

Good practices in primary production

Primary production

- Primary production should be managed in a way that reduces the likelihood of introduction of hazards and appropriately contributes to meat being safe and suitable for human consumption.
- Whenever possible and practicable, systems should be established by the primary production sector and the competent authority, to collect, collate and make available information on hazards and conditions that may be present in animal populations and that may affect the safety and suitability of meat.
- Primary production should include official or officially-recognized programmes for the control and monitoring of zoonotic agents in animal populations and the environment as appropriate to the circumstances, and notifiable zoonotic diseases should be reported as required.
- Good hygienic practice (GHP) at the level of primary production should involve, for example, the health and hygiene of animals, records of treatments, feedingstuffs and relevant environmental factors, and should include application of HACCP principles to the greatest extent practicable.
- Animal identification practices should allow trace-back to the place of origin to the extent practicable, to allow regulatory investigation where necessary.





Hygiene of feedingstuffs

Animals should not be fed feedingstuffs that:

- are recognized as likely to introduce zoonotic agents (including TSEs) to the slaughter population; or
- contain chemical substances (e.g. veterinary drugs, pesticides) or contaminants that could result in residues in meat at levels that make the product unsafe for human consumption.

Hygiene of the environment

The competent authority should design and administer monitoring and surveillance programmes appropriate to the circumstances, that:

- address hazards arising from animals and plants that may compromise the production of meat that is safe and suitable for human consumption;
- address environmental contaminants that may result in levels in meat that make the product unsafe for human consumption; and
- ensure that water and other potential carriers, e.g. fertilizer, are not significant vehicles for transmission of hazards.

Facilities and procedures should be in place to ensure that:

- housing and feeding platforms where used, and other areas where zoonotic agents and other hazards may accumulate, can be effectively cleaned, and are maintained in a sanitary condition;
- systems for active processing and/or disposal of dead animals and waste should not constitute a possible source of food-borne hazards to human and animal health; and
- chemical hazards required for technological reasons are stored in a manner so that they do not contaminate the environment or feedingstuffs.

Source: FAO/WHO, 2004.

INTRODUCTION

The number of food-borne diseases is growing rapidly, and the safety level expected by consumers has not yet been attained. Continuation of the problem has been well illustrated in recent years by human surveillance studies of specific meat-borne pathogens such as *Escherichia coli* O157:H7, *Salmonella* spp., *Campylobacter* spp. and *Yersinia enterocolitica*; the emergence of new hazards, such as the agent of bovine spongiform encephalopathy (BSE); and recurring disease outbreaks that have led to wholesale destruction of livestock (e.g. the 2001 food-and-mouth disease [FMD] outbreak in the United Kingdom of Great Britain and Northern Ireland (UK) and the 2003/2004 avian influenza outbreak in Eastern Asia).

Consequently, consumers are increasingly looking for products that are not only safe and healthy, but also morally acceptable. Assuring food safety throughout every part of the food chain has thus become a vital priority for the meat industry. This has prompted a rise in national and industry-led regulations aimed at improving food safety, animal production and animal welfare.

International standards for meat safety, which are intended to be the preferred choice of sanitary measures, are elaborated in various documents of the Codex Alimentarius Commission (Codex) and the World Organisation for Animal Health (OIE) (e.g. FAO/WHO, 2004; OIE, 2003a, 2003b). These standards are based on risk-based approaches, founded on good hygienic practice (GHP), Hazard Analysis and Critical Control Points (HACCP) and, ultimately, risk assessment (see Section 1).

The premise of GHP in meat production is that meat should not contain any pathogens or traces of growth promoters, veterinary drugs, pesticides or environmental contaminants in quantities that could compromise or damage consumer health. The role of livestock farmers in this is to ensure that good practices are employed at the farm level to avert the risk of contamination of the meat animals. Such practices are essential to underpin the application of HACCP systems and, in advanced systems, risk assessment and management strategies.

Both primary producers and competent authorities should work together to implement

risk-based meat hygiene programmes at the level of primary production. The programmes should document the general status of slaughter animals and implement practices that maintain or improve that status, and include zoonoses control programmes. National and industry-led quality assurance (QA) programmes (e.g. Assured British Meat, Meat Standards Australia, Farm Assured Namibian Meat) at the level of primary production should be encouraged and may include application of HACCP principles as appropriate to the circumstances.

The aim of this section of the manual is to set some basic guidelines for the application of generic GHP practices to primary meat livestock production. The guidelines are based on the *Recommended international code of practice: general principles of food hygiene* (FAO/WHO, 1999) and the Codex proposed *Draft code of hygienic practice for meat* (FAO/WHO, 2004). Although the focus is on good practices for producing clean meat, cognizance of the broader good agricultural practice (GAP) is taken throughout since GAP emphasizes the important ethical production practices related to animal welfare, environmental protection and labour management. For each area of livestock management in primary production, the general GAP principles are discussed and guidelines pertinent to clean meat production (GHP) are highlighted in tabular form.

The philosophy here has not been to create elaborate and detailed standards (e.g. chemical quality of drinking-water or acceptable bacterial counts in feed) but to outline common sense practices that are easy to implement. Where finding an applicable local standard may present problems, the use of specific expert guidance is advised.

PRINCIPLES AND RECOMMENDED PRACTICES AT FARM LEVEL

Guiding principle

Meat should be produced from healthy animals under generally accepted conditions. To achieve this, good and hygienic production practices should be implemented at the level of primary production so as to reduce the likelihood of introducing hazards and to contribute appropriately to meat being safe and suitable for human consumption.

Basic animal welfare

Concern for animal welfare is not based only on the satisfaction of human ethical needs, but also has to do with productivity. Animals that are stressed, experiencing pain or discomfort, or inadequately fed or watered will not produce to their full potential. It is therefore essential that basic welfare requirements be met. Good animal welfare is recognized as freedom from hunger and thirst; freedom from discomfort; freedom from pain, injury or disease; freedom to express normal behaviour; and freedom from fear and distress.

Basic animal welfare needs are:

- an adequate quantity and quality of water, food and air to maintain good health and production;
- social contact with other animals;
- sufficient space to stand, lie down, stretch, groom and perform normal patterns of behaviour – including movement and exercise (Photo 2.1);
- protection from disease and injury with access to appropriate treatment if they occur;
- protection from climatic extremes where possible.

Shelter and handling facilities

Shelter and handling facilities should be planned according to the size of the herd, expansion plans, cleaning and disinfection needs, disposal of animal excrement, the available materials and the availability of good

quality water. The shelter and handling facilities plans should take into consideration existing legislation on animal welfare and conform with the relevant animal welfare freedoms from discomfort, pain, injury or disease, freedom to express normal behaviour, to have social contact with other animals and freedom from fear and distress. The design and use of shelter facilities for beef cattle should promote the health, well-being and good performance of animals at all stages of their lives. Shelter facilities should be provided for the purposes of comfort and protection and not for the purposes of intensification, and they should be kept clean. Accordingly, cattle shelters and handling facilities should be designed to ensure ease of handling and to prevent injury to animals (Photos 2.2 and 2.3). Isolation (except when required by veterinary treatment), cramping, tethering and other forms of movement restriction are not permissible.

The design and siting of shelters must take into consideration environmental protection concerns. There should be no physical features in the environment that cause recurring injuries to animals. All reasonable steps should be taken to protect animals from predators.

Risks/hazards associated with animal shelter that could compromise the cleanliness of meat are outlined in Table 2.1 along with recommendations on how the risks could be averted and on possible control points.

PHOTO 2.1
GOOD PRACTICE:
sufficient space to
stand, lie down,
stretch, groom
and perform
normal patterns
of behaviour –
including
movement and
exercise



PHOTO 2.2
Avoid: injured animal on dirty floor with poor drainage: note the amputated tail and the swollen leg



P. HEIMANN, FEDERAL VETERINARY OFFICE, BERNE, SWITZERLAND

Livestock feeding and watering

One of the basic animal welfare needs in order to maintain good health and production is for adequate quantity and quality of feed. Livestock should have access to a wholesome diet appropriate to their species, body age and condition so as to maintain optimal body condition (Box 2.1). Neonatal calves should receive colostrum for at least three days postpartum, and naturally suckled animals should have regular contact with their mothers. For older animals, the feed provided should take into account the age, sex and physiological status of the animals being fed. Expert advice must be actively sought in this respect. Where dictated by local conditions or needs (e.g. dry seasons), livestock should be given supplementary feed.

Animal feedingstuff should not contain chemical substances or contaminants (e.g. antibiotics, ionophores, hormones and other growth-promoting substances) that could result in residues in meat at a level that makes the

BOX 2.1 How do I know that my cattle are well fed?

Probably the most reliable means of determining an animal's nutritional level is to examine it with the intention of carrying out a body condition score. Condition scoring is normally done on a scale of 1 to 5, with 1 being the poorest and 5 being regarded as overly fat.

SCORE 1

Emaciated. Ribs and points of hips protrude, musculing obviously poor. Transverse processes of vertebrae sharp to touch.

SCORE 2

Thin. Ribs clearly visible, points of hips visible.

SCORE 3

Optimum condition. Ribs barely visible, points of hips well rounded, a clear "waistline" between last rib and pelvis. Ends of transverse processes can be felt with pressure.

SCORE 4

Fat. Ribs not visible, no "waistline" between ribs and pelvis.

SCORE 5

Overly fat, obese. As for score 4, but with palpable fat deposits unevenly distributed over pelvis area and under tailhead. Transverse processes cannot be felt.

Source: adapted from Defra, 2001.

PHOTO 2.3
GOOD PRACTICE:
*clean animals on
 well drained floor*



M. BLEICH, SWITZERLAND

TABLE 2.1. **Sheltering and handling facilities**

Risks/hazards and control points	Recommended practices	Suggested measures to achieve recommended practice
<p>Risks</p> <ul style="list-style-type: none"> • Injury from uneven and/or dirty, wet floors. • High microbial load on soiled skins. • Airborne infections. • Contamination of the animal feed and water by cleaning chemicals. • Buildup of infectious material in bedding. • Infectious organisms borne by pests (e.g. rodents and insects). <p>Control points</p> <ul style="list-style-type: none"> • Design, siting and construction of shelters and handling facilities. • Animal density in shelter and handling facilities. • Design, siting and construction of effluent management system and manure storage facilities. 	<ul style="list-style-type: none"> • The living space provided to animals should be such that free movement and the expression of normal behaviour patterns are possible. • Handling facilities should be designed to ensure ease of handling and to prevent injury to animals. • Indoor shelter should have adequate ventilation. • Shelter facilities should be on mild slopes to prevent accumulation of water and prevent waterlogging. • Livestock buildings, manure and silos should be located in a way that minimizes their harmful influence on the environment; pollution of water sources by the slurry and manure should be prevented. • Slurry and manure should be frequently removed from the shelter facilities. • The volume of storage facilities should be large enough to store manure during the period when spreading is not allowed. • Shelter facilities should be maintained dry, clean and free from rodents and insects. 	<ul style="list-style-type: none"> • Specifications related to farm installations and effluent management (official sanitary legislation) should be established by the competent authority and observed in the design, siting and construction of shelter, handling facilities and effluent management system. • There should be no physical features in the environment which cause recurring injuries to animals. • Facilities and procedures should be in place to ensure that shelter and feeding platforms, where used, and other areas where zoonotic agents and other hazards may accumulate can be effectively cleaned and maintained in sanitary condition. • Agricultural chemicals should be stored in such a manner that they do not contaminate the environment, water and feedstuff. • Local guidelines for stored volumes of manure should be adhered to.

meat unsafe for human consumption. Feedingstuffs should be free of any material that is likely to introduce zoonotic agents to the meat (such as meat-and-bone meal, which could introduce the agent of bovine/transmissible spongiform encephalopathy [BSE/TSE], and poultry manure).

Where on-farm mixing of feedingstuffs is practised, good quality ingredients that are free of toxin-producing fungi and other contaminants should be used. Otherwise feedingstuffs should be procured from reputable, officially recognized manufacturers and distributors.

Livestock should always have access to clean drinking-water with no hazardous microbes and chemical contaminants. The drinking troughs should not have leaks in order to avoid wet floors and minimize the risk of transmitting foot-rot, parasitic and other disease conditions (Photo 2.4).

Risks/hazards associated with animal feeding and watering that could compromise the cleanliness of meat are outlined in Table 2.2

PHOTO 2.4
GOOD PRACTICE:
livestock drinking
clean water from
a drinking trough
(*Bos indicus* in
north Senegal)



FAO

along with recommendations on how the risks could be averted and on possible control points.

General livestock management practices

Livestock should not be unduly stressed during handling. Excessive use of electric goads (prods), whips and similar instruments is not permitted. These should be replaced as much as possible with alternative driving aids such as flags, plastic paddles and sticks with plastic ribbons attached (Grandin, 1993). Animals should not be harassed by dogs and, where necessary, dogs should be separated from livestock (except in the case of bona fide sheepdogs).

Livestock identification is essential in managing livestock. In the case of beef and dairy animals where a disease of concern to human health may emanate from a single animal, and would have to be traced back through the production chain to the single animal, the case for animal identification to the individual level is a strong one. It is thus necessary that farm animal management practices include systems for collection, collation and publishing of information on hazards and conditions that may be present in animal populations, which may affect the safety and suitability of meat for human consumption.

The identification of the animal must meet minimum standards concerning readability and tamper-resistance in order to be both reliable and credible. While the issue of livestock identification is fully dealt with elsewhere (see Section 3), the following basics apply:

- The means of identification should be easily

Box 2.2 The use of livestock brands

Hot branding has been in use for over 4 000 years. People have used branding to place their mark of ownership upon livestock. With reference to animals, branding has had the goal of identifying the owner rather than the animal – it is normally used to establish ownership, especially in cases of theft.

Branding suffers from all the disadvantages of both ancient technology and a lack of central control – it often lacks readability (as a result of poor construction of the branding iron, poor branding technique, intentional “blotching” by thieves, long winter coats on animals) and is regarded by many as a cruel practice.

Despite the shortcomings of branding and the fact that it can only be used to establish ownership, many have tried to use this obsolete technology for livestock identification. Proper identification of livestock has now been rendered possible by more modern methods.

As a means of livestock identification for management and traceability, branding must be regarded as unsuitable and outdated.

TABLE 2.2 Feeding and watering

Risks/hazards and control points	Recommended practices	Suggested measures to achieve recommended practice
FEEDING		
<p>Risks</p> <ul style="list-style-type: none"> • Infection of animals by food-borne pathogens. • Inducing animals to shed pathogenic organisms into the environment. • Animals ingesting harmful chemicals and substances which could accumulate in the meat. • High levels of undesirable residues in the meat. • Agent of BSE/TSE in feedingstuff. <p>Control points</p> <ul style="list-style-type: none"> • Source of feed ingredients, feedingstuffs and licks. • Storage of feed ingredients, feedingstuffs and licks. 	<ul style="list-style-type: none"> • Animal should be provided with feedingstuffs, licks and/or supplements of good hygienic quality. • Changes in feeding regimes should be made gradually, particularly in the case of ruminants, so that digestive disturbances do not result. 	<ul style="list-style-type: none"> • Animal feedingstuffs, licks and supplements should be produced in accordance with the code of good practices and stored in good conditions to ensure that they are free from contamination. • Records should be kept of all feed ingredients, feedingstuffs and supplements fed to the animals. • An officially recognized traceability system for sources of feed ingredients, feedingstuffs, licks and supplements should be implemented by the primary production sector and controlled by the competent authority. • Limit use of antibiotics, ionophores, hormones and other growth-promoting substances to within legal and technical recommendations. • Feeds/licks/supplements should be protected from humidity, rodents and any other possible contaminants. • Ruminants should not be fed with any feedingstuff containing proteins originally derived from ruminants. Bone meal, carcass meal, meat-and-bone meal and poultry manure should be excluded from ruminant diets.
PASTURES		
<p>Risks</p> <ul style="list-style-type: none"> • Microbial and parasitic infections from unclean pastures. • Development of resistance against anti-parasitic drugs. • Animals consuming plants that could compromise the production of safe meat. • Chemical hazards from pesticides, herbicides and fertilizers. 	<ul style="list-style-type: none"> • Minimize the risk of infection and disease by good pasture management and good grazing management. 	<ul style="list-style-type: none"> • Regular deworming of livestock and companion animals. • Pastures should be on well-drained soils to discourage growth of flukes and coccidia. • Proper grazing management after treating livestock with anti-parasites. • Proper grazing management after treating pastures with manure or sludge.

Risks/hazards and control points	Recommended practices	Suggested measures to achieve recommended practice
PASTURES, CONT.		
<p>Control points</p> <ul style="list-style-type: none"> • Animal health management (e.g. use of anti-parasites and anti-helminths). • Source of pesticides and herbicides. • Programme and rate of application of pesticides, herbicides and fertilizers on pastures. • Grazing schedule for treated pastures and animals. 		<ul style="list-style-type: none"> • Pastures should be maintained free of hazardous plants. • Pesticides, organic and inorganic fertilizers should be applied when necessary in doses recommended by the competent authority, which will not result in unwanted residues in the meat animals. • After-treatment withdrawal periods from the pastures should be adhered to. • Animals should not be grazed in any place where environmental contamination with any residue-causing substance has occurred (e.g. pastures or water sources near mines may contain high levels of heavy metals).
RANGELANDS AND RANCHES		
<p>Risks</p> <ul style="list-style-type: none"> • Infections from other (wild) animals. • Plants that could compromise the production of safe meat. <p>Control points</p> <ul style="list-style-type: none"> • Control of animal movement. • Monitoring and surveillance of rangeland. 	<ul style="list-style-type: none"> • Ensure that there are no features in the environment that can cause recurring injury or infection to the animals or that such features are either removed or animals are protected from them. 	<ul style="list-style-type: none"> • The competent authority should design and administer monitoring and surveillance programmes that address hazards arising from animals and plants that may compromise the production of meat that is safe and suitable for human consumption. • Measures to protect cattle from hazards should be implemented where necessary, e.g. fencing, herding.
WATER		
<p>Risks</p> <ul style="list-style-type: none"> • Water-borne infections. • Water-borne chemical hazards. <p>Control points</p> <ul style="list-style-type: none"> • Agricultural chemical usage. • Effluent and waste management. • Sanitation of water troughs. 	<ul style="list-style-type: none"> • Provide animals with clean water at all times. • Protect water sources from contamination. 	<ul style="list-style-type: none"> • Chemical weed control should be carried out in such a way as to avoid soil and water contamination. • Effluent and manure should be managed in a way that prevents pollution of water sources. • A schedule for regular monitoring of the water quality should be drawn up, verified by the competent authority and implemented.

applicable, easily readable, non-transferable, tamper-proof and not easily copied or forged (Box 2.2).

- Central recording of identification codes issued should be entrusted to a competent central institution, and farmers should also keep adequate records of the animals they have identified.

Risks/hazards associated with animal identification and movement that could compromise the cleanliness of meat are outlined in Table 2.3 along with recommendations on how the risks could be averted and on possible control points.

Animal health

Animals that are sick or injured should have immediate access to proper treatment and care. Treatments requiring surgical procedures should only be carried out by properly trained personnel. Such treatments include dehorning, castration and tail docking. Cruel and unnecessary treatments must not be practised.

Animals should be regularly vaccinated and treated prophylactically for internal or external parasites whenever this is judged necessary by a trained person. As these needs will differ according to circumstances, veterinary advice must be actively sought in this respect.

TABLE 2.3 **Animal identification and movement**

Risks/hazards and control points	Recommended practices	Suggested measures to achieve recommended practice
ANIMAL IDENTIFICATION AND MOVEMENT (see also Sections 3, 4 and 5)		
<p>Risks</p> <ul style="list-style-type: none"> • Transmission of disease pathogens. • Introduction of foreign pathogens and contaminants. • Stress and increased susceptibility to diseases and injuries. <p>Control points</p> <ul style="list-style-type: none"> • Sourcing of new stock. • Selection of animal identification system and its implementation. • Selection of livestock for disposal (e.g. sale, movement to other farms). • Management of transportation (see Section 5). 	<ul style="list-style-type: none"> • All acquisitions, sales of animals, acquisitions of semen, losses and discards should be recorded. • Animals destined for slaughter should be transported in a manner that minimizes soiling and cross-contamination with faecal material and the introduction of new hazards. • Consideration should be given to avoiding injury and undue stress during transportation. • Zonings for disease control should be strictly observed in animal movement. 	<ul style="list-style-type: none"> • Identify and keep records of the origin of all initial stock and animals that are subsequently introduced into the production system (e.g. births, purchases). • Animal identification practices that allow trace-back to the place of origin to the extent practicable to allow regulatory investigation where necessary should be implemented (see Section 4). • Animals destined for slaughter must be clean and healthy. • Legislation concerning vaccination, deworming and quarantine of animals before and after movement should be adhered to. • A good transportation management system should be employed (see Section 5).
BREEDING		
<p>Risks</p> <ul style="list-style-type: none"> • Transmission of pathogens. <p>Control points</p> <ul style="list-style-type: none"> • Source of replacement stock, animals for finishing off and semen for artificial insemination (AI). 	<ul style="list-style-type: none"> • Breeding bulls, semen and cows should conform to good zoonotic standards and be from herds (source) with strict sanitary control. 	<ul style="list-style-type: none"> • Purchase all breeding stock and semen from reliable sources, registered according to standards set by the competent authority.

Animals for which treatment is not possible should be put to death using a method that does not cause further pain or distress (single bullet or injectable drugs are acceptable). Where a single bullet is used, it should be fired at close quarters into the skull at the point where the lines drawn between the eye and the opposing ear intersect. Where an injectable drug is used, it should be administered by a veterinarian or an appropriately authorized and trained person. After euthanasia, stock must be disposed of safely so that they do not pose a risk of spreading disease pathogens or contaminating the environment.

Potentially dangerous or toxic chemicals, paints, dips, medicines and disinfectants should be stored safely and well away from animals.

All animals destined for slaughter should conform to good zoo-hygienic standards and originate from herds with strict sanitary controls. To facilitate the application of risk-based meat hygiene programmes, the primary producer and competent authority should record relevant information to the extent possible on the health status of the livestock as it relates to the production of meat that is safe and suitable for human consumption. This information should be made available to the abattoir as appropriate to the circumstances.

There should be a system to facilitate the return of information on the safety and suitability of slaughter animals and meat from the abattoir to the primary producers. Producers should use such information in planning farm hygiene practices. Where producer-led quality assurance programmes exist, this information should be incorporated into the programmes in order to improve their effectiveness. The competent authority should systematically analyse monitoring and surveillance information from primary production so that meat hygiene requirements may be modified if necessary.

Risks/hazards associated with animal health that could compromise the cleanliness of meat are outlined in Table 2.4 along with recommendations on how the risks could be averted and on possible control points.

Farm environment management

As a matter of basic principle, farming practices should be environmentally sustainable and

existing habitat and species diversity must be maintained and protected. Unsustainable farming practices must be discontinued. Where grazing is concerned, stocking rates and grazing rotation must be such that the ecology is improved and not degraded. Grazing management (stocking rates, frequency of rotation) must be such that positive plant succession is maintained with the aim of reaching climax vegetation (Box 2.3).

Where animals are kept in pens, these should be founded on a mild slope to prevent the accumulation of water in the pens.

Waste management must be such that no pollution of the environment, water or air occurs. Manure may be used for soil fertilization but not in such a way that long-term environmental sustainability is affected. It may be necessary to carry out soil and water analyses regularly and expert assistance must be actively sought.

Primary production of livestock should not be undertaken in areas where the presence of hazards in the environment could lead to an unacceptable level of such hazards in meat.

Risks/hazards associated with farm environment management that could compromise the cleanliness of meat are outlined in Table 2.5 along with recommendations on how the risks could be averted and on possible control points.

Labour management

The inclusion of good labour practices in an agricultural publication such as this one may be controversial, but consumers are increasingly concerned about the labour practices behind the products they buy. Labels announcing that “child labour was not used in producing this item” may well become a part of the future of agricultural product labelling.

For this reason, some guidelines have been given below on some of the basics, addressing issues such as child labour, adequate remuneration, health and housing.

- Farm labourers should be properly remunerated and local legislation regarding minimum salary or wage levels should be obeyed.
- Provision for adequate annual vacation leave should be made.
- The use of child labour is not permitted.
- Labourers should be given the proper

TABLE 2.4 **Animal health**

Risks/hazards and control points	Recommended practices	Suggested measures to achieve recommended practice
<p>Risks</p> <ul style="list-style-type: none"> • Zoonotic diseases. • Drug residues in meat. <p>Control points</p> <ul style="list-style-type: none"> • Appropriate use of veterinary medicines. • Source of veterinary medicines. • Sourcing of new stock, replacement stock and semen. • Farm sanitary programme. 	<ul style="list-style-type: none"> • Prevent the risk of livestock infection by zoonotic agents. • Control and eradicate the presence of zoonotic agents in livestock animal populations. • Prevent the possible contamination of meat from the livestock by chemical substances (e.g. veterinary drugs, pesticides) above allowable maximum residue limits (MRLs). 	<ul style="list-style-type: none"> • Establish a herd health plan that is approved by the competent authority for routine preventive measures. • The health plan should include official or officially recognized programmes for the control, monitoring and eradication of zoonotic agents in animal populations and the environment and notifiable zoonotic diseases. • Keep written records of sanitary control, including dates, batch number, laboratory and validity. • Transport and store vaccines, medicines and all veterinary products under the conditions specified by the manufacturers. • Drugs should be administered in correct doses at the correct application site. All relevant records of drug administration should be kept. • Withdrawal periods for veterinary medicines must be strictly adhered to. • The competent authority should provide monitoring systems that establish baseline data and guide a risk-based approach to the control of chemical hazards. • The competent authority should systematically analyse monitoring and surveillance information from primary production so that meat hygiene requirements may be modified if necessary.

protective clothing (overalls, boots and other clothing items as needs dictate).

- Labourers and their families (where they are resident on-farm) should be provided with adequate housing, bathing and toilet facilities, and the costs thereof must not be subtracted from their wages.
- Where rations are supplied to labourers, they should be of adequate nutritional value, and wages may be adjusted as allowed by local legislation.
- Labourers in charge of livestock should be

given adequate training in the handling of the animal species under their control.

- Livestock management practices on the farm should not place the health and safety of farm workers at risk.
- Where disciplinary action is necessary, acceptable practices (written warnings for lesser misdemeanours) should be followed. Summary dismissal of labourers is allowed only for the most extreme forms of misconduct.
- Labourers (and where appropriate, their

Box 2.3 Ecological pointers

Climax vegetation can be thought of as the greatest diversity of plant species a piece of land is capable of supporting – such a plant community is capable (in the absence of disturbance) of indefinitely maintaining itself and is regarded as stable. Properly managed animal impact should be considered as a tool for maintaining stability and not as a disturbance.

Regular evaluation of species mix and extent of ground cover will provide some clues as to the ecological health of an area.

PLANT DIVERSITY SCORING

Poor: Less than 10 different plant species visible in a given area

Medium: 10–15 different species visible in a given area

Good: More than 15 species visible in a given area

EROSION SCORING

Poor: Surface litter absent (removed by wind/water), plant roots visible, presence of erosion gullies

Medium: Evidence of surface litter deposited against obstacles, soil “pedestals” around plant roots

Good: Evidence of accumulating surface litter, little evidence of water flow patterns on the surface

Such “rule-of-thumb” evaluations are easy to do, and if carried out regularly, will provide some indication as to whether a piece of ground is being managed so that increasing diversity (i.e. positive succession) is being promoted.

Source: adapted from Savory, 1999.

family members) must have ready access to medical care.

- Records should be kept of wages paid, training given and disciplinary actions undertaken.

All principles, laws and regulations regarding hygiene and safety during any operation related to livestock production must be followed in order to avoid any health hazard to workers and consumers.

Risks/hazards associated with labour management that could compromise the cleanliness of meat are outlined in Table 2.6 along with recommendations on how the risks could be averted and on possible control points.

On-farm record-keeping

Why should records be kept of on-farm activities? The answer is very simple – keeping good records makes good management possible. Maintenance of records across a broad spectrum of farming activities enables the producer to plot his/her progress in terms of production levels, income, state of the environment and other parameters.

The availability of records also facilitates the process of farm audits and inspections where external bodies are involved in verifying the implementation of good practices.

There is a wide range of records to be kept with respect to any farming enterprise, and such record-keeping can become very sophisticated. As the aim of this publication is to assist smaller-scale farmers in developing countries, every effort has been made to keep the approach simple.

In terms of the farming practices outlined in the preceding pages, there are a number of records that are essential. These are:

Livestock population register

At the very minimum, records must be kept of births, deaths (with cause where known), purchases and sales of each species of livestock on the farm (Figure 2.1). Preferably, each birth should be recorded individually and the identity code allocated to each animal noted. Individual identification also makes it possible to record the sale and destination of each animal, and facilitates the keeping of records on individual medication.

The register must be backed up by the normal receipts or waybills that accompany the

TABLE 2.5 Farm environment management

Risks/hazards and control points	Recommended practices	Suggested measures to achieve recommended practice
<p>Risks</p> <ul style="list-style-type: none"> • Microbial and parasitic infection of livestock. • Microbial contamination of livestock. • Chemical contamination of feed/fodder, water and livestock. • Physical contamination of feed, water and livestock. <p>Control points</p> <ul style="list-style-type: none"> • Chemical usage. • Effluent and manure management. • Reclaimed water/waste usage. 	<ul style="list-style-type: none"> • Ensure that pesticides and their containers do not contaminate soil, water and animal feeds. Strictly follow legal prescriptions for handling, application and disposal of pesticide leftovers and empty containers with emphasis on the triple washing method. • Waste management must be such that no pollution of the environment, water or air occurs. Manure may be used for soil fertilization but not in such a way that long-term environmental sustainability is affected. • Grazing management (stocking rates, frequency of rotation) must be such that positive plant succession is maintained with the aim of reaching climax vegetation. • Carcasses should be disposed of in such a way that they do not pollute the environment (see Box 2.4). 	<ul style="list-style-type: none"> • A recognized protocol for the storage, usage and disposal of all chemical substances used on the farm (e.g. medication and vaccines, fertilizers, paints) should be drawn up and implemented. • Pesticide application equipment should conform to safety and maintenance recommendations. • Where possible, a recognized protocol for farm waste management, disposal of dead carcasses, etc. to prevent pollution of the environment and the spread of infectious diseases to animals or to humans should be drawn up and implemented. • Any deaths that are suspected to be from disease should be reported and carcasses should be available for post-mortem evaluation in such cases. • If necessary, a programme for regular soil and water analyses should be established with the assistance of the competent authority.

Box 2.4 Carcass disposal

Ideally, animal carcasses should be disposed of at a rendering plant. Disposal methods on the farm, such as burial or burning in the open, may cause water or air pollution. However, if no other options are practical, carcasses may be buried on the farm as long as the following guidelines are met:

- The burial site is at least 250 m away from any well or spring that supplies water for human consumption or farm use.
- The burial site is at least 30 m from any other spring or watercourse and at least 10 m away from any field drain.
- The bottom of the burial pit should have at least 1 m of subsoil above it so that the carcass is covered by at least 1 m of soil below the top soil.
- The bottom of the burial pit must be free of standing water.

Source: adapted from Latvia University of Agriculture, 1999.

purchases and sales of livestock so that registers can be reconciled with individual transactions.

Feed register/grazing records

Where a farmer has access to fenced-off camps or fields, the number of animals grazed in each camp, and the periods during which they are grazed, must be recorded. Such records, when kept together with a record of the ecological status of each camp, will enable the farmer to track progress with environmental management. The use of communal grazing makes such management processes very difficult, however, and it may not always be possible to keep a grazing register.

However, the use of supplementary feeds or exclusive feeding with zero grazing renders the keeping of records absolutely essential. Feeds may well be a source of toxins or infection, and accurate records of their use must be kept. The

FIGURE 2.2 Example of a feed/supplementary feed register

FEED/SUPPLEMENTARY FEED REGISTER

Farmer's name and address..... Year.....

Name (proprietary feed)	Composition (if own mixture)	Number/ identification of animals fed	Period (from/to)	Quantity fed

the following information: the date of the treatment; the name and dose of the medication or vaccination used; the description or identification of the animal/s treated; the length of the withdrawal period; and the date of expiry of the withdrawal period (i.e. the date after which the animal is again eligible for normal production). For a suggested layout of such a register see Figure 2.3.

Worker's paysheet

Each worker should have a sheet showing his/her name, date of birth and record of weekly/monthly payments, giving the date of the payment and the amount against the worker's signature or thumbprint. This is not only good practice in terms of monitoring labour costs, but is an added protection for the farmer against possible claims of malpractice with respect to remuneration (Figure 2.4).

Financial records

While outside the scope of this publication, it goes without saying that financial records are essential even for the smallest of farmers. At the very least, a monthly income and expenditure sheet should be kept, giving details of money spent on labour and other inputs, and details of money obtained through sales of production.

Supervision and inspection

Livestock should be kept under supervision of a person trained in their care and feeding. Ideally, they should be seen once a day by such a

person, but under extensive farming conditions, weekly checks may be more practicable. They should be checked for health, and their feeding and drinking facilities must be inspected.

Animals or facilities requiring attention must be reported without delay to the person responsible.

In order to verify the implementation of the standards elaborated here, external inspections by an authorized body must be undertaken on a regular basis (Photo 2.5). Such inspections should be carried out at yearly intervals and include not only an inspection of livestock and facilities, but also a detailed audit of all the records outlined above.

- The inspection authority should compile a suitable register of all farms intending to apply the good practices (i.e. an accreditation system should be implemented) and provision should be made for central recording of all inspections.
- Inspectors/auditors should carry out uniform inspections on all farms involved in any standards scheme, and should use a standard inspection report/checklist (Box 2.5).
- Inspection reports shall be collected and stored centrally by the inspection agency, and farms not complying with the requisite standards must be placed under sanction, e.g. exclusion from relevant markets, reduction in producer price.
- Inspectors shall inform farmers of any shortcomings noted during inspections so that farmers may take corrective action.



PHOTO 2.5
A farm inspection in Swaziland: such inspections are the cornerstone of quality assurance in the livestock industry

R. PASKIN, MEAT BOARD OF NAMIBIA

FIGURE 2.3 Example of an on-farm treatment register

ON-FARM TREATMENT REGISTER

Farmer's name and address..... Year.....

Date	Treatment/drug	Description/identification of animals	Withdrawal period	Expiry date withdrawal

FIGURE 2.4 Example of a paysheet

WORKER'S PAYSHEET

Name of worker..... Date of birth.....

Date of start of employment.....

Date	Amount paid	Signature of employee

Leave record: From..... To.....

Box 2.5 Example of farm inspection report

Questions 1–24 are answered yes/no; give details of problems/defects noted at question 25.

FARMER'S NAME:

HOLDING NAME AND NUMBER:

	Yes	No
1. Is the origin of all purchased livestock known?	<input type="checkbox"/>	<input type="checkbox"/>
2. Are there clear records of all movements to and from the farm?	<input type="checkbox"/>	<input type="checkbox"/>
3. Are all animals identified in accordance with scheme rules?	<input type="checkbox"/>	<input type="checkbox"/>
4. Are records kept of all treatments?	<input type="checkbox"/>	<input type="checkbox"/>
5. Can treatment records be reconciled with accounts for medicine purchases and veterinary consultations?	<input type="checkbox"/>	<input type="checkbox"/>
6. Are medicines and vaccines correctly stored?	<input type="checkbox"/>	<input type="checkbox"/>
7. Are records kept of all feeds given?	<input type="checkbox"/>	<input type="checkbox"/>
8. Can feed records be reconciled with proofs of purchase?	<input type="checkbox"/>	<input type="checkbox"/>
9. Are these feeds free of meat-and-bone meal?	<input type="checkbox"/>	<input type="checkbox"/>
10. Are these feeds free of poultry manure?	<input type="checkbox"/>	<input type="checkbox"/>
11. Are these feeds free of growth promotants?	<input type="checkbox"/>	<input type="checkbox"/>
12. Are feeds correctly stored?	<input type="checkbox"/>	<input type="checkbox"/>
13. Were all animals presented for inspection?	<input type="checkbox"/>	<input type="checkbox"/>
14. Was their overall condition satisfactory?	<input type="checkbox"/>	<input type="checkbox"/>
15. Are livestock raised on natural grazing?	<input type="checkbox"/>	<input type="checkbox"/>
16. Is the grazing in a satisfactory condition?	<input type="checkbox"/>	<input type="checkbox"/>
17. Do farm practices minimize stress?	<input type="checkbox"/>	<input type="checkbox"/>
18. Are handling facilities acceptable?	<input type="checkbox"/>	<input type="checkbox"/>
19. Do animals have free access to clean water?	<input type="checkbox"/>	<input type="checkbox"/>
20. Where appropriate, is shelter for animals sufficient?	<input type="checkbox"/>	<input type="checkbox"/>
21. Do animals suffering from sickness or injury receive immediate attention?	<input type="checkbox"/>	<input type="checkbox"/>
22. Does the farmer adhere to withdrawal periods when treatments are administered?	<input type="checkbox"/>	<input type="checkbox"/>
23. Are compulsory vaccinations up to date?	<input type="checkbox"/>	<input type="checkbox"/>
24. Are general records pertaining to animal numbers acceptable and up to date?	<input type="checkbox"/>	<input type="checkbox"/>
25. Details of shortcomings:		

Signature of Farmer:

Signature of Inspector:

Date:

• Checklist of relevant action for implementation of primary production standards •

Formal implementation of good practices in primary production is not an easy matter, as it requires the mobilization of a large number of farmers in order for it to be meaningful.

The first step is awareness building in the target farming community. This step is nothing more than awareness creation, informing farmers of what might be required of them, and the reasons for implementing such standards.

Following awareness building, the next step involves research to determine what standards would be applicable and to elaborate a set of standards (based on these guidelines) that would be acceptable and practicable for the farmers and acceptable to the markets they serve.

The next phase would require a series of farmer training initiatives and identification and training of other stakeholders, including the inspection agency and its inspectors. This would be followed by a gradual phasing-in of the standards on cooperating farms, with constant evaluation and modification of the system as necessary.

The checklist below summarizes these phases.

ACTIVITY	✓
Farmer awareness campaign:	
Message formulation	
Radio/TV	
Newsletters/pamphlets	
Meetings	
Elaboration of appropriate standards:	
Assessment of market needs/applicable regulations	
Assessment of farming systems/farmer capabilities	
Compilation of a set of standards	
Elaboration of suitable farm record formats	
Consultation with farmers	
Reformulation of standards and record formats	
Training:	
Identification of stakeholders	
Consultation/compile training material with farmers' organizations	
Consultation/compile training material with inspection agency	
Consultation/compile training material with government extension agents	
Consultation/compile training material with livestock agents/traders	
Consultation/compile training material with veterinarians	
Consultation/other	
Compilation and printing of training materials	
Training of farmers	
Training of inspection personnel	
Training of government staff	
Training of traders	
Training of veterinarians	
Other training	
Assessment of progress and determination of implementation deadline	
Implementation phase:	
Final compilation and printing of standards manuals and record forms	
Compilation and printing of inspection checklists/report forms	
Distribution of standards manuals and record forms	
Distribution of inspection checklists/report forms to inspection personnel	
Public announcement on implementation date – mass media, pamphlets, etc.	
First round of inspections/audits	
Assessment of progress	
Modifications to implementation as necessary	

Summary

- Implementing good practices in primary production involves the application of recommendations and knowledge to on-farm practices in order to achieve sustainable production and yield a safe and healthy product. The aim is to provide assurance to consumers that the product on their tables is both safe and ethically acceptable.
- Good agricultural practices are applicable in all livestock production activities and related areas, encompassing animal welfare, feeding, health, identification, environmental sustainability and labour relations.
 - Animal welfare – in terms of nutrition, health, living space and medical care – must be safeguarded. Areas of concern include:
 - access to adequate and safe feed and water;
 - social contact between animals;
 - sufficient living space;
 - protection from injury and disease and, should they occur, access to proper treatment;
 - protection from climatic extremes.
 - Shelter and handling facilities should be provided for the comfort, protection and ease of handling of livestock and not for the purposes of intensification. The facilities should be planned according to the size of the herd, expansion plans, cleaning and disinfection needs, disposal of animal excrement, the materials available and the availability of good quality water.
 - Standards for feeding should concern the following:
 - safety of feed and water;
 - adequacy of feed and water, taking into account the physiological needs of the animals;
 - grazing practices that match the needs of the animals and include supplementary feeding where necessary. Grazing practices should have no adverse effects on the environment and on plant species diversity in the rangelands;
 - freedom from growth promotants, meat-and-bone meal, poultry manure and dangerous contaminants.
 - Livestock identification is basic to management, record-keeping and traceability systems. The means used for identification should be readable, non-transferable and easy to apply.
 - Animal health considerations at the primary production level should mean that:
 - Animals are protected from disease and injury. Should these occur, the animals should have immediate access to appropriate treatment and care from suitably trained personnel.
 - All animals destined for slaughter conform to good zoo-hygienic standards. Primary producers should have strict herd sanitary control programmes that document the general health status of slaughter animals and implement practices that maintain or improve that status.
 - A system that facilitates the return of information on the safety and suitability of slaughter animals and meat from the abattoir to the primary producers is established and maintained. The information should be incorporated in herd sanitary control programmes.
 - Farming practices should be environmentally sustainable and such that there is no pollution of the land, water or air, and that existing habitats and species diversity are maintained and protected.
 - Good labour practices must be employed. These include adequate training, remuneration and protection of health of the employees and the exclusion of child labour.
 - Basic record-keeping would include the following:
 - on-farm livestock register, showing births, deaths, purchases and sales;
 - feed register giving details of feed used, animals fed and period of feed usage;
 - treatment register giving date and full details of treatments administered, and the animal/s treated;

- paysheet records showing details of each labourer and remuneration paid;
 - minimal financial records to reflect income and expenditure;
 - the keeping of all transaction records relating to any of the above.
- The farming enterprise must be under adequate farmer supervision, and should be subject to regular audits by a credible external entity.
- Implementation of good practices in the primary production sector necessitates the following processes:
 - sensitization of the primary producers about the required practices;
 - research to determine what standards would be applicable and to elaborate a set of standards (based on the guidelines set out in this manual) that would be acceptable and practicable to the farmers and acceptable to the markets they serve;
 - a series of farmer training initiatives; identification and training of other stakeholders, including the inspection agency and its inspectors. This would be followed by a gradual phasing-in of the standards on cooperating farms, with constant evaluation and modification of the system as necessary.

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