling natural resources see greater competition with other sectors and will become scarcer.

### Climate change mitigation

Not only climate change adaptation will have to be featured in the training for sheep farmers, but also a focus on climate change mitigation should be included, with practical and feasible solutions for climate change mitigation. Contributions to climate change by the livestock sector are caused by emitting GHGs. This can happen directly through rumen fermentation or manure. Indirect contributions originate from feed production and, for example, when forest areas are converted into grazing land. Low levels of productivity lead to high levels of emissions per livestock product unit, so productivity increases are beneficial in terms of climate change as well.

### Climate-Smart Livestock solutions

Many solutions related to climate change can easily be addressed by farmers, as they are often focused on more efficient production systems and higher productivities. In addition, these interventions will ensure the flocks remain healthy in the dry season, and seasonal variations will be reduced.

Using available natural resources for sheep production with an increased efficiency improves the environmental sustainability of the sheep sector. This includes the increased productivity per animal, increased yields per area for fodder crops, increased efficiency of feed, and efficient use of water resources, fertilizers, manure, and other inputs. Reducing waste along the sheep value chain also contributes significantly to this efficiency.

Climate change and its related effects and consequences will have to be addressed in a few key training topics further on in the course. Reference to this lesson can be made during those lessons.

### Examples of Climate-Smart Adaptation solutions

- To make sure your sheep can cope with either hot or cold weather:
  - Appropriate sheep housing in winter.
  - Ventilation and heat control.
  - Provide sufficient shade in the fields during hot periods.
  - Make sure the sheep can drink plenty of water during hot periods.
- Disease surveillance: Be on the lookout for new diseases that might be a consequence of climate change, report any new diseases to your local veterinary service.
- Report any diseases outside the standard patterns, e.g., when you see a disease that generally only occurs in a different month.

### **Examples of Climate-Smart Mitigation solutions**

Keep fewer but more productive sheep. Culling non-productive sheep can assist in this. This will result in lower GHG emissions; it can lead to higher income if costs go down and production increases.

Provide a higher quality feed to your flock and feeding balanced rations, including supplementary feeding. This will increase the productivity of your flock.

Improved grazing strategies (like rotational grazing) and grassland improvement will also lead to a higher feed intake.

Energy use efficiency in the farm: The use of solar photovoltaic power and other renewable energy sources.

Improve manure management, for example, by using manure for fodder production.

## Annex 7: Handout ID1: Animal identification

Source: Glorie, 2016 and sheep101.info

Keeping records for your sheep production system can assist significantly in monitoring the performance of your farm. Record keeping starts with animal identification, which can help in:

- Selection of sheep for culling, breeding or marketing
- For monitoring health and growth
- For monitoring drug application and vaccinations

When deciding on which type of identification to use, look for a not easy to tear method, is permanently attached, easy to read. The application should also easily and quickly provide all the information you are looking for when checking your sheep. The following techniques assist in animal identification:

- Ear tags
- Ear notches
- Neck chains or straps
- Temporary identification
- Electronic ID

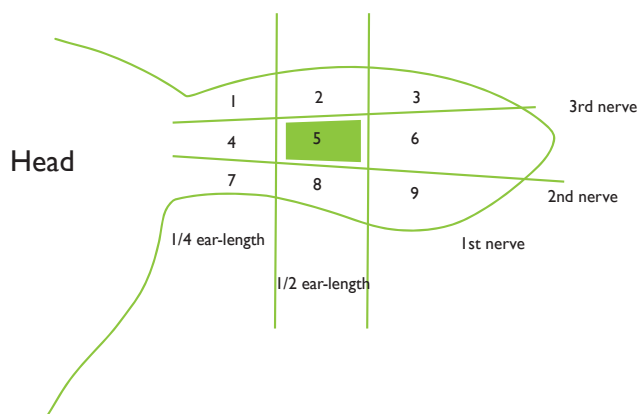
### Ear tags

Ear tagging is the usual method of identifying sheep. There are many different sizes of ear tags, as well as various brands and designs. There are brass, aluminium, plastic tags; button tags, rotary tags, swivel tags, looping tags; DNA tags; and RFID (electronic tags). Other helpful information about the animal can be incorporated, e.g., the year of birth of a sheep can be the first number of the ear tag. Different coloured tags can indicate a different year of birth, a sheep breed, or owners of the sheep. The name or registration of the producer can be included on the tag. Ear tags can be applied to both ears to denote breed, sex of the lamb, or ram.

### Ear tag application

Using the proper application technique will maximize tag retention and minimize ear infections; note that each tag type often has its applicator. Make sure the applicator is working correctly before inserting a tag. Insert the tag in the applicator. The handle of the applicator should be squeezed slowly to make sure the pin is aligned correctly. Tags should be placed more or less halfway between the tip of the ear and the skull of the sheep. Tags will be lost more easily when putting tags too close to the tip of the ear.

Figure 16. Correct positioning of ear tags



Source: Glorie, 2016

When tagging, the animal's head needs to be secured to prevent jerking and possible tearing of the ear. You can keep the sheep between your legs, someone else can hold it, or you can secure the sheep's head in a headgate. The ear is now placed between the applicator and the jaws. The handle is now pressed firmly and quickly while holding the ear until the tag is firmly attached.

Tag infections are not uncommon, and you can minimize infections by tagging lambs instead of sheep and not placing tags too close to the skull. Ears should be clean and dry; tags should be clean. The applicator should be dipped in a disinfectant solution, preferably between each application. The most severe infections occur when the ear is wet and dirty. Small tags cause less tissue irritation and allow more air access to the wound. Metal and round (button) ear tags allow less air access and should be avoided, as they are more likely to result in infections. It may help to apply antibiotics, a disinfectant, or a fly repellent. Unused tags should be stored in a clean container.

### **Ear notching**

An ear notch can be a V-shaped notch in the ear. While ear notching can be a complete animal identification system, as is done with pigs, ear notching in sheep is more commonly used for simple differentiation. For example, ear notching can be used to denote birth type or week of birth. Ear notches can be used to mark ewes for culling.

### **Neck chains or straps**

Neck chains or straps are the least used form of identification in sheep. They are most common with dairy animals. Neck chains have a numbered tag that corresponds to that animal's identification number. The chain must be positioned around the animal's neck tight enough not to fall off but loose enough not to allow for easy breathing and the growth of young animals. Growing animals need to be inspected frequently.

### **Electronic identification**

There is a growing number of animals globally that are being identified with RFID technology. The most common form of electronic identification is through electronic ear tags. These are regular ear tags but have a microchip incorporated.

### **Temporary identification**

Sometimes, temporary identification is desirable in a sheep flock. The branding by paint through spray markers, crayons, sticks, and rattles can be used for sheep identification. This paint branding usually lasts for a few weeks or months. They come in many different colours. For ease of identification, some producers paint an ewe's number on the sheep, either on the side or back. By painting the same number on the lambs, they can quickly identify which lamb belongs to which ewe. This form of temporary identification is also used frequently to mark sheep that needed to be treated, ewes that are not pregnant during pregnancy diagnosis, sheep that have been treated or need to be moved elsewhere.

## Annex 8: Handout ID2: Record keeping

Sources: Glorie, 2016, sheep101.info, NCAT 2018, Yami and Merkel (2008)

### Basic sheep records

To monitor the performance of the flock, certain records need to be kept. Animal identification, as described elsewhere, is essential for proper record-keeping. Keeping records of the sire and dam also helps prevent inbreeding. Some of the records that can be kept include:

- lamb's dam and sire;
- lambing date;
- sex of lamb;
- identification number of lambs;
- birth weight; and
- sheep signals like condition scores.

You may also want to record issues like ease of lambing, mothering abilities, and strength of the lambs. Below is an example of a basic record sheet.

Figure 17. Sample basic record sheet

| Lamb ID | Date lambed | Sire | Dam | Sex | Birth weight | Comments |
|---------|-------------|------|-----|-----|--------------|----------|
|         |             |      |     |     |              |          |
|         |             |      |     |     |              |          |
|         |             |      |     |     |              |          |
|         |             |      |     |     |              |          |
|         |             |      |     |     |              |          |
|         |             |      |     |     |              |          |
|         |             |      |     |     |              |          |
|         |             |      |     |     |              |          |
|         |             |      |     |     |              |          |

Source: FAO, 2021

### Additional basic records

Other additional basic individual records that can be kept are:

- weight at weaning;
- weight at certain time intervals, e.g., 120 days;
- other records according to the production goals;
- mating dates;
- date bought/sold and origin/destination;
- date of death;
- abortions; and
  - animal health interventions:
    - deworming
    - treatments
    - vaccination records
    - FAMACHA scores
    - others.

## **Production records**

The specific production records you want to keep monitoring your sheep performance depend on your production goals. Records that can be kept include:

- milk production, milk sold, finances;
- weight of sheep sold, finances;
- weight of wool sold, finances;
- pastureland records, grazing dates, dates of fertilisation;
- feeding records, supplementation dates; and
- production costs and other financial records

## **Computerised record keeping**

Spreadsheets (e.g., Excel) can be used to record, sort, and analyse performance data, but several software packages can do this.

## Annex 9: Handout FW1: Nutrient requirements

Source: NCAT, 2014 and Sheep 101

Proper nutrition throughout the year is crucial to a healthy and productive flock of sheep. Providing sufficient acreage of quality grazing land is the most critical aspect of sheep nutrition. When quality grazing land is available, there are often adequate nutrients available to keep the sheep production high. The sheep will still benefit from receiving some concentrates at certain times of the year. Examples of these times are in the breeding season, at the end of pregnancy, at the beginning of lactations, and growing lambs. Mineral and vitamin supplementation are probably needed as well, depending on the area. A balanced ration for sheep includes sufficient energy, protein, fibre, vitamins, water and minerals.

**Energy** is the most significant component of a fed ration and is often the most limiting diet component. The primary source of energy in a diet is carbohydrates. The primary energy sources for sheep are contained in forage, grass, silage, hay and grains. When the sheep do not get enough energy, they will lose weight, grow slower, their conception rate will be reduced, and their milk production will be depressed. When sheep are not sufficiently fed, they are increasingly susceptible to specific diseases, particularly internal parasites.

**Protein** is a crucial part of a sheep's diet. Young, growing lambs require the highest amounts of protein as they are growing and building muscle tissue. Ewes in milk also need additional protein, as they are producing milk proteins. Protein sources include meals of soybean, sunflower, cottonseed, peanut, canola (rapeseed), fish, alfalfa pellets and legumes.

In a sheep's diet, sixteen minerals are essential.

**Macrominerals** include sodium (Na), chloride (Cl), calcium (Ca), phosphorus (P), magnesium (Mg), Potassium (K), and Sulphur (S) and are required in large quantities.

**Microminerals** (also called trace minerals) include iodine (I), copper (Cu), iron (Fe), manganese (Mn), zinc (Zn), molybdenum (Mo), cobalt (Co), selenium (Se), and fluoride (F) and are required in small quantities.

**Salt** (sodium chloride), if a sheep doesn't get sufficient amounts, can lower water and feed intake. Salt also plays a vital role in the regulation of the body. In addition, low intakes affect lamb growth, as well as milk production levels. Salt is frequently added to complete feed rations at a rate of around half a percent of the diet.

**Vitamins** A, D, and E are essential for a sheep's diet. Plant material does not contain vitamin A but is synthesized from beta-carotene. B vitamins are not critical to a sheep diet, as the rumen synthesizes these B vitamins. Vitamin K is needed to stimulate the clotting of blood, but additional supplementation of Vitamin K usually is not required. Older sheep need vitamin D to prevent certain diseases.

**Fibre** maintains the working of the sheep's rumen; it increases salivation and the rumination process. It also adds bulk to the diet. One of the signals that might indicate that sheep do not get enough forage is chewing on objects, for example, wool or wood.

**Water** is essential for all bodily functions and can be called the most important element of a sheep's diet. It is, however, often the most neglected aspect of sheep nutrition.

### Nutrient requirements

A sheep needs a certain amount of nutrients for **maintenance**. If a sheep's feed intake is at the maintenance level, the animal will not lose or gain any weight.

When a ewe is in **early and mid-gestation**, its requirements are slightly higher than maintenance. During this period, feed quality is not extremely important, although feeding very low-quality feed can affect the embryo's implantation.

Once the gestation is in the **late stages**, nutritional requirements rise considerably. When the ewe is pregnant with multiple lambs, this means that the requirements increase even more. This is because the growth of the foetus takes place mainly in the last month of pregnancy. Additional nutrients are also needed to ensure the ewe's body condition is relatively high to prepare for milk production after birth.

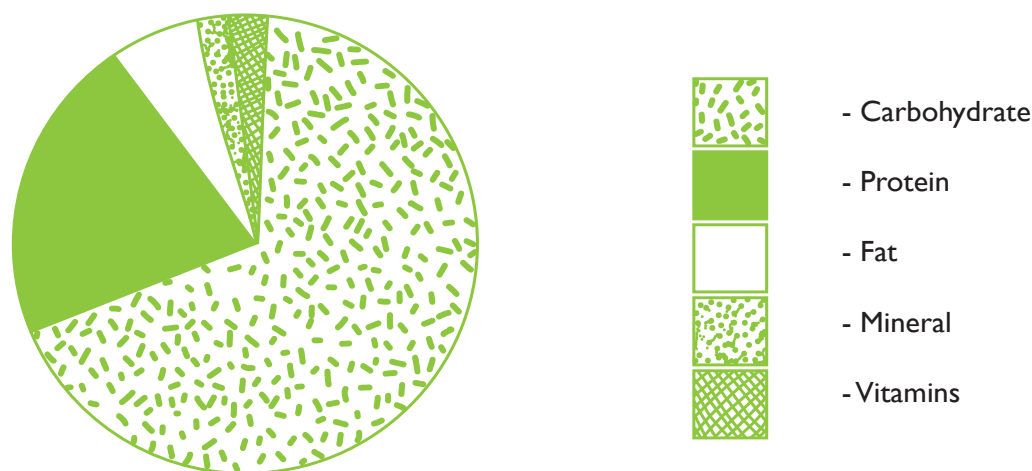
During **lactation**, the nutritional requirements are highest, especially during early lactation and when multiple lambs are born. It is estimated that the ewes with twins produce around 20 percent to 40 percent additional milk.

When lambs are being **fattened** for marketing, several nutritional strategies exist. Concentrate feeding is a common strategy for fast growth. When lambs are reared on pasture, lambs are less susceptible to worm infections and will have higher growth rates if they receive supplements.

To **keep warm** in low temperatures, sheep expend energy to maintain their temperatures. This means that sheep will eat more during cold weather.

The further the sheep **have to walk**, for example in search of feed and water, they will need more feed.

Figure 18. Illustration of the different types of feed in the daily diet



Source: FAO, 2021

### Water requirements

Water is vital for a sheep because it is required for chewing, swallowing, digestion, metabolism of the feed, as a solvent for the transport of nutrients and waste products, for the regulation of the body temperature, for joint lubrication, for the protection of essential organs and growth, reproduction and lactation. Clean, fresh drinking water should be available at all times. Both milk production and feed intake will be depressed if an animal has restricted

A sheep needs to drink 7-10 percent of its body weight, for example, between 4.5 to 7.0 litres. Sheep get a lot of moisture from grass, especially if the grass is fresh, but they need to be able to drink as well. Ensure there are enough drinking points in the grazing areas with fresh water, for example, an 80 litres container per 20 sheep. If a sheep walks up to the water trough, it should start drinking immediately. If the sheep smells the water and hesitates, then there is something wrong with the water quality. You should clean the water troughs every week with a brush.

The ideal water temperature for drinking water is 17 °C.

## Annex 10: Handout FW2: Minerals and Vitamins

The most underrated cause of underperforming sheep is mineral deficiency. If sheep are nibbling pens and posts, it may indicate a mineral deficiency. The levels of minerals and vitamins in autumn and winter grass are often lower than the sheep's requirements. You can check their mineral levels by performing blood tests. Note that the soils and, therefore, the forage might be lacking particular minerals. List the available sources of minerals and vitamins and the farmers' perception of these. Note that one cannot be sure of the quality of the commercial supplements until detailed testing by an independent body is carried out.

Minerals and vitamins are essential in milk production and animal growth (Ca and P), and fertility (Se and Co). Bring some materials to the session that are generally used for supplementations, blocks, mixes, salt, etc. Try to bring different brands and discuss the difference. Sandy and peaty ground are particularly low in copper, selenium and cobalt. This may cause problems during tupping, lambing and rearing lambs. Check their feet regularly. A smooth surface indicates good mineral supply, whilst a ribbed surface may indicate a mineral deficiency. It takes a long time to correct a mineral deficiency.

### Some signs of deficiencies

**Cobalt (Co)** - if several sheep in the flock have tear stains, crusts on the ears or a swollen head.

**Vitamin E** - can negatively influence sperm quality (make sure you give plenty of fresh grass)

**Selenium (Se)** – can negatively influence sperm quality, some soils have Selenium deficiency, and supplementation might be required.

**Copper (Cu)**– copper is needed for forming red blood cells, fleece, horn, pigment, bones, blood vessels, etc. There are significant differences in copper requirements between breeds. Sandy soils do not contain much copper. Signs of copper deficiency are poor fertility, hair-looking fleece, anaemia (pale mucous membranes), insufficient growth and scours.

Figure 19. Tear stains (cobalt deficiency)



© Glorie

## Annex 11: Handout FW3: Dung Signals

Ideally, sheep droppings should be sticky, green-brown balls as in the picture below on the right. If the droppings look differently, this is a signal that something is not right with the feed or the health of the sheep. If the dung is **too thin**, e.g., like in the second picture below, it is possible that the sheep's diet does not contain sufficient roughages or too much protein. It is also possible that the sheep has internal parasites or gut infections. If the dung is **too dry and thick**, it could be that the diet contains too much roughage, the roughages are too thick, or that the sheep don't get enough water.

Figure 20. Dung signals



Good, solid dung



Dung is too thin



Dung is too compact and dry

If a sheep has *dags* in the wool around her anus, this is due to diarrhoea (see picture). Her dung needs to be tested for intestinal worm eggs, and it needs to be checked that she is getting enough roughage. If this does not reveal the cause, this animal needs to be examined by a vet. It is also essential to check that the sheep are drinking enough, as a lot of water can be lost due to diarrhoea.

Figure 21. Sheep with dags



Other dung signals include blood in stool, or sometimes worms can be seen, see the section on animal health.

## Annex 12: Handout PG1: Grazing strategies

The grazing time of sheep is around six to twelve hours a day, usually divided into five or six grazing periods. The grazing behaviour depends on the breed, the nutritional value of the grasses and plants, the season, and what supplementary feed is provided at the time. During summer, grazing just after sunrise constitutes the most important meal of the day. Sheep will eat a lot during that grazing period and will not be very picky. They also eat a lot during the grazing period, from the end of the afternoon until sunset. There are shorter grazing periods in between.

**When to graze:** Lambs can be brought into the pasture when the grass is eight cm long, e.g., fist high, and move them on when the grass is 4 cm, roughly two fingers. This difference in length equates to approximately 450 kilograms of dry matter per hectare. A 15 kg lamb eats approximately 0.5 kg of dry matter per day. This rises to 2 kg in a 50 kg lamb. Grass grows on average 30 kg of dry matter per hectare per day in the summer months. A field should ideally be grazed for two weeks but no more than three weeks. The pasture size should therefore be aligned to the daily grass intake. As a rule of thumb, 10–12 ewes and their lambs need 1 ha of quality pasture.

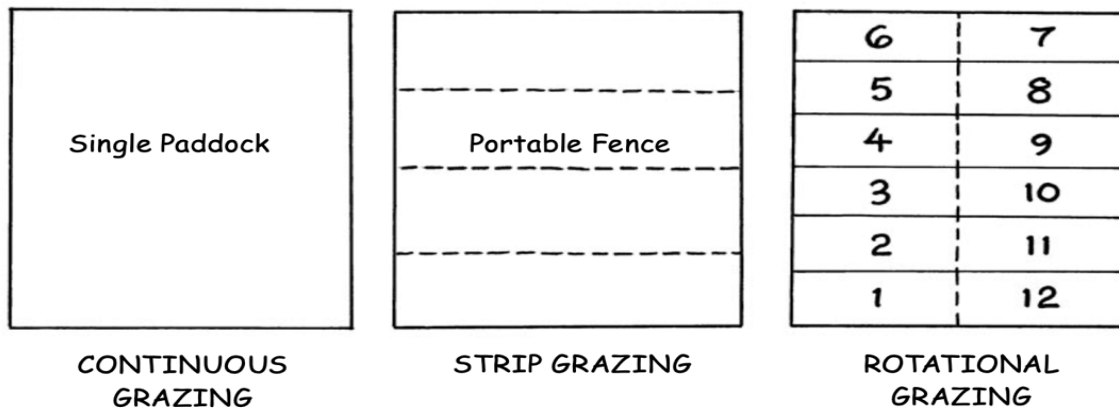
Figure 22. Grass height suitable for grazing



Sheep often graze in rows, whereby the ones at the back (the animals lower in the hierarchy) get lower-quality grass. Therefore, it is essential not to let flocks become too large (less than 50 animals) to avoid having a large number of animals that don't eat well. When sheep are allowed into the fresh pasture, they will eat a lot at a frantic speed. The grass is fresh, not trampled down, and there is no urine and dung yet on the field. A new piece of pasture every day promotes the total consumption of grass. After the first period in fresh pasture, the sheep become pickier, looking for the nice shoots and eating more selectively. This is the reason that some kind of grazing management can be very beneficial.

Some **grazing management techniques** are explained below. One of the advantages of using some kind of non-permanent grazing system is that it will reduce the **risk of worm infestation** thanks to reduced infection pressure because the sheep are frequently rotated onto new land. Since the sheep are only kept on that specific land for a short time, they will be gone before the worm eggs become infective larvae (up to three weeks). The figure below shows some possible grazing strategies.

Figure 23. Potential grazing strategies



Source: NCAT, 2008

**Continuous grazing:** In permanent pastures, sheep stay in one field for an extended period. The size of the field is such that the sheep eat the same amount of grass as grows each day. One of the advantages of permanent pasture is that it does not involve much work. However, a significant drawback is that the infection cycle of intestinal worms is not broken, and a build-up of ticks can occur. This is because the sheep are not moved regularly to a clean field. It is often difficult to keep a good balance between grass growth and grass consumption. To maintain the grazing system, low stocking rates should be maintained.

**Strip grazing** is an intensive form of rotational grazing. In strip grazing, you would, e.g., have to move sheep every two days to a new strip of grass, moving them gradually across the grazing area available. This has a positive effect on grass growth, you will provide your sheep with fresh grass, but it will be more work moving the electric fence. Strip grazing has been made a more attractive option thanks to quickly assembled, easily portable electric fences.

**Rotational grazing:** A commonly used method is to rotate pasture at least once every two to three weeks. The area of grazing area is divided into paddocks; for example, six different paddocks can be used. Once the paddocks are established, the sheep are systematically moved between the paddocks. Each paddock is grazed for around three to seven days. The length of this period depends on how many sheep are being kept in the area available and the speed of growth of the pasture. An example of rotational grazing can be found in the figure below.

Figure 24. Example of a rotational grazing system



Source: FAO, 2021

In this system, the sheep are grazed between 3 to 7 days in each paddock, after which they are moved to the next paddock. This implies that each paddock will have a resting period of 15 to 35 days.

**Deferred grazing** means that specific paddocks are not grazed for some time. Reasons for this can be that the paddock will be used at a later stage, for example, by grazing the standing hay available in the paddock in times of need.

## Annex 13: Handout PG2: Electric fencing

Sources: Glorie, 2016 and sheep101.info

Electric fencing provides a flexible solution for the implementation of grazing management techniques. The fence is generally capable of delivering short bursts of high-voltage power. As the electric shock is short, the fence does typically not use a lot of energy. In addition, the shocks only happen when the sheep touch the fence. Electric fences can either have several strands or may be woven / mesh (netting) as well. Please consider that an electric fence is essentially a psychological barrier and will not stop the sheep physically.

Figure 25. Electric fence - mesh



To respect the electric fence, sheep **must be trained**. The easiest way to put up an electric fence is to put up posts and stretch two or three electric wires or cords between them. Sheep can only feel properly with their lips and mouth, so an electric fence should be at nose-height for sheep, with the first strand at 25cm from the ground and the second strand at 50cm from the ground (see the image on electric fence heights), with posts around 10 m apart. A lamb's first encounter with an electric fence must ensure it doesn't go back a second time to ensure that it will keep a safe distance from the fence in the future.

Figure 26. Electric fence – strand heights

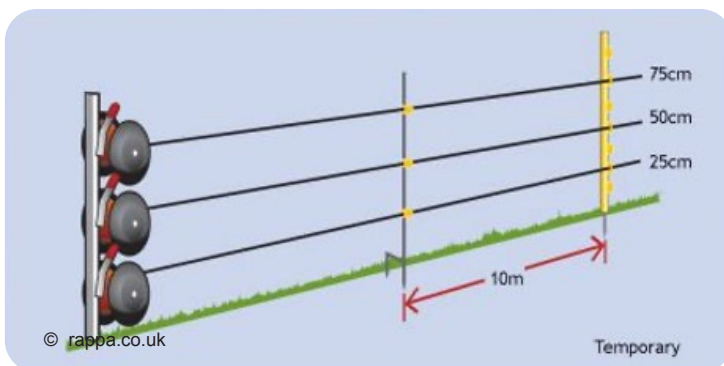


Figure 27. Electric fence - voltage check



Because the grass alongside fences has not been fouled, sheep will graze the grass shorter along the fences. That is why they are more likely to graze right up alongside fences. You should, therefore, always ensure that there is sufficient power on the fence (at least 3,000 volts) to prevent the animals from getting entangled in it.

## Powering the electric fence

As grid power is not always readily available in remote areas, electric fences are commonly powered by batteries. A solar panel and charger can be added to extend the battery's lifetime. In many countries, solar kits are available that are specifically designed for electric fences.

The **charger** is also called an energizer and converts the available power into a high voltage shock. For an electric fence that is used for sheep, usually, a 4,000-volt charger is adequate.

Electric fences can fail due to poor **grounding**. Make sure your fence is grounded correctly to ensure that the electric circuit is complete. Only when the fence is grounded correctly can the fence provide an effective shock. Each energizer (see below) needs at least three grounding rods.

A **voltmeter** is a tool that can be used to monitor the voltage of the battery and the charge that the fence delivers. It is inexpensive and an excellent tool to have to ensure your fence is functioning correctly.

**Insulators** that do not conduct electricity, for example, a material like plastic. They are used as a barrier between the shock wire and the supporting materials of the fence to ensure there are no ground leakages.



Food and Agriculture  
Organization of the  
United Nations

# Haymaking

for **smallholders**



©FAO/Eran Raizman



Food and Agriculture  
Organization of the  
United Nations

# Silage-making for **smallholders**














©FAO/James Airey

## Annex 16: Handout SB1: Overview of sheep breeds

Adapted from *Brittanica.com* and *FAO*

Below, a selection of important sheep breeds are listed, relevant for Azerbaijan. As there are many, many different breeds in the world, this handout only contains the most popular breeds.

|   | Name                                   | Main product       | Distribution  | Comments  | Characteristics   |
|---|--|--------------------|---|---|---|
|    | Garabagh (Karadolag)                   | -                  | Widespread in Azerbaijan.                                     | -   | High efficiency and hereditary (the probability of specific traits to pass to the offspring).                             |
|    | Tushin (Tush, Tusheti)                 | -                  | Azerbaijan, originally from Georgia                           | Mountainous breed adapted to a transhumance system. | Half fat-tail.  |
|   | Balbas                                 | Semi-course wool   | Azerbaijan  | -   | Strong, tall with a fat tail, head, neck and legs are without wool.   |
|  | Bozakh                                 | Meat / wool / milk | Azerbaijan  | A cross between Garabagh and Tush sheep.            | Long ears and a fat tail, good milk production.   |
|  | Merino / Azerbaijan mountainous merino | wool               | Spain and Australia, North America, South Africa, Azerbaijan. | Excellent, fine, soft fleeces.                      | With or without horns, heavily-wooled head, strong constitution, tolerant to hot weather and adaptive to cold conditions. |
|  | Shirvan / Gala                         | Rough wool         | Azerbaijan  | -   | Tolerant to summer.   |
|  | Lezgi                                  | -                  | Azerbaijan  | -   | -   |

|  | Name       | Main product | Distribution   | Comments  | Characteristics  |
|--|------------|--------------|--|---|--|
|   | Mazekh     | Rough wool   | Azerbaijan   | -   | Externally similar to Balbas breeds. Red and Brown Colour. |
|   | Garadolagh | -            | Azerbaijan   | -   | Good breeding  |
|   | Suffolk    | medium       | Originally England, now throughout the world.                          | Fine mutton breed; acceptable wool, fast growing lambs. | Face and legs are black, large, hornless.                  |
|  | Karakul    | wool         | Old breed, originates from Central Asia, now also Europe, Africa, U.S. | The wool of young lambs are called "Persian lamb".      | Medium-sized, fat-tailed, coloured fleece.                 |

## Annex 17: Handout SB1: Sheep breeding










### Breeding objectives

As the breeder, you want to create a flock with certain features, traits and characteristics; this is your breeding objective. You should therefore select the breeding animals based on this objective. Of course, the main breeding objective is your main production goal, whether this is meat, milk or wool.

### Selection of breeding ewes

In the late summer or the autumn, you should select the ewes that are right for mating. If you choose only the best ewes for your breeding objective, you will achieve it quicker. The offspring from the selected ewes will be better than average. This effect is even more pronounced when crossing two different breeds (called the heterosis effect). A sheep must be able to grow, live and reproduce, healthy and problem-free, for at least six years. Therefore, you should select ewes with good teeth, strong legs, good feet, good udder shape, and sufficient milk yield. You should not select ewes that have reared insufficient offspring, and don't select ewes that have had many veterinary treatments in the past.

Figure 28. Selection criteria – ewes

| SELECTION CRITERIA   |  |   |
|--|--|---|
| PERFECT  | DOUBT  | POOR (SEPARATE OUT/CULL)  |
|  <p>A good udder should be symmetrical and the udder tissue should feel supple. The teats should not have any warts.</p> |  <p>A lopsided udder which has been suckled on one side only by a singleton lamb, but which feels supple.</p> |  <p>Lumps and hard udder tissue indicate that the udder is not healthy and fully-functional.</p>  |
|  <p>Good legs are straight, ensuring that they can carry the weight properly without lameness.</p>                      |  <p>Bow-shaped legs (narrow), increasing the likelihood of lameness.</p>                                     |  <p>The hock angle is too steep. The bones above and below the hock are virtually in a line. This will prevent the rear legs from being able to flex much, there will be significant pressure on the joints, and the sheep will have problems walking, especially when the ewe is heavily pregnant and has a heavy rear end.</p> |
|  <p>© Glorie<br/>This hoof has a good shape and horn quality.</p>   |  <p>This hoof needs maintenance.</p>   |  <p>The claws are uneven. This is often a sign of uneven load-bearing caused by conditions such as chronic foot rot.</p>   |

## Breeding rams

As with ewes, your choice of ram also depends on your breeding objective. If you want to breed slaughter lambs, choose a ram with lots of conformation, with an offspring of high-growth-rate lambs. An experienced adult ram can cover a flock of 50–60 ewes; for a novice ram, the figure is 25–30 ewes. Rams tend to prefer older ewes, and it is wise to keep the young ewes in a separate group with a ram. Let the sheep graze together with the ram in smaller paddocks so that intensive contact is possible. Newly purchased/borrowed rams should be kept separate for two weeks (quarantine). Quarantining the ram will also prevent him from introducing new diseases into the flock. Deworm the ram and check that there are no more worms present at the end of the quarantine period.

The ram should be in good condition (not too fat, not too thin) at least 50 days before the mating period because the sperm needs that length of time to develop. It is essential to ensure that the ram gets enough vitamin E and selenium to boost sperm quality. The use of long-acting antibiotics (e.g., oxytetracycline) may reduce fertility in rams. Rams should be fitted with a **marking harness and raddle** at the start of the tupping period so that you can see which ewes have been covered each day. Change the colour of the raddle after 17 days (one fertility cycle), so you can see which ewes have been recovered. Start with a light colour and move on to something darker for the second cycle.

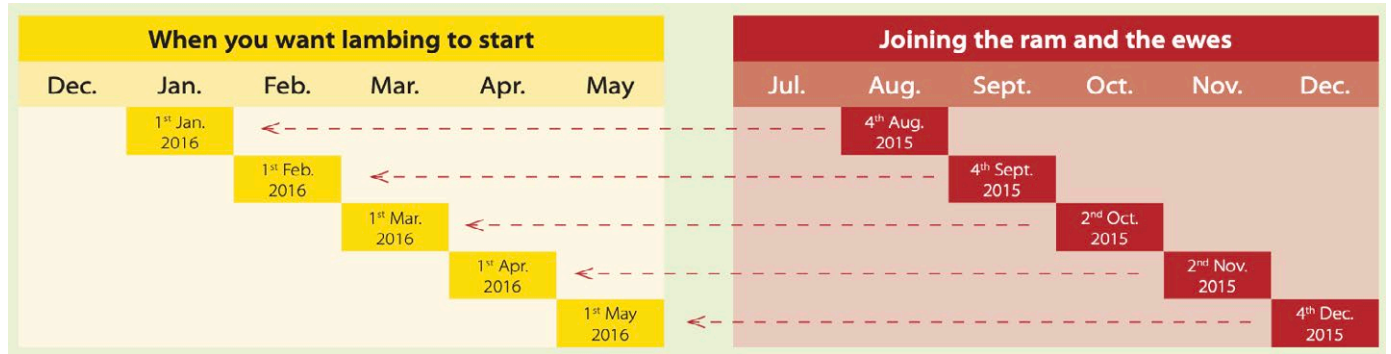
Figure 29. Ram with a harness and raddle



## Breeding planning

Sheep are naturally fertile when the days are shorter, and the light intensity is lower, e.g., in autumn. You can ensure good fertility through the proper sheep selection, good feed and minerals. By planning carefully, you can determine the lambing period, and you can ensure maximum litter size through good pasture management and feed management. On average, unless she is pregnant, an ewe will be in season every 17 days in the breeding season. An ewe in season is restless, twitches her tail frequently, and bleats more than usual. The vulva swells slightly and turns pinker to red. Sometimes mucus is secreted from the vulva. The ewe will allow herself to be covered by the ram over 20 to 30 hours. The start of the tupping season should be aligned with when you want lambing to take place. The gestation period is 146–148 days, or **five months minus five days**. Limit the tupping period to 34 days. This will mean the ewes have been through two fertility cycles, so there is a sufficiently high probability that they will be in lamb.

Figure 30. Breeding calendar

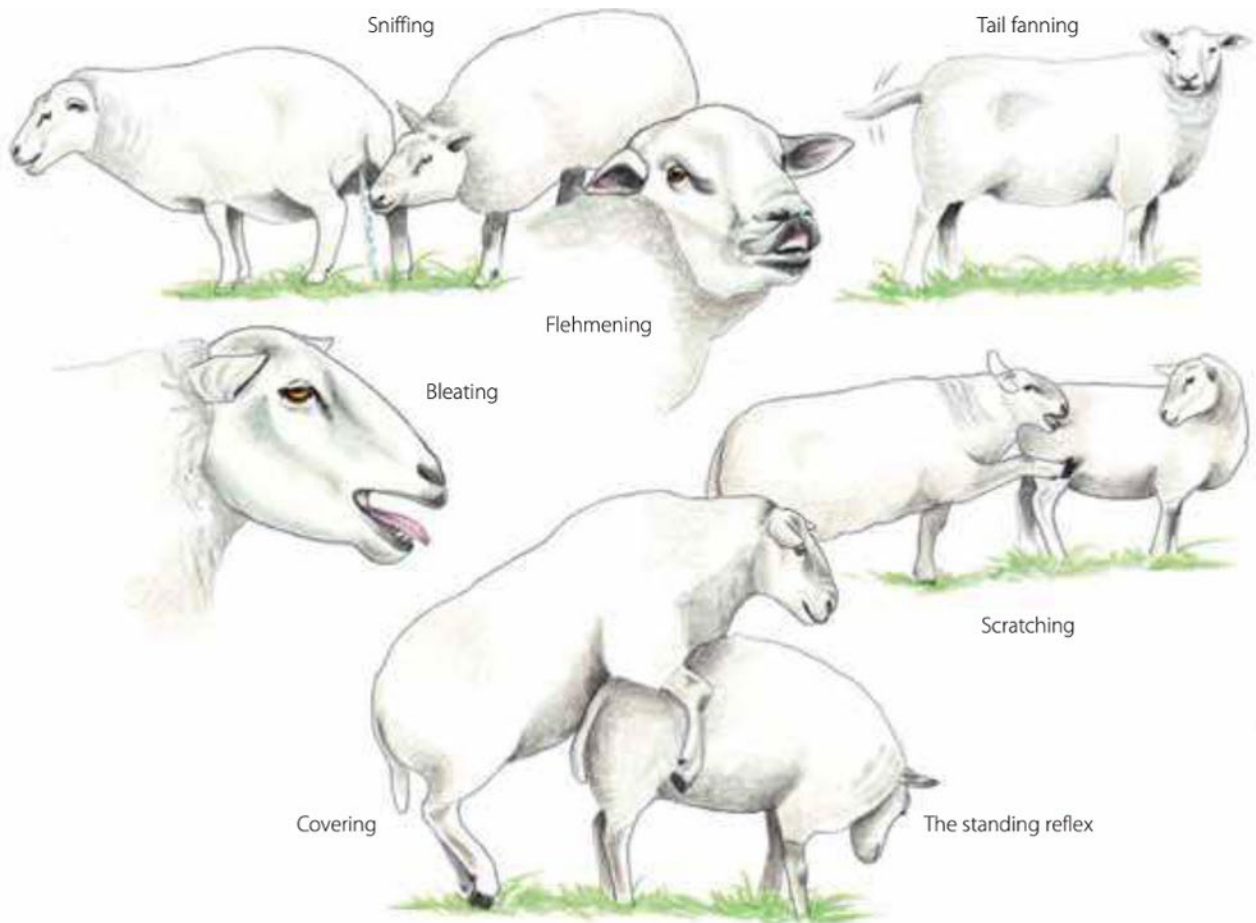


Source: Glorie, 2016

### Mating process

In general, the ewe will select the ram she wants and will stay standing in his vicinity. The ram will then sniff the ewe, stretch his neck out, curl his lip and stick out his tongue. He will bite and nuzzle, and the scent of the ewe in heat stimulates the ram. The ram will start by sniffing the vulva and urine to determine how fertile the ewe is. After sniffing, the ram will curl back his top lip and hold his head tilted backwards, drawing air audibly through an opening in his upper palate, which is known as flehmening. If the ewe is in heat, she will start standing for the ram, and the ram will then cover the ewe.

Figure 31. Mating process



## Annex 18: Handout SB2: Gestation table

Based on a 147-day gestation period

|          |         |    |    |    |    |    |    |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------|---------|----|----|----|----|----|----|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Mating:  | January | 1  | 2  | 3  | 4  | 5  | 6  | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Lambing: | May     | 26 | 27 | 28 | 29 | 30 | 31 | 1 | 2 | 3 | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |

|          |          |    |    |    |    |    |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------|----------|----|----|----|----|----|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Mating:  | February | 1  | 2  | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| Lambing: | Jun      | 26 | 27 | 28 | 29 | 30 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |

|          |       |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------|-------|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Mating:  | March | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Lambing: | Jul   | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 1 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |

|          |       |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------|-------|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Mating:  | April | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Lambing: | Aug   | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 1 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |

|          |     |    |    |    |    |    |    |    |    |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------|-----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Mating:  | May | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Lambing: | Sep | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 1 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |

|          |      |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------|------|----|----|----|----|----|----|----|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Mating:  | June | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Lambing: | Oct  | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |

|          |      |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------|------|----|----|----|----|----|----|----|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Mating:  | July | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Lambing: | Nov  | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |

|          |        |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------|--------|----|----|----|----|----|----|----|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Mating:  | August | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Lambing: | Dec    | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |

|          |           |    |    |    |    |    |    |    |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------|-----------|----|----|----|----|----|----|----|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Mating:  | September | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Lambing: | Jan       | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |

|          |         |    |    |    |    |    |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------|---------|----|----|----|----|----|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Mating:  | October | 1  | 2  | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Lambing: | Feb     | 24 | 25 | 26 | 27 | 28 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |

|          |          |    |    |    |    |    |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------|----------|----|----|----|----|----|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Mating:  | November | 1  | 2  | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Lambing: | Mar      | 27 | 28 | 29 | 30 | 31 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |

|          |          |    |    |    |    |    |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----------|----------|----|----|----|----|----|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Mating:  | December | 1  | 2  | 3  | 4  | 5  | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |    |
| Lambing: | Apr      | 26 | 27 | 28 | 29 | 30 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 14 | 14 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |

## Annex 19: Handout SB3: Castration

Source: *sheep101.info*

### Introduction

Castration is an animal production management tool whereby the testicles of a ram are either removed or destroyed; a castrated ram is called a wether. You might want to castrate certain rams, either to avoid inbreeding or to prevent unwanted rams from mating. Wether lambs, in general, are easier to manage and can prevent any unwanted pregnancies. Lambs are mature at four months of age. There is no significant taste difference between the meat of younger rams and wethers.

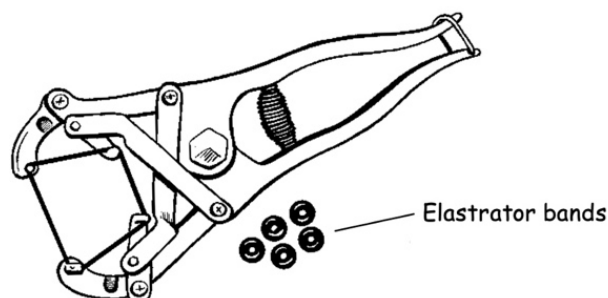
### When to castrate

You would ideally castrate your lambs when they are still young, for example, between one and seven days. Make sure that castration takes place before the age of twelve weeks. Castration in the first 24 hours is not recommended.

### Banding

For the castration of lambs, several techniques exist. An easy way to castrate the ram is by using a rubber band or ring. The **elastrator** tool is used for this method, and an elastic ring is placed above the testicles. Make sure the ring is not placed over the rudimentary teats. Within a few weeks, the testicles will shrivel and fall off. Although this method generally causes some pain, the pain does not last for very long. A clamp can be used (using a Burdizzo) to reduce the pain immediately before or after the application of the elastrator.

Figure 32. Elastrator and Burdizzo



### Surgical castration

A surgical procedure can also be used to remove the testicles. A scalpel or a sharp knife is used to cut the bottom third of the scrotum sac. Now the testicles can be removed, drain the wound and let the cut heal naturally, ensuring proper disinfection techniques are applied.

### Burdizzo

A Burdizzo is used for crushing the spermatic cord. By doing this, the blood flow to the testicles will be cut off. Over time, this will cause the testicles to shrivel up and die. As the Burdizzo does not break the skin, there is no need for disinfection. Make sure that each spermatic cord is crushed separately and that you use a Burdizzo designed explicitly for lambs and not for cattle.

## Annex 20: Handout SB4: Lambing

Source: Glorie, 2016 and Sheep101.info

### When to expect lambing will occur?

Lambs are born roughly five days short of five months after an ewe is covered (“five minus five”). An ewe carrying more than one lamb will often lamb earlier. Lambing can be delayed by up to five days in the event of stress.

### Lambing facilities

Ewes should be left in the group until the lambing process has started. If you put an ewe in a lambing pen on its own before lambing, the animal may not lamb for several days because of the stress. Lambing can be done either in specific lambing pens or outdoors. **Lambing pens** should be clean, with fresh bedding and wind drafts should be avoided. Individual pens should be at least 1.2 x 1.2 meters. When lambing takes place outdoors, fewer facilities are required. Make sure that outdoor lambing takes place in pastures that are clean and well-rested. At the same time, make sure some form of shelter is available.

### Materials needed

These are supplies you might want to have on hand during lambing:

- rubber gloves
- iodine
- disinfectant
- lubrication
- rope or leg pullers
- heat lamp/warming box
- thermometer
- feeding bottles
- weighing scale
- record-keeping book

### Signs that lambing is starting

The following are signs that an ewe is about to lamb:

- Vulva dilates and turns pinker.
- Mucus is discharged from the vulva.
- Udder fills with milk.
- Droplets of milk can fall from teats.
- The ewe becomes restless, stops eating, splits herself off from the other ewes, keeps looking downwards and backwards, sticks her tongue out, scratches at the straw bedding with her front legs, lies down and stands back up again and turns around.

A normal birth will occur within two or three hours of these signs, depending on the number of lambs.

### The normal lambing process

Two bladders will come out before lambing; the first bladder is usually the water sac containing the lamb's urine. The second is the amniotic sac which contains the lamb with a pool of slimy amniotic fluid. Sometimes, the sacs come out in reverse order. With multiple lambs, you may get several water sacs and amniotic sacs.

The lamb's front legs will come first, immediately followed by its muzzle. As long as you can see that things are progressing, there is no need to intervene. Give the ewe an hour and a half after the first bladder emerges. If no parts of a lamb are visible after an hour and a half, you will have to feel inside. Once the lamb's head is visible, the whole lamb should be out within 15 minutes.

The appearance of the afterbirth or placenta is the last stage of lambing, often happening between 30 and 60 minutes after the previous lamb has been born. There might be a problem if the afterbirth is not expelled after around 24 hours. Ewes tend to eat the placenta because of instincts that tell the ewe that she should not alert any predators to the lambing. However, to prevent the spread of disease and scavenging by dogs, the placenta should be discarded as soon as possible.

Figure 33. Normal lambing process



### Assisting with difficult lambing

Most lambs are born naturally, but sometimes you will need to assist the lambing process. Knowing when to help or call outside assistance during lambing is a difficult decision. A guideline could be that it is time to see what you can do, after about an hour without progress, from when the ewe started to strain and tried to lamb. Make sure you wash your hands with soap and water before entering and clean the backside of the ewe as well. Remove any jewellery on your hands and wear gloves. **Pregnant women** should not assist with deliveries and newborn lambs since they risk losing their child because of infections sheep may carry with them in their amniotic fluid and foetal membranes.

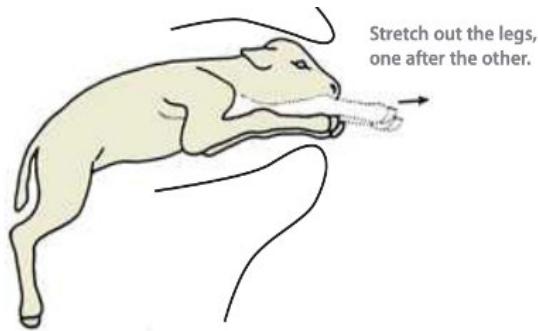
Usually, the two front feet appear first, with the head between the two legs. This is a standard delivery, and assistance usually is not needed, only when the lamb is unusually large. In this case, during contractions, gently pull the lamb downwards. Some of the different lamb positions are illustrated in the figure below, and more information on these positions follows.

Another normal delivery would be when the back legs appear first. Do not try to convert this to a delivery where the front legs appear first, as this may cause damage to the lamb or uterus.

### Elbow lock

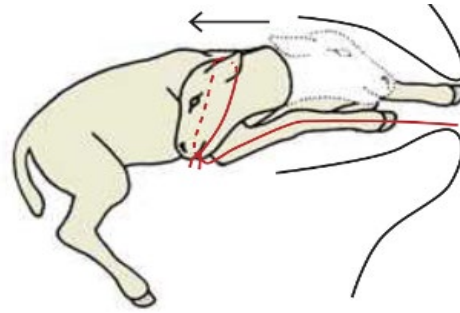
An elbow lock is a delivery whereby the elbows of the lamb are stuck in the birth canal. You can slightly push the lamb back and try to stretch the legs to make the delivery easier.

Figure 34. Elbow lock position



© Glorie

Figure 35. Head back position



© Glorie

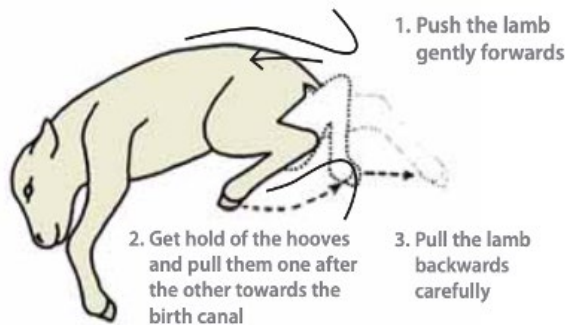
### Head back

In some delivery cases, the head is pointed backwards and the front legs forward. Try to push the lamb back and turn the head. You can attach a rope to each of the lamb's legs so that they don't get lost. Do not pull the jaw of the lamb, as this could break the jaw.

### Breech

A breech position is when the lamb is situated backwards when only the tail is near the opening, and the hind legs are pointed forward. This is a common situation when the birthing process has taken a long time. You need to try to bring the hind legs forward; once you succeed, ensure that the delivery is quick as the umbilical cord might be broken, and the lamb can drown.

Figure 36. Breech positions



© Glorie

### After Lambing

The ewe usually takes care of the lamb after a normal birthing process. Once in a while, you need to wipe the nostrils to remove mucous to ensure that the lamb can breathe. Make sure that the ewe takes care of all her lambs and that they can nurse. Typically, a lamb will get up and nurse within about thirty minutes.

## Annex 21: Handout AH1: Overview of common sheep diseases

Sources: *Fao.org, sheep101.info and Glorie, 2016*

### Introduction

If sheep are genetically strong and the farmer practices good sheep farming, the flock can be remarkably free from animal health issues. The selection of strong animals ensures that the flock doesn't need a lot of veterinary care. Your sheep can be susceptible to a variety of infectious and non-infectious diseases. This section provides a brief overview of the diseases that can affect sheep, particularly in the sheep production systems in Azerbaijan. It is by no means an exhaustive list of diseases; the list is informed by the feedback received during the FFS survey. Additional information, including more detailed treatment options, can be obtained by consulting a qualified veterinarian or other animal health professional. Some diseases that affect sheep are also contagious to people and are called zoonotic diseases.

---

### Internal parasites

Internal parasites are a widespread issue in sheep production; for this reason, a special section is dedicated to internal parasites (see Annex 23: Handout AH2: Internal parasites). Three types of internal parasites affect sheep: worms, protozoa and flukes. These parasites can cause anaemia, diarrhoea, scours, lung and liver issues and sudden death. Internal parasites cause diseases such as coccidiosis.

---

### External parasites (also called ectoparasites)

#### Flystrike

*(Other names: myiasis, fleece worms, blowflies, wool maggots)*

An infestation of maggots can affect the flesh of sheep that are still alive. Because of the wool, this happens more frequently to sheep than it does to other livestock species. In particular, dirty wool can attract blowflies. The shearing of sheep or the removal of dirty wool can prevent this disease. Alternatively, insecticides can be used as well.

#### Lice

Lice are tiny insects and are often very difficult to see in sheep, hiding under the wool. Itching is a crucial symptom of lice and can lead to anaemia in severe cases. Insecticides can be used for the control of lice.

#### Scabies

*(wet mange, sheep scab, psoroptic mange)*

Scabies is caused by mites and can be very contagious. Symptoms include itching, the falling out of wool, reddening of the skin and scabs that can appear. The only way to confirm scabies is by microscopic examination. Scabies can be controlled by dipping with insecticide.

---

### Brucellosis

Brucellosis is caused by a bacterium that is called *Brucella*. Abortion during the later stages of pregnancy is a common symptom in other livestock species but less common in sheep. Brucellosis can cause a lesion in rams, in their reproductive organs.

---

### Foot-and-mouth Disease (FMD)

FMD is a contagious viral disease. Symptoms include fever and lesions around the mouth, tongue, teats and hooves. Production and body condition is often affected, although many affected sheep can recover from FMD. In lambs, however, the disease can cause high mortality. Vaccination for FMD is available.

---

## Acidosis

Acidosis is a common metabolic disease. It is caused by excess consumption of easily digestible carbohydrates, combined with too little roughage, by animals who are not used to it. Feed is rapidly fermented in the gut, which results in large quantities of lactic acid. Symptoms can include depression abdominal pain. Within a matter of hours sheep, can become seriously ill and drowsy and start grinding their teeth. A high proportion may die. Sheep that survive will have no appetite for a while. They suffer from abdominal pain and tend to have a stiff, slow gait due to laminitis. Their breathing and heart rate will be accelerated, and filthy, foul-smelling scours will subsequently develop. The animals may be thirsty but also refuse water. You can drench sheep that are affected with bicarbonate of soda or products containing magnesium carbonate. To prevent acidosis, it is essential to make sure you properly feed your sheep and make sure that any high-energy feeds like concentrates are introduced slowly, as the rumen will need time to adjust to the new feed.

---

## Salmonella

Infection with Salmonella bacteria can cause abortion in sheep. If the bacterial load is high and the ewe is stressed, this abortion can most often occur in the later stage of pregnancy. Symptoms can include diarrhoea as well.

---

## Anthrax

Anthrax is an often-fatal zoonotic disease caused by a bacterium, *Bacillus anthracis*. The symptoms include fever, muscle tremors, difficult breathing and agitation, but sudden death occurs before the infection is recognized. A vaccination is available for Anthrax; report to the animal health services as soon as you suspect an Anthrax outbreak.

---

## Bloat

Bloat is a metabolic disease of sheep that is relatively common. When gas production in the rumen exceeds the rate at which the gas is leaving the body, bloat occurs. It can be identified by the foam that comes out of the sheep's mouth. It is caused by eating large amounts of clover, combined with young protein-rich grass with little roughage. Because of the foam, sheep are no longer able to eject the gas formed in the rumen. The rumen starts to swell because of the constant accumulation of gas. Bloat can cause sudden death, so make sure you intervene promptly.

---

## Diarrhoea

Diarrhoea can be caused by bacteria, viruses, parasites, the animal's diet and stress. The cause of diarrhoea can only be determined by microbiological analysis of the faeces. Diarrhoea is not a disease but a symptom that can have links to many aspects, including the animal, nutrition, disease agents, and the environment.

---

## Footrot

Footrot is an acute and contagious disease caused by the interaction of two bacteria, *Bacteroides nodosus* and *Fusobacterium necrophorum*. The most common symptom is lameness. Footrot can be recognised by the very distinctive smell of the hooves. The control of footrot can be done by trimming hoofs, disinfection of feet, soaking or culling the affected sheep. A vaccination also exists. Zinc sulphate is often used as a treatment.

Figure 37. Early-stage foot rot – inflammation



## Poisoning

There are many plants in pastures that can potentially be toxic to the sheep that graze these plants. In determining which disease your sheep are suffering from, make sure you don't forget poisoning. Sudden death can occur, but there is a wide range of symptoms, making it difficult to confirm whether the sheep have been poisoned.

---

## Pneumonia

Pneumonia is a significant respiratory disease and can be caused by a range of bacteria. Most common bacteria include *Pasteurella haemolytica* or *Pasteurella multocida*, or both. Symptoms include fever, coughing, respiratory problem, depression and sometimes sheep stop eating. Antibiotics assist in the control of pneumonia.

---

## Orf

Orf is a common sheep disease affecting the skin of animals. The condition is caused by a virus and is highly contagious. Symptoms include skin issues around the mouth, vulva, eyes, nostrils and mammary gland. Skin issues include swelling, reddishness, scab formation. Typically, the disease will run its course in one to five weeks. Orf can also cause hoof infections.

---

## Peste des Petits Ruminants (PPR)

PPR is highly contagious, caused by a virus and is also known as sheep plague. Once the disease is introduced, it can affect 90% of the sheep, killing up to 70% of the flock. Once the sheep are affected, it takes around two to six days for the first symptoms to appear. Sheep have a high fever, are depressed, and it looks like they are sleepy. There is an onset fever, and the mouth has sores, nasal discharges, and pneumonia. If you have any suspicion of PPR, you need to alert the veterinary services immediately.

## Annex 22: Handout AH2: Internal parasites

Source: NCAT (2014), Sheep101.info, Yami and Merkel (2008)

### Introduction

Internal parasites are often the biggest challenge in sheep production. Lambs, lactating ewes, or stressed animals are highly vulnerable to internal parasites. The animals lose body condition and weight, lose production and can even die. Parasites that have developed resistance against common dewormers are even more challenging to manage. When the weather is warm and wet, parasite numbers increase.

### Symptoms

Some of the signs of infection with internal parasites include loss of body condition and weight, weakness, symptoms of anaemia, the roughness of wool, diarrhoea, and a decrease in milk production. Infection can also affect the lambing process.

### Faecal egg counts

A faecal egg count can determine which parasite is the cause of the infection. An examination with a microscope of faecal samples can identify the parasites.

### Type of parasites and diseases

Internal parasites can be either worms, protozoa or liver flukes.

**Cryptosporidium** species are protozoa that can affect young lambs. Symptoms include depression, refusal to suckle and diarrhoea.

- **Coccidia** is a protozoan disease for which lambs are susceptible, mainly when stress occurs, for example, during weaning. Symptoms include diarrhoea, which is often bloody and contains mucous. The diagnosis can be confirmed by the identification of oocysts in the faecal samples. Coccidiosis is caused by poor hygiene, keeping too many sheep in a particular area, and sheep ingesting the protozoa by consuming contaminated feed and water. Make sure you separate any sheep suspected of having coccidia and treat the animals as soon as possible. Clean all barns and make sure they are dry, and have clean bedding.
- **Stomach worms** are the most important internal parasites. The barber pole worm is a small brown blood-sucking parasite that causes the loss of blood and protein. Anaemia is an acute symptom of stomach worms. Bottle jaw is another symptom whereby fluid accumulates under the jaw.
- **Liver flukes** can be particularly problematic in wet areas; there are two types of flukes, *Fasciola hepatica* and *Fasciola gigantica*. Sheep are infected with liver flukes by slugs or snails. The flukes will damage the liver and cause anaemia, loss of body condition, diarrhoea, and death. Ivomec® Plus and albendazole are effective against liver flukes.

### Prevention and cure

Internal parasites control is a complex task for sheep farmers, especially if resistance against dewormers is present. In that case, interventions such as improved grazing management, drenching, FAMACHA, and the selection of sheep that show resistance against internal parasites can help manage internal parasites.

**Grazing management** will assist in reducing the risk of internal parasites. Resting and rotating pastures (see the section on grazing strategies) will help. You can also let other livestock graze on the paddocks to break the parasite cycle. Make sure you are aware of when the eggs of the parasites are hatching, as you do not want to let the sheep graze during this period. You can rest the paddocks for around six weeks in the summer to reduce contamination. If it is hot and dry, two weeks of resting might be sufficient. You can also make hay from the pasture, as this will also reduce contamination.

## **Drenching**

Using dewormers is the standard method of cure against internal parasites. There is, however, a looming danger of developing resistance against the dewormers, and smart drenching can be used to avoid this. The smart drenching method is assisted by FAMACHA (see 3.7.3) and includes:

1. Determine which dewormers work in your area (ask the animal health services).
2. Use proper equipment when drenching, either a single-dose syringe or an automatic drench gun.
3. Drench only the animals that need treatment. The FAMACHA method can assist with this.
4. Dewormers will work better if sheep are fasted for around 24 hours before deworming. Make sure you don't restrict water intake during this fasting period.
5. Weigh each animal before deworming.
6. Apply the dewormer in the back of the throat, over the tongue between the molar and teeth. Use a drench gun. Ensure that the dewormer doesn't by-pass the rumen by placing the gun over the animal's tongue.
7. Keep the head of the sheep level, with the jaw parallel to the ground, as it might otherwise cause the dewormer to enter the sheep's lungs.
8. Push the plunger and give the sheep time to swallow. Before releasing, make sure that the sheep has swallowed. Always be gentle to avoid injuries.
9. If you suspect any resistance against the dewormers, try to use two types of dewormers simultaneously.

## **Dosing**

It is vital that dewormer is dosed correctly, as drug resistance can be developed when you are underdosing. By underdosing, internal parasites can potentially survive and develop resistance to the drug. Use accurate weights to calibrate doses. Calibrate the equipment for each sheep or the heaviest animal in the flock. You can divide the flock into groups based on their weight. Check your applicators to make sure the correct dose is being delivered. Clean all equipment properly after you are done.

## Annex 23: Handout AH3: the FAMACHA method

Source: Sheep101.info, Yami and Merkel (2008)

FAMACHA tests levels of anaemia, particularly for *Haemonchus contortus*. FAMACHA is named after its founder, Dr Francois “Faffa” Malan (FAffa MALan CHArt). The FAMACHA cards allow farmers to select specific sheep for treatment against worms based on the levels of anaemia observed. A colour-guided card helps to determine the levels of anaemia. Always use the FAMACHA guide (see references) and official FAMACHA cards when using the FAMACHA method.

Figure 38. FAMACHA card



Source: FAO, 2021

The principle of the FAMACHA method is that by only treating the sheep that are in critical need, drug resistance is delayed. FAMACHA scoring should be done quickly. You should stick with your first impression. Stick with the higher score if your score for one of the eyes is higher. Animals with FAMACHA scores of 1 or 2 do not require deworming unless they show other symptoms. You should always deworm animals with scores of 4 or 5. The challenge is to decide what to do with the animals that have FAMACHA scores of 3.

Figure 39. FAMACHA card in use



© J. Draaijer

For category three, a question mark is listed. You should consider deworming the category three sheep if there is more than ten percent of the flock that have FAMACHA scores of 4 or 5. Make sure you deworm the category 3 animals that have a poor body condition, bottle jaw, or if the animals are young, pregnant, or lactating.

The frequency of FAMACHA scoring depends upon environmental conditions. Every two to four weeks is recommended. When the climate is warmer and more humid, you might have to check more frequently. When temperatures are lower, for example, in spring and fall, less frequent checking may be required, e.g., every three to four weeks.



Because FAMACHA scores are based on colour, you should **not attempt to make your FAMACHA card** using a colour printer or use your smartphone for scoring.

As the colour of the cards can fade, it may be necessary to replace FAMACHA cards every two to three years. When not in use, FAMACHA cards should be stored in a dark place.

See also: <https://www.youtube.com/watch?v=RL3SBRlqIX0>

## Annex 24: Handout MB1: Marketing

### Introduction

A sheep farmer can have different products as the main production goal of the farm, e.g.:

- meat, e.g., selling lambs for slaughter;
- wool;
- milk;
- selling breeding stock; or
- other products like skins.

### 1. Marketing of lambs for slaughter

The primary source of income for most sheep farmers is through the sale of lambs or meat. The meat and lamb prices, therefore, affect the profitability of sheep farms to a large extent. There are two names for sheepmeat; mutton is the meat from a sheep older than one year, while lamb is meat from sheep younger than one-year-old. Their teeth can determine a sheep's age; see Annex 3: Handout SP2: General Sheep Parameters.

#### Age, weight, and sex of marketing

Slaughter weights for sheep vary from 14 kg to 85 kg. Lambs are usually sold at the ages of 2 to 15 months. Some consumers may note an off flavour with the meat from older rams and prefer meat from younger rams.

#### Marketing options

Marketing options vary; among them are auctions, intermediate buyers, feedlots, cooperatives and abattoirs. One crucial aspect to consider is whether the buyers' payments are fixed, immediate and guaranteed; another aspect to consider is the fees that will have to be paid for marketing.

Selling to a **middleman** can be easier and save auction costs, but you might receive a lower price. Make sure you know what the fair prices are, and make sure you know the weight of your animals.

As a **group of producers**, you can also decide to form a marketing alliance and sell your lambs as a group. In this manner, you will get a better price because of higher volumes, and associated marketing and transport costs will be lower per lamb marketed.

**Direct marketing** is when the consumer buys the sheep directly, either by purchasing live animals or meat. Although the volumes are generally lower, you might be able to get a better price for your sheep without any marketing-related costs.

---

### 2. Wool Marketing

Most sheep breeds grow wool that needs to be sheared every year, sometimes even twice a year. Wool is valuable and should be prepared in the correct way to ensure the highest selling prices. Wool can either be a primary production goal or can also be a by-product of a sheep farm that mainly focuses on meat or milk.

#### Value of wool

The value of wool is determined by several factors, including the diameter of the fibre, total yield, cleanliness, colour, the purity of the fleece and crimp. Fibre diameter is also called fineness of the wool and measures how thick the wool is, measured in microns. The **fineness** of the wool is important for the quality of the yarn that can be made from the wool.

**Crimp** is another characteristic of wool and refers to the natural bend of the fibre. Fine wools will have a higher crimp.

### **Marketing as a group**

Most sheep producers will not have enough wool from their sheep to be able to market it directly. A group of producers can come together and market the wool as a group.

### **Shearing**

Sheep should be sheared in early spring. Make sure you shear the sheep in a clean and dry environment on, for example, a clean concrete floor.

---

## **3. Milk marketing**

The milk production of a quality dairy ewe is around one kilogram but can be as much as two to three kilogram of milk daily. This maximum production can be sustained for at up to three months, after which the milk yield will slowly decrease.

### **Marketing options**

Marketing options vary; among them direct sales, intermediate buyers, milk processors, cooperatives and dairy processors. One important aspect to consider is whether the payments are fixed, immediate and guaranteed; another aspect is any fees that will have to be paid for marketing.

Selling to a middleman often means a lower milk price. As a group of producers, you can also decide to form a marketing alliance and sell your milk and other dairy products as a group. In this manner, you will be able to get a better price.

---

## **4. Producing and selling breeding stock**

Selling breeding sheep can significantly increase the income from the sheep farm. Breeding stock can be purebred or crossbred, registered or unregistered, rams or ewes. Breeding stock usually sells for higher prices than lambs for meat. Certain traits are desirable, and sheep can be selected for these traits. They include early puberty, fertility, prolificacy, mothering ability, milk production, the weight of lambs, easy-care, disease resistance, and good wool production. Ram traits include libido, strength and weight of lambs, feed efficiency and disease resistance. Sheep producers farming breeding stock should attempt to manage their flock with higher animal health standards.

Record keeping is important when selling breeding stock, and detailed records, including birth records, weights of lambs, weight gains and information from parents, should be kept.

Sheep do not sell themselves, and some form of advertising is usually necessary to sell breeding stock. Signs at the entrance to the farm or on the farm truck or trailer are a good start. Advertising in newspapers and magazines should be considered. A website is an excellent way to promote breeding stock sales. Social media, including Facebook, is becoming an increasingly common way to sell livestock.

## Annex 25: Handout MB2: Sheep farming as a business

### Introduction

If a sheep farmer thinks about the business side of this farm, it is usually about overall costs and returns. However, it is essential to calculate all the financial inputs, as together, they will determine the **cost of production (COP)** for every unit of product sold on the farm. To make good farm management decisions, a minimum of financial records should be kept, including farm assets, income/revenue, expenditure and sales. Based on these records, the farm's progress can be calculated using **key performance indicators (KPIs)**.

### Farm costs

The actual costs of producing sheep are calculated by adding these two costs:

1. **Variable costs.** Variable costs are directly linked to each output on the farm. Examples of these costs include feed costs, veterinary inputs, etcetera.
2. **Fixed (or overhead) costs.** These costs are not directly related to each output on the farm, as they have to be paid, regardless of how much the farm is producing. Fixed costs include rent, taxes, repayment of loans and living expenses. Labour costs are also classified as fixed costs in this guide.

Because sheep production is often only one of the income streams on smallholder farms, make sure you only calculate the costs related to sheep production. The total **cost of production** is the sum of all sheep farming costs. The table below provides an example of all costs on a sheep farm.

Figure 40. Variable and fixed costs

| W              | Costs               | Detail  |
|----------------|---------------------|---|
| Variable costs | Flock costs         | <ol style="list-style-type: none"> <li>1. Drugs associated with reproductive management</li> <li>2. Young stock; feed inputs and management costs</li> <li>3. Veterinary expenses including drugs, vaccines and drenches</li> <li>4. Marketing and transport costs</li> </ol> |
|                | Feed costs          | <ol style="list-style-type: none"> <li>1. Feeding supplements</li> <li>2. Forage; grass, hay, silage, by-products</li> <li>3. Expenses for fodder production and fodder conservation and storage</li> <li>4. Costs for machinery</li> </ol>                                   |
| Fixed costs    | Cash fixed costs    | <ol style="list-style-type: none"> <li>1. Labour costs</li> <li>2. Administration and insurance costs</li> <li>3. Interest and bank fees</li> <li>4. Other costs like telephone, advice, office, postage</li> </ol>   |
|                | Imputed fixed costs | <ol style="list-style-type: none"> <li>1. Family labour</li> <li>2. Depreciation of assets</li> </ol>   |

Source: FAO, 2021

## Key performance indicators

Analysing costs can demonstrate how cost-effectively the farm is operating. To see the percentage of the different costs compared to the total farm income, the following ratios can be calculated:

$$\frac{\text{Total feed costs}}{\text{Total farm income}} \times 100 = \text{Feed cost ratio (\%)}$$

$$\frac{\text{Total variable costs}}{\text{Total farm income}} \times 100 = \text{Variable cost ratio (\%)}$$

$$\frac{\text{Total overhead costs}}{\text{Total farm income}} \times 100 = \text{Overhead cost ratio (\%)}$$

$$\frac{\text{Finance costs}}{\text{Total farm income}} \times 100 = \text{Finance cost ratio (\%)}$$

$$\frac{\text{Total cost of production}}{\text{Total farm income}} \times 100 = \text{Production cost ratio (\%)}$$

## Farm revenue

Farm revenue includes farm income from the sale of produce, non-cash income, and the consumption of any consumed product on the farm. Any sales of machinery are also contributing to revenue and funds coming in through financial institutions.

Examples of cash income include the sale of lambs, the sale of milk or wool, fodder sales, and sales of manure. The table below illustrates a stock inventory.

Figure 41. Stock inventory

|               | Number | Value | Total |               | Number | Value | Total |
|---------------|--------|-------|-------|---------------|--------|-------|-------|
| Opening stock |        |       |       | Sales         |        |       |       |
| Ewes          |        |       |       | Ewes          |        |       |       |
| Lambs         |        |       |       | Lambs         |        |       |       |
| Yearlings     |        |       |       | Yearlings     |        |       |       |
| Rams          |        |       |       | Rams          |        |       |       |
| Wethers       |        |       |       | Wethers       |        |       |       |
| Births        |        |       |       | Deaths        |        |       |       |
| Purchases     |        |       |       | Closing stock |        |       |       |
| Ewes          |        |       |       | Ewes          |        |       |       |
| Lambs         |        |       |       | Lambs         |        |       |       |
| Yearlings     |        |       |       | Yearlings     |        |       |       |
| Rams          |        |       |       | Rams          |        |       |       |
| Wethers       |        |       |       | Wethers       |        |       |       |
| TOTAL         |        |       |       | TOTAL         |        |       |       |

Source: FAO, 2021

## Efficiency

The term 'capital' is used for all resources on the farm, for example buildings, land, machinery, etcetera. Most of these capital items can potentially be converted to cash. The total monetary value of these assets is called farm assets. The farm's own capital is the assets minus any existing debts.

A convenient measure of farm efficiency is profit margin. The profit margin is the net farm income expressed as a percentage of total farm income, and is measured as follows:

$$\frac{\text{Net farm income}}{\text{Gross farm income}} \times 100 = \text{Profit margin (\%)}$$

Some other key terms in relation to business management are:

- **Break-even yield** is the minimum level of product output the farmer must produce to completely recover his/her costs. This is computed by dividing the total variable costs with the output price.
- **Break-even price** is the minimum acceptable sheep price for the farmer to recover his/her costs, in the short-run and is computed by dividing the total variable costs by the total quantity produced on the farm.

## Annex 26: Example of an FFS implementation cycle

| Month | Phase          | Activity  | Methodology   |
|-------|----------------|---|---|
| 1     | Preparation    | <ul style="list-style-type: none"> <li>Assess conditions</li> <li>Select / train facilitators</li> <li>Determine needs of community</li> </ul>                                  | Participatory assessment by FFS specialist<br>ToF (22 days)<br>by facilitators and project staff  |
| 2     | Preparation    | <ul style="list-style-type: none"> <li>awareness raising meeting (2hrs)</li> <li>Identification of participants and learning sites</li> <li>Two preparatory meetings</li> </ul> |   |
| 3     | Implementation | FFS sessions (2)  | Introductory meeting<br>General sheep production, SPI-1 to SPI-4  |
| 4     | Implementation | FFS sessions (2)  | General sheep production, <b>SP2</b><br>General sheep production, <b>SP3, SP4</b>   |
| 5     | Implementation | FFS sessions (2)  | Animal identification and record keeping, ID1, ID2<br>Feed and water, FW1-1, FW1-2  |
| 6     | Implementation | FFS sessions (2)  | Feed and water, FW1-3, <b>FW2</b><br><b>Start of experiment FW-E1</b>   |
| 7     | Implementation | FFS sessions (4)<br>One visit   | Feed and water, <b>FW3</b> , Pasture & grazing PG1-1 to 3<br>Pasture and grazing PG1-4 to 1-7<br><b>Start of experiment FW-E2</b>           |
| 8     | Implementation | FFS sessions (3)<br>One visit   | Pasture and grazing PG2 and PG3<br>Sheep breeding, SB1-1, SB1-2 and SB2 (1 <sup>st</sup> part)<br><b>Visit to Silage or Hay making farm</b> |
| 9     | Implementation | FFS sessions (2)<br>FFS exchange visit  | Sheep breeding, SB2 (2 <sup>nd</sup> part), <b>SB3</b><br>Sheep breeding <b>SB4</b> , animal health AH1-1<br><b>FFS exchange visit</b>      |
| 10    | Implementation | FFS sessions (2)<br>Experiment animal health  | <b>Start of experiment PG-E1</b><br>Animal health AH1-2 to AH1-4<br><b>Start of experiment AH-E1</b>  |
| 11    | Implementation | FFS sessions (2)  | Animal health <b>AH2, AH3</b><br>TBD  |
| 12    | Implementation | FFS sessions (3)  | Marketing and business skills, MBI, MB2<br>TBD  |
| 13    | Implementation | FFS sessions (3)<br>One exchange visit  | TBD<br>TBD  |
| 14    | Implementation | FFS sessions (3)<br>Graduation / field day  | TBD<br>Evaluation of FFS  |
| 14    | Implementation | FFS sessions (3)<br>Graduation / field day  | Planning for the future<br>Graduation and field day   |
| 15    | Follow up      | Establish network<br>Second generation FFS  |   |

Source: FAO, 2021

## Annex 27: Example of a group assessment checklist

| topic:                                  | score:                        | 1                           | 2                               | 3 | 4                               |
|---|-------------------------------|-----------------------------|---------------------------------|---|---------------------------------|
| general group characteristics           |                               |                             |                                 |   |                                 |
| group name                              | no name                       | no clear name               | clear, but not appropriate name |   | well defined and appropriate    |
| objectives of the group are             | not really understood         | understood by some members  | understood by most members      |   | understood by all members       |
| long term group vision                  | no vision exists              | existing but not clear      | clear but not shared by all     |   | clear and shared by all         |
| physical working area of the group      | not specified                 | specified but not clear     | clear but not detailed          |   | well defined in detail          |
| requirements to become a member are     | not specified                 | not clear and not detailed  | detailed, not clear to everyone |   | detailed and clear to everyone  |
| official registration of the group      | no official registration      | only informally registered  | official but not appropriate    |   | official and appropriate        |
| constitution or by-laws                 | no such basis exists          | some procedures agreed upon | some written rules exist        |   | detailed and adequate           |
| members receive training                | no training is received       | every 6-12 months           | every 3-6 months                |   | every 1-3 months                |
| planning of activities                  | no plan exists                | not realistic not detailed  | realistic but not detailed      |   | realistic and detailed          |
| interactions with outside organisations | non-existent                  | very few interactions       | some interactions               |   | a lot of interactions exist     |
| participation of members                |                               |                             |                                 |   |                                 |
| average frequency of member meetings    | no regular member meetings    | on average every 2 months   | at least monthly                |   | weekly & whenever needed        |
| number of members at meetings           | less than majority; under 50% | a majority: 50-70%          | most members: 70-90%            |   | almost all: over 90%            |
| group decisions are made                | not in a regular way          | by leaders only             | by majority vote of members     |   | by a consensus of all members   |
| the activities of the group are done by | very few members              | some members                | most members                    |   | all members                     |
| participation of women                  | women do not participate      | women participate sometimes | women participate often         |   | women participate as men        |
| leadership and finance                  |                               |                             |                                 |   |                                 |
| average frequency of leader meetings    | less than every month         | every month                 | every 2 weeks                   |   | every week                      |
| tasks of leaders                        | not clear                     | some tasks are defined      | most tasks are defined          |   | tasks are clearly defined       |
| leaders receive training                | never                         | seldom                      | sometimes                       |   | regularly                       |
| rotation of leaders                     | never                         | only if not performing well | not regularly                   |   | leaders change after fixed term |
| contribution of members to the group    | none                          | seldom and not sufficient   | regular but not sufficient      |   | regular and fully sufficient    |
| savings: funds build up by members      | none                          | seldom, not sufficient      | regular, not sufficient         |   | regular and fully sufficient    |
| financial reports                       | never                         | once a year                 | every 3-6 months                |   | every month                     |
| reserve fund                            | no reserve fund               | minor reserve funds         | some funds but not sufficient   |   | fully sufficient reserves       |
| full and prompt repayments of loans     | by very few / no members      | by some members             | by most of the members          |   | by (almost) all members         |
| record keeping                          |                               |                             |                                 |   |                                 |
| financial record keeping                | no financial records          | some financial records      | reasonably accurate records     |   | accurate & up to date records   |
| minutes of meetings                     | no minutes kept               | some minutes & not detailed | detailed but not every meeting  |   | complete record                 |
| progress reports of the group           | do not exist                  | occasionally                | quarterly or less frequent      |   | every month                     |
| group membership cards                  | no membership cards           | some, not detailed          | all members but not detailed    |   | detailed membership cards       |
| list of group members                   | no list exists                | out of date, no details     | detailed but out of date        |   | detailed and up to date         |

Source: Draaijer, J. FAO, Milk Producer group resource book, (Score: 1 is lowest achievement and 4 is highest; if items are not applicable don't fill in anything)

ISBN 978-92-5-135231-1



9 789251 352311

CB7424EN/1/02.22