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FAO ANIMAL PRODUCTION AND HEALTH

manual

LIVESTOCK-RELATED INTERVENTIONS DURING EMERGENCIES

The how-to-do-it manual

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The how-to-do-it manual

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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Preface

Over the last two decades, the Food and Agriculture Organization of the United Nations (FAO) has seen a major increase in requests for assistance in responding to disasters, both natural and human-induced, in developing countries. Inevitably, it is the vulnerable members of the community who are most affected and who, in many cases, rely upon animals in one form or another to support their livelihoods. It is not surprising therefore that livestock-related interventions are commonly included as part of emergency responses.

FAO supported the development and publication of the *Livestock Emergency Guidelines and Standards* handbook and a revised edition of LEGS was published in 2014 (http://www.livestock-emergency.net). To complement the LEGS handbook, FAO has prepared this manual providing guidelines for each of the most common livestock interventions, namely: destocking, veterinary support, provision of feed, provision of water, livestock shelter and settlement, and provision of livestock. A chapter on the use of cash transfers and vouchers and a chapter on monitoring, evaluation and assessing the impact of emergency response were added.

These guidelines assume that during an emergency, and based on the LEGS handbook and other reference materials, it was decided that livestock interventions *may* be appropriate. It deals essentially with the "how-to" aspects, offering practical advice. It tries not to repeat ground covered by the LEGS handbook, and users of this manual should first familiarize themselves with it in order to make the most out of these guidelines.

Readers are asked to note that this is a first edition and by no means a comprehensive guide. We would encourage you to submit any comments and suggestions for improvements to FAO.

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Acronyms and abbreviations

ACF	Action Contre La Faim
AGA	Animal Production and Health Division (FAO)
AHS	African horse sickness
ATM	Automated teller machine
BCA	Benefit-cost analysis
CAHW	Community Animal Health Worker
CBO	Community-based organization
CBPP	Contagious bovine pleuro-pneumonia
CCPP	Contagious caprine pleuro-pneumonia
CCT	Conditional cash transfer
CFW	Cash for work
CP	Crude protein
CRS	Catholic Relief Services
DCFB	Densified complete feed blocks
DM	Dry matter
EMPRES-AH	Emergency Prevention System for Animal Health
FAD	Food availability decline
FAO	Food and Agriculture Organization of the United Nations
FMD	Foot and mouth disease
g	Gram
HPAI	Highly Pathogenic Avian Influenza
IASC	Inter-Agency Standing Committee
IDP	Internally displaced people
ISO	International Organization for Standardization
kg	Kilogram
LEGS	Livestock Emergency Guidelines and Standards
LU or LSU	Livestock unit
M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
ME	Metabolizable energy
NCD	Newcastle disease
NGOs	Non-governmental organizations
OIE	World Organisation for Animal Health
PIA	Participatory impact assessment
PIN	Personal identification number
PPR	Peste des petits ruminants
PRIM	Participatory Response Identification Matrix

PW	Public works
RVF	Rift Valley Fever
SMART	Specific, measurable, achievable, realistic, time-bound
SWOT	Strengths, weaknesses, opportunities, threats
TAFS	Trust in Animals and Food Security
TLU	Tropical livestock unit
UCT	Unconditional cash transfer
VSF	Vétérinaires sans Frontières
WFP	World Food Programme
WHO	World Health Organization of the United Nations
UN	United Nations
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
US$	United States dollars

Chapter 1
Introduction

Natural and human-originated disasters take a variety of forms, but all of them can severely affect people's livelihoods through loss of assets, including livestock. In many parts of the world, livestock are an integral part of the household economy, and contribute significantly to family subsistence, livelihood and well-being. Livestock are used for food (milk, eggs and meat), cultivation (manure, draught animal power), transport (water, wood, and market goods) and income (sale, barter and hire); they also have important sociocultural and religious functions in many communities.

When animals are lost, injured or debilitated by a disaster, and/or the resources and services that support them are disrupted, there is a serious impact on communities. Market access can be lost, animal shelters destroyed; grazing, feed and water may become unavailable and animal health services inaccessible. Disasters can be acute (floods, earthquakes, hurricanes) or slow-onset (drought, prolonged cold weather). Emergencies also commonly result from conflict, acute or chronic, in which people are displaced, animals looted, animal movement and market access restricted and animal health services disrupted. Each type of disaster has a different kind of impact and presents special survival and recovery needs. The communities involved normally have their own coping strategies but these can be affected or overwhelmed by the scale of a disaster.

In emergency situations, specific livestock-targeted interventions are required to help households survive the immediate crisis and to support communities in rebuilding their livelihoods. Livestock interventions typically cover provision of animal health services, emergency feeding and water supplies, shelter provision, destocking (marketing, slaughtering) and restocking. The need for a particular intervention depends on the nature of the emergency, the local context and the phase of the emergency (i.e. ongoing, immediate aftermath, recovery or rehabilitation).

To ensure a more rapid and appropriate response, FAO contributed to the development of the *Livestock Emergency Guidelines and Standards* (LEGS) available at www.livestock-emergency.net/resources/download-legs/

This manual complements LEGS and provides specific and technical "How-to-do-it" information for the most common livestock interventions. The technical chapter titles and numbers mirror the LEGS handbook (Chapters 4 to 9) with the exception of the Cash Transfer chapter (Chapter 3) for which there is no corresponding chapter in the LEGS handbook. The present manual also has further chapters – Chapter 1: Introduction; Chapter 2: Getting started; and Chapter 10: Monitoring, Evaluation and Impact Assessment.

Each of the technical chapters (3 to 9) has a common basic structure with the following sections: Rationale, Planning and preparation, Implementation and monitoring, Evaluation and impact assessment. At the end of each chapter, there is a checklist as an *aide memoire* to ensure that no major considerations are overlooked.

BOX 1

LEGS livelihood objectives and strategies

Livestock Emergency Guidelines and Standards (LEGS) is a set of guidelines and standards for designing, implementing and evaluating livestock interventions to help people affected by humanitarian crises. LEGS is based on three livelihoods objectives: to provide immediate benefits; to protect livestock assets; and to rebuild the livestock assets of crisis-affected communities.

LEGS supports the saving of lives and livelihoods through two key strategies:

- LEGS helps to identify the most appropriate livestock interventions during emergencies;
- LEGS provides Standards, Key Actions and Guidance notes for these interventions based on good practice.

Source: Livestock Emergency Guidelines and Standards (LEGS) 2014.

In its general approach, the "How-to-do-it" guidance is intended for emergency interventions targeting all livestock species, yet many of the concrete examples focus on ruminants and to a lesser extent on poultry. That is because, in the vast majority of cases, expertise and experiences related to emergency interventions concern those species.

The manual assumes that, based on the LEGS handbook and other reference material, it has been decided that livestock interventions *may* be necessary and appropriate. This manual tries to avoid ground covered by LEGS, and readers should already be acquainted with the LEGS guidelines. In particular, readers are encouraged to familiarise themselves with the following sections:

- the LEGS **Participatory Response Identification Matrix (PRIM)** is essentially a participatory tool which considers the LEGS livelihoods objectives (immediate benefits, protecting assets, rebuilding assets) and, based on responses to a series of standard questions, identifies interventions appropriate for specific circumstances in an emergency.
- **LEGS Livelihood Objectives and Technical Options** (Table 3.1 – LEGS 2nd edition) this is a particularly valuable table summarising the technical options and, importantly, their associated implications for each of the three LEGS livelihoods objectives.
- **LEGS "decision-making trees"** are found in each of the technical chapters. Based on "yes-no" answers, they follow a decision pathway designed to identify the most appropriate option (including doing nothing) for any given intervention.

Although the following chapters are each dedicated to a specific intervention, they should not be viewed in isolation. While readers may select a specific intervention of interest to them, being aware of the issues covered in the other chapters is essential for project preparation. For example, when an animal health intervention is being considered, thought should also be given to the water and feed needs of the target livestock. Providing health services would be pointless if feed and water were in limited supply, as animals would be struggling to survive.

This manual, like LEGS, does **not** address the prevention and control of transboundary animal diseases, i.e. cases where a particular animal disease outbreak is the emergency. This topic is already well covered by other internationally accepted guidelines such as *Good Emergency Management Practice: The Essentials* (FAO Animal Production and Health Manual 11). Animal health-related interventions associated with natural disasters and humanitarian emergencies are, however, covered in Chapter 5.

Chapter 2
Getting started

In any emergency intervention, irrespective of type, there are important cross-cutting issues to be considered and preparations to be made. Addressing these improves decision-making, use and targeting of resources and ultimately the impact of the intervention. An overview of the more important guiding principles is provided in this chapter, with additional detailed descriptions given in the relevant technical chapters that follow.

THE CONTEXT OF THE EMERGENCY

The starting point for any intervention is a thorough understanding of the local context in which the emergency is occurring and of the impact it is having. For example:

- the geographical characteristics of the zone affected – area, terrain, vegetation, normal weather conditions/seasons;
- the size, distribution, status (socio-economic levels), cultures and livestock productions systems of affected human populations;
- the size, distribution and species of affected animal populations;
- available natural resources (grazing, water and arable land) and how they have been hit;
- physical infrastructure, such as: roads, bridges, dams, markets, abattoirs, feed mills, storage facilities, water pumps, telecommunications, veterinary laboratories, cold chain facilities, etc.;
- prevalent or potential disease risks to animals (and to humans from animals);
- available expertise and relevant human resources – veterinarians, livestock assistance, etc.;
- available logistics – transport, administration, private-sector goods and services;
- the security situation of the affected area.

Interventions also need to take account of relevant cross-cutting issues, such as protecting people's rights; awareness of equity and gender issues; identification of particularly vulnerable groups, such as women, young and old people, and those living with HIV/AIDS; and the short- and long-term impacts of each intervention on the environment. Emergencies impact differently on different sectors of a community and this has implications on the type of support required. An emergency may, for example, increase the workload on women and children as they search for food, water and fuel, yet it is often women who normally tend to animals.

Agencies must also be aware of the possible consequences of an intervention and take care that they do not inadvertently expose specific groups to greater risks. In conflict situations, providing livestock to households, for example, can make them more vulnerable to stock raids, while providing livestock camps for internally displaced people (IDPs) can lead to conflict over limited grazing and water resources, and damage the local environment. Interventions should also avoid undermining local service providers such as private and public veterinarians and para-veterinarians, or livestock traders. Agencies should always try to find ways of supporting and strengthening local services.

The priority during, and in the immediate aftermath of, an emergency is to provide prompt support to affected households. It is important however that longer-term development challenges and disaster preparedness are not neglected. Specific measures may be needed to reduce future impacts on livestock. They may include building more earthquake-resistant shelters; working with communities to identify and reserve grazing areas for use during high-risk periods; or having animal health strategies in place for preventing and treating diseases that result from specific emergencies such as flooding. Many aspects covered in this manual apply to non-emergency situations as well.

INITIAL ASSESSMENT

Post-disaster emergency assessment, including effective approaches and methods, is well described in the LEGS handbook. Again, readers may find the LEGS Participatory Response Identification Matrix (PRIM) and its Livelihood Objectives and Technical Options helpful for decision-making, prioritizing and timing of interventions. This section highlights the information required for project design and planning when an initial rapid assessment indicates the need for livestock interventions.

Some of the necessary information may already be available, so coordination is important at this stage. Sources of information include assessments conducted by other bodies (government, NGOs, UN agencies, etc.), pre-emergency livelihood assessment reports, veterinary department records, IDP camp records, evaluations and impact assessments of previous livestock interventions, and project reports. Much of this is "grey" information that may not be readily accessible without searching for it. If adequate information is not available, careful planning is required of what additional information is needed and how it can be obtained. Full participation of target communities and local leaders is most likely to elicit reliable and detailed information that can be cross-checked with other sources. Certain types of emergencies, however, demand a quick response so assessments should be well focused, be undertaken by experienced practitioners and use the approaches that are most likely to yield accurate data (Chapter 3 - LEGS 2nd edition).

The following are suggestions concerning the type of information that can be collected, depending on the nature of the emergency. This information may be sourced from the documents mentioned above, or may need to be collected through field assessments covering:

- main pre- and post-emergency livelihood profiles for different socio-economic groups;
- post-disaster and long-term livelihood opportunities;
- local coping strategies and the community's capacity for supporting vulnerable members;
- available livestock management skills;
- access to services (animal health, markets, schools, credit and saving schemes);
- community development priorities;
- land tenure issues and access to natural resources;
- environmental issues – changes in the environment due to the disaster, prospects for recovery, and long-term concerns about the environment (especially related to livestock rearing).

The nature of the disaster may also define those most vulnerable. For example, an earthquake may affect wealthy and poor alike in a community, which may lose its animals, shelters and access to feed and water. A drought, however, may have a greater impact on

a community's more vulnerable members, who have fewer livelihood options. There are no set rules for defining vulnerable populations: they must be identified according to specific circumstances.

Wide consultation and transparency about the aims and process of the intervention are needed and should involve all sectors of a community. Community participation at the planning stage also gives implementers the opportunity to assess local capacity for involvement and any training needs. Where feasible, communities should play a major role in all parts of the project cycle as this is likely to result in a greater sense of local ownership and responsibility for the end results. The LEGS PRIM is a tool that can easily be used with a wide range of affected groups. However, in an acute emergency requiring speedy response, concessions must be made on the understanding that some aspects of the project cycle, such as Monitoring and Evaluation (M&E), will be discussed in more detail later, at a more appropriate moment.

When more time is available for designing an intervention – e.g. restocking – involving the community in setting impact indicators can help to clarify the objectives and expected impact. The type and quantity of information needed for Monitoring and Evaluation can also be discussed at this stage to avoid collecting data that is unnecessary or cannot be obtained easily. This is particularly important in situations where households are likely to be mobile.

IDENTIFYING THE APPROPRIATE RESPONSE

In most disasters and emergencies affecting livestock, the range of interventions falls into six basic categories – which are also the basis for the chapters in the LEGS handbook and this manual. These are:

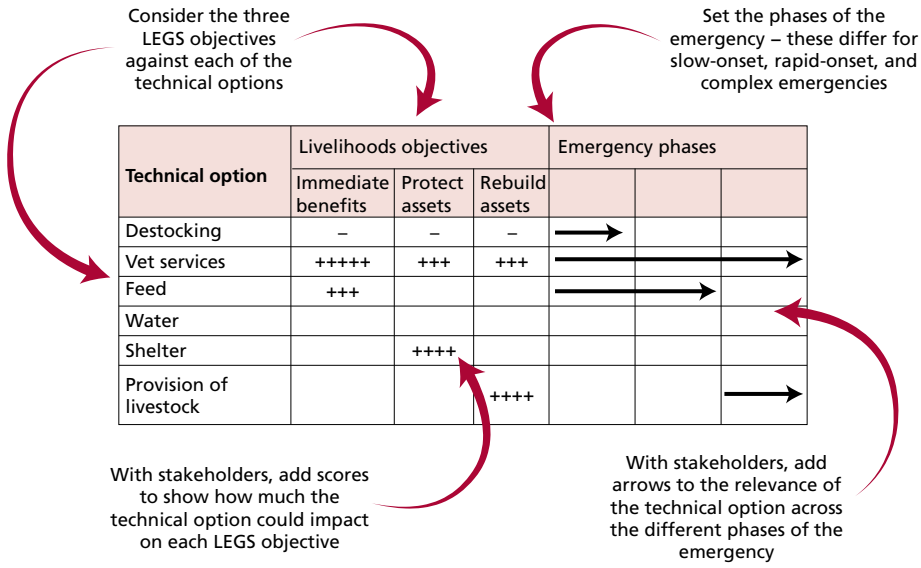
- destocking
- provision of veterinary services
- provision of feed
- provision of water
- livestock shelter and settlement
- provision of livestock

In addition, there is a timing factor to consider. Some interventions are more appropriate at certain stages in the disaster cycle than others. For example, a restocking programme would logically be in the recovery, rather than the alert phase of a disaster. It is also likely that a combination of different interventions over time will be a more effective way to safeguard the livelihoods of the beneficiaries. Again, the LEGS PRIM is particularly valuable in preparing a matrix of potential interventions over time based on the specific information given.

COLLABORATION

Any externally supported intervention will benefit from being part of a coordinated response, which can optimise the use of information and resources (financial, material and human), and allow for more effective programming and targeting. Effective coordination makes each individual intervention an integral part of a wider response and rehabilitation package. Although some countries and agencies have existing mechanisms for coordinating emergency responses, implementing such mechanisms can be challenging. Effective

FIGURE 1
Example of the Participatory Response Identification Matrix (PRIM), as described in the LEGS handbook



Technical option	Livelihoods objectives			Emergency phases		
	Immediate benefits	Protect assets	Rebuild assets			
Destocking	–	–	–	→		
Vet services	+++++	+++	+++	→	→	→
Feed	+++			→	→	
Water						
Shelter		++++				
Provision of livestock			++++			→

coordination requires strong leadership, pragmatism and "buy-in" from the relevant government departments, donors and implementing agencies.

Operating as part of a coordinated response is also important for agencies that do not have much experience in the livestock sector. It helps them identify partners who can provide specific expertise and technical backstopping. If circumstances allow, as when dealing with more predictable emergencies, coordination mechanisms should ideally be in place before disaster strikes to ensure that roles and responsibilities are clearly defined, resources available and systems tested.

One example of a comprehensive, coordinated response system is the Cluster Approach, which is implemented by the Inter-Agency Standing Committee (IASC) and deals with humanitarian assistance in response to complex and major emergencies. The IASC is an inter-agency forum for coordination, policy development and decision-making involving the key UN and non-UN humanitarian partners.

Collaboration means working together effectively and having well-defined roles and responsibilities. It also requires a realistic assessment of the capacities of the various stakeholders, including local administrations, livestock departments, animal health-care providers, local leaders and the target community. Collaboration may be practical – like sharing facilities such as transport or using local human health service cold-chain facilities for storing veterinary vaccines. It can also be at a higher level, with two agencies working together to supply different but complementary services such as restocking and animal health services.

BOX 2

The Inter-Agency Standing Committee (IASC) Cluster Approach

Clusters are groups of humanitarian organizations, both UN and non-UN, in each of the main sectors of humanitarian action, e.g. water, health and logistics. They are designated by the Inter-Agency Standing Committee (IASC) and have clear responsibilities for coordination. The Cluster Approach is used in more than 30 countries to deliver humanitarian assistance. The core functions of a cluster at country level are:

1. supporting service delivery by providing a platform for agreement on approaches and the elimination of duplication;
2. informing strategic decision-making by the Humanitarian Coordinator / Humanitarian Country Team for humanitarian response through coordination of needs assessment and gap analysis, and prioritization;
3. planning and strategy development including sectoral plans, adherence to standards and funding needs;
4. advocacy to address identified concerns on behalf of cluster participants and the affected population;
5. monitoring and reporting on the cluster strategy and results; recommending corrective action where necessary;
6. contingency planning/preparedness/capacity building where needed and where capacity exists within the cluster.

Each cluster is also responsible for integrating early recovery from the outset of the humanitarian response.

Source: https://www.humanitarianresponse.info/en/coordination/clusters/what-cluster-approach

SELECTION OF BENEFICIARIES

The selection of beneficiaries is one of the most challenging aspects of designing any livestock-related emergency response, and difficult decisions often have to be made. Selection of beneficiaries should always take place with the full participation of all stakeholders, including the target communities themselves. It is important that concerns, issues and potential challenges are addressed before any activities begin.

While needs assessment can provide the information on particularly vulnerable communities, the targeting of beneficiaries is best done using criteria established with the affected community itself. Community representative groups are frequently asked to help set criteria and lead the selection of beneficiaries, with support to ensure appropriate targeting and fairness. Many communities have strong local representative institutions and the capacity to carry out this task. These institutions must, however, represent the whole community: experience shows that some traditional institutions have difficulty dealing with issues of equity such as women's representation and the inclusion of all layers of the population.

If committees are formed to help with beneficiary selection, it is important that their members are chosen at public meetings and from different sectors of the community (families,

age groups, gender, disadvantaged, etc.). Local government should have a well-defined role as a facilitator but should not influence the community's choices. When new committees or groups are established, implementers should be aware of the support they may require and their roles and responsibilities must be agreed from the start.

Equity and gender issues need to be addressed at this stage. Ways of ensuring that benefits reach both men **and** women should be discussed and agreed prior to implementation. In particular, it is important that selection considers how women – both female-headed households and women in male-headed households – will benefit. Some donors may actually set specific targets for female beneficiaries. If payments are to be made as part of the response, how and where these payments are made can also affect women, so these aspects should also be discussed in consultation with the community.

EFFECTIVE COORDINATION AND COMMUNICATION BY COMMITTEES

Inevitably, committees are needed to ensure effective coordination and communication during implementation of activities.

As part of a coordinated emergency response, it is good practice to establish an **oversight committee** to manage all emergency livestock interventions in an affected area. This is likely to be a national-level coordination body with representatives from the key stakeholders, probably including the Ministry of Agriculture or the equivalent ministry, the Veterinary Department, local administration, FAO, national livestock experts, livestock traders, and relevant NGOs. In many cases there may be technical sub-committees of a broader disaster-response committee. Understanding national policies, standards and guidelines on emergency responses and evaluating in-country expertise is often a good starting point for such committees to avoid "re-inventing the wheel" and thus save time and resources.

At sub-national level, a multi-disciplinary/agency **intervention committee** is best placed to oversee specific interventions such as destocking, supplementary feeding, etc. Membership of the committee could include: a senior local administrator together with the district veterinarian or livestock officer; livestock marketing experts; local livestock traders; and farmer/herder representatives from the respective areas. This committee should meet weekly so that it can quickly start operations and respond efficiently and effectively to issues as they arise. Minutes of all meetings should be kept as a valuable record for subsequent reviews and evaluations.

In addition, a **local committee** should be established at each site/area where an intervention is to be carried out so that community leaders, beneficiary representatives and district councillors can meet regularly with the programme implementers to provide feedback, raise concerns and resolve disputes. Where appropriate, at least 25 percent of the members in all committees should be women to ensure their views and experience are fully taken into account. Local committees should meet at times and places that are convenient for participating farmers and women.

PLANNING

The day-to-day management of an intervention is usually entrusted to a team. When establishing an implementation team, it is important that members spend adequate time together to understand strategies and options, agree on working arrangements

and resolve logistical and operational issues. This will allow them to present to the communities a clear and consistent message regarding the scale and scope of the proposed intervention.

Topics that can be discussed during the initial planning phase include:

- the livelihoods base in the affected community;
- the role of livestock in the affected community;
- the scale of the problem: animals and households affected;
- availability of, and access to, local services;
- local coping strategies;
- the scale of the intervention;
- profiles of the project's direct and indirect beneficiaries;
- gender roles in livestock management;
- formal and informal marketing arrangements;
- the pros and cons of the different strategies;
- the pros and cons of the different options;
- relationships among key local stakeholders;
- sociocultural and religious factors that need to be considered;
- logistical and operational issues which will need to be resolved;
- how monitoring and evaluation considerations will be handled;
- how the team will operate, with individual and group responsibilities clearly defined.

Effective programme planning should also include defining intervention objectives to ensure that they are specific, measurable, achievable, realistic and time-bound (SMART). Building flexibility into the programme can help respond quickly to changing circumstances such as the arrival of rains after a drought, which may pose a different set of problems and require that corresponding activities are prioritized.

Certain circumstances can benefit from a small pilot phase to test an intervention – e.g. destocking – to help resolve problems and define the operating guidelines for a larger-scale programme. However, emergency situations often need rapid responses so each context must be assessed on a case-by-case basis, aiming for the maximum benefit for the affected communities. Of equal importance is deciding an exit strategy and making sure that the local stakeholders (communities, beneficiaries, public and private sectors) are all aware of the objectives and time frame of any interventions.

The respective roles and responsibilities of public services, non-governmental organizations and the private sector must be clearly established. In most cases, interventions will be channelled through (or will at minimum require the approval of) the local office representing the ministry in charge of livestock matters (Ministry of Agriculture, Ministry of Livestock, Veterinary Department, etc.). Local representations of other relevant ministries (Planning, Forest, Land and Water, Health, or equivalent) will also be consulted and involved as required. It is essential that the local authorities are fully committed and involved in the proposed intervention.

It is also important to recognize that in less-developed countries public services are often short of human and financial resources. External assistance during emergencies may be used to improve the operational capacity and working conditions in such services. But strict control on the use of financial resources is required. Capacity building and training should be considered along with the supply of technical equipment.

When inputs are normally provided by private sources (feed suppliers, veterinary pharmacists, livestock traders, livestock transporters, veterinarians, veterinary para-professionals, livestock technicians, etc.), it is essential that they are supported and involved during emergencies. Scenarios where the private sector is bypassed or undermined must be avoided.

Monitoring, evaluation and impact assessment systems should be participatory, as beneficiaries are likely to provide reliable information and their views are the most important. Lessons learned from M&E and impact assessments can contribute to refinements and changes during project implementation, and can help build a better understanding of local coping strategies. The results can also make an important contribution to future contingency planning and emergency preparedness. It should be recognized that monitoring, evaluation and impact assessment are essential elements of any intervention, and that sufficient time and resources are allocated to them when formulating the intervention.

CONTRACTING ARRANGEMENTS

Many livestock-related emergency interventions involve **contracts or sub-contracts** with local implementing partners such as local NGOs, traders' associations and private service providers. Most implementing agencies will have rules, regulations and standard templates for local contracts but it is important to be well aware of legal requirements for contracts at local or national level. Contracts should be clear and unambiguous, and cover the following points:

- the contractor is clearly identified;
- outputs are clearly described and quantifiable;
- activities are clearly described;
- a realistic time schedule is included, including starting and end dates;
- inputs and support to be provided by the implementing agency are quantified;
- any specific standards or certification of inputs are defined (e.g. veterinary medicines);
- responsibilities of the contractor are specified;
- a detailed budget is provided;
- responsibility for payment of government taxes on materials or services is clarified;
- payment schedules (instalments) and conditions are given;
- accounting procedures and reporting requirements are clearly described;
- what happens to unspent funds is clarified;
- how disputes will be handled is specified;
- ownership of copyright and intellectual property rights, if applicable, is clarified.

ANIMAL WELFARE

Animal welfare has always been an integral part of good animal husbandry but its importance in its own right is increasingly recognized. Animal welfare can be summarized into the "Five Freedoms", namely:

- freedom from hunger or thirst;
- freedom from discomfort;
- freedom from pain, injury or disease;
- freedom to express normal behaviour;
- freedom from fear and distress.

The majority of livestock emergency interventions can be regarded as "pro-animal welfare", for example:

- Removing or humanely destroying animals which are suffering and likely to die;
- Providing veterinary care or prophylaxis to sick animals or those at risk of disease;
- Providing feed or water to animals which are starving or thirsty; and
- Providing animals with shelter.

While animal welfare issues can arise in any livestock-related intervention, destocking and provision of livestock are activities that are most likely to have potential animal-welfare implications. Providing animals to owners who do not have the skills, labour or resources such as feed and water can compromise the welfare of the animals. Likewise, providing inappropriate species or breeds to recipients can also have welfare implications. Animal welfare must be a key consideration when planning and selecting implementing partners and beneficiaries for all interventions, especially when considering livestock provision.

COMMON TERMINOLOGY

For the non-livestock specialist dealing with livestock-related emergencies, the terminology can be confusing and the data difficult to interpret. The following section explains the commonly found terminology when dealing with livestock. Not all of the terms figure in the document but could be needed to understand the overall context.

Livestock Units

The Livestock Unit (LU or LSU) is a term commonly used to express and aggregate livestock numbers of all species into one common unit.

Why it is important: mortality, carrying capacities, stocking rates, nutritional requirements may all be expressed in terms of LSUs. Definitions vary but the unit is commonly represented as an animal of 500 kg live weight (or 250 kg in the case of a Tropical Livestock Unit - TLU), with each species having a corresponding coefficient. For example, the World Bank World Animal Diseases Atlas uses the following coefficients:

1 camel or "other camelid" = 1.1 LSU
1 cattle = 0.9 LSU
1 buffalo = 0.9 LSU
1 horse or mule (equidae) = 0.8 LSU
1 pig = 0.25 LSU
1 sheep = 0.1 LSU
1 goat = 0.1 LSU
1 poultry bird (chicken, duck, guinea fowl or goose) = 0.015 LSU

Mortality rate

A measure of the frequency of occurrence of death in a defined population during a specified time interval (usually expressed as percentage).

Why it is important: inevitably, the number of animals dying is what makes the headlines and is used as a justification for external assistance. However, making sense of mortality figures in an emergency situation can be challenging. The total number of animals that die can also be misleading; a more accurate metric would be the number of additional animals that died as result of the emergency, with an indication of total livestock population affected.

Morbidity rate

The frequency with which a disease appears in a population.

Why it is important: in epidemiology, the term "morbidity rate" can refer either to the incidence of the disease – the number of new cases over a given time in a population – or to its prevalence – the number of cases at a given time in a population. This measure of sickness contrasts with the mortality rate of a disease, which is the proportion of animals dying during a given time interval.

Birth rate

The number of females giving birth per year expressed either as a percentage of the total herd or of the breeding females.

Why it is important: the rate represents a very basic figure to describe the reproductive status of a herd. However, few species have annual reproduction cycles and therefore other parameters like parturition intervals and litter size have to be taken into account for a complete picture.

Parturition Interval (PI)

The period between two consecutive births of the same female.

Why it is important: intervals are determined biologically by several factors including pregnancy and oestrus as well as seasons, nutrition, breeding management and stress. They are only a rough guide as the environment in which the animals are kept can have a significant impact on their breeding capacity – this is particularly relevant for working animals. In cattle it can be as low as 12 months under optimal conditions, but 18 months to 3+ years is not uncommon in low-input or traditional systems. In sheep the PI averages between 9 and 12 months, allowing some breeds to give birth three times in two years. In pigs the PI averages between 146 and 150 days in commercial herds and averages 159 for backyard pigs. In donkeys and horses, it can range from 12 months to 20 months and in camels from 2 to 3 years.

Litter size

Number of offspring per female in one parturition (birth). It is It is also often expressed as the prolificacy rate (percentage).

Why it is important: the figure gives indications of how many offspring can be expected in the reproductive cycle. Together with the above-mentioned parturition interval, the total offspring of a herd within a dedicated time frame can be estimated. Large animals (cows, camels, horses and donkeys) tend to give birth only to one offspring, and twins occur less commonly. Twins are common in sheep and triplets are not unusual in goats (the expression *twinning rate* may therefore also be used). Pigs tend to have litter sizes between 6 and 12 piglets, the smaller number occurring more often with less-developed breeds.

Hatching rate

The percentage of eggs from one clutch hatching into chicks.

Why it is important: the figure indicates how many live chicks can be expected from one clutch of eggs. A low hatching rate can indicate problems with management, or disease. This figure is very variable depending on the poultry production system – lower in backyard poultry and higher in commercial flocks.

Weaning rate

The ratio of animals born alive and surviving until weaning, expressed as a percentage.

Why it is important: the time between birth and weaning is the most critical for livestock when looking at the "survival" rate, even in non-emergency situations. In this period, the young animals need to overcome the vulnerable condition of newborns through rapid growth. Their digestive tracts need to slowly adapt to solid foods from milk-based diets and their immune systems "learn" to respond to the organisms and pathogens in their environment. Once animals have been successfully weaned they have surmounted the most stressful phase: survival rates from there on are usually high.

Annual Reproduction rate (ARR)

The average number of births per year per breeding female.

Why it is important: the rate calculated for individual breeding females can be aggregated to determine the overall reproductive rate for a herd or flock. E.g. assuming the average number of offspring in a goat herd is 1.2 and the parturition interval is 240 days, the annual reproduction rate is:

ARR (%) = ((1.2/240)x365)x100 = 182.5

This means the average number of offspring per breeding female is 1.8.

Offtake rate

Defined as the proportion of animals in a defined population (e.g. one herd) sold or slaughtered (usually expressed as a percentage).

Why it is important: the offtake rate gives an overview of the commercial herd dynamics and the potential impact of an offtake intervention on the overall target population. Ideally the offtake rate is set against the reproductive performance of the herd and the expected mortality rates to evaluate if the offtake leads to a significant reduction of animal numbers over a defined period.

Sex ratio

Defined as the proportion of females to males in a given herd or flock, usually expressed as the number of females per male.

Why it is important: the ratio is essential for animal reproduction. It varies depending on factors such as animal species, animal breed, husbandry system and age of the male. For example, in an unconfined goat husbandry system with free mating, one billy-goat can service 10 to 20 goats. Young billy-goats should not be offered too many goats; the quality of the services will decline and the billy-goat becomes exhausted.

Carcass weight

The weight of the slaughtered animal minus its skin, head, hooves/feet, digestive tract and internal organs.

Why it is important: the figure determines the meat quantity a slaughtered animal will bring into the food chain. It is widely used in the meat industry, but it does not reflect all the valuable components of a slaughtered animal.

Dressing percentage

Percentage that expresses the share of the carcass weight in the live weight of an animal.

Why it is important: when aiming for meat production, the figure gives an indication of the share of the live weight that can be calculated as product. Ruminants have usually lower dressing percentage values (55%-65%) compared to monogastric species (e.g. between 70% and 80% for pigs and most poultry species)

Stocking rates

Expresses the relationship of animal numbers at any one point in time for a given unit area, usually a hectare.

Why it is important: this is reasonably easy to calculate on enclosed commercial farms or ranches, but becomes complicated in mobile pastoral systems and in traditional mixed farms where fields are usually unenclosed and animals may graze freely on adjoining common ground.

Carrying capacity (CC)

In its most basic definition, it determines the maximum livestock population that a habitat or ecosystem can support on a sustainable basis.

Why it is important: in livestock production, the concept has been applied mainly to the management of the arid and semi-arid rangeland regions of the world, and especially to pastoral systems in Africa where livestock are primarily dependent on grazing resources for feed supply. However, there is considerable debate about the usefulness of this concept when applied to such rangelands due to the large number of variables affecting grazing resources and other parameters. In the context of emergencies, the CC is most useful when applied to livestock production in an easily defined space where animals may be concentrated around water sources, holding grounds, grazing reserves or IDP camps. It is important to have a measure of the actual stocking rate (which can change quickly) and an understanding of the underlying carrying capacity (which does not change quickly).

Chapter 3
Cash transfers and vouchers

RATIONALE

Assisting people in need usually involves providing them with resources either in the form of relief assistance in humanitarian crises (emergency interventions) or of tools for alleviating medium- and long-term chronic poverty. The traditional form of assistance is in-kind aid through direct provision of goods such as food, agricultural inputs and fodder. Over the past decade, cash-based programmes have become a popular alternative to in-kind assistance. Large and small NGOs and UN agencies such as FAO, United Nations Development Programme (UNDP) and the World Food Programme (WFP) significantly expanded their cash-based portfolio in recent years – for example, from 2009 to 2013, WFP's cash and voucher operations grew by a factor of 18.

To understand the emergence of cash transfers as a tool in humanitarian, development and social protection settings, it is useful to examine the main causes of extreme food insecurity events such as famines. For a long time, it was widely assumed that famine was due to a sharp decline in the availability of food in the affected region. However, recent famines in Asia and Africa have been caused by a decline in people's purchasing power and therefore by a reduced access to food rather than a diminished availability of food. Once problems of food insecurity and, by extension, of poverty and vulnerability are viewed in terms of food access rather than availability, it becomes clear that the most appropriate response cannot always be in kind. When food insecurity, poverty and vulnerability are caused by inadequate access, cash transfers are a viable and more appropriate form of assistance.

Classifying cash transfers

Cash and vouchers programmes can be classified according to two criteria:

1) conditions which must be fulfilled by the recipient in order to receive the transfer;
2) use the recipient can make of the transfer.

A cash transfer programme is *conditional* if the recipient must fulfil certain conditions to receive the transfer. Conversely, a cash transfer programme is *unconditional*, if the recipient does not have to fulfil any conditions.

When a transfer is made (conditionally or unconditionally) and the recipient is allowed to spend it only on preselected goods or services, the transfer is *restricted*. Vouchers are always restricted because they can be exchanged only at the retailers or suppliers participating in the voucher programme for specific goods and services.

Key features of cash and vouchers

The increasing popularity of cash transfers as an alternative to in-kind assistance is partly due to a growing appreciation of the needs and wishes of recipients. In this respect, the advantages of cash transfers and vouchers are clear. Cash, and to a lesser extent vouchers,

enable people to decide for themselves what their most pressing needs are, and what goods/services they wish to purchase in local markets. This means that there is a shift of power from the implementing agency to the beneficiaries. With cash and vouchers, recipients have far more control over how the transfers are used.

By shifting the power of choice to beneficiaries, cash-based transfers can give recipients a sense of dignity in situations where they are dependent on external assistance.

In many contexts, cash transfers are more cost-efficient than in-kind assistance. In-kind interventions, whether they involve agricultural inputs, food, or livestock, imply transaction costs (procurement, transport). Furthermore, they can interfere with production or marketing in the recipient country and disrupt local markets. For instance, a large-scale food shipment can drive down the prices of local food commodities, thus harming local producers.

Since beneficiaries spend the transfers buying goods and services in local markets, cash transfers can have a multiplier effect benefiting other actors in the community such as neighbours or traders.

Cash transfers and voucher schemes are very flexible tools and can be set up as:

- a response to humanitarian crisis situations where farmers and pastoralists find their ability to purchase agricultural inputs and animals so diminished that they cannot engage in agricultural or livestock production;
- a tool in development programmes to increase agricultural production and market access, establish or improve disease control measures, etc.;
- a social protection mechanism[1] – farmers and pastoralists who depend on rainfed agriculture to sustain their livelihoods are vulnerable to extreme natural hazards and seasonal cycles. Cash-based programmes can be used to address seasonal cash-flow bottlenecks and support communities whose livelihoods face threats such as high prices, declining soil fertility, water scarcity and poor health.

Preconditions for cash transfer programmes

Cash-based transfers are not always appropriate. They should be implemented only if local markets are well functioning and able to absorb the increased demand for goods and services. Therefore the decision about whether to provide assistance in kind or in cash/vouchers must always be based on a market assessment. The assessment should analyse the prices of basic goods, the capacity and willingness of traders to respond to increased demand, the potential effect of injecting cash and how well the market is integrated with other markets. A weakly integrated market implies poor market access, volatile prices and irregular supply. Since the objective of a market analysis is to determine whether beneficiaries are ultimately able to access goods and services, such assessments should also look at roads and security conditions.

Several tools have been developed to analyse markets and determine the most appropriate form of intervention (cash, voucher or in-kind). In emergencies, two most commonly used market analysis tools are EMMA (Emergency Market Mapping Analysis)[2] and MIFIRA (Market Information and Food Insecurity Response Analysis).[3] Depending on the scope

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[1] Social protection is defined as consisting of "public actions taken in response to levels of vulnerability, risk, and deprivation which are deemed socially unacceptable within a given polity or society" (Conway *et al.*, 2000).

[2] Albu, 2010, Ward and Ali, 2015

[3] Lenz, 2008; Barrett *et al.*, 2009

of the intervention, the time required to carry out these analyses can range from one to several weeks.

OPTIONS FOR CASH TRANSFERS

There are four main types of cash transfers: unconditional cash transfers (UCT), conditional cash transfers (CCT), public works (PW) and voucher programmes. Each of these is discussed below.

Unconditional cash transfers

Unconditional cash transfer (UCT) interventions provide money to poor and vulnerable households or individuals without conditions – no action is required from recipients in order to receive transfers. The rationale for UCTs rests on the assumption that poor people are rational actors and that by relaxing their main constraint (lack of money), they can make investments or buy goods – such as small ruminants, forage, seeds, fertilizers and tools – that they could not have afforded otherwise, and take risks they would not have run.

The absence of conditions means that UCT programmes do not require monitoring of such ties. This makes them easier and cheaper to manage than other cash transfer programmes.

UCTs are particularly appropriate when rapid intervention is necessary and when beneficiaries must satisfy many needs. UCTs are also frequently used in social protection programmes to support vulnerable segments of the population, including pastoralists. Cash can overcome liquidity and credit constraints, increase beneficiaries' productive capacity and reduce or even avoid risk-coping strategies (Covarrubias *et al.*, 2012).

The use of UCTs is sometimes criticized on the grounds that in the absence of conditions and restrictions on the use of transfers, cash would be misspent on non-essential items such as alcohol and tobacco. Many analyses of recent cash transfer programmes including UCTs suggest that this concern is misplaced, at least in developing countries, and there is clear evidence that transfers are not consistently used for drinking and smoking.

BOX 3

Unconditional cash transfers for pastoralists, Hunger Safety Net Programme in Kenya

The Hunger Safety Net Programme (HSNP) is an unconditional cash transfer programme managed by the Government of Kenya and implemented in four northern districts of the country from 2009 to 2012. HSNP was designed to reduce extreme poverty in the districts of Turkana, Marsabit, Wajir and Mandera. It delivered UCTs targeting chronically food-insecure families, including thousands whose livelihoods depended on livestock. The programme reached 60 000 households who received 2 300 Kenyan shillings (about US$33) every two months for three years through a prepaid card (Government of Kenya, 2014).

Conditional cash transfers

Conditional cash transfers (CCTs) provide cash to poor and vulnerable households and individuals on condition that they fulfil certain requirements such as ensuring children attend schools, undergo regular health checks or participate in immunization programmes. In general, CCTs have two objectives: in the short term, they are designed to provide poor households with the income required to maintain a minimum standard of living; in the long term, the objective is to improve the human capital of children, thus breaking the intergenerational transmission of poverty.

The conditions imposed on the transfers do not restrict how beneficiaries spend the cash but, rather, specify the requirements they must meet to qualify as recipients. On receiving the cash, beneficiaries are free to spend it as they wish. The key assumption behind CCT programmes is that poor families do not invest enough in human capital (education and health) so that poverty is passed on from one generation to the next.[4]

Over the past two decades, CCTs have become very popular in Latin America, where most governments increasingly employ them as key tools in their poverty reduction programmes. *Oportunidades*, originally established in 1997 by the government of Mexico as PROGRESA, was the first large-scale CCT programme. It focused on two key aspects:

- providing families with an incentive to change behaviour (sending their children to school, going to health clinics and *pláticas* (small group sessions focusing on health and nutrition education);
- addressing the transmission of poverty from one generation to the next. Today, *Oportunidades* reaches almost 6 million families.

Currently, the largest CCT programme in the world is implemented in Brazil where *Bolsa Familia* (Family Fund), established by the government in 2003, reached 14 million households (about 50 million people, or one quarter of the Brazilian population) in 2013.[5] CCTs implemented in Brazil and Mexico have been replicated, albeit on smaller scale, in almost every country in Latin America. Similar programmes have been set up in Southeast Asia and in pilot form in sub-Saharan Africa too.

In order to be effective, CCTs, as originally conceived in Latin America, must be implemented in countries with relatively reliable infrastructure (e.g. schools, health clinics). Where social services are non-existent or inadequate, CCTs are of little use in achieving their intended objectives. This explains why CCTs are widely implemented by governments in Latin and Central America and in Southeast Asia, but are still uncommon in sub-Saharan Africa.[6]

In addition, as CCT programmes require beneficiaries to change their behaviour, CCT interventions should be implemented only where there are systems in place to monitor compliance of conditions.[7] Enforcing conditions and monitoring recipients' compliance obviously involve substantial administrative costs.

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[4] Poor families may be aware of the benefits of investing in their children's education and health but cannot afford the school fees or the opportunity costs of sending children to school.

[5] *Bolsa Familia* was established in 2003 from four pre-existing programmes, one of which dated back to 1995 (Lindert *et al.*, 2007).

[6] CCTs are usually employed by governments as tools in social protection programmes designed to reduce poverty and social vulnerability and are still infrequently used in humanitarian settings.

[7] Recent evaluations of CCTs suggest that conditions need not necessarily be monitored for a programme to achieve intended outcomes (Benhassine *et al.*, 2013).

Public works

Public works (PW) programmes involve paying individuals in exchange for non-skilled work on community infrastructure. Payments are typically made in cash, vouchers and food. UN agencies, governments and NGOs implement cash-for-work, voucher-for-work and food-for-work programmes.

Similar to CCTs, PW programmes have short- and long-term objectives. In addition to reducing poverty or providing short-term relief through wage payments, PW interventions can potentially deliver long-term benefits through the productive assets (e.g. roads and irrigation infrastructure) built, maintained or rehabilitated by beneficiaries.

Because beneficiaries must work in order to receive payment, PW programmes enjoy the support of donors. Where the labour force is abundant, PW labourers are often employed to repair damaged communal infrastructure, clean up disaster-stricken areas or construct communal assets.

PWs are obviously designed to target only able-bodied adults and exclude vulnerable individuals such as children, the elderly, and people with disabilities. In rural areas, PW programmes must be planned to ensure that activities do not disrupt agricultural tasks. This is why PW interventions often coincide with the agricultural slack season. PW programmes are self-targeting because they offer employment at a low wage and only the truly poor are willing to participate. Better-off members of a community can earn more in farming, trading or salaried jobs. To reach the poorest members of a population, a PW programme must therefore set a self-targeting wage rate that is below the minimum wage rate of a region. However, in areas with high unemployment demand for employment in PW activities can exceed supply, even at very low wages.

PW interventions are regarded by some agencies and NGOs as conditional cash transfers (beneficiaries are required to do something in order to receive the cash). However, other agencies take a different view since participants do not have to change their behaviour in order to improve their human capital.

Voucher Programmes

There are times when for one reason or another cash-based assistance is preferable to in-kind distribution. For instance, if the objective of an agency/NGO is narrowly defined – e.g. increasing smallholder farmers' maize production – the most appropriate tool would be a commodity voucher entitling recipients to 20 kg of maize seeds, 50 kg of urea and 60 kg of Natrium Phosphat Kalium (NPK). If an assisting agency wishes to restrict beneficiaries' use of transfers to specified goods or services, it uses vouchers instead of cash. Vouchers are paper or electronic cards that can be exchanged by beneficiaries at selected shops and providers of goods and services. Vouchers can be denominated in cash (e.g. US$20), in commodities (e.g. 12.5 kg of maize) or services (e.g. veterinary treatments for animals).[8] By design, all vouchers are restricted forms of transfers, and commodity/service vouchers further limit the choice of beneficiaries compared with cash vouchers. Voucher programmes are based on the assumption that beneficiaries will redeem their vouchers with retailers within an existing market system.

[8] Called respectively cash and commodity vouchers.

BOX 4

Vouchers to support herders' livelihoods in Mongolia

During some of Mongolia's long, harsh winters (dzud in the national language), deep snow, strong blizzards and severe cold make foraging almost impossible and lead to high livestock mortality. The dzud of 2009 was particularly severe, causing the death of approximately 20 percent of the country's livestock and affecting 770 000 herders or 28 percent of Mongolia's human population. Action Contre La Faim (ACF) implemented a commodity voucher programme in the western province of Uvs to help families who lost livestock, forage and their livelihoods. ACF gave vouchers to herders, preventing them from falling in debt or being forced to migrate to the slums of the capital, Ulaanbaatar (ACF, 2010).

BOX 5

Vouchers enhancing the impact of livestock restocking

In the aftermath of Cyclone Sidr, which struck the southeast coast of Bangladesh in 2007, two NGOs, AGIRE and Save the Children, implemented a livestock restocking project to help affected communities to re-establish their livelihoods. Each household beneficiary received two dairy cows and vouchers. While the cows provided milk for household consumption and were used as draft animals during the paddy season, the voucher scheme was designed to support the families in taking care of the animals. Two kinds of vouchers were distributed, one for veterinary services worth 440 taka (about US$6.5) and another one for feed costs worth 920 taka (about US$13.5). The voucher scheme enhanced the recovery effect of the livestock restocking project. (AGIRE, 2007).

The average monthly salary in rural areas of Bangladesh in 2007 was around US$70 so the vouchers were worth a significant amount of money, particularly in rural communities.

Voucher programmes have been set up as a tool for emergency relief and in development settings, targeting a variety of vulnerable populations including refugees, farmers, herders and urban dwellers. Boxes 4 and 5 illustrate two examples of vouchers targeting pastoralists and herders.

Fairs

Individuals needing support to buy inputs and services sometimes lack easy access to shops or markets where they can exchange their vouchers.[9] In such situations, it is useful to organize markets where beneficiaries and traders can meet to buy and sell goods and

[9] This is because they are refugees far away from market towns or because they live dispersed in rural areas, etc.

BOX 6

Fairs for small ruminants in Burkina Faso

In 2012, Catholic Relief Service (CRS) organized a series of small ruminants fairs using vouchers to support vulnerable households in Burkina Faso's Boulkiemdé province, then severely affected by a regional drought.

Through the fairs, CRS distributed vouchers worth US$50-60 to women in 1 000 households for the purchase of small ruminants for rearing, animal feed, and veterinarian costs (CRS, 2012).

services through vouchers. These events are traditionally called fairs. In humanitarian and recovery settings, UN agencies and NGOs have often set up trade fairs focusing exclusively on seeds, inputs and agricultural implements. In arid and semi-arid areas (e.g. the Horn of Africa, the Sahel), but also in countries with harsh winters such as Mongolia, fairs have also been arranged for pastoralists to address various needs.

Fairs are temporary – usually one-day – markets targeting farmers, pastoralists and traders. They are small-scale events with an upper limit of about 1 500 beneficiaries.[10] Several fairs can be set up in the same intervention area to reach thousands of beneficiaries. An input trade fair takes place in one venue (usually an enclosed space such as a school yard) on a set day, making it easier to keep track of exchanges between participants. Furthermore, at an input trade fair, inputs and animals can be inspected visually and prices can be monitored to prevent collusion or price fixing. Practical guidance on how to organize a livestock fair/voucher programme is provided later in this chapter.

PLANNING AND PREPARATION

Determining the size of the transfer

In every cash-based programme, a key step is determining the size of the transfer. In general, this will depend primarily on the objectives of the programme.

More specifically, the size of the transfer should be based on the prices[11] of the goods/animals/services which beneficiaries can obtain through the cash or the vouchers, and the difference between beneficiaries' basic needs (food, non-food items, animals, agricultural inputs, etc.) and their capacity to address those needs. For instance, a voucher could cover X percent of the food consumption of a household taking part in a voucher programme, or it could enable a herder to purchase Y kg of animal feed, or three small ruminants. The implementing agency should be aware of whether other agencies are providing assistance in the same area.

[10] When the number of beneficiaries is greater than 500–600, the tasks of beneficiary and trader registration, voucher distribution, voucher exchange and monitoring become difficult unless the organizing agency has a very large staff. If the number of beneficiaries significantly exceeds 500/600, it is better to set up several fairs to address the needs of all those targeted.

[11] If the programme is put in place in a volatile market environment, the size of the transfer can be adjusted against inflation.

If a pastoralist participates in a cash-for-work project such as building or rehabilitating a borehole, then his or her wage will be based on the expenditure needs of individual pastoralists, the proportion he/she can provide themselves and the current wage for unskilled or semi-skilled labour.

The implementing agency should always take care that the money injected into the community through a cash transfer programme does not disrupt the local market.

Delivery mechanisms

There are many ways to deliver cash and vouchers to beneficiaries. In the design stage, it is essential that the most appropriate delivery mechanism is selected to transfer cash or vouchers to beneficiaries. Getting that right depends on a number of context-specific factors including available budget, number of beneficiaries, available technology infrastructure (e.g. electricity, mobile phone coverage, bank branches), capacity of the agency and implementing partners, available time to set up the delivery mechanism and beneficiaries' needs and constraints.

Until the early 2000s, cash transfers and vouchers were delivered to beneficiaries in two low-tech ways, illustrated below:

Cash envelopes

The easiest way to transfer cash to beneficiaries is to distribute the cash directly to them, often in an envelope. The *cash envelope* payment system has several advantages, including the following: payment does not require costly or sophisticated equipment; beneficiaries do not need to be literate/numerate; they do not need to be specially trained. However, this system is susceptible to leakage and fraud, exposes recipients and staff to the risk of robbery, and can be time-consuming in the distribution phase.

Therefore, even though a *cash envelope* payment system has the advantage of speed, simplicity and low transaction costs – and all those factors can be crucial in emergency situations – it has some important drawbacks. Staff are especially exposed when distributing cash, often in crowded, outdoor locations. Furthermore, unlike electronic transfers, cash is not traceable.[12] However, the system does have the advantage of being flexible, and it does not stop beneficiaries from moving to other locations. This can be important when dealing with pastoralist communities or during civil unrest.

Paper vouchers

A second delivery system is payment through paper vouchers. Given their resemblance to local currency bills, paper vouchers quickly become familiar to beneficiaries. They have often been used in programmes providing access to goods (e.g. food and non-food items, agricultural inputs, fodder for animals) and services such as veterinary help, and traditional livestock drought assistance such as destocking and restocking.

[12] If money needs to be transferred quickly to beneficiaries, as in the aftermath of a sudden-onset shock when there is no time to set up an electronic payment system, then cash in an envelope can be the most appropriate choice.

Delivery via electronic delivery mechanisms

Both *cash envelopes* and paper vouchers are labour-intensive and pose challenges of transparency, traceability, and cost-efficiency. However, thanks to the diffusion of technologies in low- and middle-income countries, cash and vouchers can be delivered electronically. In the last few years, electronic means of delivering assistance to vulnerable populations have rapidly been gaining popularity.

Mobile phones

The rapid expansion of mobile phones in Eastern Africa has made it possible to use them to deliver cash . Transfers through mobile phones are particularly appropriate for reaching beneficiaries who are itinerant, nomadic or temporarily displaced. In Kenya, more than 12 million individuals use the M-PESA system ("M" stands for mobile and "PESA" means money in Swahili), which allows people to send money via text messages to other mobile phone users. Registered users can collect the money at one of the more than 81 000 M-PESA outlets present even in the country's most remote villages. NGOs have successfully used M-PESA to help pastoralist communities in emergencies as well as assist households enrolled in Kenya's national Hunger Safety Net Programme.

Other electronic payment systems

Currently, many electronic delivery mechanisms are used to make transfers to beneficiaries, even in regions with weak infrastructure (the Sahel, Democratic Republic of Congo, Somalia). These mechanisms often eliminate traditional financial institutions such as banks but always require the involvement of the private sector (mobile network operators, credit card companies). Various payment systems are briefly illustrated below.

- **Smart cards** are plastic cards with a microchip containing information on beneficiaries and on the transfer amount. Usually, a beneficiary goes to a pay-point (an agent with a reading device, an ATM, a post office or a bank) where the information can be retrieved.
- **Magnetic cards** contain a magnetic stripe that can store personal identification. They can be used to withdraw cash – previously loaded in an account – from ATMs or from agents using a reading device. Compared to smart cards, the initial cost of a magnetic card system is low but magnetic cards are easily damaged or demagnetized.
- **Scratch cards** are cards where one area is covered by a substance concealing a Personal Identification Number (PIN). Typically, beneficiaries can redeem an array of goods at a retailer's shop by scratching the area and entering the PIN into the retailer's mobile phone or on his/her computer. A scratch card can only be used once, however.

Setting up an electronic transfer mechanism requires at least ten weeks and involves many steps, including:

1. understanding the regulatory context in which the e-transfer options will operate;
2. assessing the commercial landscape of services and providers;
3. launching a tender to identify the best service provider;
4. negotiating and signing a contract with the selected service provider;
5. preparing and signing the contracts;
6. ensuring the e-transfer service's compliance with internal and donor requirements;
7. opening an account at the service provider's partner bank;

TABLE 1
Selected risks and mitigation measures in cash and voucher programmes

Risk	Mitigation option
Inflation of prices of key goods and distortion of local markets	Carry out market assessment (before the cash/voucher programme begins) and perform market monitoring (during and after the programme)
Gender bias (I) – allowing targeting to reflect existing societal gender biases against women	Ensure that management resists pressure to influence the targeting process
Gender bias (II) – favouring men's crops/livestock over women's *	Ensure that the assortment of animals available at the fair/voucher programme is varied and includes those owned/tended/sold by women
Poor quality (food, inputs, forage, livestock and services)	Ensure that proper quality control measures are in place and monitor how they function throughout the programme
Undue interference from local authorities (over targeting, selection of suppliers, etc.)	Create a strong management that knows how to negotiate with local authorities
Irregular exchange of vouchers for inputs, livestock and services	Monitor exchanges during voucher programmes and, as far as possible, set up grievance and corrective mechanisms for beneficiaries to report irregularities
Theft, corruption and misuse of cash vouchers	Implement effective monitoring and ensure segregation of duties
Problems with electronic delivery mechanisms	Test the functioning of e-voucher readers, smart cards, mobile phone coverage, etc.
Funds transferred to financial institution to fund operations are diverted	Transfer limited amounts in tranches

* The division of agricultural labour between men and women varies considerably from one community to another, but often men are responsible for cash crops while women take care of household food consumption. Women often grow secondary crops such as legumes and vegetables (Doss, 2001). Similarly, for livestock women take care of poultry and small ruminants while men look after large stock, such as camels, cattle and sheep (FAO, 2012).

8. ordering e-transfer devices (smart/debit cards, mobile phones, reading devices);
9. registering beneficiaries and training them on how to use an e-transfer device;
10. loading beneficiary data and making transfers.

Risks

As in any assistance intervention, there are risks associated with the use of cash and vouchers. These risks must be considered before, during and after implementation. Table 1 lists some the key risks an agency/NGO faces during a cash/voucher programme along with some strategies for mitigating them.

IMPLEMENTATION

Designing a voucher programme/livestock fair

The detailed design of a fair/voucher programme depends on its objectives, the socio-economic environment in which it is implemented and other factors. However, for any fair/voucher programme several key steps must always be carried out:

- assess community needs;
- meet with local authorities and community representatives to plan the fair/voucher programme;

- select the goods, the animals and the services needed by the targeted community;
- select the beneficiaries;
- select traders;
- carry out quality control – ensuring that the inputs (fodder, feed, mineral supplements, vitamins, etc.) meet certain quality requirements;
- carry out the required disease control measures or ensure that animals have received required treatments;
- design vouchers or select the appropriate technology to transfer cash/vouchers to beneficiaries (e.g. electronic cards, mobile phones) and minimize the risk of counterfeiting;
- train beneficiaries, traders and other stakeholders (local community, Ministry of Agriculture, implementing partners);
- monitor prices;
- set up an accountability system.

Each of these steps will be discussed below. Naturally, financial constraints may affect how they are implemented.

Meeting with local community

Representatives of the community should be involved in the planning and implementation of a fair/voucher programme. Community sensitization leads to greater transparency and accountability, and enhances community support for the programme.

Vulnerability assessment

Before setting up a voucher programme targeting pastoralists, it is necessary to understand the nature of the vulnerability that the intervention is seeking to address. It is critical to identify the factors that are at the root of the livelihood insecurity which the implementing agency is attempting to remedy.

Targeting

Targeting depends on the objective of the programme, e.g. does the programme aim to reach a particular group (such as women), provide access to water (e.g. build/rehabilitate boreholes for nomadic herders), restock herds after a drought, support the poorest and most vulnerable members of a community, etc.? Targeting should be carried out according to clear and transparent criteria. It should also involve the local community and the local authorities to minimize the risk of the more influential community members benefiting most.

Targeting criteria will depend on the purpose of the fair or voucher programme – is it set up to address vulnerability during a humanitarian crisis, or in a development project, or as part of a social protection programme? In a humanitarian context, targeting should ideally include all vulnerable pastoralists affected by the crisis (e.g. drought, blizzard, high prices, conflict). This can prove difficult in practice as there will often be a greater number of households than can be covered by the available budget. Therefore, the following criteria need to be considered:

- income;
- animal ownership;
- access to land;
- ability and willingness to work the land;

- assets' ownership – households with fewer assets (livestock, oxen, etc.) would be selected first;
- demographics – for example, female-headed households, individuals who live with elderly and/or chronically sick people;
- access to other assistance programmes (other things being equal, priority should be given to those who are not benefiting from other assistance programmes);
- number of economically active individuals in the household.

Quality control

One of the critical issues in achieving the objectives of fairs and voucher programmes is ensuring that the goods available to beneficiaries are of acceptable quality. For example, if small ruminants are being provided for vulnerable herders to select, the animals must be healthy and in good condition. This point is covered in greater detail in Chapter 6, *Provision of Livestock*.

Before describing the measures that the implementing agency staff can take to ensure that goods (e.g. forage, vitamins) meet minimum quality standards, it is important to emphasize that unlike in-kind interventions, where the implementing agency procures the goods and is wholly responsible for their quality, fairs and voucher programmes are designed to give beneficiaries a choice. As a result, part of the responsibilities and risks associated with choosing animals/goods lies with the beneficiaries. However, the implementing agency has an obligation to minimize the risk to beneficiaries. If the market from which animals or goods are sourced for fairs and voucher programmes is considered too unreliable, then the implementing agency should use other types of intervention.

Selecting the traders

The selection of traders involves the following steps:

- Advertising the terms and conditions of the fair/voucher programme in local and national press and radio.
- Identifying potential traders based on the advice of extension services, UN agencies and NGOs and the recommendations of experts and pastoralists. Visit all potential traders. During the visits, the staff assess the health of the animals or the quality of fodder and explain the terms and conditions of fairs and voucher programmes.
- Arrange meetings with selected traders. The meetings should disclose information about the value of the vouchers, the list of approved items from which pastoralists can choose and the time during which vouchers can be exchanged (one day in the case of a fair).
- Traders must be informed of the voucher exchange and payment procedures. In the case of paper vouchers, traders should be informed about the deadline for submitting redeemed vouchers to the implementing agency for payment.

Designing the vouchers and minimizing the risk of counterfeiting

A common challenge in paper voucher programmes is minimizing fraud risks. The paragraphs below list a number of anti-counterfeiting techniques aimed at reducing the chance of fraud. A basic paper voucher must show: [13]

[13] This section on counterfeiting is partially based on Vinet and Calef, 2013.

- its value
- the logos of the participating partners (e.g. implementing agency, country, donor)
- a serial number
- the period of validity

The value of the voucher should be denominated in the local currency and any text should be written in the local language. In some cases, the beneficiary's number may be printed on the voucher.

Two factors should be taken into consideration when choosing the value of the voucher:

- When the value of the voucher is too small, the relative costs of administration and printing increase.
- When the value of the voucher is too big, beneficiaries may encounter problems if they want to redeem goods/services of small value.[14]

Vouchers can be collected in booklets containing various vouchers of the same denomination. The booklets resemble chequebooks, with the voucher separated from a counterfoil by a perforated line. The implementing agency tears the vouchers off and gives them to the beneficiaries to pay for goods or services, while the counterfoils remains in the book. The agency keeps the book and uses the counterfoils to keep track of transactions and expenditure.

It is important that vouchers are user-friendly. In this respect, the golden rule is that they should be simple and easy to understand, taking into account literacy levels in the target community. This means the implementing agency should use large fonts, colour-coding and symbols familiar to the beneficiaries (e.g. a tree for a US$10 voucher, a cow for a US$15 voucher, etc.).

Measures against voucher counterfeiting

There are a number of measures to make counterfeiting and duplication of vouchers difficult. The effectiveness and cost of these techniques vary. Depending on the budget and the time available, implementing agency staff can select some or all of them.

Below is a list of the simplest counterfeiting measures:

- Printing vouchers on special (e.g. textured or coloured) paper makes photocopying/reprinting difficult. If special paper is not available, the vouchers should be printed on good quality paper.
- Colour-coding the vouchers is helpful not just to discourage duplication but also to help illiterate beneficiaries.
- Whenever possible, the vouchers should be printed far away from where the fair or the voucher programme is implemented. This makes fraud involving anybody from the printing company more difficult.
- Fancy logos should be used. The fancier the logo, the more difficult it is to reproduce it.
- If there are multiple fairs at different dates, a different stamp (e.g. one of a different colour) can be added at the last minute to distinguish the vouchers for the first fair from those for the second fair, etc.
- The vendors involved in the fair must know how to recognize the vouchers. This can be done in a training session prior to the fair.

[14] Usually at fairs, whether for livestock or agricultural inputs including fodder, vendors do not give change back after a transaction.

In addition to the measures described above there are two final points to be considered:

- A simple, cost-effective strategy to reduce the likelihood of fraud is to put in place a good monitoring system during the fair. With adequate staff supervision, the introduction of counterfeit vouchers and their inappropriate use (exchanging vouchers for cash) becomes difficult.[15] For example, is it possible to link the serial number of a voucher to a beneficiary? Lists are made available for the traders to cross-check the voucher number with the name of the beneficiaries who have to show some official identification (or a letter from the village head in case no official identification is available).
- Vouchers should be treated with the same care as money. They should be kept in a safe until the fair/voucher programme begins. Only the programme manager or staff designated by the programme manager should be able to access the safe.
- A general strategy to discourage potential counterfeiters is to make them think that duplication is extremely difficult. For instance, a random number or an unusual symbol can be added to the voucher design. This number or symbol might never be checked during the fair, but it may deter potential forgers, who would think that they have to reproduce the symbol/number for the voucher to be valid.

Training beneficiaries, traders and other stakeholders

All stakeholders of livestock fairs and voucher programmes – beneficiaries, traders and staff from the implementing agency – have specific responsibilities. First, they must understand the objectives of the fair/voucher programme and how it is being implemented. For example, beneficiaries need to know exactly how the programme works, what will be available, which traders will participate and the basic rules governing the intervention. In most cases, training and/or briefing sessions can ensure that beneficiaries are fully aware of such aspects.

Training of staff from the relevant ministry, local authority, NGOs and other participants

After the training and briefing sessions, implementing agency staff should be able to accomplish the following:

- identify which animals/inputs/services will be provided through the voucher programme and those which are excluded;
- be familiar with the approximate prices of the inputs available at the fairs/voucher programme;
- understand the voucher exchange process;
- provide guidance in the selection of suitable traders;
- verify the identity of beneficiaries and ensure that vouchers are distributed only to those on the list;
- monitor traders when vouchers are being exchanged to prevent irregular exchanges of vouchers, inputs and other illicit practices;
- allocate appropriate space for live animals and for goods (feed, fodder, vaccines);
- examine goods/animals and monitor prices being charged by traders;
- provide veterinary services for inspection of live animals and veterinary products traded.

[15] Adequate staff will, obviously, also be essential for monitoring prices and quality during a fair.

Training of traders

Before a fair/voucher programme, traders should be trained or briefed to ensure that they:

- have enough time to assemble the animals and stocks of inputs in sufficient quantities to respond to beneficiaries redeeming vouchers;
- know the values of the vouchers issued by the implementing agency;
- know the duration of the fairs/voucher programme, i.e. when the exchange of vouchers against animals/fodder/services begins and ends;
- are aware of the approximate number of beneficiaries participating in the fair/voucher programme;
- recognize that the prices of animals, goods and services available at the fairs/voucher programmes cannot exceed local market prices unless the increase can be fully explained by the superior quality of the animals/goods/services provided;
- understand the rules and procedures governing the exchange of vouchers for cash – for electronic vouchers, payment is immediate, while for paper vouchers payment is usually completed in about one week;
- maintain detailed records of the animals/goods/services provided to beneficiaries for monitoring and evaluation purposes;
- know the deadline for the submission of redeemed vouchers along with the traders' invoices for the total value of vouchers exchanged;
- are aware of the quality/disease control checks to be undertaken by the implementing agency and its partners – the traders must also agree that they cannot intentionally offer low-quality goods or sick animals and that violation of this rule entails non-payment of their products and blacklisting from future fairs/voucher programmes.

Monitoring prices

It is essential to conduct a market analysis before a fair/voucher programme. The analysis will determine the current prices for the animals and goods/services available during the programme. Unless there are price hikes, which can happen during months-long voucher programmes, prices at the fairs/voucher programmes should reflect general market prices recorded during the market analysis. In a fair whose location may be some distance from the traders' enclosures, prices may be slightly above market prices because of transportation costs. In general, the greater the number of traders present a fair/voucher programme the more competitive prices will be.

Setting up an accountability system

The implementation agency should always be accountable to beneficiaries. It should therefore set up a system whereby beneficiaries can address comments or complaints to the agency and its implementing partners. The agency should ensure that the complaints are dealt with promptly.

NOTES ON MONITORING, EVALUATION AND IMPACT ASSESSMENT

Monitoring and evaluation

Just like any other aid intervention, cash and voucher programmes targeting pastoralists should always be monitored and evaluated to ensure that they are being implemented as planned and they are achieving the expected, identify shortcomings and, if necessary,

propose possible solutions or adjust the programme's design. Below are the key questions to be asked during the monitoring and evaluation phases of most cash and voucher programmes:

Market

Before the programme

- Are basic goods and/or services available in the local market?
- Is the local market functioning?

During and after the programme

- Does the cash injected into the target community have an impact on prices of basic goods and services?
- How accessible (how far, how safe to reach) is the market where beneficiaries will spend their transfers?

Targeting

- Is the programme reaching the targeted beneficiaries?
- Are there any social norms limiting equal participation (men, women, ethnic minorities, etc.) in the cash transfer programme?
- Are beneficiaries familiar with the targeting criteria? Do communities or their representatives participate in developing criteria for targeting and selecting beneficiaries?
- Do community representatives truly represent the communities? Do people participate in cash-based programme independently of political or power structures?
- Do all beneficiaries have access to clear, unbiased information regarding targeting and selection? Do they have a chance to question the process?

Implementation

Communication

- Is sufficient information (e.g. transfer value, targeting criteria, voucher redemption process) given to beneficiaries, the communities that host them and other relevant stakeholders?

Delivery of the transfer

- Are beneficiaries receiving the expected transfers?
- Is the value of transfers sufficient to meet the needs of beneficiaries in line with the programme's objectives?
- Are the transfers being disbursed to beneficiaries on schedule?
- Are vouchers being distributed and redeemed to the targeted beneficiaries under secure conditions?
- Are beneficiaries comfortable with the selected delivery mechanism?

Accountability

- Has the programme set up an accountability system for its beneficiaries? Are beneficiaries able to provide feedback on the programme? Is this feedback used to adapt/adjust the programme?

- Does the programme have mechanisms in place to avoid negative consequences (on food security, health, attendance to own agricultural activities, etc.)?

Unintended consequences

- Do transfers have an impact on relations within household?
- Do transfers create tensions between beneficiaries and non-beneficiaries or among any other stakeholders?
- Which goods or services are beneficiaries spending the transfers on? Is cash spent on temptation goods (cigarettes, alcohol)?

Vouchers and fairs

- Are the specific goods/services covered by the vouchers able to address beneficiaries' needs?
- Are suppliers/traders/retailers being paid on time?
- In livestock fairs, is there a health inspection protocol at the entrance?
- Are the animals available at a livestock fair or in a voucher scheme in good health? Have they been vaccinated and dewormed?
- Is there sufficient staff to monitor prices of the goods/services exchanged through vouchers?

Public works

- Are the assets built or rehabilitated through cash-for-work programmes useful to the community? Do the assets built/rehabilitated meet minimum quality standards?
- Are the public works activities timed so as to not disrupt the traditional livelihoods and coping strategies of participants?
- Are beneficiaries' wages congruent with standard wages for unskilled work in the project area?

Conditional Cash Transfers

- Are beneficiaries complying with the conditions set by the programme?
- Are the conditions easy to comply with or do they impose high transaction costs on beneficiaries?

Impact assessment

For each cash transfer modality, the evaluation must set relevant indicators to measure whether the programme's objectives have been achieved. For instance:

- In a voucher-for-inputs (e.g. animal feed) programme, the indicators can include the resulting change in production (e.g. eggs, meat, milk, wool).
- In a voucher-for-veterinary support programme, the indicators could include the prevalence or incidence of a disease, the animal mortality rate and animal production indices (milk production).

CHECKLIST

Assessment and Planning

- undertake needs analysis/ baseline assessment;
- conduct a market assessment (e.g. goods availability in the local market, minimum quality requirements for goods, overall functioning of the market);
- define the programme objectives;
- determine the cash transfer modality (e.g. voucher schemes, fairs, public works, unconditional cash transfers);
- decide the duration of the programme;
- select a payment mechanism (e.g. paper vouchers, electronic vouchers, cash envelopes);
- identify possible risks (e.g. price inflation, poor quality of goods, fraud);
- obtain the approval of beneficiaries, local authority and the government.

Preparation

- mobilize the local community;
- set up a local committee;
- develop targeting criteria;
- target and register beneficiaries;
- establish a beneficiary list;
- select the traders (for fairs and voucher schemes);
- determine the value of the transfer or, for cash-for-work, the wage rate;
- design and print the vouchers;
- ensure that the paper vouchers feature all the necessary security measures (e.g. micro-printing, holograms) to reduce the risk of counterfeiting;
- set up an accountability system.

Implementation

- sensitize/train the beneficiaries;
- sensitize/train the traders (for vouchers schemes and fairs);
- distribute the vouchers, disburse the cash or pay wages to beneficiaries;
- ensure smooth redemption process (exchange of vouchers against goods);
- monitor the execution of the assets built or rehabilitated through a public works programme;
- monitor the quality of the goods being exchanged at a fair or during a voucher scheme.

Evaluation

- conduct a beneficiary satisfaction survey;
- document lessons learned;
- measure the impact against objectives.

Chapter 4
Destocking

RATIONALE

Destocking is a long-established practice found throughout the world's drylands.[16] Both commercial ranchers and pastoralists sell off surplus animals ahead of the months-long annual dry season in order to capitalize on the best possible prices and to reduce potential losses. During slow-onset emergencies such as droughts, or when conflict prevents movement of people and animals, livestock conditions inevitably deteriorate as feed supplies become scarce. The result is that animals lose both condition and value, and are often presented for sale in local markets. In such situations the livestock owner is doubly disadvantaged as cereal prices increase and livestock prices collapse. Rapid-onset emergencies such as floods or earthquakes can restrict access to, or close local markets. In such circumstances, livestock keepers are unable to sell their livestock.

This chapter introduces the common destocking options: **commercial destocking** (also called **accelerated offtake**) and **humane slaughter for consumption**. A third option, **humane slaughter for disposal**, is also presented. The following pages seek to inform how destocking can serve the interests of livestock keepers and, where possible, help protect their core breeding animals. It is not uncommon for destocking to be undertaken in conjunction with other interventions, such as supplementary feeding, water distribution or provision of animal health services. It is important therefore that this chapter is read in conjunction with other chapters in this manual.

Destocking involves the removal of livestock during an emergency before animals become so emaciated that they are worthless or starve to death. It releases the value tied up in these depreciating assets, providing much-needed cash or food equivalent to support livelihoods through the crisis. In the past, destocking was also justified on environmental grounds as improving degraded rangelands by reducing stock numbers, although there is little evidence of such impact. Today, destocking is primarily undertaken as a means of livelihood support. Destocking interventions have been successful and attract considerable interest among livestock keepers.

The animal welfare element of destocking should also be considered.

Destocking has advantages and disadvantages.

Advantages

- Livestock keepers receive cash/food from the sale or slaughter of destocked animals that would otherwise require continued feeding, management, veterinary medicines, etc. or might die from nutritional stress or disease.
- Impact assessments confirm that where animals are sold for cash in times of drought, most of that cash is used within the local economy to purchase household food and

[16] See also Chapter 4 of the *Livestock Emergency Guidelines and Standards* (LEGS).

BOX 7

Destocking and animal welfare

Destocking also contributes to two of animal welfare's five freedoms: *freedom from hunger and thirst* and *freedom from discomfort*. Removing animals to a more favourable location may allow them to resume their normal behaviour. Where necessary, slaughter destocking will relieve animals from the pain and distress associated with starvation and thirst. As destocking involves handling, transporting, and slaughtering animals, special attention is needed to ensure they do not suffer pain, fear, or distress.

Source: LEGS handbook 2014

to protect the remaining livestock through the purchase of veterinary medicines and fodder, and by transporting shock-affected animals out of the affected area.

- The removal of livestock reduces the demand for fodder or grazing of the remaining herd, which may result in improved rates of survival of core breeding livestock.
- The slaughter of livestock and subsequent distribution of fresh and dried meat provides a useful source of local animal protein which can be used to complement cereal-based food distributions.
- The removal or safe disposal of diseased and emaciated livestock reduces potential environmental and health problems.
- Commercial destocking interventions also help forge links between farmers/pastoral communities and livestock traders, which may result in traders expanding their businesses into remote areas which they previously did not reach. In so doing, farmers/pastoralists may benefit from improved livestock marketing opportunities throughout the year.

Disadvantages

- Destocking interventions are often successful and attract considerable interest among livestock keepers. However, during a widespread emergency the level of interest may be so high that livestock traders have inadequate resources to purchase all the livestock that owners wish to sell.
- Few livestock traders have instant access to bank loans, and development agencies face restrictions regarding the use of development funds and are therefore not always able to switch funds, leading to destocking interventions being launched too late. As a result, the quality of animals available for purchase is already poor and in some cases, slaughter destocking is the only remaining option. However, if destocking interventions are started too early, the price offered by the humanitarian actors may hold up market prices artificially, discouraging traders from purchasing larger numbers of animals at more reasonable prices and thus from benefiting more households.
- Destocked animals are lost to the herd and therefore post-shock production levels can be seriously affected until replacement animals can be bred, purchased or gifted.

- Destocking interventions should not become routine or institutionalized.

There is growing recognition that destocking can provide much-needed cash or food to households in times of need. Evidence available suggests that development and aid agencies should look positively on destocking programmes in the right circumstances.

OPTIONS FOR DESTOCKING

Commercial destocking (accelerated offtake)

Commercial destocking involves the purchase and removal of livestock from disaster-affected areas to places where feed is available, so that animals can recover and subsequently be sold, slaughtered or returned home. Accelerated offtake is usually carried out in the alert phase of a drought cycle, when livestock are still in relatively good condition. It essentially facilitates the normal market process; it is, however, dependent on the presence of a vibrant national or export market that can absorb additional animals.

Activities associated with accelerated offtake may include:

- briefing and convincing livestock traders of the benefits and objectives of destocking;
- introducing interested buyers to livestock keepers willing to sell;
- organizing meetings with livestock traders, middlemen, local administrators and farmer representatives;
- suspending market taxes;
- easing transport restrictions by providing safe routes (organizing convoys), suspending road tolls and transport taxes;
- establishing transport or fuel subsidies;
- arranging for the backloading of food aid trucks with purchased animals;
- establishing temporary markets in remote locations;
- supporting traders in securing additional temporary holding grounds and feedlots;
- facilitating access to credit so that traders can buy more livestock.

Livestock traders, who routinely buy surplus livestock from rural areas to supply the urban markets, are commonly viewed with suspicion by some development and aid agencies who assume that they make inflated profits from their trade. However, the cost of trekking livestock or transporting them by lorry out of remote areas can add at least 25 percent to the purchase price of an animal, resulting in profit margins more modest than might be suspected. The accelerated offtake option relies on the full cooperation and collaboration of the livestock traders – an attractive option because when traders are introduced or already operate in the affected area, they can be left to organize and manage the bulk of the activities themselves. Given that fewer external inputs are required, it makes this a cost-effective and sustainable option.

Traders may become involved in some of the following activities:

- purchasing and positioning fodder at buying sites;
- liaising with livestock keepers and local brokers regarding the numbers, ages and sex of the livestock to be purchased, as well as when and where;
- agreeing a provisional price structure;
- arranging transport;
- recruiting local handlers;
- building temporary handling facilities and loading ramps;
- arranging payment procedures.

There are also clear advantages for the livestock traders to get involved if they are helped to identify new market opportunities. Moreover, during times of crisis, livestock in poorer condition can be obtained at attractive prices and such animals can be moved to a holding area or feedlot where they can quickly regain weight and be sold for a profit.

There is clearly scope for malpractice and corruption, which has indeed plagued some destocking programmes in the past. Such programmes therefore require robust monitoring, constant supervision and frequent visits to the affected areas. Regular communication with the involved communities, beneficiaries, other aid agencies, local authorities and the traders is essential to ensure that destocking remains equitable and that disputes are quickly resolved. Agreeing minimum operating standards with traders prior to the intervention is essential. Regular monitoring of the number and condition of animals available for sale and of prevailing market prices is also critical to ensure the programme can respond quickly to changing circumstances.

Humane slaughter for consumption

In some cases, the sheer scale of an emergency can mean that the number of animals available for sale exceeds market capacity. Unsold animals may simply be abandoned if they are too weak or if the owners cannot afford to take them back to the main herd. Governments and aid agencies may then consider buying and slaughtering animals locally for human consumption or, as a last resort, for disposal. Slaughter destocking with meat distribution is normally carried out in the alarm or early emergency phase of a natural disaster (usually a drought), when body condition remains acceptable and meat still has nutritional value and is safe for human consumption.

Slaughter destocking is attractive as there are multiple beneficiaries – the household that sells animals (receiving cash, food aid or a combination of both), the team of paid slaughterers and the recipients of the meat, hides and skins. There are also animal welfare benefits.

In contrast to accelerated livestock offtake, the purchased animals are not transported out of the area but are slaughtered locally. Animals may be:

- purchased and redistributed to vulnerable families or institutions for home slaughter; or
- purchased and slaughtered at an agreed location, followed by the distribution of fresh or processed meat (e.g. dried meat) to vulnerable households, schools, hospitals or other institutions – often as part of an organized food distribution programme.

Purchase and distribution of live animals to households for slaughter

This option requires fewer staff resources and is less expensive. Once an animal has been purchased, it is immediately marked (usually with an ear notch) so that it cannot be presented again for sale, and then handed over to the beneficiaries to slaughter at their own convenience. Experience suggests that a sheep or goat can be shared between four households while a large ruminant can be shared between 10-15 households. Only animals that are judged fit for slaughter by a qualified person should be considered.

Purchase and slaughter of animals and distribution of meat

Under this option, small teams are established to slaughter, skin and butcher carcasses and, once inspected, to distribute the fresh meat to selected beneficiaries. Alternatively,

the meat can be dried and distributed later. Slaughter teams sometimes construct concrete slaughter slabs, with blood collection pits and metal frames to assist skinning and butchering. Although slaughter slabs are valuable as a permanent fixture, in temporary situations plastic sheets are cheaper, portable and washable.

Prior to slaughter, it is important that animal inspections are carried out by a qualified person (either a veterinarian or a qualified veterinary para-professional) to ensure that the animal is fit for consumption; that appropriate animal welfare practices are followed; and that the required post-mortem inspections are carried out. Once an animal has been approved for human consumption, its carcass can be jointed and the fresh meat distributed to beneficiaries – schools, health clinics, vulnerable households, prisons, etc. – or distributed as part of targeted food-aid programmes. Adequate disposable material should be provided for hygienic transport and storage of meat by individuals after distribution.

Humane slaughter for disposal

This represents a last resort when animals are so emaciated that they have neither economic nor nutritional value. Slaughter for disposal usually takes place at the height of the emergency phase – which can include the period immediately after a drought breaks, when large numbers of emaciated animals die or are unfit for human consumption. There is a strong animal welfare benefit in humanely disposing of distressed animals. But disposal of carcasses inevitably means there will be fewer beneficiaries, as no meat is distributed. Also to be considered is the issue of ensuring the safe disposal of carcasses (see Annex 2.D for more information).

PLANNING AND PREPARATION

Design considerations

When designing a destocking or marketing intervention it is important to bear the following in mind:

- **Flexibility** is essential as is **timing**. How livestock owners value their animals is not necessarily a straightforward economic assessment, but takes into account a host of factors including an assessment of the chance of their animals surviving – in whatever condition. At the height of a drought, for example, owners may be willing to sell animals at almost any price, but at the first signs of rain they will change their minds. Flexibility is needed to respond quickly to changing local circumstances, including the ability to switch funds into alternative interventions.
- Where a number of different agencies, including national governments, are operating destocking programmes, **harmonization** and **coordination** are essential through destocking teams and local site committees. In cases of slaughter destocking, there should be an agreement on a standard price, either in cash or kind, for each class and condition of animal.
- It is equally important that the **private sector** (large or small) is recognized as a key player and implementer. The success of a destocking programme inevitably depends on how well the private sector has been integrated and involved. The worst-case scenarios are those where donor interventions actively discriminate against and compete with local traders and service providers.

TABLE 2
Summary of key issues for destocking options

Requirements	Commercial destocking	Humane slaughter for consumption	Humane slaughter for disposal
Context for response	Early warning systems facilitate an early response	An extended crisis	An extended crisis or livestock disease
Livestock condition	Reasonable body condition	Reasonable but declining body condition	Very poor condition or diseased
Feedlot and feed capacity	Adequate capacity and feed availability	Inadequate capacity or limited/expensive fodder	
Market requirements	Accessible markets (domestic or export)	Limited market access	
Target communities	Livestock keepers willing to sell livestock	Livestock keepers willing to sell animals. Vulnerable communities needing food (meat) aid (local, domestic)	Livestock keepers willing to sell animals
Traders	Active and willing private traders operating	Traders have completed their planned purchase of livestock and/or are not prepared to travel to more remote locations	Poor quality or diseased livestock that traders are not prepared to purchase irrespective of price and/ or members of local communities are unwilling to consume
Banking	A supportive banking system prepared to extend loans to traders		
Funding for traders	Funding for traders to visit the crisis area to meet farmers/pastoralists and assess livestock body condition	Limited funds for traders to visit crisis-affected area	
Government support	Facilitation of the increased offtake through the removal of trade barriers and market / transport taxes	Supportive government structures willing to support slaughter destocking	Supportive government structures willing to support slaughter destocking for disposal
Facilities / services		Slaughter facilities and operating personnel including animal and meat inspectors	Facilities and personnel for slaughter and disposal

- Consideration should be given to how the programme ends through the provision of an **exit strategy**.
- Regular **monitoring** of livestock prices and conditions is essential and is greatly facilitated by the widespread availability of mobile communications.
- It is vital to **evaluate** destocking or marketing interventions to assess their impact on direct and indirect beneficiaries and to learn lessons for the future.

Pre-intervention assessment

Chapter 2 provides more detailed information on pre-intervention assessment. A thorough understanding of the local context is essential for the design of a successful destocking intervention. This would include broader issues of access to the communities and their

animals, and local socio-economic factors as well as more specific information about animals, available feed, markets, trade routes and slaughter facilities. Ideally, a multidisciplinary assessment team is deployed and this group, with some modifications, usually evolves into the team responsible for the operation of the programme. Establishing the scope of its work and agreeing on the assessment tools and reporting formats helps the members be clear about the team's objectives and priorities.

The assessment team can collect information from a range of sources (see Chapter 2) and information specific to destocking may include:

- a profile of the affected communities, including vulnerable groups, and their livestock management, barter and marketing arrangements;
- main uses of livestock – food, income, draught, pack animals;
- estimates of the numbers of men, women and children involved in livestock production and marketing;
- the roles of different household members in livestock management, sale, slaughter, skinning etc.;
- estimates of the numbers and types of livestock in the area, and an estimate of the animals needing to be destocked;
- the geographical context including the number of livestock markets, abattoirs and butcheries affected;
- details of particularly badly affected areas (hotspots), where markets are particularly disrupted or the need to destock is particularly intense;
- who are the key stakeholders and decision-makers, including local livestock traders and butchers;
- access issues – quality and distribution of markets, distances and access roads (before and during the emergency);
- quantity and quality of essential local support services.

Once the basic information has been collected and analysed, meetings or focus group discussions can be organized to improve the understanding of more specific design issues, such as:

- the availability of fodder or closure of a market, which might result in the need to consider destocking as an option. The following information should be collected:
  - the availability and purchase price of different types of feed (fodder, concentrates and by-products);
  - the projected increase in feed prices, based on the result of previous shocks;
  - current accessible markets and the associated costs of moving the livestock to the markets;
  - market prices for different livestock species and types.
- livestock keepers' efforts to minimize the impact on animals such as through the purchase of locally available fodder, and the impact on household cash flow;
- the availability of livestock markets:
  - currently accessible markets;
  - the costs of moving livestock to those markets;
  - number and condition of animals available for sale;
  - market prices (over time) for different classes of livestock.

- previous experience of destocking including:
  - lessons learned – successful and unsuccessful;
  - practicality and appropriateness of previous targeting initiatives;
  - roles and responsibilities, including those of the community;
  - purchase prices – in cash/ food/ fodder – for different animal species, sexes and ages.

Finally, it is important that the destocking assessment team report its findings to farmer and pastoral leaders and to local government to lay the foundation of a solid destocking partnership that includes all stakeholders and decision-makers. Information that can usefully be shared and discussed in such feedback meetings includes outline plans for the destocking response, participating donors, planned relief assistance entitlements and – perhaps most important – the number of livestock that the donor will be able to purchase when slaughter destocking is planned. This gives the host community a clear view of the potential scale of the intervention and the likely number of beneficiaries.

Selecting the appropriate destocking option

Selecting the most appropriate destocking intervention is relatively straightforward as the options closely correspond to the stage of the emergency. Commercial destocking is preferred to slaughter destocking and is most appropriate in the early phases of a crisis. Slaughter destocking for human consumption is preferable to, and generally precedes slaughter and the disposal of carcasses. The hierarchy of destocking is generally considered to be as follows:

- commercial destocking by livestock traders;
- commercial destocking supported by humanitarian organizations;
- humane slaughter for consumption, with live animals distributed to targeted beneficiaries;
- humane slaughter for consumption, with fresh or processed meat distributed to targeted beneficiaries;
- humane slaughter for disposal.

The LEGS handbook decision-making tree for destocking options (LEGS 2nd edition – Figure 4.1) is a valuable tool for deciding the appropriate destocking option.

Support services

All destocking interventions are dependent to some extent on the availability of local support services such as veterinarians, community animal health workers, livestock traders and feed suppliers. It is important that an intervention's requirement for support services is determined and the actual availability and efficiency of such services is adequately assessed. It is also important that an intervention supports and builds the capacity of local service providers, whether government or private-sector, rather than competes with them. Specific support services that may be relevant to a destocking programme may include:

- livestock market managers;
- livestock traders and brokers;
- transporters;
- qualified veterinarians and meat inspectors (public or private);
- qualified veterinary para-professionals (e.g. CAHW);

TABLE 3
Risks and mitigation options for destocking

Risk	Mitigation option
Disrupting and undermining the local market and private sector by providing free or competing services, and paying well above market prices	**Ensure** that the private sector is a full partner
Inadvertently helping owners of larger herds benefit disproportionately compared with more vulnerable households	**Give** greater attention to selection criteria and supervision during the beneficiary selection process
Discrepancies between agencies paying different prices and applying different conditions	**Ensure** proper harmonization and collaboration among implementing agencies
Overdependence on destocking seen as a safety net for maintaining unsustainably large herds	**Ensure** greater attention in selecting destocking interventions
Carrying large quantities of cash in remote markets locations may increase the security risk	**Consider** using alternatives to cash such as vouchers or mobile banking
Weakening of local authorities by the removal of cash revenues, such as market fees	**Ensure** that local authorities are partners and collaborate. Consider compensation for any loss of revenue
Potential for private-sector opportunism and racketeering	**Ensure** adequate contractual arrangements, supervision and monitoring
Inadequate availability of materials and equipment for the safe disposal of carcasses during slaughter destocking	**Ensure** adequate budget allocation
Inflexible design and funding are unable to respond to changing circumstances, such as a sudden lack of willing sellers	**Ensure** programme design is participatory, inclusive, pragmatic and flexible
Destocking requirements cannot usually be defined accurately so there is a risk of running out of operational funds while there is still a demand for destocking	**Ensure** programme design is participatory, inclusive, pragmatic and flexible
Evaluation and impact assessments compromised by poor programme design, lack of assessment criteria and baseline data	**Ensure** evaluation and impact assessment are an integral component in the design of the programme

- livestock extension agents; experienced slaughterers and butchers;
- experienced hides and skins processors;
- feed suppliers;
- local savings and credits associations;
- local branches of banks;
- relevant local NGOs or CBOs (community organizations).

Risk assessment

All destocking interventions have inherent risks and consequences, and it is important that these are, as far as possible, foreseen and assessed. For a destocking programme, potential risks include are illustrated in Table 3.

IMPLEMENTATION

Harmonization and Coordination

A multidisciplinary/multi-agency destocking committee or team is best placed to oversee a specific destocking programme – this can often evolve from the assessment committee. Membership of the committee can include those directly involved, such as: a senior local administrator, the district veterinarian officer, livestock technicians, livestock marketing experts, local livestock traders and farmer/herder representatives from the targeted communities. This committee should meet regularly – weekly if possible – so that it can quickly initiate operations and respond efficiently and effectively to issues as they arise. Minutes of all meetings should be kept as a valuable record for subsequent reviews and evaluations.

It is important that the members of the team spend adequate time getting to know each other, discussing the preferred destocking options, agreeing on working arrangements and resolving administrative and logistical issues. Topics that can be discussed during the initial planning meetings include:

- a review of the scale of the problem: number of markets, animals, households and communities affected;
- the scale of the project: how many animals can be destocked with available funds;
- a profile of the project's beneficiaries;
- formal and informal marketing arrangements;
- the pros and cons of the different destocking options;
- sociocultural and religious factors, especially for meat handling, slaughter and distribution;
- administrative, logistical and operational issues that need to be resolved;
- how monitoring and evaluation considerations will be handled;
- how the team will operate, with individual and group responsibilities clearly defined.

In addition, local committees should be established at each site (a contiguous area that could be a village, council area or even the district) where the destocking will be carried out. The presence and participation of women as committee members should be actively pursued so that their views, experience, concerns and interests are fully taken into account. Local committees should meet at convenient times and places for all committee members, including women, to participate. Where local committees or similar structures already exist, new ones should not be created. See Chapter 2 for more information on committees and team building.

Selection of beneficiaries

The selection of beneficiaries is one of the most challenging aspects of preparing a destocking intervention, and should be done with the full participation of all stakeholders, including the target communities. It is important that concerns, issues and potential challenges are addressed before any actual destocking takes place.

During the assessment phase, criteria for selecting beneficiaries should be discussed and agreed with the affected communities. During these discussions it is important to settle on the maximum number (and type) of livestock to be removed from a participating community or household. Selection criteria, once agreed, should be the same across all communities in the programme.

Difficult decisions may need to be made. For example, if poor households with small numbers of livestock have to sell animals, they may be left with too few to continue as viable enterprises after the crisis: yet their need of humanitarian assistance may be the greatest. Impact assessments have shown that it is these vulnerable households that benefit most from receiving cash since this can be used for purchasing food or protecting their remaining animals by buying additional feed. If an intervention targets the larger herds, then more animals can easily be bought, thus easing the pressure on the remaining feed resources. The downside is that such interventions often benefit the richer and more resilient households. Livestock traders may also prefer to buy cattle, while the most vulnerable groups usually own sheep and goats.

Ways of ensuring that there are benefits for both men and women should be discussed and agreed prior to implementation. In particular, it is important that the selection of beneficiaries considers how women – both female-headed households and women in male-headed households – will benefit. How and where payments are made can also affect women, so these aspects should also be discussed in consultation with the community.

Selection criteria for a destocking programme may include:

- number and type of animals in the household;
- condition of the animals;
- household income level or known vulnerability grouping;
- household status (female-headed household, number of children etc.);
- size and make-up of the household;
- access to markets or slaughter facilities;
- recipients of other aid programmes or assistance;
- willingness to participate in the programme and sell animals.

Phasing

A number of distinct phases can be identified in a destocking programme.

Launch

Every opportunity must be taken to inform and communicate with the targeted communities, and this is particularly important at the start of a programme. One or more launch meetings should be organized at each operational site, enabling local committee members to learn from the implementing organizations and discuss and agree on all aspects of the intervention. The following are common areas which often require clarification:

- geographical scope;
- how beneficiaries are to be selected;
- what will (and will not) be provided by the intervention;
- final selection for participating markets/slaughter facilities and the location of any temporary markets;
- building of (and payment for) the required livestock handling facilities;
- who will be responsible for the day-to-day management of sites, including hours of operation and numbers of operating days per week;
- how will payments be calculated (cash or in-kind) and how will the beneficiaries receive their compensation (cash, in-kind or vouchers);

- if vouchers are issued, how and where can they be redeemed;
- who will be eligible to benefit from meat distribution – not forgetting institutions, such as clinics, schools and supplementary feeding centres;
- appropriate ante- and post-mortem inspections, animal welfare and slaughter techniques;
- how hides and skins are to be disposed of;
- how to dispose of carcasses that are not fit for human consumption;
- indicators for monitoring progress (e.g. number of livestock slaughtered per week, maximum time for full payment to be made);
- schedules for local meetings;
- procedures for handling and resolving disputes and disagreements.

Pilot Phase

Once all the stakeholders are clear about their respective roles and responsibilities, a pilot phase can be launched in selected locations. This may not be necessary in areas with previous experience of destocking programmes. Only enough animals should be removed (purchased or slaughtered) in this phase to ensure that the intervention is fully tested. Emphasis should be given to assessing the day-to-day operations, sourcing of animals, payments procedures, evaluation procedures and response from the community.

The suggested duration for a pilot phase is one month. This enables the intervention to be tested in a number of weekly markets – or specially organized markets if local markets have failed or are not functioning – and for the teams to come together to share experiences. When it is completed, it should be reviewed as quickly as possible so that no time is lost in rolling out the full programme. Necessary adjustments should be made based on the findings. Urgent situations may dictate a more pragmatic approach with a limited pilot phase.

Main Phase

After the pilot phase has been reviewed and any modifications made, plans can be developed for expanding into the main phase. According to the nature of the crisis/emergency, this should last one to four months. It is unlikely that interventions can continue longer as resources run out fast and crises abate. In the case of commercial destocking, stockyards would likely be full and capacity saturated, and in the case of slaughter destocking, most of the animals to be destocked would have been removed over a four-month period.

The new phase may entail adding new teams and training additional operators. It is important that common operating standards are followed at all the sites. In this way each new team has a chance to contribute to learning and innovation, thus expanding the body of information available on implementing a destocking intervention. Good communication with local committees and beneficiaries is essential to provide rapid and accurate feedback, allowing the programme to adapt quickly to changing circumstances.

After a destocking intervention, common operating standards should be reviewed and good practices or Destocking Guidelines produced, based on local experience. These would then be available in future crises.

Exit Phase

It is important to consider how the programme will end and an exit strategy should always be a component of the project design. This is particularly important since the end of an emergency is rarely clearly defined. Some of the points an exit strategy may consider include:

- ensuring that the beneficiaries, community leaders and local authorities are fully informed and understand the closure of the programme – especially if the emergency itself and the demand for assistance has not ended;
- transferring ownership and responsibility for equipment or infrastructure provided by the programme, such as slaughter slabs, renovated markets etc.;
- ensuring that links and bonds developed between livestock owners and traders are maintained and strengthened;
- assisting in finding roles for locally recruited (and trained) programme staff;
- ensuring the community is involved in any evaluation and informed of the results and lessons learned.

The exit phase would normally be around six weeks to allow for the handover of equipment/staff, etc. and to undertake a rapid impact assessment. Any longer would make the disengagement process too long and send mixed messages to the community.

Evaluation and Impact Assessment Phase

When the proposed activities are completed, a participatory evaluation should be undertaken with the involvement of all stakeholders (see Chapter 10 for more information on evaluation and impact assessment). It is important that the findings and conclusions of such assessments are well documented so that the lessons learned can be used to improve future interventions. Ideally, although this rarely happens, post-intervention impact assessments should be undertaken after at least one year to assess the real impact on targeted beneficiaries.

Which animals to include?

With regard to commercial destocking, the decision on animals to be sold should be left entirely to the owners and traders as this is a commercial activity. The destocking team/local site committee would, however, monitor this and discuss trends – for example, if old and unproductive females are not being purchased it could decide on other destocking options.

For slaughter, destocking decisions need to be made on which type of animal should be included in the programme in close consultation with the local community. Older, less productive animals, whether male or female, and animals that are rapidly deteriorating in condition should be prioritized. Young, weaned animals and the younger breeding females should be retained wherever possible to rebuild the herd or flock after the crisis.

Where animals are being slaughtered and the carcasses disposed of, the decision is reasonably straightforward. Animals to be included are those that are so weak, emaciated or diseased that they no longer have economic or nutritional value. Animal welfare considerations may dictate that other species, such as donkeys and horses, should be included too.

Valuing animals

Establishing the value/purchase price of the animals to be destocked or slaughtered can be tricky and contentious.

With accelerated destocking the usual practice is not to intervene in setting market prices, which are left to negotiation between the buyer and seller. There may be exceptional circumstances where the programme is justified in setting modest floor prices to safeguard farmers.

Where animals are being purchased for slaughter, the programme has to agree on the value of the animals. This may be a cash value (or a voucher of equivalent value) or payment in kind, usually grain. Sometimes it can be a mixture of the two. If payments are being made in grain, it should be ensured that sufficient quantities are available locally to cover requirements.

Prices may be a fixed flat rate (cash or in-kind equivalent) for a cow, sheep or goat, irrespective of age, sex or condition. Flat rates are always used for animals that have no economic value and will be destroyed and disposed of. Alternatively, values may vary for different classes of animals – for example, there could be specific rates for male and female animals of certain ages. The condition of animals may also be taken into account. For operational reasons, the simpler the system, the better. If the age or condition of animals is taken into account, it introduces a level of subjectivity which can lead to disputes and abuse. Transparency and consistency between implementing partners is essential.

Payments

Whatever payment system is used (cash, in-kind or voucher – see Chapter 3 for more information about vouchers –), it is also important that the system is transparent and easily understood. It needs to be efficient so that beneficiaries receive full payment as soon as possible and return to their homes with minimum delay. Payment modalities must be both safe for staff of the implementing organization – there are inevitably dangers associated with carrying large amounts of cash in remote areas – and also for the beneficiary households. Equally important is that payments systems are coordinated and standardized among government and other implementing agencies.

Facilitating the market

Encouraging traders to participate in new or apparently unattractive livestock markets is fundamental to the concept of commercial (accelerated) destocking. A number of temporary or permanent initiatives can be undertaken to facilitate the marketing of livestock.

Market organization

Organizing livestock markets on predefined days and at set locations can, if well advertised, encourage traders and transporters to travel to more remote areas knowing that adequate numbers of livestock will be available for sale. This will entail the local destocking team spending time encouraging farmers to bring their animals to the market. It may also entail building temporary markets, or rehabilitating existing ones if necessary.

Market fees and taxes

It is common for local authorities to charge for the use of municipal markets and slaughter facilities. This can be a valuable source of income which they may be reluctant to give up.

However, especially with accelerated offtake, the temporary suspension of market or transport fees, and of transport or movement permits, can encourage livestock traders to enter and participate in local markets. Consideration may be given to compensating municipalities for all or part of lost revenue.

Transport subsidies

Transport subsidies are another contentious issue. At a time of high fuel prices, the cost of transportation can be prohibitive and is factored into the prices paid by the traders. A fuel subsidy may make the difference in increasing offtake from more remote areas. The challenge is to establish and manage a transport subsidy in such a way that it benefits livestock keepers in remote locations only and encourages greater offtake. One option is to give fuel vouchers directly at remote markets to those traders with loads of an agreed minimum number of animals. Transport subsidies may also be triggered by the value and condition of the available animals, thus encouraging the removal of animals that might otherwise be unattractive to traders – especially with sheep and goats, where profit margins are likely to be lower than for cattle. Tight control mechanisms are, however, required to avoid abuse and fraudulent claims.

In many emergencies, there will be a considerable inflow of food aid and equipment into the affected area. This offers the possibility of backloading the returning lorries with animals.

Slaughter destocking, butchering and distribution

The common practice is to establish small, mobile teams that slaughter, skin and butcher selected animals. These teams should consist of an experienced slaughterer, a qualified veterinarian or meat inspector, plus animal handlers and labourers. In the majority of cases the slaughterer is also able to butcher and joint carcasses. The teams usually operate a regular, predefined schedule at locations throughout the programme area.

Slaughter teams will sometimes need to construct concrete slaughter slabs, with blood collection pits and associated metal frames where slaughtered animals are hoisted for skinning and butchering. Another option is to have temporary structures built by the local community as their contribution. Although slaughter slabs may be useful in some circumstances, many agencies now recommend the use of portable frames and plastic sheets, as they are cheaper, portable, washable and can reused.

The teams will need basic equipment such as: knives, cleavers, bone saws, meathooks, ropes, pulleys, protective clothing, aprons, boots, disinfectant, etc. To humanely slaughter animals, the preferred solution is the captive-bolt pistol, although cultural customs need to be taken into account.

Prior to slaughter, it is important that ante-mortem inspections are carried out by qualified professionals. The meat inspectors also ensure that appropriate animal welfare practices are followed and that post-mortem inspection of the meat is carried out. The OIE Terrestrial Code for Animal Health[17] provides further information. Once an animal has been approved for human consumption, its carcass can be jointed and the fresh meat distributed to agreed beneficiaries and institutions, or included as part of a targeted feeding programme. Suitable packaging (greaseproof paper, etc.) should be provided for the transport of meat from the slaughter site to the place where it will be consumed. A standard process would be:

[17] http://www.oie.int/international-standard-setting/terrestrial-code/access-online/

- ante-mortem inspection;
- slaughtering in accordance with local customs and appropriate animal welfare standards;
- hanging animals and skinning;
- post-mortem inspection;
- butchering and distribution;
- disposal of waste;
- cleaning.

If the meat is to be dried, it is best transported to a ventilated drying shed where it is dried for a minimum of three days, then sun-dried for an additional three to four days. Dried meat can be preserved and distributed over a wide area but it is more expensive and labour-intensive to produce. It is therefore recommended only when so many livestock are being slaughtered that fresh meat would exceed local consumption capacity.

There are human health risks associated with the slaughtering and butchering of animals, notably anthrax, Rift Valley Fever (RVF) and some parasites. If there is a suspected zoonotic risk, particular attention should be given to the safety and health of the operators (e.g. provision of adequate protective clothing).

Management of hides and skins

The management of hides and skins offers opportunities for cost recovery for the implementing agency or for additional benefits for the affected community. The options include:

- Skins/hides from distributed livestock can be cleaned and dried by beneficiary families and returned to the implementing agency for later sale.
- Skins/hides can be gifted to additional beneficiaries (e.g. women's groups) to process and sell as an income-generating activity.

Check the local curing techniques. But whatever process is used, careful skinning to avoid cuts and damage, as well as to remove excess flesh and fat, is essential as it can reduce the value of the hide or skin. Simple training and instruction can pay major dividends in increasing the value of hides and skins. Most curing techniques require the application of salt. Traditional "stack curing" requires a third of the weight of the skins as salt – even natural drying requires light salting of the skin.

NOTES ON MONITORING, EVALUATION AND IMPACT ASSESSMENT

The evidence base for destocking still needs to be expanded, which makes monitoring and impact assessment particularly important. With more comprehensive evidence, destocking can be shown as a reliable and effective emergency response. It usually focuses on the actual impact achieved on the beneficiaries themselves. Impact assessments are by no means routine in all destocking programmes – often it is not practical to undertake comprehensive assessments of numerous, small interventions. In such cases, implementing agencies may consider undertaking impact assessments on a number of separate but similar interventions. There is also scope for agencies to collaborate in more comprehensive and inclusive impact assessments. A further complication is that the true impact of a destocking programme may not be apparent until some time after the intervention.

Monitoring

In any destocking intervention, it is important to establish and maintain detailed records. Such records are required to evaluate progress against programme targets and objectives. The information is valuable in assessing the overall impact of the programme and as a means of keeping communities and donors informed. What information is required, how it will be collected and by whom, are questions than need to be considered as an integral part of the planning process.

Not all the information will be readily available or easily collected. Where sub-contracts are issued, supplying information can be a contractual obligation. However, collecting information from the private sector, especially traders who are under no contractual obligation, can be challenging. Examples of the type of information that can be collected include:

Beneficiaries

- type and number (livestock sellers, local institutions, meat recipients or direct employment);
- number of households (these could be categorized) for each type of beneficiary;
- location of households;
- number of female beneficiaries.

Animals

- number of animals purchased directly by the programme (by species, sex, age, condition and location);
- number of animals purchased by traders facilitated by the programme (by species, sex, age, condition and location);
- number of animals purchased and removed from the affected area (by species, sex, age, condition and location);
- number of animals slaughtered for human consumption (by species, sex, age, condition and location);
- number of animals slaughtered for carcass disposal (by species, sex, age and location).

Meat, hides and skins

- kilograms (meat, bones and offal) by species fit for human consumption (estimate);
- number of recipients;
- kilograms (meat, bones and offal) by species condemned as not fit for human consumption (estimate);
- number of hides and skins (by species);

Costs

- cost of animals purchased (by species, sex, age, condition and location);
- slaughter costs;
- transport subsidies, market fees, etc.;
- wages for full-time or temporary employment;
- operating costs.

TABLE 4
Livestock seller monitoring form

Date	Household	Village/ location	District	Animal type	Number of livestock sold	Unit price	Total sale price	Signature of seller

TABLE 5
Meat receiving monitoring form

Date	Household	No. of adults	No. of children	Location	District	Quantity of meat	Signature

Slaughter and marketing

- number and location of slaughter slabs;
- number and size of markets;
- number of animals sold at each market over time;
- weekly market prices for different classes of animal;
- number of market traders associated with the programme.

Under ideal circumstances, monitoring forms should be completed for each seller and each receiver, though the scale of the operation may prevent this. Where it is decided that full details need not be kept, summary details of the basic information should be maintained, i.e. date, location, district, animal numbers, unit price and signature. Examples of monitoring formats (for livestock sellers and meat consumers) are to be found in tables 4 and 5.

Accountability

Equally important to external reporting requirements, the targeted community must also be updated regularly on the progress of the destocking programme so that it can provide all-important feedback. Meetings should be scheduled during both the pilot and main implementation phases and attended by both women and men to inform participants on implementation and progress. Minutes of meetings should be kept and made available to project review teams. In addition, larger quarterly review meetings attended by senior programme staff can help ensure that the destocking continues to meet the community's needs and is having its intended impact.

Other activities that help inform destocking programmes and ensure that they operate to the highest possible standards of accountability include:

- introducing the implementing agencies and destocking team to the community, and outlining their destocking experience to date;
- involving community leaders and the wider public in all stages of destocking programme design, development and implementation;

- identifying the changes that people want to see from the destocking, and agreeing a few key success indicators;
- monitoring progress against agreed destocking indicators, and adjusting programme implementation accordingly;
- carrying out an impact assessment to identify the impact of destocking in greater detail and help develop the evidence base;
- disseminating the results of the impact study.

Impact assessment

Impact assessments are important for determining the cost-benefits and actual benefits of a destocking programme, and for identifying the reasons for what worked well and what did not. Assessments also usually identify lessons learned and make recommendations for future destocking interventions. Results and lessons to be drawn from impact assessments make them invaluable so that they should be made available to the public. For example, in the 2005/2006 Ethiopian drought, an impact assessment report on a *Save the Children* destocking programme confirmed a benefit-cost ratio of 41:1 The report provided useful information on how households made use of the cash received from the sale of their livestock. It showed conclusively that the beneficiaries used the cash rationally, and that most of it was used locally, thus stimulating the local economy – especially as the cash was injected into the economy long before any food aid arrived. The study also revealed that the livestock – which might otherwise have died – were eventually exported, thereby contributing to export earnings.

Impact assessments contribute to the development of a strong body of evidence to evaluate destocking interventions. It is therefore important that the assessments are as participatory and as independent as possible. If envisaged – and many donors may now require impact assessments – it is important that an assessment is adequately budgeted and not seen as an afterthought in the programme. When it is known at the outset that an impact assessment will be carried out, and who will be doing so, it may be possible to involve the assessor/s in designing the monitoring system.

CHECKLIST

Baseline information

- What phase has the emergency reached?
- What is the condition of the livestock being brought to market?
- What is happening to the price of livestock both locally and at terminal markets?
- What is happening to local grain and feed prices?
- Is there a demand to sell/supply animals?
- Is there a demand for animals to be purchased?
- What local institutions and support services can facilitate destocking?
- Has the relevant infrastructure (markets, roads, water and electricity) been adequately defined?

Design considerations

- Have the relevant sections of the LEGS handbook been read?
- Is destocking the most appropriate intervention – have alternatives being explored (see LEGS Participatory Response Identification Matrix)?
- Is the scale and scope of the disaster and its implications fully understood?
- Are there national, provincial or district disaster response committees established?
- Will destocking be undertaken in conjunction with other interventions?
- What potential partners (government, international or national NGOs, CBOs) are operating in the area?
- Is there scope for collaboration – can a coordination forum be established?
- Is there an existing mechanism for working with the livestock traders?
- Is the proposed timescale realistic?
- Is there sufficient flexibility in the design to divert funds to other activities at short notice, if circumstances change?
- Is there an exit strategy?
- Have monitoring, evaluation and assessment requirements been taken into account?
- Have ways of ensuring stakeholder involvement been taken into account (local authorities, community, beneficiaries, etc.)?

Preparation

- Has an emergency livestock response committee been established?
- Has a destocking team been set up – does it have the necessary mixture of skills and expertise?
- Have the appropriate destocking options been discussed and agreed on?
- Has the scale (geographical area, number of beneficiaries, number and type of animals to be destocked) of the intervention been adequately defined?
- Are the expected targets and budgets realistic – is there a timetable?
- Has a local site committee been established?
- Are the required skills available locally, will they have to be brought in, will there be need for training?
- Are there particular "hotspots" that can be identified and prioritized?
- Are there particular weak links in the activity cycle that can be identified and highlighted?
- Are there ongoing food distribution programmes that can distribute fresh or dried meat from the programme? Do they have lorries returning empty or with spare capacity?
- Are the beneficiaries (including women) and local institutions/authorities adequately represented?
- Has a needs assessment been undertaken?
- Has the selection of beneficiaries been discussed and agreed with key stakeholders and local authorities?
- Have the beneficiaries and key stakeholders (local authorities) been fully informed of the proposed interventions and how they will operate?
- What species and classes of livestock (sex and age groups) will be included?

- Is it clear how animals purchased by the programme will be valued – have standard prices been set?
- Have different payment arrangements been discussed and agreed?
- If vouchers are used have they been printed?
- Have local contractual agreements been prepared – are they clear and unambiguous?
- Is there a mechanism in place for resolving disputes?
- Is there a contingency plan should the disaster be shorter or longer than expected?
- Have the monitoring requirements of the programme being adequately covered?
- Have potential risks been adequately assessed?
- Have monitoring forms been developed and printed?

Commercial destocking (accelerated offtake)

- Are traders already operating in the area – are they willing to collaborate?
- Is the infrastructure in place to enable livestock offtake, especially from remote areas?
- Do (temporary) holding grounds exist, or do they need to be provided?
- Is there access for lorries?
- Are feed and water available at the markets and along the supply routes?
- Are there any particular constraints (market fees, movement permits, high fuel prices) that could be eased?
- What restricts access to markets by the most vulnerable?
- What precautionary measures can be taken to reach the most vulnerable?
- Will larger, less vulnerable, herd owners be disproportionately advantaged?

Humane slaughter for consumption

- What is the state and condition of existing (if any) slaughter facilities?
- Are there qualified people to inspect animals pre-slaughter, to slaughter and butcher them, and to inspect the meat?
- Are animal welfare principles understood by those involved in slaughtering?
- Is there a training requirement?
- Are there local religious or sociocultural requirements regarding the slaughter of livestock?
- Have the most vulnerable communities, households and individuals been identified as primary beneficiaries?
- Which vulnerable groups (or institutions) should be targeted to receive the meat from the destocking operations?
- How will hides and skins be handled?
- Have equipment and supplies requirements been identified?

Chapter 5
Veterinary support

RATIONALE

Natural and conflict-based disasters affect the health, well-being and productivity of livestock; this in turn has implications for household economies and livelihoods as well as animal welfare. Veterinary support[18] can prevent sickness and death and help maintain the value of the surviving animals. This chapter deals with the animal health issues associated with disasters and humanitarian emergencies.[19]

The animal health situation can be affected by disasters in various ways, including:

- Susceptibility to disease increases due to debilitation resulting from cold, insufficient feed or water.
- Immediately after a drought (once rains arrive), animals may become further stressed by sudden temperature drops and susceptible to diseases prevalent during new pasture growth (e.g. internal parasites, blackleg, enterotoxaemia, etc.).
- Specific circumstances can lead to particular disease risks. Flooding, for example, can lead to an increase in internal parasites or disease vectors such as mosquitoes transmitting Rift Valley Fever. Crowding animals in IDP camps or in reduced grazing areas can also increase disease transmission.
- Risk of zoonotic diseases (transmittable between animals and humans) increases due to sharing of restricted living space and water sources.
- Following an acute crisis such as an earthquake, many injured animals may require immediate clinical attention. Some may need to be humanely destroyed.
- Surviving animals will need the same preventive and curative treatments as in normal times but services may have been disrupted or livestock owners may not have the financial resources to pay for treatment.
- Services can be disrupted due to inaccessibility (floods, snow, earthquakes), or service providers may themselves be affected by the disaster.
- Conflict situations lead to particular issues of security for both service providers and livestock owners seeking animal health care; movement of people to safer areas or IDP camps can overwhelm existing services.

Disasters compromise access to animal health services (public and private), which are invariably disrupted and/or overwhelmed. Yet livestock owners need access to such

[18] See also Chapter 5 of the *Livestock Emergency Guidelines and Standards* (LEGS).

[19] Major outbreaks of transboundary diseases may be declared emergencies in their own right. The 2006 and subsequent outbreaks of H5N1 Highly Pathogenic Avian Influenza is one example. This chapter does not address the prevention and control of such events. This topic is already well covered in other internationally accepted guidelines by FAO-EMPRES (Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases), e.g. the second edition of FAO's "Good Emergency Management Practice: The Essentials" (FAO Animal Production and Health Manual 11), and the recommendations of the World Organisation for Animal Health (OIE).

BOX 8

Veterinary support and animal welfare

As part of emergency response, veterinary support also contributes to one of animal welfare's five freedoms, namely *freedom from pain, injury, or disease*. It does this in several ways, including:

- preventing disease, for example, by vaccination;
- enabling rapid diagnosis and treatment;
- improving herd health by treatment for parasites or by providing vitamins and minerals to malnourished animals;
- enabling rapid response to disease as a consequence of enhanced surveillance and disease reporting.

Source: LEGS handbook 2014

services throughout an emergency to protect their animals and maintain productivity. Pastoralists, whose livelihoods depend on livestock, are particularly vulnerable, as are poorer households whose few animals may be their only assets. In addition to access to animal health services, good husbandry and adequate feed and water are required to keep animals healthy.

Animal health interventions alone will not necessarily have the desired impact. If animals are in poor condition, starving or dehydrated, treatment and vaccination alone are unlikely to have any impact. There is truth in the saying, "There is no vaccine against starvation." Sick animals or carcasses can also constitute a public health hazard without a functioning veterinary service.

Animal health is a component often undertaken in conjunction with other interventions. For example, restocking involves a substantial investment in acquiring and distributing animals, so it is important that they are, and remain, in good health. The LEGS handbook makes a clear reference to the animal welfare support that veterinary care can provide (see Box 8).

The LEGS handbook decision-making tree for clinical veterinary services (LEGS 2nd edition – Figure 5.1) is a valuable tool for deciding the appropriate veterinary support interventions.

OPTIONS FOR VETERINARY SUPPORT

Selecting the most appropriate veterinary intervention is not necessarily straightforward. Choosing between supporting clinical services or focusing on public health issues will depend on a thorough needs assessment as well as benefit-cost considerations. Such information allows decisions to be taken on the scale and types of treatments, drugs and vaccines required, and any additional training needs.

To identify how best to meet community needs, it can be helpful to categorize veterinary services into *clinical veterinary services*, and *public-sector veterinary services*. Each has different objectives and delivery systems. These two categories and the various options within them, as described in LEGS, form the basis for this chapter.

Clinical veterinary services

- examination and treatments of individual animals or herds;
- disease control and preventative programmes including vaccination, deworming and management advice.

Public-sector veterinary functions

- veterinary public health activities addressing zoonotic diseases, overall sanitation and carcass disposal;
- livestock disease surveillance;
- disease control of notifiable diseases.

Clinical veterinary services

These are often referred to as *private goods services* and deal with curative and preventive treatments for sick, wounded and injured animals, as well as providing vaccinations to prevent seasonal disease outbreaks (e.g. Newcastle disease [NCD] in poultry, blackleg in young cattle, pasteurellosis and clostridial diseases in sheep, camel pox, African horse sickness [AHS], etc.), and those more likely to occur as a result of the emergency (e.g. anthrax due to spore exposure following flooding). These types of service give people the choice of treating the diseases they feel are important for them and their animals, whether for economic or social reasons. Increasingly such services are provided by private operators, including veterinarians and, where appropriate, veterinary para-professionals, owing to the budget constraints facing government services.

Community-Based Animal Health Services

Many government and development agencies support the establishment and development of *community-based animal health services*, with local livestock owners being trained as community-based animal health workers (CAHWs) to deal with the main diseases affecting livestock in their areas.

A CAHW is a veterinary para-professional who is authorised to carry out certain veterinary tasks with authorization from a Veterinary Statutory Body, under the responsibility and direction of a registered or licenced veterinarian. Following training, the CAHWs provide private services under veterinary supervision either through the public or the private sector. CAHWs can also play a vital role in disease reporting and surveillance, working closely with government veterinary services. In some countries, veterinarians working on the ground collaborate with a network of CAHWs. In a livestock emergency CAHWs can play an important role and rarely confine themselves solely to animal health duties.

Recommendations made in this publication on the role and responsibilities of CAHWs are only applicable in countries where the status of CAHWs is recognized by relevant authorities.

Examination and treatment of individual animals and herds

This includes the treatment of sick, wounded and injured animals. Where some form of veterinary service exists, it is important that any animal health intervention supports these systems, and external support must not compete with local services unfairly. This can happen when free or highly subsidized drugs and services are provided when inappropriate.

Cash transfers and veterinary vouchers are increasingly being used as a means for people to access care for their animals and to support local private service providers (vouchers are covered in more detail later in this chapter).

Mass medication and vaccination campaigns

These campaigns aim to prevent and reduce diseases during emergencies by providing medication or vaccination to a large number of animals as part of an organized, "one-off" event. Treatment is often delivered at no charge to pastoralists so that the impact of such campaigns on private service providers needs to be taken into consideration during planning. Primary clinical service providers can be subcontracted to deliver medication or vaccination. Supporting them ensures that money goes into the local economy.

Vaccination and treatment campaigns must be based on sound epidemiological (disease situation) knowledge, including that of local livestock owners who are well versed in the seasonality and transmission modes of diseases. Implementers and donors should not assume that a disaster *per se* is likely to cause an increase in any particular disease – most diseases are seasonal and are likely to remain so, despite the emergency. A disaster's impact on livestock needs to be assessed before the disease risks can be understood. Some emergency situations may predispose livestock to an increased risk of disease, (e.g. through close contact of animals in IDP camps), as well as exposure to new diseases; whereas other emergencies may have little impact on disease outbreaks.

Public-sector veterinary functions

It may be appropriate for an emergency animal health intervention to support public veterinary services in their duties. These services are frequently referred to as *public good services.*

The support required will depend on the existing capacity of government veterinary services and their potential to scale up operations. National policies on disease control and on who can provide veterinary services will also influence what type of support is required. The following are areas of public-sector service where external support may be provided, including:

- Setting up systems to deal with public health and animal welfare issues (euthanasia and carcass disposal, public health awareness-raising). This involves:
  - making people aware of increased risks of particular diseases when humans share a confined living space with animals (e.g. in camps). Besides RVF and anthrax, which have already been mentioned, outbreaks can include rabies transmitted via predators; tuberculosis; brucellosis; hydatid disease and other parasites; and highly pathogenic avian influenza (HPAI). Large numbers of exposed carcasses also pose disease risks, and people should be made aware of disposal methods;
  - reviewing food hygiene for meat and other animal products. For example, does

meat inspection need to be established and/or supported? Are people boiling milk to prevent transmission of brucellosis and tuberculosis, and are they cooking meat?
  - possibly developing specific public awareness campaigns tailored to the disaster;
  - identifying area-specific priority diseases, and those diseases whose control and prevention falls under the remit of national veterinary authorities;
- setting up and managing disease surveillance systems, including the incorporation of veterinary para-professionals, and ensuring quality (accurate and timely) reporting;
- training in participatory epidemiology as needed to ensure veterinary staff can adequately assess potential disease risks at specific times or events, such as flooding;
- clarifying the veterinary department's role and responsibilities in supporting and supervising CAHWs where they are legalised. This involves:
  - identifying vaccinations that can be provided by private practice (e.g. NCD, anthrax, blackleg, pasteurellosis), and those for which the veterinary department should be responsible (e.g. HPAI, brucellosis, classical swine fever, AHS etc.);
  - making certain veterinary authorities are responsible for ensuring that all service providers follow correct vaccine management and vaccination protocols;
  - ensuring sufficient service providers are trained and are aware of their roles and responsibilities.
- addressing issues of national veterinary standards including the availability, accessibility, quality, affordability and acceptance of animal health services;
- planning vaccination campaigns as part of an overall disease prevention strategy rather than a one-off emergency response;
- assisting with the procurement, quality control and transport of veterinary medicines and vaccines;
- establishing and maintaining effective cold chains;
- developing contingency plans where outbreaks of specific diseases or large-scale movements of people and their animals are expected;
- putting in place a coordinated response mechanism, with high-quality vaccines and medicines made available.

Disease surveillance

Surveillance of notifiable diseases should, wherever possible, adhere to the OIE[20] standard disease surveillance procedures. Further advice on appropriate surveillance measures is available from OIE or FAO.[21] All disease reports must be submitted to a central authority or, in the absence of government, a lead authority or agency responsible for compiling and disseminating the information. If no government veterinary service is available, implementing agencies must ensure that CAHWs submit monthly disease reports and that the information is compiled into area-wide reports and submitted to a central authority or agency.

The advantages and disadvantages of the options for veterinary support interventions set out in Table 6 are taken from the LEGS handbook, 2014.

[20] OIE Terrestrial Animal Health Code http://www.oie.int/eng/normes/mcode/en_sommaire.htm.

[21] Disease epidemics are addressed by the EMPRES guidelines produced by FAO: http://www.fao.org/ag/againfo/programmes/en/empres/home.asp

TABLE 6
Advantages and disadvantages of veterinary support interventions options

Option 1: Clinical veterinary services		
Sub-option	**Advantages**	**Disadvantages**
Examination & treatment of individual animals/herds	• Allows flexibility and veterinary care on a case-by-case basis • Can support existing private-sector service providers, e.g. through voucher schemes • Wide coverage is possible, particularly when well-trained and supervised veterinary paraprofessional workers are used • Allows targeted or strategic prophylactic treatment or vaccination of individual animals or herds at risk • Some quantitative evidence of impact on animal mortality is available	• If provided free, coverage and duration of service likely to be limited by the budget • If provided free, risks undermining existing private-sector service providers • Quality of locally available medicines may be poor
Mass medication or vaccination programmes	• Relatively easy to design and implement • Mass deworming does not require a cold chain • Cost per animal can be low • If done effectively, mass medication has the potential to enhance livestock survival and production • Mass medication has the potential to provide income for the veterinary sector; for example, through voucher schemes	• There are weak laboratory facilities in many areas for confirming disease diagnosis before targeting specific diseases • Large-scale vaccination programmes difficult to design properly without basic epidemiological information • Coverage is often determined by budget rather than technical design criteria • Free treatment and vaccination can undermine the private sector. • For many vaccines, need to establish or support cold chains • Risk of poor immune response to vaccination in animals already weakened, e.g. due to lack of feed • Quality of locally available medicines may be poor
Option 2: Support to public veterinary service functions		
Sub-option	**Advantages**	**Disadvantages**
Veterinary public health	• Public awareness-raising is often inexpensive • Can foster collaboration between veterinary and human health sectors	• May require specialized communication expertise to design and test educational materials in local languages • If not carefully managed and timed, can divert resources away from more direct livelihoods-based assistance
Livestock disease surveillance systems	• Can complement all other veterinary interventions and assist impact assessment of these interventions • Fosters linkages between central veterinary authority and affected area • Can help to promote international livestock trade in some countries and regions	• Needs to be based on clearly defined surveillance objectives • Can easily become a data-driven rather than an action-oriented process • If not carefully managed and timed, can divert resources away from more direct livelihoods-based assistance

PLANNING AND PREPARATION

Assessing the situation

Assessment is one of the first activities of any animal health intervention. A thorough understanding of the emergency context, as far as is possible, is essential for the design of a successful animal heath intervention. This should cover the geographical, epidemiological, social, cultural, religious and economic contexts of the particular emergency, as well as its physical parameters – area, animals, available feed, markets, slaughter facilities, veterinary services centres, number of veterinarians and veterinary para-professionals and service coverage, drug and equipment supplies, etc. Particular attention should be given to understanding the normal disease situation, including seasonal disease patterns, as this will serve as the baseline for assessing the impact of both the crisis itself and the interventions undertaken.

The assessment of veterinary services is commonly based on five key indicators of service provision which are defined below (this section is taken from Chapter 10 of this manual). The indicators provide a clear framework for supporting the development of context-appropriate interventions.

- **Accessibility** is the physical distance between livestock keepers and the nearest trained service provider (e.g. a community-based animal health worker) or fixed-point facility (e.g. a veterinary pharmacy). This distance can be measured in kilometres or travel times.
- **Availability** is a measure of how widely usable a service is in an area. An area may have many veterinarians, but if they are all concentrated in a main town, the service is available but not accessible to rural people. In contrast, a veterinary worker may be close to livestock keepers, but if he/she works only one day a week, they are accessible but not available. Availability can be measured using hours of availability per week. The range and quantity of required items such as veterinary medicines is another measure of availability.
- **Affordability** is people's ability to pay for services. Given the need to target vulnerable groups during emergencies, assessment of affordability should include examination of poorer people's capacity to pay for services. For veterinary services, comparing the cost of veterinary care with the local market value of animals provides useful insights into affordability and the benefit-cost of treatment.
- **Acceptance** relates to the sociocultural, religious and political acceptance of services and service providers, and is influenced by sociocultural and religious norms, ethnicity, gender, language capabilities and other issues.
- **Quality** of service can be measured by the level of training of service providers, their technical knowledge and skills, their communication skills, and the quality and range of items or equipment at their disposal.

In additional to these five key indicators, the following points highlight the essential elements of delivering an effective clinical veterinary service. They should all be considered when planning an animal health intervention:

- It is important to understand and clarify the roles of various public and private-sector service providers and to recognize the potential for private-public partnerships.
- Private animal health workers will generally provide "front-line" (or primary) clinical care and approved vaccination services. Public-sector veterinarians supervise and support primary care service providers. Certain notifiable diseases (normally serious

zoonotic or epizootic diseases) may remain within the control of the veterinary authorities. It is important that primary care providers are aware of what diseases are notifiable in their areas.
- Newly established systems must support and develop existing primary service providers.
- There must be an understanding by all parties – from the community to the government – that initial services are designed to meet the immediate crisis but are expected to evolve into sustainable services in the longer term.

Ideally, the assessment team will be multidisciplinary and transdisciplinary, rather than purely veterinary, and include representatives from all the involved agencies, with special emphasis of gender balance. Experience and knowledge of the livelihood systems of the target population is essential and the team should also have experience in the use of participatory assessment methods and, if possible, participatory epidemiology, for understanding the disease situation.

The assessment team needs to establish its scope, objectives, priorities and operational arrangements. Responsibilities of individual members need to be clarified, as do the assessment tools to be used and the reporting formats. The team will need to assess the risks of the proposed interventions and resolve outstanding issues, such as providing free or subsidized services and how to support existing service providers.

The team should collect information through several sources, including: primary and secondary literature (often referred to as "grey" literature such as unpublished reports); results of local disease surveillance programmes; clinic and laboratory records; livestock owners; veterinarians and veterinary para-professionals; local government officials and community leaders.

Where possible, local community representatives should be involved in the assessment process. They are likely to have valuable knowledge, experiences and opinions; for example, poorer households may keep goats, sheep and poultry, while wealthier households may own camels, buffalo, cattle and horses. Women and children may be more aware of diseases in small stock (poultry, rabbits), small ruminants (sheep, goats) and donkeys, which they manage, while men may be better sources of information on the larger animals (cattle, camels, buffalo, etc.). It is important that the assessment team shares its findings with the community and government.

Information to be collected

- The context:
  - physical boundaries of the affected area;
  - estimates of total and affected livestock population (by species, sex and age groups);
  - identification of key stakeholders and decision-makers, including government authorities and services, community leaders, private stakeholders (service providers).
- Severity of the crisis:
  - general condition of the animals;
  - livestock morbidity and mortality rates.
- Known and potential animal health threats:
  - injuries resulting from the emergency;

  - infectious bacterial and viral diseases;
  - non-infectious diseases (nutritional and reproductive disorders, toxicity and poisoning, wounds, heat stress, etc.);
  - internal parasites (worms) and external ones (ticks, mites, etc.);
  - seasonal disease patterns;
  - geographical areas that present specific disease risks;
  - local (coping) strategies for controlling and preventing diseases.
- Profiles of affected communities, including vulnerable groups:
  - household size and composition;
  - average livestock holdings (numbers and species);
  - accessible and available animal health services;
  - affordability of local animal health services;
  - access to other livestock needs (food, water, shelter);
  - identification of vulnerable groups who cannot afford available services;
  - particular groups of households or animals that need specific help – women-headed households, people living with HIV/AIDS, poor, vulnerable families.
- Resources available:
  - numbers and distribution of veterinarians and veterinary para-professionals, veterinary pharmacies, holding grounds, markets, etc.;
  - distances and condition of the roads (are the roads passable and/or safe);
  - availability of animal health service providers, private and public, and their coverage of the affected area;
  - the type of services they provide - before and after the crisis;
  - affordability of the services for all sectors of the affected population;
  - ability of service providers to move around their areas without additional assistance;
  - safety of the area for animal health workers carrying drugs and money;
  - availability of veterinary supplies (vaccines, antibiotics, etc.) and their accessibility by animal health workers;
  - availability of an effective cold chain for vaccine delivery.
- Previous experience of animal health interventions including:
  - lessons learned – successful and unsuccessful;
  - practicality and appropriateness of previous targeting initiatives;
  - roles and responsibilities, including those of the community;
  - vaccinations and treatments undertaken, drugs procured and disbursed;
  - impact assessments and evaluations of previous interventions.

Known and potential animal health threats

A thorough understanding of the normal animal diseases situation in a disaster area is essential for planning an effective response during an emergency. The following sources can help identify the priority animal diseases:

- Livestock owners often have knowledge of the diseases their animals face and, particularly in pastoral communities, an understanding of disease epidemiology.
- Local knowledge can also help highlight diseases that may pose a particularly high risk in a specific period.

- Local government and private-sector veterinarians and veterinary para-professionals should be involved in such consultations, as they have experience and background knowledge of the area.
- Information can be cross-checked against veterinary department records, private veterinary pharmacy sales records, discussions with pharmacy staff and agency reports.

Availability of animal health service providers

An assessment should identify gaps in services, for example, where more veterinarians and veterinary para-professionals need to be trained and deployed. The number of veterinarians or veterinary para-professionals required will depend on:

- the number and distribution of livestock in a given area;
- the topography – how difficult it is for a service provider to move around;
- livestock movements (husbandry practices) and how they have been affected by the emergency;
- the type and coverage of the animal health interventions being proposed.

Accessibility of veterinary services

- The disaster may have damaged roads, restricting the movement of service providers, livestock and their owners. An agency may then have to consider using alternative transport such as boats or even planes to help providers move around. Motorcycles, bicycles, donkeys, mules and even camels can provide cheap ways of reaching isolated areas, and may need to be provided to speed up response. They should be supplied on a credit or subsidized basis wherever possible rather than as free handouts. If pack animals are used, welfare considerations must be taken into account to ensure that animals are properly cared for and not exploited. Key factors in ensuring good welfare of pack animals include providing sufficient feed and water, appropriate equipment and padding, allowing the animals sufficient periods of rest and ensuring that injured, unwell, weak and pregnant animals are not used.
- Animal health service providers and pharmacists may not be able to access their normal suppliers, so veterinary medicines and equipment may have to be brought to them. Obviously, using boats and planes incurs high logistical and operational costs, and should be thoroughly assessed before they are used. There may be opportunities to share transport costs with other agencies providing different services.

Design considerations

When designing animal health interventions, it is important to bear in mind the following:

- Are the **objectives** and expected results/outcomes of the proposed interventions fully understood and based on sound scientific evidence and knowledge of the local animal health environment?
- **Flexibility** is essential, as is **timing**. Flexibility is needed to respond quickly to changing local circumstances (seasons, new disease outbreaks), including the ability to switch funds into alternative interventions.
- Even where there is a clear need for an animal health intervention, the question has to be asked, "Is it **feasible** in the prevailing, evolving conditions?"

- Invariably the public veterinary services will be involved in any animal health intervention in some way, and there may be other agencies also operating similar programmes: harmonization and **coordination** are therefore essential.
- The success of an animal health intervention depends largely on how well the **private-sector service providers** are integrated and involved in the programme. The worst-case scenarios are those where donor interventions actively discriminate and compete against the local animal health service providers through free or highly subsidized drugs and services.
- Consideration should be given to how the programme will end its operations by providing an **exit strategy**. Beneficiaries and local stakeholders need to know how long support will be provided. Sustainability of services needs to be thought through.
- Regular **monitoring** of the changing animal health situation is essential to allow programmes to respond effectively to changing circumstances.

The scale of an intervention depends on the extent of the disaster and the number of affected people and livestock, the available services (private and public) and their capacity to cope with the situation, the prevalent diseases, and the financial, technical, logistical and operational capacity of the implementing agencies. Also, it is not uncommon for conflict, flood or drought situations to trigger large movements of people and animals. This can result in a concentration of people and livestock in *ad hoc* or designated displacement camps.

National veterinary policies

It is important that national veterinary policies are fully understood and complied with by all agencies. For example:

- the type of services that the different cadres of veterinarians and veterinary para-professionals can provide, fees for services, and control of diseases that are private- or public-sector goods;
- national standards, such as a uniform curriculum for training of veterinary para-professionals ;
- split responsibilities between public and private veterinary service suppliers, in particular in the field of provision of vaccines for specific diseases.

Sustainable service delivery

A veterinary intervention must have the capacity to support the continuation of existing services, or allow the development of long-term services, by identifying private- and public-service roles, and options for private-public partnerships. There must be understanding at all levels – from the community to agencies and government – that initial services are designed for the immediate crisis, and should evolve into sustainable services.

Diseases to be covered by the private sector must be identified, along with the public sector's role in supervising and supporting primary service providers. Which vaccinations are to be provided by which sector, and who leads strategic vaccination campaigns? Veterinarians and veterinary para-professionals reporting and disease surveillance requirements should be identified, as well as means of subcontracting veterinarians and veterinary para-professionals during vaccination campaigns and for disease surveillance activities.

Stakeholders

All animal health-based emergency interventions are dependent to some extent on the availability of local support services, not just veterinarians, but also veterinary para-professionals, livestock traders and feed suppliers, etc. It is important that an intervention's requirements for support services are determined and the actual availability and quality of such services adequately assessed. It is equally important that any intervention supports and builds the capacity of local service providers, whether from the government or private sector, rather than competes with them. Specific support services that may be relevant to an animal health intervention include:

- qualified veterinarians and meat inspectors (public or private);
- approved veterinary para-professionals (including CAHWs);
- veterinary pharmacies;
- diagnostic laboratories;
- livestock extension agents;
- experienced slaughterers, butchers, hides and skins processors;
- livestock traders and brokers;
- feed suppliers;
- relevant local NGOs or CBOs (community organizations).

The capacities of various stakeholders need to be recognized and, where appropriate, their strengths used to support the programme. For example, NGOs specializing in animal health can advise and assist government and multi-sectoral development agencies, and can take a key role in any coordination mechanism. Such agencies can also take a lead role at the assessment stage, as they are likely to have technically experienced staff familiar with the local service providers, the disease situation and the procurement of medicines and vaccines. Government veterinary staff will also have experience of dealing with local emergencies and have valuable local knowledge.

Services provided by Community Animal Health Workers (CAHWs)

As previously mentioned, CAHWs are of relevance in many countries in areas where public and private veterinary services either do not exist or are not accessible to the majority of livestock owners. In emergencies, their services can be crucial to a relief programme. Note that recommendations made in this publication on the role and responsibilities of CAHWs are only applicable in countries where the status of CAHWs is recognized by relevant authorities.

Quality of service

To determine and ensure the quality of services provided by CAHWs, the following points need considering:

- Capacity:
  - The capacities of existing and new CAHWs to provide an adequate service should be developed through short training courses as required, ensuring that training is tailored to the animal species in the target communities.
  - In some situations, it may be appropriate to train more women as CAHWs so as to allow women livestock owners easier access to services – although security and

protection issues need to be considered. This is particularly relevant for livestock usually managed by women – poultry, sheep, goats and donkeys.
  - CAHWs may need training in wound care and injuries related to a specific disaster, as well as in any priority diseases, treatment regimes, and vaccination protocols.
- Access to drugs and facilities:
  - Quality drugs must be available and accessible to CAHWs – external implementing agencies may have to support the provision of drugs and vaccines or support local private pharmacies to access supplies.
  - A functioning cold chain which can be maintained in crisis is required – local cold-chain facilities for human medicines have often been shared where veterinary ones do not exist.
- Supervision:
  - Qualified veterinary oversight must be available to support CAHWs either through the state veterinary department or through a local private veterinarian. In the absence of this requirement, or if local veterinary services are stretched, implementing agencies will need to have their veterinary/animal health personnel take on this role.
- Disease surveillance:
  - Disease surveillance and CAHW reporting systems should be assessed, and a support package developed if necessary.
  - CAHWs need to be trained to use reporting forms. Picture forms can be used if CAHWs are illiterate.
  - There should be a system for submitting reports, as well as analysing and collating data.
  - Disease information must be shared and disseminated to livestock owners, service providers, local and national government departments, implementing agencies and any emergency coordination structures.

CAHW training

Specific considerations should include:

- Training requires experienced veterinary trainers with skills in participatory training techniques and an understanding of community-based animal health systems and local livelihood systems.
- CAHWs need regular refresher training, which may be an opportunity to help them to deal with a particular crisis.
- If local private or government veterinarians have been providing training, agencies should work with them to avoid duplication.
- The relationship between CAHWs and veterinarians, both private and public, is a crucial link in the service supply system and can be strengthened through training courses.
- An implementing agency may assist with course design to ensure that priority and high-risk diseases are covered, including treatment and vaccination protocols; to support the use of appropriate adult learning techniques; and to help organize training under difficult conditions.
- Training should target prioritized and potential high-risk diseases in the key local livestock species, treatments and vaccinations, quality veterinary supplies and pricing, reporting formats, and disease surveillance.

- Often CAHW training focuses on cattle, sheep and goats as these are considered to be the predominant livestock. Poultry, (chickens, ducks, guinea fowls, turkeys, etc.), pigs, equids, camels, buffalo and in some situations small stock such as rabbits and bees can be significant livelihoods assets and training must be tailored to these species too. CAHW trainers must have the appropriate species experience in terms of major diseases, treatment and equipment, and vaccination protocols.
- In an acute emergency, CAHW training may initially target only the immediate major diseases to reduce the training time, with more comprehensive training provided during the post-emergency phase.

Establishing new community-based animal health services

The above points are equally relevant when establishing new community-based animal health services; the emphasis should be on providing a coordinated response. Particular attention should go to:

- Mapping the relevant area to understand community distribution and approximate numbers of livestock species; and mapping the topography and infrastructure to assess the numbers of CAHWs needed.
- Working closely with communities to:
  - Identify the need for CAHW services, and ensure commitment to supporting CAHWs. It can be useful to develop a letter of agreement with communities, with the support of local authorities, detailing the key points of service provision, particularly when some aspects – such as payment for services – are likely to change after the immediate crisis is over.
  - Identify the local livestock species, management systems and priority diseases with their epidemiology.
  - Select competent CAHW trainers (including women).
  - Select CAHW trainees.
- Organize CAHW training (focusing on community-prioritized diseases, the use of drugs, vaccines and equipment, and disease/treatment reporting and surveillance). This may best be done through several short training courses to allow the CAHWs become active quickly.
- Establish a drug supply route, preferably through a private veterinary pharmacy.
- Establish links with the local veterinary department and any private veterinarians to define roles and responsibilities regarding CAHW supervision, support, and reporting requirements.
- Establish, with the government veterinary services, disease reporting systems for surveillance using CAHWs.

Selection and acceptance

- When setting up new CAHW services, it is crucial that the people who use and pay for them have a say in who should be their service providers. It is important to be aware of any minority or disenfranchised sections of the community that risk being excluded from the decision-making process. Selecting CAHWs can be challenging, especially during an emergency when time is scarce. In such cases, the implementing agency, in

consultation with local leaders, the local administration and the local veterinary department, may have to make a choice based on more limited community involvement. While this is not ideal, it does enable services to be available as soon as possible.

National disease surveillance systems

An effective coordination mechanism can speed up the flow of information from existing disease surveillance systems and can quickly raise the alert on potential disease threats and assess the likely area affected. On the other hand, national surveillance systems can themselves be disrupted by disasters, or they may lack the resources necessary to reach remote areas.

In an emergency situation, it is important that the public sector and implementing agencies apply the same surveillance criteria and that they involve private primary service providers such as veterinarians themselves, CAHWs and other veterinary para-professionals. The latter are in constant contact with their communities, which allows them to provide timely information on the local disease situation. Remuneration of CAHWs for disease reporting should also be considered.

Vaccination and treatment campaigns

Bringing together large numbers of animals for a campaign can increase disease transmission rates so that a system for reducing this risk should be set up.

Welfare aspects must also be considered with mass medication and vaccination campaigns. Equids, in particular, need careful handling as they should not be crowded closely together due to the risk of injury. Horses are also prone to injection-site abscesses, especially if the vaccinators are not used to dealing with this species. The benefits of vaccination for equids should be weighed against such considerations, as well as the stress caused to the animals and the potential for injuries if large numbers are brought together.

Vaccination campaigns

Mass vaccination campaigns are reasonably easy to design and implement and have been popular with donors, governments and implementing agencies which regard them as "action-oriented", though evidence of their impact on livelihoods is currently limited. Vaccination can be a cost-effective way of safeguarding livestock as part of a well-designed disease prevention programme (see the **Impact assessment** section for more information). As previously mentioned, it should not be assumed that a disaster will automatically lead to an increase in any particular disease or disease risk to livestock. Indeed, the impact of the disaster on livestock needs to be assessed before these risks can be fully understood.

Incorrect timing of vaccination, failure to follow vaccination protocols, using inappropriate vaccines and low vaccination coverage will all result in failure to meet the campaign objectives. Implementers (government and/or agencies) are encouraged to be proactive and focus on ensuring that vaccination takes place in the appropriate season to build sufficient immunity. Vaccination itself may not be an effective response where animals are stressed and weakened.

The choice of vaccine(s) will depend on geographical area, species to be vaccinated and the epidemiology of the disease. For example, disease serotypes (strains) need to be known to ensure that the appropriate type of vaccine is used. AHS alone has nine serotypes and there are several vaccines targeting the different strains. The choice of vaccines should therefore be left to specialists.

The key points to consider with regard to effective vaccination include the following (adapted from the *National Guidelines for Livestock Relief Interventions in Pastoralist Areas of Ethiopia*, Federal Democratic Republic of Ethiopia, Ministry of Agriculture and Rural Development, 2008):

- ***Vaccine composition:*** *Vaccine efficacy will depend on the identification of local field isolates and their inclusion in the vaccine (e.g. AHS, various forms of bovine and ovine pasteurellosis). The composition of vaccines must be checked with the suppliers to ensure that they are appropriate for the disease and geographical area of operation.*
- ***Vaccine efficacy:*** *OIE and FAO guidelines and peer-reviewed literature should be consulted when assessing specific vaccine efficacy. It is not enough to rely on vaccine producers' own laboratory data.*
- ***Vaccination protocols:*** *The level and duration of immunity will vary according to the vaccine, the number of doses given per animal and the timing of the vaccinations. For example, the anthrax vaccine (based on Sterne's spore vaccine) is a live vaccine and a single dose provides immunity for up to 12 months, whereas the inactive ovine pasteurellosis vaccine, if correctly prepared, requires two doses administered four weeks apart – there is little evidence to indicate that a single dose provides immunity.*
- ***Timing of vaccination:*** *For most diseases, vaccination must be carried out before mortality and morbidity peak in a herd, otherwise it is unlikely to reduce the effects of the disease. In many areas, disease outbreaks can be predicted, to a certain extent, based on seasonality and environmental conditions. It is therefore important to ensure that animals are vaccinated with the correct vaccine and protocol, and that a high proportion of the animals in a herd are covered before high-risk periods, to reduce the impact of an outbreak.*
- ***Disease control policy:*** *Diseases in OIE's list A should be included in national disease control programmes. Other diseases, such as clostridial disease, can be considered as a private good, and these vaccines should be delivered by the private sector.*

The World Organisation for Animal Health (OIE) regularly updates a list of diseases that are considered notifiable.[22] Official information on the occurrence of the OIE-listed diseases in the different countries and regions can be obtained from the OIE website. Control of these epizootic diseases is usually a public-sector (government veterinary service) responsibility, although the private service providers are often subcontracted to provide front-line services. As such, the control of epizootic diseases will often be put forward as a high priority for emergency intervention by government services, which are often strapped for cash and equipment.

When selecting diseases to be targeted by vaccination campaigns, other diseases that are not covered by the OIE list but might be relevant for livestock in the local setting should also be considered.

It is important to understand the distinction between disease control and prevention programmes, and emergency animal health interventions. Control and prevention usually involves mass vaccination campaigns against specific endemic and infectious diseases,

[22] A notifiable disease is any disease that is required by law to be reported to government authorities. The collation of information allows the authorities to monitor the disease, and provides early warning of possible outbreaks.

based on a thorough understanding of the epidemiology of the disease. The success of such programmes requires a certain critical mass (percentage) of the susceptible animal population to be vaccinated. Most emergency animal health interventions, however, do not attempt the broader control or prevention of specific diseases – the aim is to ensure the survival of affected animals though the provision of clinical animal health services. In such situations, vaccinating a smaller number of animals may be justified by the protection afforded to them and the livelihoods they support.

Mass medication campaigns

These types of campaigns frequently focus on treating internal (worms) and external parasites (e.g. ticks, mites). It is normal for livestock to carry a variety of internal and external parasites. The impact of parasites on health and productivity varies from no impact to severe clinical signs. The development cycle of parasites is seasonal, and parasite burdens and their potential impact, vary accordingly. Certain age groups and species are more sensitive to parasites. Gastrointestinal parasites, for example, are more likely to cause problems for young animals than adults since animals develop immunity to these parasites as they mature. Some emergency situations, such as extreme cold or lack of feed, may affect the immune status of animals, making them more vulnerable to parasite infestations. However, during an emergency, it is highly unlikely that there will be any information on parasite burdens or their impact on productivity or mortality. In such cases the knowledge of livestock owners on the impact of parasite infestations and their seasonality will help prioritize the veterinary support needed.

Dosing protocols must be adhered to since under-dosing can lead to parasite resistance. Information on local parasite resistance to specific medicines must also be sought.

Medicine and equipment procurement

Both the private sector and government veterinary departments have their own procurement systems, but in times of crisis and high demand they may be overstretched, just at the time when fast and effective procurement is essential. It is important therefore to assess which agency is best placed to do the job. There may be international agencies or NGOs which have well-established veterinary procurement systems and could take responsibility for vaccine and/or medicine supply while working closely with the government and private vet service providers. Key to effective procurement is the distribution system and adequate storage facilities.

Certain vaccines and medicines will not be available in-country and, particularly in slow-onset emergencies or with seasonal climatic events such as heavy rain, potential disease threats need to be identified early on to ensure timely supply of medicines. An example of this is Rift Valley Fever (RFV) outbreaks which frequently occur with seasonal heavy rain and warm temperatures.

Providing quality-assured biologicals and pharmaceuticals

Fake, poor-quality or poorly manufactured pharmaceuticals and biologicals are readily available in some countries. These range from generic products that have not undergone quality assurance, through products that have been adulterated or diluted, to completely false products that resemble the genuine article only in colour or label.

International pharmaceutical companies and their subsidiaries usually market their products through recognized local agents. These products have codes and batch numbers that can be cross-checked with the company, while labels bear specific details that distinguish them from forgeries. Reputable companies always provide details of their manufacturing practices as well as quality assurance for each product.

In many countries, local companies also produce significant numbers of the more commonly used animal and human health medicines. These are often of high quality, but care should be taken that they are bought only from the source or accredited agents. Buyers should insist on seeing quality control data, especially in an emergency when veterinarians rarely have the time or the facilities to carry out independent quality assurance on locally obtained drugs. Some veterinary drugs, such as those used to prevent trypanosomosis, are very specialized and may be obtained from a very few legal sources.

Standard supplies

Service providers will require supplies of the basic medicines and equipment to allow them to do their work. In some circumstances a veterinary drug supply chain may need to be established and, in the short term, procurement is usually part of the external intervention. The long-term goal should be to support the development of an effective supply chain delivering reputable, affordable, quality veterinary medicines. If local veterinary pharmacies are operating, they should be supported to ensure adequate essential supplies are available.

To help with the rapid start-up of the programme, consideration could be given to providing initial medicines and equipment to CAHWs through local pharmacies, either on credit or at subsidized rates (with the agency covering the subsidy). Further supplies should be provided at full cost. Annexes 2A and 2B provides suggested medicines and equipment for different species that are appropriate for CAHW kits.

Vaccines – procurement and management

Vaccines against prevalent diseases such as anthrax, blackquarter, Newcastle disease and enterotoxaemia are available and of good quality in many countries. They can be purchased locally if supported by good quality assurance and the approval of local veterinary expertise. Other vaccines need to be produced in specialized laboratories which are only present in relatively few countries. Examples include those against peste des petits ruminants (PPR), RVF, sheep and goat pox, lumpy skin disease, contagious pleuropneumonia in cattle and goats and haemorrhagic septicaemia (HS). Details of recommended vaccines and their suppliers for all the major diseases are given in the OIE ***Manual of Diagnostic Tests and Vaccines for Terrestrial Animals.***

Some governments allow private veterinary service providers to buy and use vaccines to control specific diseases, whereas others control the complete vaccine supply chain from procurement to delivery. In the event of high demand, governments may benefit from external support with procurement. Where certain vaccines are available through the private sector, its ability to supply, store and transport reliable vaccines correctly and in sufficient quantities should be assessed. Where government is absent or unable to undertake procurement, the lead implementing agency should be appointed to play this role.

Vaccine cold chain

This is the system used to ensure that vaccines are maintained at the correct temperature from manufacture to injection (most vaccines need to be kept at between + 2 and + 8 ˚C). This can be achieved through a system of fridges, cold boxes and vaccine carriers, but it also requires correct handling by users. Like all medicines, vaccines have expiry dates, and excessive heat and exposure to sunlight will affect their potency, rendering them useless. Each vaccine has specific standards and guidelines for usage which should be strictly adhered to.

Cost-effectiveness

When designing the intervention, looking at the associated opportunity costs and asking if the funds could be used more effectively elsewhere can be helpful to ensure the best use of money. An economic assessment should look at the costs of the intervention compared to the expected economic impact on the target households. The following scenarios might be compared at this stage to assess how available finances could best be used:

- supporting the development of locally based, private primary clinical services;
- providing free or subsidized services to affected households;
- supporting free mass vaccination and treatment campaigns;
- supporting state veterinary services.

From an economic perspective, interventions should concentrate on supporting or establishing primary clinical services to benefit a greater number of households, with the proviso that vulnerable households are supported through vouchers or subsidized services if necessary. Supporting public-sector services, such as euthanasia, carcass disposal and maintaining public health also benefits a wider population. In chronic and slow-developing emergencies, support to government can be extended to include disease surveillance and timely vaccination campaigns.

Providing free or subsidized animal health services is likely to benefit a fairly small group of households, and the costs can be high (drug purchase, transport, veterinary services etc.).

Linking animal health to other emergency interventions

Although animal health services may help livestock recovery and improve post-emergency survival, the success of an intervention also depends on livestock having access to basic needs such as food, water and, in certain climates, shelter. Agencies must be aware of these needs and identify ways of meeting them by:

- encouraging experimentation with different types of locally available feeds (e.g. seed pods, agricultural and industrial by-products, etc.);
- linking livestock owners to private feed suppliers;
- supporting community rehabilitation of water points (during drought);
- where absolutely necessary, organizing emergency feed supplies and/or bringing water in tankers.

Marketing, or commercial destocking, can be linked successfully to animal health service support, especially in slow-onset emergencies where markets are available and people have time to reduce their herd sizes in line with declining pasture and water. The income generated from sales can help pay for veterinary services for the remaining animals. Animal

health services also need to support livestock provision activities. Livestock provided to beneficiaries must be certified as healthy and with the appropriate protection – vaccinations, etc. – and beneficiaries must also have access to acceptable and affordable animal health services.

Environmental concerns

Concern may be raised regarding the potential increase in livestock numbers resulting from improvements in animal health, and its consequent impact on natural resources through overgrazing and competition for limited water, etc. This is a valid concern, especially in settled livestock-owning communities. But in normal times, there is little evidence of it being a problem in pastoral and agropastoral areas where people and their animals are free to move to seasonal grazing areas. Emergencies or conflict may restrict or prevent such movement, however, e.g. when people and their animals are confined to displacement camps. In such situations, the impact of any animal health intervention needs to be carefully assessed. The various destocking options (Chapter 4) could provide a way of balancing livestock numbers if conducted alongside animal health interventions.

Risk assessment

All livestock emergency interventions have inherent risks and consequences and it is important that these are, as far as possible, foreseen and assessed. For an animal health programme, potential risks are listed in Table 7.

IMPLEMENTATION

Once the type and scale of the intervention have been decided, the roles and responsibilities of the state veterinary authorities, private service providers, the lead coordinating agency and other implementing agencies should be defined and agreed. Some of the more technical issues mentioned earlier are covered in greater detail in this section.

Coordination and involvement

Establishing an animal health team/committee

One of the first tasks is to establish an animal health team or committee. A multi-disciplinary/multi agency animal health committee is best placed to oversee specific veterinary programmes. Apart from veterinarians (public and private), membership of the committee should include others directly involved, such as: local administrators, livestock experts, local livestock traders and farmer/herder representatives from the targeted communities, and implementing agency technical staff. This committee should meet regularly so that it can start operations quickly and respond efficiently and effectively to issues as they arise. Minutes of all meetings should be kept as a valuable record for subsequent reviews and evaluations. The government veterinary department should chair the committee if possible.

It is important that the members of the team spend adequate time getting to know each other, discussing the preferred options, agreeing on working arrangements and resolving logistical issues. This will allow them to present a clear and consistent message to the target community. Topics that can be discussed during the initial planning meetings include:

TABLE 7
Risks and mitigation for veterinary support

Risk	Mitigation
Disruption and undermining of local private service providers	**Ensure** that the private-sector service providers are beneficiaries through subcontracting agreements. Avoid free or subsidised services if possible
Inadvertently, larger herd owners benefit much more than vulnerable households	**Ensure** greater attention to selection criteria and targeting in the beneficiary selection process, e.g. use of veterinary vouchers
Competition between agencies offering similar animal health services but applying different conditions	**Ensure** proper collaboration between implementing agencies
Embarking on treatments/vaccination campaigns without sufficient epidemiological evidence	**Ensure** that sound epidemiological information is gathered, using local knowledge and other recognized means to inform decision making
Risk of environmental degradation (overgrazing) through maintaining unsustainably large herds	**Ensure** greater attention in selecting interventions, especially in settled farming communities, e.g. destocking
Procurement of large quantities of unnecessary drugs and/or vaccines, sometimes of questionable quality	**Check** actual requirements and purchase from reputable suppliers
Potential for private-sector opportunism and racketeering	**Ensure** adequate supervision and monitoring
Inflexible design and funding unable to respond to changing circumstances	**Ensure** programme design is pragmatic and flexible, based on locally prioritized needs
Evaluation and impact assessments compromised by poor programme design, lack of assessment criteria and baseline data	**Ensure** valuation and impact assessment is an integral component of the programme's design

- the role of livestock in the affected community;
- a review of the scale of the problem: number and species of animals, households and communities affected;
- the scale of the project – what can be achieved with available funds;
- what are the key animal health issues and how will they be addressed;
- a profile of the project's beneficiaries;
- gender roles in livestock management;
- formal and informal veterinary/animal health arrangements;
- understanding the pros and cons of the different animal health options;
- relationships among key local stakeholders;
- logistical and operational issues that need to be resolved;
- how monitoring and evaluation considerations will be handled;
- how the team will operate, with individual and group responsibilities clearly defined.

Local site committees

In addition, local committees should be established at each site (a contiguous area that could be a village, council area or even the district) where the services will be carried out. This is to allow community leaders, beneficiary representatives, local councillors and local service providers to meet regularly with the programme implementers to provide feedback, raise concerns and resolve disputes.

Selecting beneficiaries

The aim of supporting animal health services is to ensure that all livestock owners affected by the emergency have access to quality, affordable and relevant services. Payment for services is recognized as an essential element of any sustainable primary clinical veterinary service. It can be anticipated that substantial numbers in the target population will be able to pay if the services are available. However, some groups will not, and they need to be identified. The selection criteria need to be clear, unambiguous and available for all to see. They may include:

- female and child-headed households;
- HIV/AIDS-affected households;
- elderly people with no family support;
- disabled people with no income-generating activity;
- households below the accepted poverty line.

The respective communities will be valuable sources of information for identifying these groups, along with local leaders, and government and NGO staff with experience of working with those communities. Any recent vulnerability assessments will also be valuable.

When deciding which groups to support, it is important to be aware of the potential for local conflict if certain communities perceive that they are being overlooked. Beneficiary communities can become the target of livestock raiding, destruction of local service facilities and looting of veterinary medicines and equipment. Understanding the social dynamics of the communities can help design programmes that promote good relations among different communities.

Involving the private veterinary sector

When considering any system that delivers veterinary services, care should be taken to avoid undermining existing services, especially if they are viable and sustainable. Private operators could be supported, with additional help if necessary, to cope with a crisis, regardless of whether they are veterinarians, veterinary technicians, animal health workers or suppliers of veterinary medicines and equipment. Good relationships should be fostered and maintained with these private service providers and with local government animal health staff – they provide a crucial link to affected communities. They also have in-depth knowledge of community needs and the challenges involved in meeting them. Activities and areas where additional support may be needed include:

- identifying gaps in service provision – even if private providers have been operating, they may themselves be victims of the disaster (e.g. floods or earthquakes);
- identifying priority animal health needs, including seasonal diseases and high-risk diseases linked to the crisis;
- setting up voucher systems or subsidized services to help the more vulnerable groups access animal health services;
- maintaining vaccine cold chains;
- helping transport private providers to isolated communities;
- helping with the procurement and transport of medicines, vaccines and equipment to private service providers.

Affordability and cost recovery

Affordability

Whether supporting an existing private service system or establishing a new one, payment for services is the main element in ensuring a system's long-term sustainability. Free drugs supplied during emergencies by government and other agencies seriously undermine attempts to support private enterprise.

Private service providers may use different systems for charging, but in every case the provider needs to make a profit. In the most common pricing system, providers add a mark-up to the drugs they buy, and the livestock owners pay for treatment at the higher price. Some services, such as minor surgical procedures – castrations, dehorning – and wound treatment are charged per animal or group of animals, depending on the particular procedure. Some providers may need help with setting fair and acceptable prices and profit levels, and with discussing their payments and pricing with their communities.

Voucher systems for animal health services

Voucher systems[23] provide vulnerable households with access to animal health services. The rationale for using such systems is to:

- offer additional support and custom for existing animal health service providers;
- avoid undermining existing veterinary drug traders;
- ensure that vouchers are safer to carry than cash;
- make certain that medicines bought with vouchers are adapted to local needs and diseases;
- reduce the risk of poor-quality drugs being purchased;
- support the private sector through drug purchase.

Cash-transfer programmes have provided useful lessons that should be considered by implementers. Examples are:

- Programmes to create community awareness of the aims of a voucher system are essential. Communities must understand that these are short-term measures in response to a specific crisis.
- Beneficiary selection is difficult; it needs time and is best done in open consultations with the community.
- Adequate discussion and agreement with all stakeholders is needed on the aim, modalities, responsibilities, drugs to be included, and any training needs for veterinarians, veterinary para-professionals and livestock owners (e.g. training in the use of vouchers or drugs). In the case of livestock owners this would be for uncontrolled drugs such as anthelmintics.
- The associated veterinary pharmacists must keep good records of voucher redemption and of the drugs sold/given to veterinary and para-veterinary personnel and directly to livestock owners to allow full reimbursement.
- Monitoring the number of animals treated can be challenging as treatment is sometimes given by owners, especially for parasite control.
- A voucher system can also be good business for private veterinary pharmacists, private

[23] See Chapter 3 (Cash Transfers) for more information on vouchers.

veterinarians and veterinary para-professionals (e.g. CAHWs), who can make a profit, promote their businesses and reinforce their roles as community service providers.
- A voucher system establishes links between the veterinary and para-veterinary personnel and veterinary pharmacies for future drug supplies and support.
- It can be an opportunity for private veterinarians to establish themselves as CAHW trainers, or to train livestock owners, for which they should be remunerated.
- Systems should support application of controlled drugs - such as antibiotics - by veterinarians or authorized veterinary para-professionals rather than allowing livestock owners to administer them. This might be done by subsidizing such treatments, while providing vouchers for uncontrolled drugs such as anthelmintics.

Euthanasia/emergency slaughter for disposal

During an emergency there may be animals requiring euthanasia on welfare grounds, e.g. severely injured or debilitated livestock. The euthanasia method used needs to be discussed with the local stakeholders (community, veterinary workers, veterinary department and local authorities) as there are often local beliefs and sensitivities around this issue. Methods must be humane and based on sound animal welfare principles, and undertaken under veterinary supervision. National guidelines on euthanasia should also be consulted. If drugs licensed for euthanasia are used, care must be taken with disposal of carcasses to avoid scavenging animals ingesting the drugs or contaminating the environment.

Carcass disposal

Whatever the emergency, it is likely that animal carcasses will need to be disposed of and an appropriate system needs to be in place.

In ideal conditions, carcasses which need to be disposed of are transported to a designated site that is well protected and away from people and scavengers. Generally speaking, carcasses should be properly disposed of as soon as possible to reduce health risks to human and animal populations. If weather conditions allow and the threats to human health are considered minimal, carcasses may be left to dry in the sun for several days before being either burned or buried. There are five main methods of carcass disposal: burial, incineration, composting, rendering and alkaline hydrolysis. As the latter two require structures that are usually not present in targeted areas and settings, these are not covered in further detail. It is recommended though that in case carcass disposal needs to be organized, common disposal practices should be assessed. In case proper structures (e.g. rendering plants) are in place, these should be used or reactivated.

The main challenge associated with the disposal of carcasses in the context of a livestock emergency is site selection. Factors to consider include:

- geological traits of the area: soil properties (texture, permeability, surface fragments, depth to water table, depth to bedrock); slope or topography; hydrological properties; proximity to water bodies, wells, public areas, roadways, dwellings, residences, municipalities, or property lines;
- nature and amount of material for disposal;
- gaining official permission;
- availability of sites for burial or cremation adjacent to the slaughter site;
- availability of transport means for carcasses;

- accessibility, if lorries are to be used for transport;
- weather conditions (e.g. prevailing wind, rain, frozen ground);
- availability of labour/earthmoving equipment;
- future uses of the area.

Full details of the disposal methods listed above are covered in Annex 2D.

NOTES ON MONITORING, EVALUATION AND IMPACT ASSESSMENT

Monitoring and evaluation of veterinary support interventions in an emergency

Different aspects of animal health interventions can be monitored and evaluated, but under emergency conditions monitoring and evaluation can be challenging and implementers must be realistic about what can be achieved. The aspects that can be monitored and evaluated include:

- the numbers of animals, by species, treated for a specific disease/condition over the course of one month, relative to the overall population at risk;
- the quantities of drugs sold by a veterinary pharmacy, by product type, and the main clients (veterinarians, veterinary para-professionals, livestock owners);
- the numbers of animals vaccinated, by species and disease, relative to the population at risk;
- the quantities of vaccine used (from government, NGO and pharmacy records);
- the geographical and herd coverage of the veterinary services per month.

This type of information can provide a picture of the disease incidence level, priority diseases, new diseases, and disease outbreaks where additional control measures are required through government and/or agency support. The extent of service coverage in terms of species and geography can also be assessed to help identify any possible bias in provision. Service providers' reports can be cross-checked against the quantities of drugs and vaccines sold – significant discrepancies may indicate recording and reporting problems, incorrect dosing or inappropriate sales (e.g. on the black market). The reporting systems, and the quality and frequency of reporting should also be monitored to assess the accuracy and quality of information. Disease surveillance information from private veterinarians, veterinary para-professionals and government reports can be used to see whether disease outbreaks are being controlled.

Who uses the information?

The information is primarily for use by the state veterinary department and implementing agencies, particularly animal health emergency committees, which should try to analyse information together and then provide feedback to veterinarians, veterinary para-professionals and communities. If a coordination structure exists, monitoring information should be shared at regular coordination meetings. The information will allow implementers to identify training needs among veterinary para-professionals; issues for further discussion with communities and service providers; gaps in the veterinary medicine supply chain; groups that may require particular support (e.g. female-headed households, elderly people, the disabled); areas where more coverage is needed; and new diseases that may require control strategies.

How should M&E be undertaken?

Any service provider involved in the programme, both veterinarians and veterinary para-professionals, should provide the state veterinary department with monthly reports on their activities and the results of reporting can be compiled by the veterinary department. This information can then be fed into an area-wide reporting system, either through the state veterinary department or the coordination mechanism, to establish the coverage of specific diseases and particular disease threats.

For CAHWs in particular, training should cover reporting, whether pictorial or written, and they should be aware of the importance of this work. CAHWs should have access to simple tally sheets for each main disease or condition by species and should practice completing them.

The community should be consulted using participatory assessment tools to understand the clients' perspective on service provision. This can be an involved process, so timing should be carefully assessed – in the immediate post-disaster phase people may be too concerned with other priorities, but once the situation improves it is vital that community views are solicited and systematically recorded.

Veterinary department monthly reports on vaccination, disease outbreaks and disease investigations are another way of monitoring and evaluating, adding to the information provided by the service providers. Reporting must also include information from pre-slaughter examination at slaughter slabs and abattoirs. Meat inspection should also be reported on as it is particularly important for monitoring tuberculosis, internal parasites and generalized systemic diseases. Veterinary health checks at local markets can provide additional information on the disease situation in the area.

Who does the monitoring and evaluating?

M&E is likely to be a joint activity, involving the state, the private sector and implementing agencies in a specific area. Monitoring should be discussed during the initial design phase, when roles and responsibilities are being defined and agreed under a coordination mechanism. Certain agencies may have greater experience in monitoring, and may be able to provide training and support in the design of a monitoring system. M&E of veterinary services requires technical veterinary skills, so agencies should ensure that they have the necessary expertise and participatory assessment skills to monitor effectively.

Impact assessment

Ultimately, the goal of any intervention is to make a positive impact on livelihoods. It is therefore crucial that impact is assessed, so that ongoing interventions can be adjusted and future interventions can be appropriately designed and targeted. When to assess impact depends on the nature of an emergency , but it is most likely to be during the recovery phase, when households have more time and the situation has stabilized. The exception is in situations of chronic conflict, which can stretch over many years, making impact assessments necessary during the emergency phase if security and access conditions allow. Target communities are the key group to involve in the assessment, through community-led discussions using participatory approaches. The impact of service delivery and service delivery agents can also be assessed, using the service delivery indicators of availability, accessibility, quality, affordability, and acceptance of services.

BOX 9

Foot-and-mouth disease vaccination in South Sudan: benefit-cost analysis and livelihoods impact

"The study used participatory epidemiology (PE) methods to estimate the prevalence and mortality of acute and chronic FMD in different age groups of cattle, and the reduction in milk offtake in cows affected by FMD. The benefit–cost of FMD vaccination was 11.5. Losses due to the chronic form of FMD accounted for 28.2% of total FMD losses, indicating that future benefit–cost analyses for FMD control in pastoral and agropastoral areas of Africa need to consider losses caused by chronic disease. Participatory epidemiological methods were also used to assess the importance of milk in the diet of Nuer agropastoralists, and seasonal variations in diet in relation to cattle movements and FMD outbreaks. Marked seasonal variation in diet included a "hunger gap" period during which households were highly dependent on milk as their main source of food. Outbreaks of FMD occurred immediately before this period of milk dependency, with chronic losses extending through this period and affecting human food security. The paper discusses the need and feasibility of mass vaccination and strategic vaccination for FMD in South Sudan. The paper also discusses the value of combining conventional benefit–cost analysis with livelihoods analysis to inform disease control efforts and funding commitments in humanitarian contexts."

Source: Barasa *et al*., Transboundary and Emerging Diseases, 2008

The impact assessment should include a benefit-cost analysis, comparing the costs of different types of intervention and their impact on livestock, for example by looking at the value of animals saved through treatment or mass medication campaigns. Also required is information on reductions in mortality rates to demonstrate the impact of the intervention on livestock as data of the numbers of animals treated or vaccinated are process indicators and do not provide evidence of impact (see Chapter 10 for more detail on Monitoring, Evaluation and Impact Assessment).

An example of a benefit-cost analysis is set out below, based on a foot-and-mouth disease (FMD) vaccination intervention in South Sudan in 2008, when the country had been receiving humanitarian aid for many years due to chronic conflict. As well as demonstrating actual benefit-cost, the study shows how participatory epidemiology can be used to acquire the necessary information for calculating the benefit-cost ratio and for making a livelihoods impact assessment.

Participatory methods can help to identify what groups are not using services and why, as well as the overall quality of the services available. Services may not be being offered for all species of livestock, or people may be unaware that services are available for certain species: for example, people are often surprised that poultry can be treated and vaccinated, and this is also the case for horses, donkeys and mules. Some veterinarians and veterinary para-professionals may be more interested in treating large animals such as cattle and

camels, as the returns may be better, or they may not have been trained to treat other species. Some women may not have access to services if all the service providers are men and cultural norms make it difficult for women to approach them. The monitoring system should be able to pick up such issues, making it possible to adapt the services or provide awareness-raising discussions.

Lessons learned, documentation and sharing are the key to a successful coordinated intervention and to effective responses to future emergency situations. They help less-experienced agencies assess needs and their own internal capacity to implement veterinary interventions. They also provide information to help people working in similar emergencies in other areas to design appropriate interventions.

CHECKLIST

Baseline information

- What phase has the emergency reached?
- What is the prevailing disease situation and the condition of livestock in the affected area?
- What existing local institutions and support services can provide animal health services?
  - Coverage and capacity of private veterinary and para-veterinary services?
  - Coverage, capacity and responsibilities of the public/state veterinary service?
  - Has relevant infrastructure (markets, roads, water and electricity) been adequately defined?

Design considerations

- Have the relevant sections of LEGS been read?
- Is support to animal health services the most appropriate intervention – have alternatives being explored (see LEGS Participatory Response Identification Matrix)?
- Is the scale and scope of the disaster and its animal health implications fully understood?
- Have national, provincial or district disaster response committees been established?
- Will animal health provision be undertaken in conjunction with other interventions?
- What potential partners (government, international or national NGOs, CBOs) are operating in the area?
- Is there scope for collaboration?
- Is there an existing mechanism for public and private animal health providers to work together?
- Is the proposed time-scale realistic?
- Is there sufficient flexibility in the design to divert funds to other activities at short notice, if circumstances change?
- Is there an exit strategy – leaving a sustainable and viable animal health service?
- Have monitoring, evaluation and assessment requirements been taken into account?

Preparation

- Has an animal health team been established – does it have the necessary skills and expertise?
- Have the appropriate animal health options been discussed and agreed upon?

- Has an emergency livestock response committee been established?
- Has the scale (geographical area, number of beneficiaries, number and type of animal treatments) of the intervention been adequately defined?
- Are the expected targets and budgets realistic – is there a time schedule?
- Are the required skills available, especially with para-professionals, or will they need to be trained?
- Are there particular animal health hotspots or major gaps in service provision that can be identified and prioritized?
- Are there any weak links in the proposed activities that can be identified and highlighted?
- Are there ongoing animal health programmes?
- Are the livestock owners (including women) and local institutions/authorities adequately represented?
- Has a needs assessment been undertaken?
- Has the selection of beneficiaries been discussed and agreed with key stakeholders?
- Have the beneficiaries (livestock owners) and key stakeholders (local authorities) been fully informed about the proposed interventions, how they will operate and how they will continue? Have they been fully involved, as far as the context allows, in developing the interventions?
- What species and classes of livestock will be included?
- Has the payment of drugs and services been discussed - how will the vulnerable households be able to access such services, e.g. with vouchers?
- Have local contractual agreements been prepared – are they clear and unambiguous?
- Is there a mechanism in place for resolving disputes?
- Is there a contingency plan should the disaster be shorter or longer than expected?
- Have the monitoring requirements of the programme being adequately covered?
- Have potential risks been adequately assessed?

Supporting animal health services

- Have gaps in service provision been identified?
- Are there capacity (training) issues to be resolved?
- Have the priority animal health needs been identified?
- Are drugs and vaccines readily available in local veterinary pharmacies?
- Is there a functioning cold chain?
- Is there a need for an externally supported medicine supply chain?
- Is the quality of the drugs and vaccines assured?
- Are there opportunities for cost savings – e.g. sharing cold chain facilities?
- Can veterinarians and veterinary para-professionals easily and safely move within their territories?
- Can the most vulnerable individuals access animal health services?
- Is there need for a voucher system? Would it be accessible to the community?
- Is a disease surveillance system envisaged?
- Are reporting mechanisms in place?

Support to public-sector veterinary services

- Have the gaps in service been identified?
- Are there capacity (training) issues to be resolved?
- Are national veterinary and public health policies and regulations fully understood?
- Are mass treatments or vaccinations timely and based on sound epidemiologic evidence?
- Are the linkages between public veterinary authorities and private animal health service providers understood?
- Have requests for large quantities of drugs, vaccines and equipment from public authorities been thoroughly vetted?

Disposal of carcasses

- Can carcasses be moved away from water sources or human settlements immediately and protected from scavengers?
- What is the common method of carcass disposal in the region; are any supporting infrastructures in place?
- Is all necessary information available for selecting the appropriate disposal method?
- Is the proposed disposal method permitted by the authorities and accepted by the community?
- Are means of transport available to roll out disposal in reasonable time?
- Is an appropriate disposal site available, keeping in mind considerations like the environment and vicinity to human settlements?
- Is monitoring in place to assure all carcasses are removed, including if a new wave of mortality occurs during the intervention?
- Is the removal site properly guarded and is the process of disposal supervised?

Chapter 6
Provision of feed

RATIONALE

Adequate nutrition[24] is fundamental to the survival, welfare and productivity of domestic livestock. During emergencies, the type of supplementary feeding required varies depending on the type of livestock involved and the nature of the emergency. Essentially, it involves the provision of extra feed to livestock owners to enable them to meet the current nutritional needs of their animals. Provision of feed also addresses one of the five animal welfare freedoms covered in Chapter 2, *Freedom from hunger and thirst through ready access to fresh water and a diet that can maintain full health and vigour.*

The main objectives of emergency supplementary feeding programmes include:

- **Ensuring the survival of affected livestock**
  This objective simply aims to keep as many livestock as possible alive until the onset of the recovery phase. In the most acute emergency situations, this may be the only realistic aim for a feeding programme.
- **Re-establishing breeding capacity**
  The reproductive capacity of animals which have been underfed for some time is reduced. Females are particularly sensitive and may exhibit disrupted reproductive (oestrus) cycling at relatively low levels of undernutrition. Supplementary feeding programmes that aim to preserve livestock as a livelihoods asset normally put a high priority on breeding females.
- **Re-establishing the capacity to work**
  Draught and pack animals which are undernourished are unlikely to be able to work. In agropastoral and mixed crop-livestock systems, livestock play an important role in providing draught power for tillage and transport. Re-establishing crop production after an emergency may well be dependent on associated draught animals regaining sufficient strength to work. In some emergencies, pack animals are required to deliver emergency supplies to isolated areas where there are no roads, or where roads have been badly damaged. Women in particular use donkeys for transporting food aid, in combination with other household activities.
- **Re-establishing productivity (milk, meat, eggs)**
  As feed resources become scarce the physiology of affected animals changes to direct the limited nutrients consumed towards survival functions. This means that productive outputs can disappear. It can be a particular problem for households which sell these outputs as part of their livelihood strategy.
- **Support for destocking programmes**
  Destocking programmes should normally be implemented as soon as a slow-onset emergency arises. However, this is not always feasible and livestock may already have

[24] See also Chapter 6 of the *Livestock Emergency Guidelines and Standards* (LEGS).

lost substantial body condition when they are destocked. In this situation, short-term supplementary feeding may be required if their condition is so poor that they cannot be sold for meat.

- **Support for livestock provision programmes**
  If provision of livestock has been selected as a post-emergency intervention to allow sustainable production to resume, there may be a case for using supplementary feeding to provide short-term support to the initiative, at least until local feed sources can again meet demand.

OPTIONS FOR FEED SUPPLEMENTATION

Most of the documented experiences of supplementary feeding during emergencies concern ruminants and therefore the content of this chapter is mainly about these species. Information for poultry, pigs and equids is included, but in less detail.

Although the provision of supplementary feed may appear to be a useful intervention, a number of factors need to be assessed before proceeding with confidence. No supplementary feeding initiative can expect to provide all affected animals with adequate amounts of feed. Resources available to the programme will always be limited. Attempting to spread the benefits too widely is likely to be counter-productive since no animal will receive sufficient feed for there to be a significant impact on their owner's livelihood. Therefore the first step in implementing supplementary feeding is to identify its advantages and disadvantages.

The LEGS decision-making tree for feed options (LEGS 2nd edition – Figure 6.1) is a valuable tool for deciding the appropriate intervention regarding provision of feed.

Advantages

- For pastoralists, whose livelihoods are dependent on livestock, it provides long-term benefits by keeping animals alive.
- Keeping draught and pack animals alive can play an essential role in supporting the livelihoods of many families.
- It also improves the nutrition and health status of animals, leading to higher productivity in pastoral and mixed crop-livestock systems.
- It improves the survival of animals, which is cost-effective when compared to restocking.
- Animals may have to travel far for grazing, resulting in higher energy expenditure. Supplementary feeding can prevent negative energy balances in such situations.
- It reduces environmental degradation and overgrazing of the most palatable plants since animals will be satisfied with lower quality rangelands due to the additional feed.

Disadvantages

- Regular access to supplementary feed may promote large, unsustainable herd sizes and high stocking rates.
- It can increase water requirements, which may be scarce, especially during drought.
- It can increase appetite, placing greater stress on pastures, or increase demand for crop residues.
- External support may ignore indigenous strategies.

- Transporting feed into an area may disrupt local markets.
- There is a risk of introducing pests or disease (crop or livestock) vectors from other regions.
- Grouping animals together in feed camps may enhance the spread of infectious diseases.

Emergency feeding *in situ*

This refers to a type of feed distribution where the beneficiaries keep animals in their present production system but gain access to feed through a feed supplement programme. It is the preferred option as it is less disruptive to the local livestock keeping traditions, leaves the livestock owner in charge of management, and offers multiple options for implementation (vouchers, in-kind provision, etc.).

Emergency feeding in feed camps

If *in situ* feed supply is not an option, feed can be provided to beneficiaries' animals in feed camps. This option involves moving animals to the camp on a daily basis for their share of the available feed (in-out camps), or animals remaining in camps and receiving the needed attention. The option to install camps requires much more management, but it can contribute to greater security and better monitoring of the intervention.

PLANNING AND PREPARATION

Assessing the situation

As already noted in Chapter 2, a thorough understanding of the local context of an emergency is required to inform the planning process.

An assessment team normally initiates a supplementary feeding programme. Ideally the team will be multidisciplinary and include all directly involved agencies. These teams can collect information from a range of sources, and information specific to supplementary feeding may include:

- the geographical context, including those areas with the most animals affected, plus physical access and communications (roads, bridges, telecommunications, etc.);
- a profile of the affected communities, including their livestock species and their management systems (pastoral, agropastoral, mixed farming), their livelihoods base and any vulnerable groups;
- estimates of animals lost or starving and any traditional emergency feeding strategies;
- estimates of the numbers of households with starving animals suitable for supplementary feeding;
- estimates of locally available feed resources;
- estimates of local feed storage facilities;
- water availability;
- current sale price of livestock to support decision-making for less productive animals;
- quantity and quality of essential local support services, i.e. animal health;
- consideration of combining alternatives such as destocking and cash transfer;
- scope for cost-recovery (payment for feed by beneficiaries) so that the programme's benefits can be spread more widely;

- existence of possible partners with long-term experience in the area. They should understand sociocultural, economic and other aspects, and should be trusted by the community;
- other relief activities in the area which can either substitute for feed interventions or complement them to reduce the level of inputs required for each household;
- cost-sharing with other relief activities (e.g. by backloading lorries transporting feed into an area with animals that are being destocked);
- identifying indigenous responses to the emergency that can be strengthened more cheaply than providing full supplementary feeding inputs;
- any in-kind inputs which could be made to the programme by beneficiary households to reduce labour or other costs;
- the cost-effectiveness of private-sector involvement in delivering benefits, e.g. private traders in an affected area may have an existing distribution network that could be mobilized at much lower cost than setting one up from scratch.

Once the basic information has been collected and analysed, public meetings and focus groups with local authorities, local leaders and the target community can improve understanding on more specific design issues by:

- agreeing on the objectives (outcomes) and priorities;
- identifying the most appropriate target livestock populations (species, age and sex) to receive supplementary feed and for how long;
- deciding on the system for feeding animals – on-site or in camps;
- determining the availability and cost of different types of feed (fodder, concentrates and by-products);
- calculating the exact number and condition of animals needing supplementary feeding;
- assessing the specific nutritional requirements of the affected animals;
- calculating the feed requirements and costs of purchasing and distributing suitable feed;
- reviewing previous experience of supplementary feeding programmes including:
  - lessons learned – successful and unsuccessful;
  - practicality and appropriateness of previous initiatives;
  - roles and responsibilities, including those of the community.

When to initiate supplementary feeding

As a general rule, if the availability of feed for livestock is severely depleted and it is difficult to protect animals highly valued by their owners, it is time to initiate supplementary feeding. For slow-onset emergencies such as droughts, supplementary feeding strategies should be initiated towards the end of the Alarm phase and should continue through the Emergency phase. Emergencies such as floods or earthquakes require a specific assessment of individual situations to identify vulnerable groups and potential supplementary feeding strategies based on local needs, practices and opportunities. Delay in initiating supplementary feeding can lead to substantial productivity losses and livestock mortality.

Prerequisites

For a supplementary feeding programme to succeed, the important prerequisites are:

- availability of reliable supplies of feed for the expected duration of the programme;
- ability to distribute the feed;

- access to adequate support services such as a water supply.

However, in practical terms sometimes an emergency is so acute that feeding needs to be started quickly and compromises have to be made over the type of feed used since the alternative would be not feeding at all.

Design considerations

When designing a feed supplementation intervention it is important to bear the following in mind:

- Traditional coping mechanisms should be assessed early on and, if supplementary feeding is still deemed necessary, the programme should aim wherever possible to complement them.
- Flexibility is essential in order to respond quickly to changing circumstances and, if necessary, to switch funds into alternative interventions. Seasonal factors, the unexpected continuation of a drought and changes in the availability of feed can all affect a feeding programme.
- Is supplementary feeding sustainable in the longer term, or are there broader feed resources issues in the area such as overstocking? Is there a risk of sustaining in the short term what is unsustainable in the longer term?
- Many restocking and feed supplementation programmes bridge the divide between emergency intervention and longer-term development. It is important that plans are made for an exit strategy.

More information on design considerations can be found in Chapter 2.

Livestock production objectives

Once the main objectives of the supplementary feeding programme have been identified, the most appropriate and feasible production objectives for rationing can be specified. In general terms, it is possible to identify four broad production objectives appropriate for supplementary feeding programmes. These are:

- **Restricting body weight loss** – This is essentially a survival strategy. It aims to balance limited available feed resources with the animals' minimum nutritional requirement for survival. It requires an estimation of the likely duration of the emergency and the body weight loss that can be tolerated over that period. That will be influenced by the animals' condition when the programme is initiated: animals in better condition are able to tolerate relatively greater losses of condition.
- **Maintaining body weight** – This entails feeding animals a maintenance ration. Where resources are adequate, it is preferable to the previous weight-loss option. It stabilises the situation and can be continued indefinitely. Nevertheless, feeding strategies designed to maintain body weight should not be considered if it would mean excluding at-risk households in the area.
- **Recovering lost body weight** – This objective is not relevant during the acute phase, when resources are more efficiently used maintaining or managing weight loss. However, in the early recovery phase it is important as reproductive functions and productive outputs cannot return until a basic level of body condition has been regained.

TABLE 8
Links between specific production objectives and the main objectives of the supplementary feeding programme. (✓ - desirable; ✓✓ - essential)

		Production objectives			
		Restrict weight loss	Maintain body weight	Recover lost body weight	Increase production levels
Main objectives of the Programme	Ensure survival	✓✓	✓		
	Re-establish breeding			✓✓	
	Re-establish work for draught and pack animals			✓✓	✓
	Re-establish production			✓✓	✓✓
	Support destocking			✓✓	
	Support restocking		✓✓		✓

- **Increasing production levels** – This objective becomes feasible after recovery of body weight since severely malnourished animals will direct most of the nutrients consumed to body weight gain. The objective can be considered during the recovery phase, possibly in support of restocking programmes.

It is necessary to understand these objectives in order to select appropriate feed interventions. There are, however, no hard-and-fast rules regarding the selection of appropriate production objectives, which must be based on individual circumstances, resources available and implementing capacity. Table 8 offers general guidance.

Selecting animals for feed supplementation

Once the decision has been taken to proceed with feed supplementation, the animals to be included for maximum impact of the programme need to be selected. The following points should then be considered:

- the condition of individual animals in participating households;
- the status and location of affected livestock owners, and the local security situation;
- the logistics and cost of supplying animals with feed;
- are the financial and logistical resources adequate to implement a feeding initiative? Small, unfocused, under-funded programmes are unlikely to generate meaningful impact;
- the supply of good-quality drinking water must be adequate to support a feeding initiative – draught and pack animals in particular require large quantities of water, especially in hot climates;
- supporting services, such as animal health services, must also be adequate;
- the longer-term sustainability of livestock populations "rescued" by supplementary feeding programmes must be assessed. In situations where this is in doubt, it may be more appropriate to consider other interventions such as destocking, employment-generation or cash transfers.

While it is necessary to identify households to benefit from supplementary feeding, it would normally be inappropriate to feed all of the animals in a household. Selection of individuals should be based on the following factors:

- **Species and type** – Some species of animals are better adapted to coping with, and recovering from, feed or water shortages. The decision may be to concentrate only on the species that require the least assistance, e.g. sheep and goats rather than cattle. Within species, only the most valuable animals should be targeted. In practice this mostly means the younger breeding females and, to a lesser extent, limited numbers of the better male animals. These will be needed to rebuild post-emergency herd/flock recovery. In some situations, working animals may also be considered or, if a destocking initiative is operating in parallel, animals that could attain reasonable market value with minimal input of feed.
- **General health** – Whatever their perceived value, sick or injured animals are unlikely to benefit from supplementary feeding. If they subsequently die, any feed inputs will have been wasted. It is important that feed supplementation programmes should form effective links with any disease surveillance or ongoing veterinary interventions to identify and exclude any at-risk animals. Consideration should also be given to linking with local slaughter facilities or emergency slaughter interventions. Where animal health programmes are demonstrably effective in improving animal health, it may be appropriate to augment them with supplementary feeding.
- **Body condition** – The body condition of animals should be assessed before including them in the programme. Some animals may be regarded as a better bet for assistance than more vulnerable animals, which are unlikely to survive even with the feed resources available. Annex 1 provides a rough guide to scoring the body condition of animals for inclusion in feeding programmes. Animals should be reassessed periodically if the programme is likely to last for more than a month as livestock can quickly lose condition.

In pastoral areas where large herds predominate, the focus may be to preserve the breeding stock; however in mixed crop-livestock communities it may be possible to target all household animals as their numbers are likely to be small.

Overall, inclusion in a programme should reflect the ultimate value of the individual animal as it enters the recovery phase. It will normally be more cost-effective to sell, slaughter or otherwise dispose of low-value animals that would not benefit from the programme, thus avoiding competition for resources with higher-value animals.

How long should supplementary feeding programmes continue?

The final step in designing a supplementary feeding programme is deciding how long it should last. This can be difficult, as the course of an emergency is often unpredictable. In a drought, for example, recovery strategies will only be possible after rain arrives. In practice, programme duration may need to be based on little more than an educated guess. Past experience can be a guide, however, and monitoring can help either to adjust the programme approach as more information becomes available; or justify seeking more funding if the acute phase is prolonged.

Definitions

- **Proteins** are chemical compounds that contain nitrogen and are needed for the repair and growth of body tissues such as muscle. Ruminants are able to make use of non-protein nitrogen compounds (commonly urea) to make proteins. Other species, such as pigs, equids and chickens are unable to do so.
- **Crude Protein (CP)** is the usual measure of protein content (an indicator of the nitrogen content of the feed) and is expressed as a percentage of dry matter.
- **Carbohydrates** are essentially sugars and are a major source of energy in the diet. Fibre is also a carbohydrate, consisting mostly of cellulose (plant material), and is incompletely absorbed by animals, although ruminants have a digestive system capable of handling high-fibre diets.
- **Fats** are a group of high-energy (higher than carbohydrates) nutrients consisting of several fatty acids held together by a glycerol. Most fatty acids are non-essential, meaning the body can produce them from other fatty acids as required; others are classed as essential and must be included in the diet.
- **Energy** is primarily supplied by fats and carbohydrates and drives the chemical reactions that allow animals to keep warm, move, grow, produce and reproduce.
- **Metabolizable energy (ME)** is the energy available in a food that can used by the animal for productive purposes and is measured in mega joules of ME per kg of dry matter (MJ ME/kg DM).
- **Minerals** are generally needed in the body in very small quantities but are important for a wide range of functions.
- **Vitamins** are also needed in very small amounts but are more complex substances than minerals. They also perform many tasks in maintaining the efficient function of body processes.
- **Feed intake** is the physical amount of feed an animal can eat a day and is influenced by many factors including: feed composition, especially its dry matter content; palatability; ambient temperature; and the age and physiological status of the animals. It is measured in kg of dry matter per day (kg DM/day). A rule of thumb for ruminants and equids is that they can eat up to 3 percent of their body weight as dry matter daily.
- **Dry matter (DM)** is measured as a percentage and can range from 90 percent for dried cereals to 15 percent for lush, fresh, wet forage.
- **Forage** is plant material which livestock can graze.
- **Hay** is grass that has been cut, sun-dried and stored for later use.
- **Standing hay** is naturally dried grass that is left standing (uncut) in the field.
- **Stovers** are the dried stems and leaves of maize, sorghum and millet left in the field after harvest.
- **Browse** is usually leaves, often highly nutritious, of trees and shrubs that animals eat either directly or have cut for them.
- **Crop residues** include straw, stovers and haulms.
- **Crop by-products** are the materials left over from food processing: bran, sugar beet pulp, brewer's grains, oilseed cakes.
- **Cake** is the material obtained after extracting oil from oilseeds (cotton seed) using a mechanical press.

- **Meal** is ground cereals (not as coarse as flour) or the material obtained after using both mechanical and solvent extraction of oil from oil seeds.
- **Free-range** means that animals are not confined and are free to graze or forage.
- **Scavenging** is term used for poultry and sometimes for pigs, and means searching for locally available feed in the environment such as organic matter, including insects. The feed scavenged by poultry is frequently not considered edible by humans.
- **Semi-scavenging** means that poultry flocks and pigs are under partly controlled management, with scavenged feed accounting for a significant part of the total feed eaten (supplied feed typically comprises one-third, or 30-40 g of grain, per day for poultry and 200-500 g per day of grain or compound feed per pig, depending on breed, age and weight).
- **Scavengeable feed resource base** comprises material from two sources: household food waste and leftovers, and materials from the environment, i.e. crop by-products and the gleanings of gardens, fields and wastelands.
- **Supplementary feed** is extra feed given to animals – in addition, for poultry and pigs, to the amount they obtain from scavenging.

IMPLEMENTATION

Feeding ruminants in emergency situations

Broadly speaking, three main types of feed can be included, either alone or in combination, in a supplementary feeding programme for ruminants:[25]

- **Roughage feeds** provide energy although they can also contain significant levels of protein. Examples include: dried grass (hay), fresh or dried fodder crops (grasses or cereals grown especially for animal feed), straws and stovers (husks), bran. Dry crop residues (straws and stovers) are not particularly nutritious but are cheap and can ensure an animal's survival for considerable periods. They are, however, bulky and costly to transport.

  In recurrent emergencies such as the severe winters in Mongolia and Afghanistan, or droughts in some African regions, grasses from a portion of the grazing land can be cut and stored as hay or silage during favourable periods and used in emergency situations. Legume crops (e.g. *Trifolium spp.; Stylosanthes spp.*)[26] or grasses such as napier can be cultivated in places generally not affected by an emergencies. When needed, they can then be transported (preferably in pellet or block form to reduce bulk and transport costs) to the affected areas. Supplementation of feeds containing high levels of crude protein and minerals helps optimize rumen fermentation, thus enabling efficient utilization of available feed resources – e.g. low-quality grasses, pastures, and crop residues. Further information is given later in this chapter on the preparation and transport of densified complete feed blocks (DCFB) or pellets from places not affected by emergency.

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[25] *Note:* Feed tables can be found at http://www.feedipedia.org/ which give information on the relative nutritional quality of a range of feeds available to a supplementary feeding programme as a source of energy and protein. A feed supplementation programme should aim to complement the feeds that are already available.

[26] Legume crops can be fed to equids but they are better fed mixed with other grasses or forage – alfalfa is a commonly used legume for equids. Pelleted or block feeds would not be the preferred option since equids need long fibres for good digestion.

- **Concentrate feeds** can be very effective at providing an appropriate balance of nutrients as they can be formulated to meet specific needs. Examples are cereals (maize, barley, wheat, and sorghum), beans (soya) and pulses, as well as by-products such as cotton seed cake. They are, however, relatively expensive and some are valuable human food in their own right. Feeds may be provided either as **straight feeds** or as **compound feeds**.

  Straight feeds consist of just one ingredient, such as maize or barley. These come in different forms, such as whole grains, crushed, rolled or pelleted. They provide concentrated nutrients in a digestible form and are relatively easy to transport and distribute. But the local availability of straight feeds is usually limited in emergency situations, particularly in a famine. However, in some emergencies they may be easily procured from adjoining unaffected areas. Grains should be introduced gradually (start with about 50g per day for sheep, 100g per day for equids and 200g per day for cattle) to avoid grain toxicity (acidosis),[27] which can result from overfeeding. Grains must never account for more than 50 percent of the total diet: the rest should be roughage such as hay or crop residues.

  Compound feeds are a mixture of different ingredients formulated to meet specific nutritional requirements and are produced by the feed industry. They usually consist of cereals, and pulses with mineral and vitamin supplements added. Formulations vary according to requirements for different species and for different physiological requirements, e.g. for growth, milk production, egg production, etc. The quality of these compound feeds varies considerably. Feeds from reputable companies come with information about the ingredients and their nutritional composition. Less-reputable feed companies may sell substandard (possibly toxic) ingredients that do not meet nutritional requirements.
- **Multi-nutrient blocks** are similar to concentrate feeds but made from ingredients such as urea (supplying non-protein nitrogen for ruminants) and molasses (supplying energy), which are generally cheaper. They supplement nitrogen, vitamins and minerals, which are generally deficient in crop residues. If blocks contain urea they must only be fed to ruminants and never to monogastric species (chickens, donkeys, horses, pigs, rabbits) or to young, especially pre-ruminant calves, kid goats and lambs less than six months old.During early drought there is usually sufficient poor-quality pasture available which cannot, however, be efficiently utilized, mainly due to lack of nutrients such as nitrogen. Before the nutritive value of pastures decreases further, consideration may be given to providing ruminants with nitrogen in the form of multi-nutrient blocks to improve intake and efficiency. Being concentrated, they are quite cheaply and easily transported, and can provide a rapid way of improving or maintaining the nutritional status of affected animals. Multi-nutrient blocks should not be fed without a source of roughage in the diet. Incorrectly or excessively used urea can be extremely toxic. Detailed information on urea-molasses multi-nutrient blocks can be found in Annex 3C.

[27] Acidosis is a condition resulting from overload of grain which is rapidly fermented inside the rumen or the intestines in monogastric species, with the resultant production of large quantities of gas and foam, along with other major changes in the body's metabolism, such as laminitis in equids, which often leads to death in acute cases.

TABLE 9
Some common feeding strategies for ruminants, and supplements to enhance their impact in emergency situations

Available feeds	Constraints	Approach to overcome constraint	Supplements required and frequency of feeding
Sufficient dry feeds such as crop residues, dry grass and pastures	Low digestibility decreases intake and nutrient availability. Nutrient imbalance, particularly nitrogen, minerals and vitamins	Provide protein and mineral supplements	• urea-molasses blocks (continuous feeding) • protein-rich grains such as lupin or peas (feed every second day) • oilseed cakes/meals (feed twice weekly)
Green fodder	Unavailability of pastures and dry forages limits intake and protein availability	Provide energy supplements	• hay of good quality and/or • cereal grains (2 to 3 times per week)
Dry pastures and grasses of very poor quality	Low intake of dry pasture due to poor quality and inadequate availability	Provide both protein and energy containing supplements	• urea-molasses blocks (continuous feeding) • grains and oilseed cakes/meals (feed daily or thrice weekly)

Some companies now produce multi-nutrient blocks with additional roughage that can be fed as a complete ration. These **Dense Complete Feed Blocks for ruminants (DCFB)** provide a balanced ration in a block format. This is an attractive option for emergency supplementary feeding programmes. The major ingredients of these blocks are roughage and concentrates with minerals and vitamins added as required. To reduce bulk, the blocks are compressed, making them easier to handle and transport. A typical composition for a survival DCFB would be: straw 85 percent, molasses 10 percent, urea 2 percent, minerals and vitamins 2 percent, and salt 1 percent. For animals in the recovery phase, the straw component could be reduced to 60 percent and replaced with 25 percent oilseed cake.

Using browses

Browses available under harsh conditions are generally high in crude protein and minerals whose action is, however, impaired by the presence of tannins (polyphenols) which bind to them, making these valuable nutrients unavailable to animals. Most browses present in harsh conditions have high levels of tannins as a defence mechanism, which decreases their intake by animals. Addition of 5 to 10 g of polyethylene glycol/day/animal (an inert substance) in water or any feed (e.g. a handful of concentrate, wheat bran or wheat flour dough) before cattle go out for grazing can enhance the intake of browse and availability of nutrients from the diet consumed in rangelands, which is a mix of grasses and browse. The levels of polyethylene glycol can be decreased to 3–5 g/animal/day for small ruminants. The industrial grade polyethylene glycol (molecular weight 4000 or 6000 whichever is easily available; polyethylene glycol of < 4000 molecular weight is not recommended) is reasonably cheap, and its addition in diet can be considered as a strategy for saving animals under very harsh dry conditions. This strategy was used in the 1990s drought in Zimbabwe and it saved thousands of animals.

Using fodder trees

Such trees have deep roots and can extract water from deep soils. As a result, they are able to survive severe water stress. Grasses and pastures in drought conditions contain low levels of crude protein and minerals so that their intake by cattle, sheep and goats decreases because of sub-optimal rumen fermentation. Overall intake and extraction of nutrients from the consumed grasses or pastures can be enhanced by supplementation from fodder trees, which are rich in crude protein and minerals. This "speeds up" the rumen fermentation, enabling higher nutrient extraction from available feed resources, and higher intake. As a result, the nutritional status of ruminants increases, helping animals survive harsh conditions and even improving their growth and production.

Vitamins and minerals

For ruminants and equids, concentrations of vitamins and minerals in feeds are generally low, but highly variable, making it hard to apply a simplified rationing process. Emergency supplementary feeding programmes that seek to support body-weight recovery or to re-establish productive functions should try to ensure that vitamins and minerals are in adequate supply by:

- Providing combinations of browse or other green forages, at least in small quantities. Indigenous knowledge may identify herbs or other plants said to promote animal health and well-being.
- Using proprietary vitamin-mineral mixes in powder form (premixes), as licks or blocks. Where possible, these may be formulated with combinations of vitamins or minerals that address specific deficiencies in the affected area. Vitamin-mineral mixture in powder form can be added to the feed at levels of 2 percent for large ruminants and 1 percent for sheep and goats. For equids, free access to salt blocks or having salt added to the diet is preferable to using proprietary mixes. This is particularly important in hot climates, when working equids will lose salt through sweating. If mixes are used, equine-specific ones are best. They should be fed at the recommended daily rate since premixes vary in content.
- Urea-molasses or other multi-nutrient feed blocks can also contain vitamins and minerals.

Which feeds should be used?

The types of nutrients and the quantities required by livestock depend on factors such as species, size, age and physiological status of the animal. Pregnant and lactating animals need more than non-pregnant ones. Draught and pack animals require more, energy-rich feeds than non-working animals. Young, growing, lactating and pregnant animals require diets with higher protein levels than older, non-lactating animals. Lactating females require more calcium, phosphorus and energy than their non-lactating counterparts. Supplementary feeding is most efficient if animals are segregated into various classes so that they can be fed according to their nutritional requirements.

Protein and energy content of feed are the most important components. Where there is no localized mineral deficiency, poor animal performance is generally due to insufficient protein and/or energy supply. The main objective of a supplementary feeding strategy should be

to overcome any protein/energy imbalance, and until this is achieved, supplementation with other nutrients such as minerals and vitamins may not produce beneficial effects.

Determining an appropriate and cost-effective combination of the different types of available feeds for the different classes of affected livestock is a key aspect in designing an effective supplementary feeding programme. In order to make the best possible use of allocated funds, some kind of cost-benefit evaluation of the different available feeds will be required. In this context, "available" means that adequate quantities to achieve the objectives of the programme can be realistically delivered. This assessment should be based on a comparison of:

- The cost of delivering each feed to the recipient animals. This must include the costs of purchasing, processing, handling and transportation.
- The nutritional value of each feed to the recipient animals. This encompasses both the types of nutrients that the feeds supply and their relative concentrations.

Annexes 3A and 3B provide a detailed methodology for deciding on the best option(s).

Feeding equids in emergency situations

Care must be taken when feeding equids to ensure that forage is the bulk of their diet and that any concentrates are only used as a supplement, and divided into several small feeds per day. Equine diets should never contain less than 50 percent forage. The equine digestive system has evolved to digest fibre rather than cereals, and feeding too much of the latter can lead to acidosis, laminitis and colic.

How much to feed equids

- If equids are not working, they can eat a diet entirely made up of forage. It is recommended that equids receive a minimum of 1 percent of their body weight in long-stem (fibrous) forage daily, which is equivalent to 1 kg DM/100 kg body weight.
- Horses should be fed forage only up to 2 percent of their body weight per day. Horses can eat up to 3 percent of body weight as dry matter, depending on the nutritional quality of the diet and their level of work, whereas donkeys only require around 1.5 percent as they are efficient digesters.
- Donkeys and mules require lower levels of protein than horses and can be fed lower-quality forage than horses.
- Working equids need energy-rich feeds, which should be cereal-based, e.g. concentrates, to supplement the forage. Concentrates should not make up more than 1 percent of body weight per day, fed in several small amounts during the day (0.75 percent for donkeys and mules).

Feeding poultry in emergency situations

The feeding of poultry in emergency situations is determined by the poultry production system.

Backyard poultry

Scavenging production systems are characterized by limited provision of supplementary feed, especially during periods of feed shortage and reduced scavengeable resources. In many locations such shortages occur regularly at certain times of the year, either during the

dry season or when scavenging by the birds is restricted to protect crops. A regular supply of feed, over and above maintenance requirements, is essential to maintain productivity in all family and backyard poultry systems. When feed resources are scarce, it is preferable to maintain fewer birds in production.

During emergencies, a surplus of food grains is generally not available. Agencies sometimes procure and distribute poultry feed but poultry feed is preferably purchased from local feed shops, if available, as it supports the local economy. The recommended practice is to identify and use, whenever practicable, locally available feed resources to formulate diets that are as balanced as possible. The by-products of processing local crops (brans, oil and seed cakes) can be used both as energy and protein sources.

Scavengeable feed sources include household kitchen waste; grains and grain by-products; roots and tubers; oilseed cakes and meals; leaves of trees, shrubs (including *Leucaena*, *Calliandra* and *Sesbania*) and fruits; animal protein meals; blood, termites, maggots, earthworms, oysters, snails; aquatic plants (*Lemna, Azolla* and *Ipomoea aquatica*).

The following techniques can be used to produce poultry feed for backyard poultry:

- producing protein from:
  - leaves such as cassava, *Leucaena, Sesbania*, and *Glyricidia*;
  - animal protein from, e.g. blood meal, rumen microbes, hatchery waste and leather by-products;
- using non-conventional feed ingredients such as tea leaf waste, duckweed, earthworms and insects as protein sources for semi-scavenging poultry;
- cultivating earthworms, maggots, termites and cockroaches, and incorporating them into the feeding system;
- using industrial by-products, e.g. from breweries and fish-processing plants, as supplementary feed;
- substituting commercial feeds with feed energy sources such as cassava, sweet potato, coco yam (*Colocasia esculenta*), arrowroot (*Maranta arundinacea*), coconut residues, coconut oil, palm oil and other non-traditional sources of energy;
- substituting non-conventional, protein-rich feedstuffs for fishmeal, soybean and groundnut oil meals: substitutes include earthworm meal, maggot meal, winged bean, pigeon pea, jack bean, Azolla (*A. pinnata, A. caroliniana, A. microphylla*), leaf meals and leaf protein concentrates such as *Moringa oleifera*;
- mineral-rich sources from animals include scorched seashells, snail shells and eggshells, fish and chicken bones. Mineral-rich sources from plants include papayas, *Leucaena, Calliandra, Sesbania* and aquatic plants.

The cafeteria feeding system which gives poultry the opportunity to select nutrients according to their physiological demands, is a popular method for feeding scavenging chickens. Energy supplements such as maize, sorghum and millet are offered early in the morning and late in the evening. During the day, birds scavenge mostly for protein (insects, worms, larvae), minerals (stones, grit, shells) and vitamins (leafy greens, pepper, oil-palm nuts). There is evidence that the cafeteria system is not inferior to providing complete feeds. The real need, therefore, is to determine the nutrient content of available feed resources and give needed nutrients to birds at the right time, which does not necessarily mean at the same time.

Commercial poultry

Specialized poultry production systems for eggs (layers) or meat (broilers) depend largely or exclusively on feeding with compound feed, either purchased or produced locally on-farm from available feed grains. For an efficient performance, compound feed has to address the exact and specific nutrient requirements for specific growing or production periods. Compounded feeds for starter, grower and layer hens, with different chemical compositions are available, and these should be fed according to the producer's instructions. Formulated feeds are balanced for protein, energy, amino acids, vitamins and minerals.

Production is usually organized in batches that may be kept for short periods of 5–9 weeks for broilers or 12–18 months for layers. Specialized poultry production systems may vary in size from as few as hundreds or less, to flocks of several thousand birds. Sudden emergency situations may affect a specialized production system's feed supply. Short-term solutions to address such emergencies include reducing the quantity of feed provided or practicing skip-a-day feeding, when the recommended commercial feed type is not provided every day. But such feeding is only be feasible for very short periods, and if no regular feed supply can be arranged the flock has to be sold or slaughtered. Given the need for quick solutions to sudden feed shortages in emergencies, assistance from organizations may not be fast enough.

Calcium is an important mineral for laying hens. Its approximate level in the diet should be 1 percent (at age 1 day to 2 weeks); 2.5 percent (2–15 weeks); 5 percent (16–28 weeks); and 4 percent thereafter. At around 16–20 weeks of age, layers start laying and production drops after approximately 25–28 weeks. Commercially available vitamin-mineral premix may be added at a level of 1 percent of the feed.

During emergencies such as droughts and floods, mould and aflatoxin contamination of feed is of primary concern and aflatoxin levels should be monitored closely (see the section **Quality of Feed** for more information on aflatoxins).

By-products of various processes (given below) can also be added to make feed less expensive: grain milling, baking, brewing, rendering, fruit and vegetable processing and edible oil seed meals are all possible sources of feed. The appropriate inclusion rates depend on cost, nutrient availability, amino-acid composition, protein digestibility, shelf life and the stage of growth of the chickens.

Poultry require clean drinking water and adequate quantities must be maintained at all times. Watering containers and feeders designed specifically for poultry should be used, wherever possible.

Table 10 provides rough estimates of the quantities and characteristics of the feed required for commercial birds. Table 11 provides rough estimates of the quantities and characteristics of the feed required for restocking poultry flocks after emergencies.

Feeding pigs in emergency situations

The most common commercial pig production systems rely on compound feed for their animals.

Providing pig feed in emergency situations will in most cases mean purchasing compound feed from feed mills either within the affected area if still functioning, or further away. At the regional level, compound feeds will most likely be available in large amounts

TABLE 10
Commonly used ingredients in a typical poultry feed formulation

Energy source	Protein source	Mineral source	Miscellaneous
Cereals (mainly maize; sorghum and wheat also used in many parts of world)	Soymeal	Calcium supplements: limestone and shell grit	Vitamin supplements: vitamin premixes
Cereal by-products	Canola meal	Calcium and phosphorus supplements: dicalcium phosphate, de-fluorinated rock phosphate, bone meal	Crystalline amino acids: methionine, lysine, threonine
Animal fats and vegetable oils	Sunflower meal	Trace mineral premixes	Non-nutritive feed additives: enzymes
	Peas	Sodium chloride and sodium bicarbonate	
	Fishmeal		
	Meat and bone meal		

TABLE 11
Approximate feed requirements of layer and broiler birds

System	Age of birds	Total feed quantity (kg/bird/feeding period)	Energy (kcalories of ME/kg)	Protein (minimum)
Layer	0–6 weeks	1.1	2750-3000	20%
	6 weeks until production	4.9	2750-3000	16%
	Hen	0.1/day	2700-2900	17%
Broiler*	0–5 weeks	2.9 – 3.5	3100	22–25%
	5–9 weeks	5.4 – 5.6	3300	20%

* Broiler slaughter weight = 2 kg

if needed. Providing compound feed to beneficiaries represents the best opening support that can be provided as it eliminates the need for any further inputs. The quality of the compound feeds found on the market can vary substantially and purchase should depend on regular quality controls by the feed mill.

Compound feeds used in commercial pig production are available in different compositions depending on the physiological stage of the animal. Rations are usually designed for gestating and lactating sows, weaned piglets and fattening animals – with significant differences within those categories. In regions with abundant pig production, the selection of the recipient population is critical. As with other short-cycle species which can be restocked at lower cost and in relatively short time before returning to normal farm production, de- and restocking interventions should have high priority. Emphasis for feed supplementation should be given to breeding stock, in particular young sows and selected boars, to secure future production while keeping the number of animals on supplementary feeding as low as possible.

An overview of feed components commonly used in pig production is given below. Globally, soybean is the most abundant protein source used in monogastric feeds, combined with

TABLE 12
Commonly used ingredients in a typical pig feed formulation (with emphasis on tropical climates)

Energy source	Protein source	Mineral source	Miscellaneous
Cereals (mainly maize; sorghum and wheat also used in many parts of world)	Soymeal	Calcium supplements: limestone and shell grit	Vitamin supplements: vitamin premixes
Cereal by-products	Canola meal		Crystalline amino acids, in particular lysine
Sugar cane	Cottonseed meal		
Sugar cane juice or molasses	Coconut seed meal		
Cassava starch			
Bananas and plantains	Sunflower meal	Trace mineral premixes	Non-nutritive feed additives: enzymes
	Peas	Sodium chloride and sodium bicarbonate	
	Fishmeal		
	Meat and bone meal		

TABLE 13
Estimates of feed requirements for pigs in different production stages

Type of pig (live weight)	Feed intake per day (in kg)	Energy requirements (MJ ME / kg feed*)	Protein requirements (CP g/kg feed*)
Piglet (approx. 10 kg)	0.5	13.5	165
Hog (25–50 kg)	2	13	175
Hog (50–80 kg)	2.5	13	160
Hog (80–100 kg)	3	13	150
Sow (lactating)	4	13.5	165
Sow (gestating)	3	12	130
Boar (>100)	3		

* calculated for 88% DM

an energy source such as grains. The composition of compound feeds often varies according to availability and prices of the different components.

Table 13 provides an overview of rough estimates of the feed requirements of pigs in different production stages to allow overall calculations for feed rations. As a rule of thumb, small piglets and lactating sows need higher levels of energy and protein compared to an average pig feed of 13 MJ ME and 160 g CP per kg. Gestating sows would need lower rations combined with higher levels of fibre.

For young pigs (<50 kg body mass), the vitamin-mineral premix obtained commercially can be added at a level of 4 percent of the diet, while for pigs > 50 kg body mass the level can be reduCed to 2 percent.

Pigs kept in very low numbers and mainly for household consumption in backyard or scavenging production systems tend to eat a different diet composed of kitchen leftovers, agricultural by-products, roughage and only very limited components of higher nutritional

value such as purchased compound feeds, e.g. cereals, maize or soy. Animals adapted to such feeding can be supplemented with concentrates in times of overall reduced availability of their regular feedstuffs without having to provide a complete diet.

Quality of feed

Imported feed must meet phytosanitary (plant health) and other feed safety requirements and be adequately stored. To reduce the risk of distributing substandard feed, the following precautions can be taken:

- Check locally available feeds for suspect packaging, unknown proprietary names, source of origin and, if necessary, check codes and batch numbers with the representatives of the manufacturers.
- Check the feed for visible signs of mould, rancid smells, dampness or discolouration.
- Check the label for ingredients and nutritional composition.
- If the feed looks suspicious, consider an independent laboratory analysis for nutrients (energy and protein), dry matter, inert additives (such as soil or sand which will show up as an excessive level of ash in the analysis) and moulds or toxins, especially aflatoxins. The four main aflatoxins found in contaminated plant products are B1, B2, G1 and G2 and are a group of structurally related difuranocoumarin derivatives that usually occur together in varying ratios, aflatoxin B1 usually being the most important one. These compounds pose a substantial hazard to human and animal health. The maximum permitted level in feed for aflatoxin B1 is 20 parts per billion. This applies to all species of animals.
- If large quantities of feed are to be purchased, a representative sample should be sent for independent analysis.
- Determining the unit cost of ME for grains, hay and straws and CP for protein-supplying supplements (e.g. oilseed cake/meals, lupin, beans) provides a basis for choosing the appropriate supplements.

Feed transport and storage

Transport

The vehicles used for transporting feed materials should be clean and dry to minimize the risk of contamination. Previous loads should be completely removed from the containers and only containers carrying compatible loads should be used to avoid contamination. This means only carrying other feed types, not materials that might be toxic such as herbicides, fuel, or certain liquids. Sea transport can increase the moisture content of feed materials and moisture-proof sacks and containers should therefore be used. The points listed below in the storage section are also relevant to sea transport, when feed may be in transit for some time. Trucks and other vehicles used for transport should be covered to protect the feed material from sunlight, rain and contamination. Covers should also be kept clean and dry.

Storage

Feed ingredients or prepared feeds should be stored properly. Improper storage can lead to build-up of high temperatures and losses due to mould infestation or pest attacks including rodents, insects, reptiles and birds. Individual feed ingredients and prepared feeds should

be stored separately to avoid spread of pests and insects should one of the ingredients be infected. Different materials should be stacked in such a way as to minimize chances of cross-infestation. Pests not only consume feed but contaminate them with excreta, animal carcasses and shed skins. A full-scale rodent and pest control programme should be planned if feed is stored for long periods.

Sufficient cleanliness should be maintained during storage so that exposure to pests, insects and pathogens is minimized. Lighting should be good to ensure that hygienic conditions are maintained. Drains and holes from which pests can enter the storage area should be kept closed or wire-meshed. Detergents, fertilizers and pesticides should be stored separately and well away from the feed or feed ingredients. Feed materials should be stored in such a way as to be identified easily. Feed ingredients or feeds with high moisture content are susceptible to mould growth and risk turning rancid when stored at high temperatures. Oil-rich ingredients are particularly prone to spoilage due to turning rancid (easily detected by the rancid odour). If mould growth is found in a stored material, it should be immediately removed to prevent contamination of other stored goods.

Moisture content higher than 13–14 percent during storage should be avoided because it provides favourable conditions for auto-oxidation and fermentation, leading to heat generation, which if not dissipated can lead to the "smoking" of feeds/grains or combustion. Abnormally high stacking of bags should be avoided. It is suggested that under tropical conditions no more than 18–20 bags should be stacked. Sets of stacked bags should be no more than 5–6 metres long and 3–4 metres wide. There should be a minimum gap of 0.5-0.8 metres between two consecutive sets to ensure proper air circulation. If raw feed ingredients are stored in silos, aeration systems must be operated at regular intervals to avoid temperature rises. Feed materials stored in dry and cool conditions also require aeration to equalize temperatures since differences in temperatures create convection currents which can concentrate moisture at the top and centre of the silos. This can lead to the development of moulds and insects, and the production of mycotoxins.

Feed materials with high moisture content undergo physical and biochemical changes when stored at high temperature and high relative humidity. This applies especially to grains, with bursting and gelatinization of starch and a consequent increase in feed sugar content. High moisture content in storage can also lead to the production of alcohol and acetic acid, resulting in a sour odour. All these factors reduce the quality of the stored grains and lower intake.

Feed materials may also undergo drying losses during storage, which reduces the weight of the feed – with undesirable consequences on feed management. The longer the duration of storage, the higher the moisture loss.

A first-in, first-out approach should always be adopted to ensure rapid turnover of stored feed.

Some do's and don'ts for supplementary feeding

Do

- Ensure fodder is free of noxious weed seeds while buying.
- Meet energy requirement of animals in drought as a priority – choose a drought feed that provides energy at the lowest cost.

- Consider the increased energy requirements of animals in cold conditions. Energy levels in rations should be increased up to 20 percent or more depending on the severity of the conditions.
- Consider that draught and pack animals also require higher energy (20–30 percent over maintenance energy requirements) in the ration.
- Introduce high-grain diets slowly, ensuring that fibrous feeds such as hay, straws are also included. An optimum level of fibre is required for the rumen to function optimally: low-fibre and high-cereal grain diets can cause the rumen to become too acidic.
- For equids, feed plenty of roughage. Concentrates should only be given as a supplement to forage as too much concentrate can lead to colic, laminitis and other serious digestive disorders.
- Always ensure that there is plenty of water available when providing supplementary feed to avoid problems of impaction and poor digestion.
- If abundant, incorporate roughage in pig rations to reduce compound feed quantities needed for maintenance feeding regimes.

Specifically for ruminants

- Mix high-quality diets (quality hay, silage, grains) with high-fibre diets to avoid shortfalls in energy requirements which can occur from the low digestibility and low passage rate through the rumen of pure high-fibre diets, e.g. crop residues.
- Provide grains as they are easier to handle, store and transport than hay. Assure that they are free of contaminants such as pesticides and mycotoxins.
- Feed less than 6 percent of fats since a high fat content can decrease feed intake and digestibility. However, fats are a concentrated form of energy and therefore a valuable component.
- Mix pulses (lupin, peas, etc.) with cereal grains to increase the overall protein content of the diet. Cereal grains are rich in energy but lower in protein and pulses can therefore be added to high-fibre diets to boost the protein level.
- Consider processed grains for purchase and provision. Milling, crushing or rolling cereal grains enhances the energy availability by 30–40 percent in cattle – but not in sheep.
- Add 1 percent of limestone to grains to prevent calcium deficiency if a diet contains > 50 percent grains as these are generally deficient in calcium. If roughage in the diet is more than 50 percent, addition of limestone is not required.
- Consider adding common salt at a level of 0.5 parts per 100 for grains. Sodium can become deficient in high-grain diets.
- Guard against potential vitamin A and E deficiency in the absence of green forage in the diet. Consider unconventional feedstuffs (apples, grapes and tomato pomace; citrus pulp, grain screenings, rice and wheat bran) that can be added to up to 15–20 percent of the diet. Pomaces and pulps are high in moisture (50–85 percent) and susceptible to mould if not stored properly. Rice and wheat bran are also good sources of phosphorus.
- Use monocalcium and dicalcium phosphates as source of phosphorus in animal diets which are low in fluorine and cadmium.

Don't

- change diets quickly as it can seriously upset the digestive process;
- feed urea in any form to non-ruminants (poultry, pigs, equids) or to young ruminants under six months old);
- use phosphate fertilizers as a source of phosphorus as they contain fluorine;
- use swill for feeding pigs unless it is properly heat-treated and contains no pork;
- feed cottonseed cake at levels greater than 30 percent of total dry matter due to the potential presence of gossypol (a natural phenol).

NOTES ON MONITORING, EVALUATION AND IMPACT ASSESSMENT

Regular monitoring and evaluation are essential for the success of a feeding programme and should be conducted throughout the programme. All stakeholders need to ensure that information gathered is shared in an open, regular and timely manner so that corrective decisions and action can be taken. Monitoring should focus on:

- **Animal-related indicators** – Required animal-related information varies according to circumstances but could include information on body condition score, body weight (noting changes over time using a simple girth band) and survival rates. Other indicators such as milk production, egg production, reproduction rates and offspring survival may be monitored where applicable for breeding females. In addition to the biological data, feedback from beneficiaries and socio-economic information on, for example, prices of livestock and livestock products should also be collected.
- **Process indicators** – May include: the amount and type of feed distributed, to whom it is distributed, how long distribution lasts, and the cost of the feed.

Evaluation based on the livestock production parameters, feed intake and quality parameters enables the supplementation strategies to be adjusted to achieve the desired results. Socio-economic information, financial indicators, and productive parameters are all useful contributions to any impact assessment or end-of-programme evaluation. Collation of this type of information can also be invaluable for dealing with future emergencies.

Given the complexities involved in designing feed supplementation strategies for different production systems and emergency situations, it is difficult to provide a blueprint for an impact assessment. However, at the start of activities it is essential to define the variables that will be collected to carry out an impact assessment when activities come to an end.

Costs include the purchasing, transporting, handling, storing, wastage and distribution of feeds; plus training of farmers, and "fixed" (overhead) costs of the implementing agency. Quantitative information on benefits can be obtained from any increase in milk production, the eventual rate of return of livestock to normal production levels, live weight gain, reproduction rates, survival of offspring and the animals, economic benefits of using pack and draught animals and indirect savings from not having to restock at a later date. Benefits are often only indicative since a number of assumptions must be made, e.g. mortality without supplementary feeding.

Chapter 10 contains more information on impact assessment and benefit-cost analysis.

CHECKLIST

Baseline information

- Are the objectives of the feeding programme clearly defined: emergency survival, maintenance of core breeding and young stock, supplementing a missing essential ingredient (lack of protein or minerals in the diet), establishing a healthy flock for a new enterprise (restocking)?
- What is the nutritional risk: immediate starvation, acute under-nutrition (short-term lack of access to feed), chronic malnutrition (longer-term feed deprivation, e.g. in a drought)?
- What animal species are to be targeted?
- Are there feed resources (grazing, crop residues, by-products, commercial feed) available locally – can the amounts be quantified?
- Before the proposed feed supplementation, what was the feed supply-and-demand situation? Was the area considered to be over- or under-stocked?
- Are the locally available feeds accessible and affordable by the proposed beneficiaries?
- Is the feed problem due to a lack of supply or demand – or both?

Design considerations

- Have the feed requirements (based on the programme objectives, expected duration and number of animals affected) been estimated?
- How will the feed requirements be met and by what feedstuffs (hay, grains, multi-nutrient blocks, or commercial feeds)?
- Is the proposed time scale realistic – can feeds be procured in time to meet needs?
- Where will the required feeds be sourced – locally, nationally or internationally?
- Are contractual arrangements for procuring feed fit for purpose?
- How will the feed be distributed to beneficiaries?
- Will feed supplementation be undertaken in conjunction with other interventions?
- Are other services available – animal health services, water supplies?

Chapter 7
Provision of water

RATIONALE

Water[28] is fundamental to the physiological equilibrium and well-being of all animals which, with the exception of some camelids, cannot survive more than a few days without drinking water. Lack of water causes poor appetite, poor digestion and reduced excretion of waste products – all of which contribute to many disease processes. In emergency situations where access to water for animals is compromised, the provision of alternative sources of water becomes a priority. Lack of water may also make areas of otherwise adequate grazing unusable. Ironically, the unplanned development of water resources for livestock in the world's drylands can result in overgrazing in strategic dry or drought-season grazing areas that have historically played an important role in drought resilience.

Restriction in the supply of water to livestock is often a consequence of natural disasters and emergencies – especially droughts. It may, however, also be significant in other types of emergency, including earthquakes or landslides in highland areas, which can block long-standing routes to livestock water points. Other hazards, including tsunamis, may also result in the loss of freshwater to livestock as ponds are inundated by salt water from the ocean.

As in feed supplementation, water provision programmes can involve either:

- **moving animals to where water is available**, especially breeding stock;
- **increasing water availability**, by accessing available surface and groundwater or by transporting water to the affected area.

It must be taken into consideration, however, that shortage of water in a crisis-affected area will almost certainly impact humans and animals alike.

OPTIONS FOR INCREASING WATER AVAILABILITY

There are three standard approaches to addressing water shortages and improving the availability of water in the context of a livestock emergency. They are listed in order of ease of implementation and cost-effectiveness:

Moving animals to where water is available

It is increasingly recognized[29] that livestock keepers in the drylands share water sources – wells, boreholes and surface water catchment schemes (dams and rainwater harvesting installations such as haffirs) with neighbouring pastoral and smallholder farmer communities. This is particularly common during times of crisis. In some cases, these reciprocal arrangements have been fashioned over generations and enable livestock keeping to

[28] See also Chapter 7 of the *Livestock Emergency Guidelines and Standards* (LEGS)

[29] Kratli, S. (2015) Valuing Variability: *new perspectives on climate resilient drylands development*. IIED. Edited by de Jode, H. Available from: http://pubs.iied.org/10128IIED.html

continue in harsh environments where it would otherwise be impossible. The relocation of drought-affected livestock therefore offers one of the most cost-effective ways of addressing both feed and water constraints and is a tried-and-tested response to drought in many of the world's dryland areas.

The process of livestock relocation is typically assisted by the slow onset of droughts, allowing herders to warn communities in non-drought areas that they are starting to trek livestock towards them. In addition to alerting potential host communities, livestock keepers are also able to alert local authorities and therefore obtain help in the orderly movement of livestock, including through towns and villages. Such treks further provide local authorities with opportunities for providing emergency animal health and supplementary feed support to drought-affected livestock along the route.

In some areas of the world such reciprocal arrangements for sharing water and grazing have started to break down as a result of changes and developments in administrative boundaries. Wherever that happens, it may, however, be possible for local administrators to bring the communities back together and to renegotiate long-standing reciprocal rights to safeguard livestock assets and build resilience. Achieving agreement between such communities can, in some cases, be assisted by the renovation and improvement of livestock water points in the host communities.

Rehabilitation of existing water points

In times of drought and/or following an earthquake, water points are often damaged or destroyed. During droughts, hand-pumps and boreholes, which typically provide water for small human and livestock populations, may become over-used by large visiting herds; similarly, livestock ponds may suffer structural damage as a result of congestion. Damage is usually higher in areas where routine maintenance and repair of livestock water points is lacking.

During earthquakes, infrastructure for livestock water points may be damaged or destroyed. In such cases, emergency repair and rehabilitation helps provide livestock with water and prevent congestion around the remaining water sources. As water points are rehabilitated and access is restored, the time required for herders to water their livestock is reduced and animals can return earlier to available pastures, thereby maximizing grazing time.

After relocation of livestock from drought-affected areas, rehabilitation of existing water points is often the most cost-effective form of emergency intervention relating to watering livestock. Benefit-cost ratios are also commonly improved as, in many cases, water from rehabilitated water points is shared with herders and their families. However, where water points are shared in this way, consideration should be given to providing separate and safe water for human populations.

Transporting water

Transporting water is expensive, inefficient in terms of resources, and labour-intensive. "Water trucking", or transporting water by lorry, is usually considered an intervention of last resort because once water has been trucked into a crisis area, transport needs to be continued until the normal water supply is restored. During a severe drought, water may not be available for several months, leading to escalating costs. However, due to the critical danger of dehydration and the importance of livestock assets and of breeding animals in

particular, it may be the only option available in the short term. In such situations, difficult decisions may need to be taken about which animals to water and which to consider for destocking or slaughter.

PLANNING AND PREPARATION

To plan an intervention to improve the availability of water to crisis-affected livestock, the following should be borne in mind:

- **Local availability of water** – assessment of the current supply, including quantity of water that can be extracted from available sources, and the water quality;
- **Regional availability of water** – similar to the assessment of local water resources, but covering a wider area. Must include the closest possible water sources that are not immediately affected and other areas which may historically have been accessed by crisis-affected pastoralists;
- **Calculation of demand** – total number of animals (and humans if applicable) in need of water, according to minimum requirements;
- **Relocation** – mapping out the routes which livestock and herders would use to move to areas unaffected by crisis;
- **Rehabilitation** – assessing the cost of rehabilitating damaged and partially destroyed livestock water points, including an assessment of priority water points;
- **Transport** – mapping out means of transport from source to beneficiaries;
- **Distribution** – how to assure equal access for the beneficiaries selected, taking into account the needs of all stakeholders, particularly current users.

It is important that all plans aimed at improving the availability of water for crisis-affected livestock are shared with government agencies and other organizations involved in supplying water to human populations. This is particularly important when increasing water access for livestock may impact on water availability for human populations, as when water sources are either shared or in close proximity.

When working on the rehabilitation and management of existing water points, it is important to recognize that technical challenges are often of secondary importance, and that community engagement and management-related issues may be harder to address. It is therefore important that, prior to any livestock water intervention, time is taken to map the key stakeholders and their associated roles and responsibilities. Time invested in mapping and learning about different stakeholders can be of critical importance in deciding on the right approach to improve the situation, in designing an intervention and, ultimately, on the sustainability of the improved water system.

During stakeholder consultations it is crucial to meet with groups of users in order to better understand how water points for livestock and human populations are managed day-to-day. Is, for example, water use restricted to a single community or is access shared with a wider group? Which species of animals use the water and in what order, or is it first come first served? And who is responsible for desilting and other maintenance? Questions might also be asked on how communities manage conflict between different users. Through such dialogue, it may also be possible to introduce other topics, including ways in which poorly maintained and damaged water points could be rehabilitated and improved, and who would best lead the process. To illustrate the value of dialogue, an agency working with pastoralists

in a drought-affected area of the Horn of Africa raised the idea of replacing traditional livestock drinking troughs – made of stone and mud – with troughs made of reinforced concrete. The aim was to reduce the time taken by herders to repair the troughs, thus increasing both the passage of livestock and the time that livestock could drink. Through the dialogue, it was agreed to start a small project using locally available craftsmen but it was further decided that the project would also improve access to water for women. The improvements included creating a special footpath for women and a holding tank so that women could quickly draw their water and return home.

At times during community dialogues, requests for additional investment to pay for new water points may be made, in particular if the crisis is drought-related. Although water may be in short supply even under normal conditions, the development of new water points in times of crisis is not recommended. There is too little time and there are too few resources to discuss in detail issues such as long-term management of new water points, both in terms of access and maintenance. As a result, water points developed in times of crisis not infrequently fail to provide planned benefits – they may be co-opted by an elite, or fall into disrepair. However, while recognizing the challenges associated with developing new water points, in some circumstances the cost of transporting water is so high that drilling a borehole may be cheaper. In such cases, it may be possible to discuss and agree with the community that the borehole should be capped after the crisis and used only in an emergency, in particular if hydrological studies confirm that the water table is already dropping.

The LEGS decision-making tree for the provision of water (LEGS 2nd edition – Figure 7.1) is a valuable tool for deciding the appropriate intervention regarding water provision.

IMPLEMENTATION

Water quality

The issue of water quality for a livestock water intervention is seldom straightforward, despite the fact that water standards for livestock are lower than for humans. This is because in many parts of the world, herders continue to use the same water as their livestock. Although this practice should be discouraged, every effort should be made to provide livestock with water of the best quality on the assumption that some people will consume it. Water should be as clear as possible, with no animal carcasses, (even small ones such as rodents), no plant and organic matter and no bad odour. Where a water point for livestock is being developed, the intervention should be supported by community consultations that outline the associated health risks of using this type of water for human consumption. Every effort should also be made to monitor the use of water and to encourage human populations to use alternative, potable supplies.

The following points should be taken into account when designing an intervention:

- **Water source** – small, shallow wells and streams are more likely to become contaminated or produce poor-quality water than large wells and strongly flowing streams. Also groundwater is likely to be more chemically unbalanced than surface water.
- **Seasonal changes in quality** – water of marginal quality may become unsuitable in hot, dry periods because of: (a) natural increases in salinity due to higher levels of evaporation from open-water sources; (b) increased use of the water supply by livestock due to heat and greater intake of dry feed, which can lead to contamination; and (c) increased water temperature.

- **Age and condition of the animal** – lactating, young and weak animals are normally more susceptible to the effects of poor-quality water than males and non-breeding females.
- **Species** – variation in tolerance to water salinity is considerable between animal species.

Water requirements

Water requirements for livestock vary widely according to the ambient temperature, feed intake, types of feed, physiological condition (pregnancy/ lactation) and level of production. Indicative guidelines per animal would be:

- Cattle (adult) 40–50 l/day
- Yearlings 25–40 l/day
- Calves 15–25 l/day
- Camel/dromedary 30–40 l/day.
- Sheep/goats (adults) 5–10 l/day
- Young stock 5 l/day
- Horses – moderate exercise 50–55 l/day (air temperature 35°C)
- Horses – moderate exercise 20–30 l/day (air temperature 20°C)
- Pigs (adults) 5–10 l/day
- Poultry 20–40 l/100 birds/day

Donkeys generally have slightly lower water requirements than horses. The type of feed given will also impact on an animal's daily water requirements – for example green fodder has a high water content, so if this is being fed, less drinking water will be needed.

Water requirements of working equids are hard to predict and depend on environmental factors (heat/humidity), duration and intensity of work, and acclimatization of the animal to the particular environment. Ideally, fresh, clean water should be provided at all times but if this is not possible sufficient water must be offered at regular intervals through the day. Owners can be encouraged to carry a water bucket with them, e.g. tied to their cart, so that whenever an opportunity arises (a water pump is available), water can be given to the animal.

As it is rarely feasible to meet the full water requirements of all animals in an emergency situation, it is recommended that cattle are provided with approximately 20 litres every two days and that sheep and goats get 5 litres every two days.

Water transport and distribution

Transport

Whenever water needs to be transported, whether through pipes and canals or in buckets or tankers, the condition and cleanliness of the means of transport has a direct impact on water quality. Tankers may have been used to transport other liquids, including potentially toxic substances such as herbicides, fertilizers and fuels. So although "water trucking" is best avoided, if it is the only feasible option the trucks need to be thoroughly cleaned.

Water storage

Water storage facilities are required when dealing with large quantities of water, whether transported or locally extracted. Storage facilities should prevent any deterioration in water quality. In particular, access to such facilities should be limited to avoid misuse of the stored

water (for cleaning, washing or personal hygiene), pollution through human or animal faeces, and drowning of smaller animals such as rodents.

Distribution points

Once water is made available to the communities, the distribution to individual households or herds/ flocks needs to be organized to avoid many people and livestock congregating in one area. For ruminants, camels and equids it is recommended that selected animals are walked to a common water distribution point and that animals are allowed their turn to drink their share and then walked back to the households. This practice eliminates the need to transport water to the end-users. If water resources are shared between human and livestock populations, the water extraction point for humans should be upstream and separated by physical barriers from the livestock drinking points to avoid contamination by animals.

Livestock species that are usually not walked, (e.g. pigs, poultry and other minor species), need to be provided with water directly where they are kept. This requires the organizers to ensure that the last transport segment is feasible for all beneficiaries – perhaps including the distribution of jerry-cans or locally used water containers – in particular when dealing with dispersed settlements and challenging transport infrastructure.

Payment for services

In normal times, the development of new water points and the maintenance of existing ones in rural areas requires the sharing of responsibilities between local authorities and communities. For example, in some countries the local authority – often supported by the national government – will take the lead in developing new water points, while communities are responsible for the maintenance and repair of completed schemes. However, in some countries communities may develop their own new water points in consultation with local authorities.

In times of crisis, however, these arrangements may break down so that creating new, and maintaining existing water points may be become impossible for local governments and communities alike. It may then be necessary for either the national government or international development partners to provide assistance to ensure that existing water points are appropriately and fully maintained so that water availability is not compromised. While local governments and communities may need assistance, it is important that all work is preceded by a community consultation in order that all stakeholders are clear that the assistance is crisis-related and that when the crisis has passed, more normal arrangements are reintroduced. If under normal circumstances water points are poorly and inappropriately maintained, this can be used as an opportunity to discuss new arrangements such as starting a community maintenance fund.

In the Horn of Africa, governments and development partners have mobilized cash-for-work payments to ensure the maintenance of existing water points, e.g. desilting livestock drinking ponds and haffirs in time of drought as they are more likely to be dry and therefore accessible. Removal of silt using cash for work not only increases storage capacity when the rains next come, but also injects funds into the local economy.

In order to reduce the potential for overcrowding with people and animals at the point of delivery, water transport interventions can be supported by vouchers (paper/electronic/ smart cards) which make clear the type and number of livestock from each household that is to receive water and also in which sequence on which day. Ideally the number of animals

should remain constant, with the order in which the animals receive water being reversed to allow those that are first on one occasion to be last on another.

There may also be a need or opportunity for using fuel vouchers to assist the implementation of water trucking interventions, in particular in remote areas. The use of fuel vouchers for livestock-related interventions – destocking and supplementary livestock feed and water – is covered in Chapter 4: Destocking.

NOTES ON MONITORING, EVALUATION AND IMPACT ASSESSMENT

Monitoring and evaluating water-related interventions is notoriously difficult because the immediacy of water needs does not allow for the methodical collection and analysis of water-related information – livestock without access to adequate water will die in just a few days. That is why decisions should focus on meeting immediate livestock water needs, followed by the development or rehabilitation of more sustainable water points. The checklist below offers pointers to inform both short- and longer-term planning priorities.

In many cultures the provision of water for the household and certain stock such as small ruminants is the responsibility of women and children. Special attention should therefore be given to monitoring the potential impact on women and children when planning a water intervention.

Overall, monitoring and evaluation should ensure that water provision is implemented effectively, reaches the selected beneficiaries and has a positive impact on the livelihoods of the target community with no, or very few, adverse side effects. For example, over-reliance on water trucking will not result in sustained improvement in the water supply as it can only provide enough water for a few days. All interventions that go beyond the emergency trucking of water into a crisis area are designed to bring longer-term benefits to the local communities and should be monitored and evaluated beyond the intervention time.

CHECKLIST

Baseline information

- Are the causes of the water crisis understood?
- Are local water-coping strategies understood?
- Has the extent of water shortage (distances to water sources) been assessed?
- Is it known how many people and animals are severely affected?
- Do current watering arrangements have environmental implications?
- Have all available options been assessed and prioritized?
- Can livestock be relocated to another area?
- Are the routes to these water sources secure?
- Is there a history of maintaining and rehabilitating existing water points in times of crisis? What are the lessons learned? How can positive practice be developed and strengthened?

Design Considerations

- Is it possible to use cash-for-work programmes?
- Have suitable water sources for rehabilitation been identified including:
  - water capacity and quality

  - water demand
  - extent of damage
  - water point management
  - environmental considerations
- Is there a history of developing new water points in times of crisis? Again, what are the lessons learned and how can positive practice be developed and strengthened?
- Have suitable water sources for new water points been identified including:
  - water capacity and quality
  - water demand
  - cost
  - water point management
  - environmental and sustainability considerations
- Is water available in sufficient quantity[30] and quality[31] within transport distance? Would transporting water for livestock result in conflict with human populations?

Preparation

- Are contractual arrangements for transporting water 'fit for purpose'?
  - are there reliable sources of fuel and spares?
  - are the bowsers clean and uncontaminated?
- Has it been ensured that the existing users of the water sources are not undermined?
- How will water distribution to the beneficiaries be managed?
  - will vouchers be used to access water?
  - how will the water be rationed?

[30] Continuity of supply is also important.

[31] Water quality for livestock is less critical than for humans and water that would be unfit for human consumption can be taken from rivers or lakes.

Chapter 8
Livestock shelter and settlement

RATIONALE

Physical damage to animal housing, shelters, feed stores and stockades[33] or other infrastructure relevant to livestock keeping communities is a common consequence of both natural and human-origin disasters. In addition, any crisis that results in displacement of people and their animals will result in the need to provide housing or shelter for both people and their livestock. Emergency response programmes usually assist first with the supply of construction materials and equipment to build or replace damaged buildings and infrastructure for people, and following this, for any livestock, as appropriate.

Livestock shelters can be defined as the physical structures that animals need to survive, protecting them from weather, predation, and/or theft, and can be either temporary or longer-lasting. In extreme climates, even basic livestock shelters provide an environment that reduces discomfort and the impact of the extreme climates. Young animals are especially sensitive to rain, humidity and cold during the night, and this can cause high mortality.

Provision for shelter is made in the context of human settlement, e.g. when populations have been displaced and simply replacing previous structures is not possible. An assessment of livestock shelter needs can be carried out as part of broader assessments of shelter requirements. The main objectives of livestock sheltering and settlement are:

- **ensuring the survival of affected livestock** by supporting the construction of sheds using local materials, and the creation of covered areas or secured external spaces;
- **addressing animal welfare** by providing protection against climatic threats (thermal comfort) and by ensuring there is sufficient space in the shelter for movement;
- **managing access to water, grazing areas or fodder through confinement** avoiding uncontrolled animals wandering and damaging crops;
- **reducing environmental and public health risks** through appropriate management of manure and effluents as well as carcass disposal;
- **reducing the risk of disease spread** through confinement, easier vaccination and treatments, and proper quarantine;[34]
- **re-establishing productivity (milk, meat, eggs)** by maintaining the animals in an appropriate and safe environment in combination with programmes for adequate supplementary feeding and watering.[35]

Livestock sheltering and settlement are as old as displacement of populations, but unfortunately little documented information exists because activities are often neither recorded nor reported.

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[33] See also Chapter 8 of the *Livestock Emergency Guidelines and Standards* (LEGS).

[34] See also LEGS Chapter 5, provision of veterinary support.

[35] See also LEGS Chapter 6, provision of feed, and LEGS Chapter 7, provision of water.

OPTIONS FOR SHELTER AND SETTLEMENT INTERVENTIONS

Shelter and settlement are strategies that contribute to the security, safety, health and well-being of displaced and non-displaced affected populations. They promote recovery and reconstruction where possible, and can encompass people's livestock too. A livestock shelter provides protective physical infrastructure which animals require to survive, produce and reproduce. Provision of shelter also addresses one of the five animal welfare freedoms, *Freedom from discomfort*, by ensuring that animals have adequate thermal comfort and space.

Temporary livestock shelters

In the immediate aftermath of a disaster, particularly in extreme weather conditions, there is often an urgent need to provide livestock with shelter where feed and water can be delivered. Temporary solutions using local materials can help the livestock-keeping communities to shelter their animals without affecting human shelter requirements. Temporary livestock shelters should remain in place until time and resources are available to provide longer-term solutions.

Depending on the species and the overall situation, temporary shelters fulfil several purposes. In general, they:

- protect animal from rain, wind, direct sun, snow, cold or hot temperatures;
- protect animals from predators and theft;
- provide options to feed and water animals;
- provide nesting and/or resting areas;
- allow owners to enclose animals to prevent free roaming;
- separate particular groups within the flock or herd;
- provide a minimum space of freedom from discomfort for different animal species

The type of husbandry system and the context of the emergency will define which of the above criteria need to be addressed as a matter of priority. In communities keeping ruminants, donkeys and horses, all that may be needed is to use living fences, provide some fencing material such as wooden poles and put up some roofing for shade. For minor species such as chickens, ducks or rabbits, provision of cages, baskets or nets and very basic construction materials can provide adequate temporary shelter.

Table 14 gives suggested minimal space requirements for temporary shelter construction. If shelters are intended for longer use, then different space requirements may apply, and in the interest of animal welfare, it may be necessary to increase the minimal space requirement.

Livestock shelters can be provided for either individual or multiple households. Temporary livestock shelter must be built in accordance with any applicable local/national legislation, and the following points should be considered:

- Does government legislation address livestock keeping in refugee settings, and how does it affect the current situation?
- Does legislation provide an opportunity for promoting sustainable and environmentally sound practices?
- Are there any agreements relating to refugee livestock production between the lead refugee agency and the government, and how is this interpreted?
- Which other organizations, institutions or individuals have the right to contribute to debate and decisions?

TABLE 14
Indicative minimal space required for freedom from discomfort of different animal species in the tropics

Species	Length	Width
Cattle (adults)	2–2.5 m on average	1.50 m
Horses (adults)	3–4 m	1.70 m
Donkeys (adults)	2.50 m	1.00 m
Sheep	Adult= 0.60-0.80 m² and female with kids = 0.90–1.20 m²	
Goats	Same as sheep	
Pigs	< 50kg = 0.60–1 m² and > 50 kg= 1–1.50 m²	
Poultry*	3–5 animals per m²	
Rabbits	4–6 animals per m², female with kids minimum 0.25 m²	

* The type of poultry production system dictates the requirements – local or commercial breeds, backyard or intensive, which species (chickens, ducks, etc.), meat or egg production.
Source: Manuel de construction des bâtiments pour l'élevage en zone tropicale, Ministère des relations extérieures coopération et développement, Institut d'élevage et de médecine vétérinaire des pays tropicaux, République Française, 1985

Material and equipment

Livestock shelters should include as much locally available construction material as possible as this reduces costs, while local communities will be familiar with its handling. Local purchase also strengthens the local economy.

For temporary shelters, materials supplied may include:

- galvanised metal roofing sheets – available in different sizes, thickness and profiles (corrugated or ridged) – or natural materials such as grasses or palm leaves;
- wire netting – available in different sizes, pattern (hexagonal or interlinked), thickness and coatings;
- wire, nails and staples (sold by weight) and local ropes;
- poles or timber (sawn timber, posts or rails) – timber can either be soft- (conifer) or hardwood;
- sand, aggregate and cement (sold by weight and/or volume).

Extra equipment may include:

- feed and water troughs (plastic, wood or galvanised metal);
- feed bins;
- milking machines, buckets, etc.;
- hammer mills (capacity kg/hour);
- weighing scales;
- cages or enclosures for poultry, rabbits and other small animals.

For herded livestock, materials may include:

- poles or wooden poles for fencing using, when available, fencing wire, stones or branches;
- wire, nails and staples (sold by weight) and local ropes.

Extra equipment may include:

- feed and water troughs (plastic, wood or galvanised metal);
- feed bins;
- milking machines, buckets, etc.

Longer-term livestock shelters

As temporary shelters are built to meet the most pressing needs, they may not offer the best options as permanent shelters or enclosures. Structures intended for long-term use should be similar to temporary structures but should be much more robust and constructed with greater attention to detail, particularly with regard to local husbandry practices. Longer-lasting livestock shelters are more expensive but have to be considered as an investment if built properly since, in certain farming systems, shelter is a key feature of livestock production. Where possible, longer-lasting livestock shelters should be designed and built to minimize risks to livestock in the event of future disasters.

If displaced people travel with belongings and livestock, they should be provided with enough space to keep both, making sure that the animals are kept separate from people for reasons of hygiene. Livestock may also require separate water supplies.

Settlement and infrastructure support

Settlement and infrastructure support covers a wide range of interventions that can also be relevant for livestock-rearing communities, e.g. when water supplies or marketplaces have been severely damaged or communities have been displaced to other areas.

Settlement interventions are often accompanied by policy and advocacy work. In the case of livestock- keeping communities, these include supporting participatory negotiations on land rights or access to grazing lands, environmental management to reduce animal and public health threats, and liaison with camp designers to identify the needs of livestock keepers.

> *When supporting self-settled or planned camps, it is therefore important to identify ways in which to make marginal land viable for the livelihoods of the displaced population. Ideally, as part of this process, the land should be made useful for the local population, so that it becomes a developmental resource for them, once the displaced population has achieved durable solutions. Examples include draining land that floods, or improving sustainable water sources on sites with little water.*
>
> ***Source:*** **Transitional Settlement Displaced Populations, University of Cambridge-Shelter Project and Oxfam, Tom Corsellis & Antonella Vitale, 2005**

PLANNING AND PREPARATION

Pre-intervention assessment

A needs assessment and analysis of the situation is essential for proper planning of interventions targeting shelter and infrastructure. Comprehensive baseline information on the number of households to be supported, including gender and age, division of labour and cultural norms will be required for detailed planning. Data on livestock should include target species, and the number and types of animals (e.g. sex, adult vs. young stock), while information on infrastructure should cover predominant shelter types and the level of damage to shelter and infrastructure. It is worth mentioning that many groups, while

BOX 10

General guidance on safe shelters for human populations

These considerations are from, *Shelter safety handbook: some important information on how to build safer,* published by IFRC in 2011. They are valid for livestock shelters as well.

Building new shelters

The likely hazards that may need to be avoided or resisted should be considered at the stage of designing a shelter and choosing its site. Where a collection of new buildings or the developments of a new residential site are concerned, the analysis of hazards and design for risk reduction should include reviewing the selection, layout and infrastructure of the whole settlement. National building codes may identify regions that are prone to particular hazards and specify safety features that should apply. Traditional building techniques may also offer appropriate measures for dealing with local hazards. The PASSA process (Participatory Approach for Safe Shelter Awareness) may identify additional or optional features and techniques applicable at community level.

Improving existing shelters

For the majority of communities, increasing shelter safety depends on improving their existing shelter. Most of the examples of simple improvements to make safe shelters provided below can be implemented on existing buildings, either as a specific measure or at a time when major repairs or modifications are being carried out. For example, if a roof is replaced on a masonry house, this would provide an opportunity to add a ring beam before putting on the new roof, and ensuring that the new roof is well fixed onto the ring beam.

The importance of maintenance, repair and careful modifications

All buildings deteriorate over time, and it is essential that they are regularly inspected and repaired if needed so that their safety is maintained. Any modifications should be carefully considered and carried out in such a way as to increase safety rather than decrease it.

displaced along with their animals, will have saved basic assets and materials to ensure a minimal continuity of livestock activities.

Legal issues need to be considered as part of the assessment. The primacy of national governments should be recognized by humanitarian organizations. Gaps and/or inconsistencies identified in the national legal framework should be drawn to the attention of the public authorities, while emphasizing locally and internationally accepted principles and standards. When the need for transitional settlements is being assessed, the laws and regulations of the host country/area must also be taken into consideration. Areas for consideration include:

- traditional grazing and watering rights;
- access rules and land tenure rights;

- veterinary service regulations;
- regulations regarding movement of animals and quarantine.

Design considerations

The assessment process provides the information needed so that various options can be considered. It should take account of key factors such as population needs, risks, the environment, economic context, relations between the affected and host populations in cases of displacement, security concerns and seasonal weather patterns. If restoring and repairing existing structures is feasible, salvage of materials can be a relevant option. If not, a list of required materials can be developed from the baseline assessment. In case new structures are needed, it is recommended that a basic construction plan is developed for models fitting the production purpose and for an adequate number of animals. Ideally, these should be comparable to the shelters commonly used in the local context so their installation does not require changes in husbandry practices or create envy among those community members not considered as beneficiaries.

Where indigenous animal shelter designs and cultural practices are concerned, community participation in the planning and design of the intervention is essential. The construction plan for such livestock shelter models will allow the type and quantities of materials to be procured. The models ideally should include as much locally available construction material as possible to reduce costs, while local communities will already be familiar with handling the materials. Local purchase of materials strengthens the local economy.

The options for sheltering and managing animals are:

- temporary shelters, in and around camps or settlements, where animals can be kept without the need for much land;
- herded livestock, kept outside camp limits, where they are grazed and watered;
- free-ranging livestock, at liberty to wander in the vicinity of the compound;
- settlement, which concerns the wider environment that supports the provision of livestock shelter, in particular when populations have been displaced and simply replacing previous structures is not possible.

Source: LEGS handbook 2015

IMPLEMENTATION

Coordination

After the completion and validation of the baseline information, it is essential to work together with other active organizations and stakeholders in the target area and ensure best use of resources and expertise by establishing a coordination body. Members of the group should include national and local government, emergency and development agencies (national and international) and institutions, technical specialists, donors and of course representatives of the affected communities. Within this body, a working group could focus on land issues and basic land use, planning and tenure. The specific conditions of the emergency will dictate who should take the lead – possibly the national government, but in some circumstances government staff and services may either not have the capacity to do the job or may be overwhelmed by the scale of the emergency.

The coordination body also needs to ensure that a robust consultation mechanism is in place with local and displaced communities regarding planned activities, and that a monitoring and evaluation system is also present to continuously update, modify and evaluate strategic planning.

The LEGS decision-making tree for livestock shelter and settlement (LEGS 2nd edition – Figure 8.1) is a valuable tool that can be used in deciding the appropriate intervention in relation to shelter and settlement.

The UN cluster approach

The UN cluster approach mentioned in Chapter 2 is one of a number of approaches for coordinating an emergency response. The clusters that directly support shelter, settlement and reconstruction activities are the:

- Emergency or Global Shelter Cluster;
- Early Recovery Cluster (ERC);
- Camp Coordination and Camp Management (CCCM) Cluster.

Other clusters that support shelter settlement and reconstruction activities include:

- Water Sanitation and Hygiene (WASH) Cluster;
- Logistics Cluster;
- Protection Cluster.

Technical considerations

Technical specialists within the coordination body will deal with the following aspects of shelter safety.

- location and layout of the settlement as a whole;
- siting and orientation of individual shelters;
- design of shelters (size, height, shape etc.);
- choice of construction materials;
- quality of construction, and the way the materials are put together.

In addition, technical specialists must recognize and respect traditional land-use systems. The inappropriate siting of transitional settlements can lead to vegetation loss as a result of fuelwood and building materials being collected. Grazing and browsing by refugee or IDPs' livestock may disrupt traditional resource use and management systems, and impact on important seasonal grazing lands. This can be catastrophic to host communities, affecting their livelihoods and providing grounds for antagonism and hostility between them and displaced populations.

Consultations mechanisms

Following the widely recognized *Sphere Minimum Standards* for humanitarian response, LEGS also acknowledges the importance of customary land rights, land ownership and usage. Appropriate consultations should be undertaken to establish not only who owns a site but also who may have formal or customary use rights and would be affected by its use as a temporary settlement.

Through all the project cycle, from planning to evaluation, consultations with indigenous communities and all stakeholders help estimate the potential capacity for hosting

displaced families. They should take into account ethnic and religious compatibility, livelihoods, and overall numbers of families, rather than attitudes towards hosting, which are likely to vary considerably before and after an influx of displaced people.

Consultations help maximize coordination and cooperation, and minimize potential disputes between local and displaced populations. Consultations should include meetings with local administrations and relevant community representatives, developing options for parallel systems of support for the host and the hosted, with long-term benefits for the host-family household, but without raising expectations in any group.

Participatory negotiations on land rights or access to grazing lands and environmental management can help to reduce tensions between displaced or resettled people and their host community. While strategic planning can be initiated within hours of a rapid-onset disaster, the initial incorporation of land issues will take at least a few weeks.

Transitional settlement and infrastructure support covers a wider range of interventions that can be relevant when the supporting infrastructure for livestock-keeping communities has been severely damaged or communities have been displaced. Work on infrastructure may very well be relevant for non-livestock-related issues as well, such as the reconstruction of water supply, and veterinary and commercial infrastructure (such as livestock markets, veterinary clinics and slaughter facilities). Construction and reconstruction of commercial infrastructure may be the responsibility of the private service providers rather than that of government or external agencies, but will also be considered in the consultations mechanisms.

Key recommendations for all shelter and settlement interventions

These include:

- providing or planning areas where livestock can be kept at a distance from living areas, and possibly fenced;
- not providing individual fencing for the livestock of each family if it means consuming a significant proportion of available construction materials;
- providing alternative water sources for livestock, situated away from existing human habitations and sources of water;
- ensuring that slaughter facilities are hygienic, easy to clean, and provided with traps and soak holes for sedimentation as well as facilities for disposal of waste;
- selecting and registering local suppliers for the various types of material required. Chapter 2 provides further information on contracting arrangements that should be considered;
- setting up quality control mechanisms for livestock shelter safety. Wherever possible given local conditions, the materials supplied should conform to national or ISO standards. It is important that the exact specifications (weight, length, thickness, ISO standard etc.) for each material are clearly specified.

Quality control should also be considered when contractors are involved in repairs, construction or reconstruction of livestock shelter and also when:

- people use salvaged material for livestock shelters taken from the human shelter programmes;
- livestock keepers receive material for shelter construction directly;
- livestock keepers receive training for the best use of materials;
- livestock keepers receive cash or vouchers for livestock shelters.

It is also important to:

- Respect land tenure and rights issues based on the stakeholder analysis from the initial assessment. It may be necessary to set up committees or ad hoc working groups to facilitate the preparation and implementation of a set of rules to guide communities in their livestock activities. For displaced populations and their livestock, it is particularly important to ensure that the new settlements do not cause major tensions with the local population and that displaced livestock do not compete for the same – often limited – feed resources. During a crisis, IDPs can be regarded as an additional burden by host communities and good conflict management skills are required to deal with this issue at a time when local populations may also be struggling to support themselves.
- Consider the provision of livestock (Chapter 9) in combination with provision of longer-lasting shelter or settlement. In some cases, it may be necessary to offer assistance to beneficiaries in building the shelters, especially if they are also receiving live animals and have limited experience of raising livestock – e.g. single mothers with no livestock, or child soldiers registered in a Disarmament, Demobilization and Reintegration programme.)[36] Appropriate provision of livestock can be fundamental to the continuity of the livelihoods of IDPs when they return home.
- Consider voucher and cash-for-work interventions:
  - Set up cash transfer based assistance as it can also be a valuable option, in particular when dealing with construction work related to shelter and infrastructure.
  - Use cash-for-work programmes for building communal animal shelters or working on communal infrastructure. Other programmes, such as unconditional or conditional cash grants, or voucher, distribution can be used to empower beneficiaries to build shelters, depending on the context. More information on cash transfers is available in Chapter 3.
  - Use vouchers with the exact specifications (weight, length, thickness, ISO standard, etc.) for each material clearly indicated on the voucher. Although every effort should be made to ensure that material of appropriate quality is used, a pragmatic approach is often required to make the best use of locally available materials.

Potential impact of shelter/settlement interventions

There can obviously be negative effects in situations in which displaced population bring their livestock herds with them. These can vary considerably depending on the local context, but impacts mainly regard local ecological conditions, social systems and existing stocking practices. Some possible negative impacts are:

- Increased numbers of animals may damage rangelands and crops, and can lead to serious land degradation. If not well managed, herds can also damage unprotected fields by eating and trampling crops. Livestock may cause overgrazing and destroy vegetation, especially near the water points.
- Livestock herders may cut bushes and trees to construct temporary night enclosures for their flocks. Foliage may also be cut from trees as animal fodder. Both activities can contribute significantly to localized deforestation.

[36] Disarmament, Demobilization and Reintegration (DDR) has become an integral part of post-conflict peace consolidation, featuring prominently in the mandates of peacekeeping operations over the last 20 years.

- If unprotected, tree seedlings and young saplings will be eaten by livestock, especially goats. Few seedlings recover once their growing shoots are removed.
- Many traditional societies have developed particular rules to regulate the coexistence of livestock and wildlife. In transitional settlements, increased livestock production on rangelands is likely to have a negative impact on local flora and fauna, particularly through increased competition for vegetation and water resources.
- In transitional settlements, water resources are often limited. Without timely and strict control, the presence of large animal herds can contribute to water depletion and pollution.

NOTES ON MONITORING, EVALUATION AND IMPACT ASSESSMENT

Monitoring and evaluation of an intervention must be incorporated into the planning and preparation phase so as to respond quickly to unforeseen problems or changes in the situation, and also to allow for appropriate final evaluation and impact assessment.

Regular monitoring and evaluation are essential to the success of a shelter and settlement programme and should be conducted throughout the programme. In particular, support related to temporary shelters must be monitored closely to see if improvised shelters fulfil their purpose for the animals, and if the community accepts the structures. For this type of monitoring, regular communication between implementers and beneficiaries is necessary.

All stakeholders involved in livestock shelter and settlement programmes need to ensure that information gathered is shared in an open, regular and timely manner, so that corrective decisions and actions can be taken. As for other interventions such as feed, water, veterinary support, monitoring should focus on:

- **Animal-related indicators**, which vary according to circumstances but can include information on body condition score, body weight (noting changes over time using a simple girth band) and survival rates. Other indicators such as milk production, egg production, abortion and parturition rates and offspring survival may also be monitored.
- **Process indicators**, which may include the amount and type of shelter material distributed, to whom it is distributed, how long distribution lasts, and the cost of the material and its purpose (temporary or longer-lasting shelters). As noted, quality control directed at the different aspects of livestock sheltering should be considered. Whenever possible given local conditions, the materials supplied should conform to national or ISO standards.
- **Financial indicators**, which provide some socio-economic information by looking at the contribution of rehoused or settled livestock to households, e.g. milk, eggs, offspring, transport, etc.

Evaluation of interventions related to shelter and longer-lasting infrastructure should go beyond counting the delivered inputs or restored shelters and look at the impact on people's lives and livelihoods. Impact assessments and end-of-programme evaluations are important in terms of lesson-learning for future emergencies, while the information can also be used to advocate for similar, successful emergency interventions.

The impact on animal welfare and productivity should always form part of evaluations and impact assessments. Animal-based parameters such as reduced losses due to extreme climate

conditions, predators or theft, increased production, etc. are not easy to assess in detail; yet overall impressions and feedback on those issues by the beneficiaries should give good indications (qualitative data) of any impact relating to shelters. Chapter 10 provides more detailed information on monitoring, evaluation and impact assessment approaches and tools.

CHECKLIST

Livestock Sheltering is a process – not just a product. Meeting livestock shelter needs in disasters or conflicts should be seen as a process of sheltering by and for affected households. The factors affecting livestock shelters must be considered at all phases of a project.

Options for shelter and settlement interventions

- Have livestock keepers been displaced from their original settlements?
- Are adequate grazing and water resources available at the proposed site?
- Are there risks of land degradation and pollution?
- How near is the site to an established economic and service centre?
- Does accessibility vary at different times of the year?
- Is the shelter supposed to be temporary or longer-lasting?
- Is there potential for conflict between the host and guest communities?
- How are security issues addressed regarding thefts, predators, etc.?
- Is the site prone to hazards such as flooding, high winds or seismic activity?
- Is the local environment particularly valuable or vulnerable?
- What are the likely impacts of increased population settlement on agriculture and livestock?
- Is there sufficient space for the desired density of housing?
- Should livestock shelters be placed close to, or far from, humans' houses?
- Do people and their livestock need to be relocated to a new area or is reconstruction possible on the original site?

Planning and preparation

- Have all the actors involved understood the pros and cons of resettlement?
- What coordination mechanism is to be used – who will be the lead agency, what will be the role of government, etc.?
- If the cluster approach is to be used, which cluster will take the lead for transitional settlement and infrastructure support?
- Is specialist knowledge required for shelter construction?
- Will specialists and commercial firms with a focus on engineering be needed?
- Has consideration been given to people's abilities and capacities to maintain, develop and enhance livestock shelters?
- What are the security risks?
- How close is the new settlement to a border or other potential flashpoints?
- Do the displaced people agree on the targeted new site?
- Who will be responsible for its management and maintenance?
- Are there any religious or cultural taboos associated with the presence of livestock on this particular site?

- If livestock are kept in good conditions on the site, is there space to provide for livelihood and employment opportunities?
- Have potential negative impacts due to increased numbers of animals been properly assessed?
- In transitional settlements, water resources are often limited and animals can contribute to the depletion and pollution of these resources.

Implementation

- Are external technical specialists/agencies available?
- Is their knowledge of the community and its traditional building techniques relevant?
- Are the proposed measures for livestock shelter too costly and difficult to implement?
- What construction materials are available and affordable without degradation of the environment?
- If not present, should construction materials be transported to the site?
- Is there space for future extension?
- Is the new settlement sufficiently close to the old one for people to retain their existing livelihood patterns?
- What does a typical local livestock shelter look like and what materials are needed to construct it?
- Can a standard shelter module, including the building materials needed, be identified?
- Who is drafting the initial tender describing the work required, and what are the required standards?
- After gathering information on local contractors, who is responsible for drawing up a shortlist of qualified contractors?
- Who is convening representatives and committee members when tenders are opened (should this be done in public or by elected group/s)?
- Who is in charge of negotiating the contract with contractors, of reviewing the bill of quantities, and of planning and executing documents? If reconstruction activities are managed by the population, it needs to pay particular attention to the social and economic make-up of the settlement.
- If the population is managing reconstruction, how can the agencies/specialists ensure that ad hoc committees are established for construction as well as land tenure and right issues?
- Do the IDPs have the required skills to build the livestock shelters, or do they need training?
- National and local authorities should be involved from the start of planning and throughout the intervention, including monitoring and evaluation. This will allow any impact on the host community to be assessed and will help identify any potential conflicts.
- How will host and target communities be involved in the planning, decision-making, implementation and monitoring and evaluation?
- What monitoring and evaluation systems are in place and who manages them?
- Are the indicators (animal-related indicators, process and financial indicators) drafted and shared among the monitoring group?
- Is a final evaluation being undertaken and how will any lessons learned be shared?

Chapter 9
Provision of livestock

RATIONALE

For many of the world's most vulnerable rural families, livestock may be one of the few, or indeed the only, asset they own.[37] It is common for households affected by disaster to lose part or all of their livestock, which can seriously threaten their livelihoods and food security. Small stock that survive rapid-onset emergencies are often consumed or sold in the immediate post-disaster phase, when food reserves are low and external supply has not yet reached affected communities.

Such loss of livestock can result in depletion of household assets, income and food, which in turn can lead to poverty and, in some cases, destitution. Coping strategies for those affected include moving to urban centres in search of food and income, reliance on relief programmes such as food aid, and reliance on relatives and friends. Repeated cycles of extreme weather conditions such as drought, floods or extreme cold can erode household assets and increase hardship.

Provision of livestock covers a number of scenarios in which households are given animals to replace – usually partially – those that they lost in a disaster. The objective is to help them rebuild their assets, or to build new livestock assets as a means to secure their household livelihoods. These programmes are usually implemented in the recovery period of the disaster and may follow earlier interventions such as destocking, animal health provision, or supplementary feeding.

For those such as pastoralists who depend almost entirely upon livestock for their livelihoods, providing animals may enable them to rebuild a viable herd and resume their previous lifestyle. Pastoral families are used to fluctuations in herd size, and restocking – by themselves or with community support – is part of their lives. This is often referred to as traditional restocking. However, there are indications that these mechanisms may be breaking down or coming under strain as drought, floods and conflict cause increased livestock losses and traditional systems are unable to meet the needs of ever greater numbers of affected households.

Providing smallholders or displaced families with livestock, either for the first time or as replacements, supports their livelihoods in several ways since they can use the animals as a source of income, food or transport.

Advantages and disadvantages of livestock provision

Livestock provision is usually a complex activity and many issues should be considered before embarking on it. The following sections cover the key benefits and the feasibility.

[37] See also Chapter 9 of the *Livestock Emergency Guidelines and Standards* (LEGS).

Advantages

The benefits of restocking vary, depending on the situation and lifestyle of the affected households, the type of disaster, and the aims of the programme. Livestock provision is usually most effective when it is a rehabilitation/development activity, rather than immediate post-emergency help. Benefits include:

- Direct benefits
  - increased availability of animal products;
  - cash from sale of animals and products;
  - rebuilding of household assets;
  - women, young people, and vulnerable groups (disabled people, elderly people, HIV-positive persons, etc.) can benefit directly when provided with small stock such as poultry, sheep, goats, or donkeys;
  - labour-saving and crop benefits (ploughing, water collection, wood carriage) when draught and pack animals are provided;
  - income generation through hiring out draught and pack animals;
  - the local economy is stimulated if livestock are purchased locally;
  - people are motivated to return to productive activities and are given (including children) a sense of well-being.
- Indirect benefits
  - It can help people re-enter social networks by improving their social standing.
  - Families may receive more help from relatives once they become part of a social structure.
  - Families are encouraged to move back from urban centres or IDP camps, reducing pressure on local services and resources.

Disadvantages

There are, however, a number of concerns associated with restocking programmes, including:

- Programmes are complex, expensive and time-consuming to implement.
- Other interventions, such as cash distribution, may be easier, cheaper and more flexible.
- Programmes cannot be undertaken as short-term, stand-alone interventions when in reality training and further input provision might be required (food aid, equipment).
- Programmes, to be effective, need excellent understanding of the target area, communities and their lifestyles.
- Issues frequently arise as to whether animals should be given as loans or outright gifts.
- There are also concerns about beneficiary selection: equity/fairness, commitment to raising and caring for livestock, livestock management skills.
- Provision of livestock may not be appropriate for most vulnerable families who need to be supported in other ways.
- Monitoring, evaluation and impact assessment requirements often exceed the lifetime of a programme and can be challenging with mobile communities.
- Programmes run the risk of introducing inappropriate species and breeds.

- Lack of animal health services, markets, feed, water and shelter can make animals a burden rather than a benefit.
- Poor animal welfare conditions result when animals are kept in restricted spaces such as IDP camps, or when they are distributed to households who have no experience of animal husbandry.
- Risks arise of localized overstocking and natural resource degradation in areas where people lack access to open rangelands or cannot return to their home areas.
- There is competition between people and animals for resources in and around IDP/resettlement camps as well as sanitation issues and the risk of zoonotic diseases.
- Animals can put a strain on households, with increased labour costs, children unable to attend school and less time for other income-generating activities.

OPTIONS FOR PROVISION OF LIVESTOCK

Provision of livestock involves the full or partial replacement of animals lost in a disaster. In some cases, it may involve providing affected families with a new livestock enterprise if the know-how is already present. In all cases, the aim is to provide people with additional means to support and maintain their livelihoods as well as a safety net against further shocks. Livestock provision has generally been regarded as successful in helping households get back on their feet and, as such, has attracted considerable interest from both the donor community and livestock keepers. It is important however, to understand how success can be achieved.

Successful livestock distribution projects are frequently linked to longer-term initiatives or development-oriented activities in which livestock provision is part of a wider package of support. Such support may include ways of increasing resilience to future emergencies and of managing livestock during such events. Examples of such initiatives include early warning systems for potential emergencies, livestock marketing support, supplementary feeding, land tenure reform, animal health services, agricultural inputs and appropriate government policies.

Replacing livestock assets for pastoralists/agropastoralists

For communities whose livelihoods depend heavily on livestock and who have lost most of their animals through drought, extreme cold, other natural disasters or conflict, the aim is to rebuild livelihoods and assets and help people re-enter the pastoral or agro-pastoral sector. Providing displaced persons who have lost most of their belongings with livestock can allow them to return home with some assets with which to rebuild their livelihoods. For families who have moved to urban centres in search of food and labour, livestock can act as an incentive to return to their home areas if they want to. This assumes that a programme can provide sufficient animals for viable herds/flocks to sustain households.

There may be broader issues regarding whether IDPs' home rangelands can actually sustain the livelihoods of existing users, let alone more. The viability of many pastoral and agropastoral systems is being constrained by agriculture expansion, conflict and cross-border issues that restrict the movement of people and herds.

In communities where traditional restocking is practised, marginalized sectors of the community can also be left out, such as female-headed households, individuals who have dropped out of social networks, and less powerful clans and ethnic groups.

Replacing livestock assets for farmers

Many smallholder farmers keep a few animals, usually a mixture of species that are well integrated into their farming practices. While not entirely reliant on livestock for income and food, such farmers regard animal ownership as an integral part of their support system. Owning animals confers a valued socio-economic role and makes an important contribution to the household economy. Providing displaced smallholders with animals according to their needs allows them to resume many of their former livelihoods activities – for example, draught animals can be critical to support cropping.

Building livestock assets as a new livelihood activity

For poorer households with restricted access to land, or limited opportunities to support themselves if they live in IDP camps, a small number of animals may provide an essential safety net. In some situations, very vulnerable households may be introduced to livestock for the first time or to species they have not kept before. However, livestock provision under such circumstances must always be accompanied by a support package that includes training for beneficiaries in livestock management.

PLANNING AND PREPARATION

Pre-intervention assessment

As livestock provision is usually a rehabilitation activity, there will probably be enough time for an agency to undertake a well-planned and detailed assessment. The assessment team may collect information through several sources, including: primary and secondary literature; observations; meetings with local experts, local government officials and community leaders; and focus group discussions. It is important that the assessment team shares its findings with local community and government representatives. Information specific to restocking may include:

- the geographical context – where most animals have been lost, physical access and communications in the affected areas (roads, bridges, telecommunications, etc.);
- a profile of the affected communities, including vulnerable groups, estimates of animals lost, husbandry practices and any traditional restocking strategies;
- people's aspirations and interests in owning livestock;
- estimates of the number of households that have lost animals and could be considered suitable for livestock provision;
- estimates of the numbers and types of livestock available for the programme in the affected area, as well as potential sources of livestock (markets, hatcheries, breeding centres, commercial or government farms, etc.);
- quantity and quality of essential local support services (animal health, feed and water, markets). Would livestock provision exacerbate existing overstocking and animal undernutrition?
- the roles of different livestock species in supporting household livelihoods;
- household roles in managing and benefiting from livestock, as well as the time and resources available to manage livestock;
- peoples' knowledge and skills in livestock production – is training required?
- is there a risk of the programme being jeopardized by livestock disease in the area?

- is a ready market for more animal products emerging as a result of the programme?
- are there agencies with long-term experience of sociocultural, economic and other realities in the area, and could they provide non-livestock support?
- does the security situation in the area place livestock and their owners at any risk?

Once the basic information has been collected and analysed, public meetings and community focus groups can be organized to improve understanding of more specific design issues, such as:

- defining the objectives (outcomes) and priorities of the programme;
- selection of beneficiaries and options for them to select the livestock best suited to their needs;
- availability and cost of different types of feed (fodder, concentrates and by-products);
- availability of animal health services, both public and private;
- number and condition of animals available for purchase and distribution;
- market prices for different classes of livestock;
- availability of any required facilities, such as shelters, stockades, handling facilities.

The LEGS decision-making tree for the provision of livestock (LEGS 2nd edition - Figure 9.1) is a valuable tool that can be used in a range of situations to stimulate discussion on restocking options.

Understanding the local restocking strategies

An important precondition for any livestock restocking programme is a thorough understanding of the local customs for supporting less well-off families, or those that have lost animals as a result of an emergency. Traditional loan systems are often very different from the restocking described in this chapter. The following questions should therefore be asked when attempting to unravel traditional support mechanisms:

- **Are there traditional systems for livestock redistribution and are these active?** Even systems that have become dormant owing to prolonged stress, such as chronic conflict, may be reactivated. However, providing livestock after extended conflict may need to be considered as a special case, as many networks and mechanisms will have been eroded or destroyed. Careful thought is needed on how best to support rehabilitation and development.
- **How do these systems operate and are there sectors of the community they fail to reach?** In some societies, support is provided along family, clan or ethnic lines, and some families will fall outside the system. Female-headed households frequently do not benefit, as many support systems operate through networks involving male heads of households.
- **Can traditional systems be adapted for a restocking project?** Sometimes a traditional livestock distribution system has features that can be adapted for an external programme. Examples are the process used for forming a local selection committee, beneficiary targeting methods, the use of a loan or gift system, and a requirement for matching contributions of animals from the community.

Design considerations

When designing a restocking intervention, it is important to consider the following:

- **Flexibility** is essential to respond quickly to changing local circumstances and, if necessary, to switch funds into alternative activities or interventions. Seasonal factors, the unexpected continuation of a drought, changes in the availability of feed and animals, livestock disease outbreaks and market prices all influence a programme's ability to provide animals and the beneficiaries' willingness to accept them.
- **Coordination** is essential where a number of different agencies, including national governments, are operating restocking programmes. In particular, there should be an agreement on a standard set of conditions, eligibility criteria and/or any replacement requirements (loans versus gifts).
- **The private sector** should be recognized as a key player. The success of a restocking programme inevitably depends on how well animals can be sourced and distributed, and the private sector (commercial farms, hatcheries, market traders, etc.) can play an important role here. The worst-case scenarios are where donor interventions actively discriminate and compete against the local traders and service providers.
- **Defining an exit strategy**. Many restocking programmes bridge the divide between emergency intervention and longer-term development. Consideration should be given to how the programme will end its distribution operations. This may best be done in consultation with other agencies implementing livestock and non-livestock programmes to assess long-term viability and other support options.

Technical considerations

Selection of beneficiaries

The selection of beneficiaries is one of the most challenging aspects of restocking interventions, and should be done with the participation of all stakeholders, including the target communities. It is important that concerns, issues and potential challenges are addressed before actual restocking takes place.

Difficult decisions may need to be made. Owning livestock requires a certain level of both economic and social security and the more vulnerable families, often in greatest need of humanitarian assistance, may not have the necessary resources, labour or skills to take on new or additional stock. In such situations, other types of support may be more appropriate, e.g. cash transfers. However, looking after a few poultry is usually within the reach of even the most vulnerable households. There is also a risk that a restocking intervention may benefit the richer and more resilient households in a community.

When considering restocking for pastoral households, it must be recognized that the nature of pastoralism is changing and many households are looking for a diverse livelihoods base as a way of securing assets and withstanding repeated stresses. This means that not all families or members of a family will want to return to full-time pastoralism. External actors and initiatives should endorse the choices made by these communities, and support diversity. If both local people and experts view livestock ownership as increasingly unsustainable for some households, external actors should consider other options to help these communities.

Ensuring that there are benefits for both men and women should be discussed and agreed prior to implementation. In particular, it is important that the selection of beneficiaries consider how women – both in female-headed households and male-headed households – will benefit.

Selection criteria for a restocking programme may include:

- number and type of animals in, or previously owned by, the household;
- experience and skills in keeping animals;
- household income level or known vulnerability grouping – does the household have sufficient resources to avoid selling or consuming the animals provided;
- household status (female-headed, number of children, etc.) and gender and children's roles in managing livestock;
- size and make-up of the household;
- access to adequate feed and water for the animals;
- access to markets;
- access to animal health services;
- recipients of other aid programmes or assistance;
- willingness to participate in the programme.

Selected beneficiaries should be registered and given identification to prove their participation and entitlements.

It is crucial that recipients are involved in discussions on the species, age, sex and number of animals they are to receive. When providing animals for smallholder farmers, there are likely to be variations in the need for different species based on the household's livelihood context. For herd reconstitution, the experience and local knowledge of livestock owners can be invaluable in designing the appropriate package, especially minimum viable herd sizes. In all circumstances, decisions made on the number and type of animals to be given to each household, and any associated conditions, must be shared with and understood by beneficiaries, their community and local stakeholders. Selection criteria, once agreed, should be the same across all communities within the programme.

Experience shows that programmes that allow time for completing this process and for the community to voice any concerns are more likely to get the targeting right. When the community is part of the process and can discuss issues openly, complaints about bias and bad feelings can be minimized.

Conditions for restocking

Certain conditions and expectations are often applied to households receiving livestock to help ensure that programme goals are achieved. Conditions should be clearly understood and agreed with the local selection committee, government departments and beneficiaries, so that they all understand the possible implications of any conditions. These most commonly concern the way in which animals are provided (loan or gift), responsibility for animal health, and offtake of distributed animals and their offspring.

Loan or gift?

Arguments supporting the provision of animals as a gift highlight the faster herd growth and improved household food security for beneficiaries. Loan systems, with repayment in

TABLE 15
Advantages and disadvantages of providing animals as gifts or loans

Gift	Loan
Advantages	**Advantages**
• Help for impoverished families • Animals become an immediate asset • Family gets the full benefits of any production • Easy and cheaper for the programme to administer	• Fosters sense of social responsibility, as other families can benefit from the funds • Flexible – can be in cash or in kind • Can strengthen community bonds and support conflict resolution • Can relieve people from social responsibility of giving animals to other family members, for ceremonies, or for local fund-raising events, until loan is repaid • Can increase the number of ultimate beneficiaries • Revolving fund mechanisms can be used to maintain approach for longer periods
Disadvantages	**Disadvantages**
• Gifts might cause handout mentality, e.g. where communities suffer recurrent droughts • Gifts might be perceived as of no value or low quality • Potentially decreased level of ownership • Fewer families may benefit when compared to the loan system since funds cannot be re-used	• Can undermine a project's objective if family has to sell animals to repay loan • Ownership of stock handed on to second-round beneficiaries may be disputed • Can be difficult to monitor repayments, especially in mobile communities • People may default on repayment – resolving this is labour- and time-intensive for a project

cash or animals, are thought by some to engender a greater sense of moral responsibility towards the programme and future beneficiaries, and to benefit a larger number of households. For example, setting up a system where initial beneficiaries hand on the offspring from the initial animals to second-round beneficiaries can have several advantages. These include strengthening social bonds between the two groups of beneficiaries from the programme's outset; using peer pressure to ensure programme rules are followed; cooperation between families; and more families benefiting from programme funds.

Loan repayments can be made either in cash or in kind. Some schemes are based on cash payback over periods of up to five years, and others on passing offspring on to other families, either as a fixed number of animals or a proportion of the herd increase over a period of time, (e.g. 2 years). When a loan system is chosen, the key point is to set repayment rates that are fair to the recipients and their community, and to allow flexibility if repayment proves difficult or if circumstances change. Repayments will usually extend beyond the programme period, and this should be taken into consideration at the design phase to ensure there are mechanisms to supervise and administer the scheme. However, there are circumstances, such as an acute emergency resulting from an earthquake, when a loan system would not be appropriate.

Whichever method is chosen, who owns the livestock (programme, community or beneficiary) also needs to be clear from the outset, so that if offspring are handed on they become the property of the new recipient, and cannot be reclaimed by the original owner.

Ownership under a loan-based system has to be clearly explained: usually it is the beneficiaries who are the rightful owners of animals, and not the programme. This is different from some traditional loan systems, where the animals remain the property of the lender, who retains the right to reclaim them for many years.

Control over the use of the animals

Should beneficiaries be restricted in selling or giving away some of their animals as gifts, or should they have total control over their animals? Placing restrictions on beneficiaries' use of animals can lead to faster herd growth; and where only a small number of animals has been given, households' access to income and food improves more rapidly. If there are no restrictions, families may benefit from contributing to social networks, which maintain strong clan or family ties through traditional gifting (e.g. for marriage) and the slaughter of animals for ceremonies or important guests. These practices and social ties provide a safety net in times of hardship, give people recognition and standing within the community, and reinforce traditional systems for helping the less well-off. When deciding whether or not to allow offtake, the financial needs of the family, such as having to pay school or medical fees, should also be taken into account. The feasibility of placing restrictions should also be considered, especially in mobile communities where monitoring and enforcement are difficult.

In some poultry distribution programmes, both male and female chicks have been provided to beneficiaries. If necessary, the males can be sold for cash, exchanged as a gift, used for ceremonial purposes, or again kept for home consumption. This relieves the pressure to sell or use the female birds, which allows them to grow and become productive layers.

Death and losses

Inevitably, after distribution there will be some deaths and losses. How these are handled must be agreed in advance and made clear to all concerned, especially the beneficiaries.

Animals may die through no fault of beneficiaries or through neglect. Likewise, theft may occur even if the beneficiaries have taken every feasible precaution. Most programmes will have a policy of replacing lost (dead or stolen) animals within an agreed period of time (usually 1-3 months) unless there is a clear case of neglect. If the animal is given as a loan (cash or in-kind repayment) then it is even more important that the beneficiaries' responsibilities are clarified. The local committee will invariably have an important adjudication role.

What species of animals?

The type of package depends partly on the objectives, the funds available, the community's advice and the availability of livestock. Livestock provision may have a range of aims which can be achieved by distributing different species. For example, poultry are a good option for female-headed households with limited access to labour, as the animals require minimum maintenance and have a short reproductive cycle. Sheep and goats may be more appropriate for families that have some labour and access to grazing available. A donkey could make a significant contribution to the income of families with limited access to farmland.

In dryland areas, mixed packages of sheep and goats have commonly been provided, although goats are often preferred because of their hardiness, browsing habits and ability to produce more milk than sheep. Poultry packages, often with an initial supply of feed

and housing materials (roofing sheets, netting, etc.), are commonly provided to households which have been relocated or have lost all their belongings.

Cost and coverage are important factors. With finite funds, the provision of relatively expensive cattle or buffalo will benefit fewer households than packages consisting of cheaper sheep and goats, or poultry.

What breed of animal?

The choice of breed depends on the production system in which they are being introduced. Invariably, local breeds or breeds that have been introduced successfully before should be the preferred choice. They will be better adapted to local conditions, traditional management practices and feed availability, and are likely to be more resistant to local diseases. They will also be the breeds that the beneficiaries are familiar with. Extreme caution should be exercised in bringing in exotic breeds or, to a lesser extent, similar local breeds brought in from a different region. There have been numerous negative experiences associated with the introduction of inappropriate breeds, including losses due to high mortality rates and poor performance. There is thus rarely any justification for introducing new or exotic breeds in an emergency situation.

Some stakeholders may argue about the benefits of replacing a traditional system with a more modern one, and there may be pressure from government technicians and politicians to introduce "improved" breeds to upgrade the local stock, especially poultry and milk cows. These requests should be considered with caution – there are many challenges to rearing exotic breeds and livestock owners should be made aware of these. Challenges include increased feed and water requirements, increased susceptibility to local diseases, less tolerance to extremes of temperatures, and increased labour needs. While there is evidence that "crossbreeds" can improve milk production, growth and meat yield, any increase in productivity would be dependent upon a corresponding increase in inputs: husbandry, feeding and animal health care, etc.

The situation is more complicated with poultry. The logistics of buying and redistributing local, backyard chickens on any scale are formidable. Securing day-old chicks or point-of-lay hens on the commercial market (national or international) is reasonably easy. However, with few exceptions these will be commercial hybrid birds bred specifically for either egg laying or meat production, with potential for fast growth and a high laying rate when produced and managed under commercial conditions. This means providing good-quality, balanced rations, controlled environments and good management that are rarely found in households affected by a disaster or an emergency. There are also so-called "dual-purpose" breeds, such as the Rhode Island Red and Australorp, which have been introduced into village situations. Such breeds are both robust yet capable of laying a reasonable quantity of eggs and producing a meaty carcass: but it is getting increasingly difficult to find breeding farms that can supply them.

What age of animal?

- Large ruminant females should ideally be young females of reproductive age that have yet to calve, or females that have already had one calf. In either case, the animals could be supplied pregnant. In terms of age, one would be looking at cattle in the region of 2–4 years old (with 4–6 of their eight permanent incisor teeth showing).

- Sheep and goats should ideally be between 12 and 24 months old (with probably four of their eight permanent incisor teeth showing) and have had one parturition to show they are fertile.
- Donkeys or mules should be at least three years old as they can suffer from chronic musculoskeletal problems if they are worked too young.
- Chickens are often distributed at point of lay, i.e. when they are around 21 weeks of age – meaning that someone has to rear the chicks to that stage. Distributing day-old chicks (DOCs) is not usually recommended as it is unlikely that the beneficiaries have the necessary brooding facilities. In some circumstances, birds 4–6 weeks of age may be distributed – at this stage they are reasonably robust and have been vaccinated.

How many animals of both sexes?

This will depend on whether the aim is to provide a viably sized flock/herd that can fully support the livelihoods of families (herd reconstitution) or, more commonly, to assist households replace animals that partly supported their livelihoods. The availability of funds and the amount spent per household are issues that need to be established, and it also raises the question of what is a viable herd or flock size. It is important to discuss the type of package with the community to ensure that the right species, breed, age, male-to-female ratio and number of animals are selected.

Factors influencing viable herd size are: household size, degree of dependence on livestock, ownership of other animals, availability of feed and water, potential herd growth rate, and the probability of weather extremes. The cultural roles of men, women and children may also affect the package, as management roles and livestock handling experience vary between communities and countries. For example, when women are being targeted, they might be experienced in using donkeys as a pack animal but not in managing camels.

The significant cost of large ruminants and equids makes it is unusual for packages to exceed one or two animals. In pastoral systems in arid or semi-arid regions, packages of sheep and goats can consist of between 20 and 40 animals if herd reconstitution is being offered, although in mixed farming systems 5–10 animals would be more common. Poultry packages usually consist of 6–12 hens or pullets (young birds about to come into lay), with one cockerel. Sometimes younger birds (up to one month of age) are distributed and these may be a mixture of male and female birds – the males being consumed or sold for meat.

For sheep and goats, it is usual to include one breeding male for every 15–20 breeding females. It is unusual to distribute bulls or stallions, although consideration may be given to providing a breeding male to be shared among a number of beneficiaries. For poultry packages, one cockerel to approximately 20 hens will suffice. Increasingly, chickens being distributed will come from commercial, hybrid stock, where the laying birds are supposed to be replaced with new hybrids at the end of their laying life, and replacements are not bred on the farm.

Timing of the intervention

The timing of livestock distribution must take into account how long it takes the local population to recover from the emergency. This ensures that people are able to care for livestock and are neither fully occupied with day-to-day survival nor too traumatized by the

disaster to take interest. In agropastoral and pastoral communities, livestock provision is often a medium-term, post-emergency intervention to rebuild assets, with a longer-term perspective of herd reconstitution

Once it has been decided to provide livestock, the next step is to work out the most appropriate season for buying animals so that they are in reasonable condition and have access to sufficient feed and water. It should also be a time when beneficiaries are not fully engaged in other activities such as harvesting. Seasonal livestock disease patterns are an important element to take into account. Decision on timing should be taken in conjunction with the target communities, using local seasonal crop and animal production calendars.

Scale of the intervention

The scale of the intervention depends on its aims, the extent of the disaster, available funds, size and type of package, community contributions and implementing agency capacity. If smallholders are the target group, funds may be sufficient to reach a larger number of beneficiaries, as only a few livestock are given to each household. However, the implementing agency must assess its own capacity to undertake all aspects of the programme, including follow-up support and monitoring, which may be a limiting factor.

Sourcing livestock

As a general rule, it is always best to buy animals locally which ensures they:

- are adapted to local conditions and husbandry practices;
- stimulate the local market for livestock;
- inject cash into the local economy;
- avoid the introduction of diseases;
- allow for animal redistribution within the area, rather than increasing stock numbers if overstocking or available feed resources are an issue.

Local purchase also makes it easier to assess the quality of stock. It reduces the level of quarantine needed, as beneficiaries take delivery of their animals after health checks and treatments. It also enables animal welfare standards to be supervised.

Before agencies buy animals locally, they must assess the likely effect of a large cash injection on livestock and other commodity prices in the local market, and the likely impact on the wider community. When an external agency is buying livestock, owners and traders selling animals are likely to inflate their prices, which increases livestock prices for all purchasers. This may in turn create an increase in the prices of other commodities, and poorer households may suffer.

If large numbers of animals are needed, purchase may have to take place over time and from a wider catchment area. Groups of beneficiaries could be selected to receive animals at different times, and staggering of purchases may also ease procurement logistics. Alternatively, livestock fairs can be used, where local owners and traders bring animals to a central point on a certain date, specifically for the beneficiaries and/or the programme to select and purchase the animals they require. Beneficiaries are usually given vouchers equal to the total value of the package, and use these to buy their animals; the sellers then redeem the cash from the programme implementing agency. Although higher prices are likely to prevail at the fairs since sellers will know that an external programme is buying,

the beneficiaries have the advantage being able to choose from a large number of animals. A veterinarian should be on hand to ensure that the animals are fit for purpose along with programme staff to ensure that any conditions are observed. Chapter 3 contains further information on livestock fairs and cash transfers.

The procurement procedures of some organizations may not be appropriate for buying small lots of animals, especially where competitive tendering is an official prerequisite. In such cases, implementing agencies may resort to using traders, rather than the beneficiaries, to procure the required number of animals. Where poultry are part of the restocking package, then invariably contracts have to be made with either hatcheries or breeding farms to supply birds in sufficient numbers. In both these situations, a contract should be signed by all parties, stating the price range, species, breeds, age, sex, number, and health and body condition of the animals needed. A clause explaining that animals not satisfying the criteria will be rejected must be included. One should also be aware that animal welfare may be compromised during holding and transport by traders, an issue which can be addressed by project and/or government technical staff, as well as a community representative accompanying the trader when purchasing – this will also prevent animals that are unfit for transportation from being trucked over long distances.

The question of who buys the animals is complex – for example, will the beneficiaries be given money to purchase them; will they be given vouchers which the sellers can redeem from either the project or the selection committee; will the committee or the project buy the animals, or a combination of these systems? Table 16 illustrates some of the main advantages and disadvantages of different purchase mechanisms.

Animal welfare

Most interventions, such as destocking and the provision of feed and water can be considered "pro-welfare". Animal welfare is, however, a factor that needs to be considered in a restocking programme both during purchase and longer term. The welfare of the distributed animals must be a priority and a minimum standard of care should be established. Beneficiaries therefore need to have the motivation, skills, time and resources necessary to properly manage the livestock they have been given. There may also be positive welfare considerations in actually delaying the procurement of animals as it gives the surviving livestock more time to recover body condition if local purchase is undertaken.

Animal health care and quality control

Whether animals are bought locally or by traders they need to have a health and body condition check. This is often done by the local veterinary department, which should have the necessary technical experience for diagnosing the major diseases in the area and helping with decisions on which vaccinations to give. Health checks at markets and many vaccination schemes are often a statutory function so projects should try to support whatever system is in place. This ensures government approval for the project, and helps to develop good collaborative links, allowing veterinary staff to have responsibility for their field of expertise. Some projects may not have specialized animal health staff and therefore are entirely reliant on government veterinarians. If there is no local veterinary department, or if no staff are available, the project should use private veterinarians and veterinary para-professionals (e.g. CAHWs) where appropriate.

TABLE 16
Advantages and disadvantages of different livestock purchasing systems

Who buys animals?	Advantages	Disadvantages
Beneficiary: with cash or voucher, at local market or livestock fair	• Beneficiaries select own animals, likely to be satisfied • Competitive price • Vouchers ensure money spent on livestock • Reduces cost and logistics	• Cash may not be spent on animals, and used for other needs instead • Hard to ensure all animals are vaccinated, treated for parasites and marked • Difficult to monitor animal welfare standards during purchase
Beneficiary and local committee: beneficiary selects and committee pays, at local market or livestock fair	• Ensures all money spent on livestock • Beneficiaries select own animals • Reduces costs and logistics • Committee likely to negotiate fair price • Animal welfare standards can be monitored during purchase	• Need to monitor purchases to ensure all beneficiaries receive agreed package (equity issues) • Committee must be accountable and keep clear records of spending • Hard to ensure all animals are vaccinated, treated for parasites and marked
Beneficiary and programme: beneficiary selects and programme pays, at local market or livestock fair	• Ensures all money spent on livestock • Beneficiaries select own animals • Animal welfare standards can be monitored during purchase • Reduces cost and logistics: no holding ground needed • Project can ensure all animals vaccinated, treated and marked	• Risk of higher prices once seller sees project is paying
Programme: at local markets or livestock fair	• Ensures all money spent on livestock • Animals are monitored for diseases in holding ground • Animals can be vaccinated, treated for parasites and marked • Animal welfare standards can be monitored during purchase	• Risk of higher prices once seller sees project is paying • Beneficiaries do not select own animals (but can select from bulk group) • Risk of buying animals in bad condition that beneficiaries may reject, if buyer not experienced in livestock purchase • Needs holding ground for animals before distribution, and feed, water • Risk of disease transmission in holding ground
Project via traders (contracts)	• Ensures quick purchase of large number of animals • Allows negotiation and price setting • Beneficiaries may be interested in breeds from new areas (e.g. drought-resistant) • Animals monitored for diseases in holding ground • Animals can be vaccinated, treated for parasites and marked	• Risk of animals being in bad condition • Trader may look for more profit by buying cheaper animals • Cannot ensure animal welfare during holding and transport • Needs holding ground for quarantine for animals from outside area and for bulking, feed, water • Risk of disease transmission in holding ground • Risk of introducing new diseases

If animals have been brought from outside the area or from an area where there is a known disease risk, they must be quarantined. Advice should be obtained from the local veterinary authorities regarding:

- the need to quarantine;
- duration;
- location and specification of the quarantine area;
- quarantine conditions (access, contact with other animals, etc.);
- standard treatments (vaccinations, anthelmintics, ectoparasite control);
- any prophylactic cover if required;
- inspection protocols.

Ownership and who is responsible for looking after the animals (feed, water, guards, etc.) during quarantine and who pays the veterinary bills needs to be agreed. Equally important is that the responsibility for any animals that are rejected or die during quarantine is clearly agreed and understood. Where animals are purchased by a trader, it is usual practice that the latter is fully responsible for the animals until they are released to the programme. However, animal welfare standards must be considered and therefore it may be pragmatic for the programme to assist in establishing suitable quarantine facilities, and for ensuring feed, water and adequate handling are available. Any sick animals should be dealt with by the local veterinary department where possible. The project should seriously consider the ethics and welfare implications of simply rejecting sick animals without treating them.

When animals are bulked together from different areas, the stress of handling, transportation and mixing with other animals can lead to serious health problems and even death. Apart from close supervision during quarantine, a programme of prophylactic cover (parasite control and vaccinations) may be called for. The potential risk of zoonotic diseases has to be addressed by ensuring that people and animals have separate water sources, that proper systems are on hand for disposing of manure and carcasses, and that enclosures exist to avoid animals sharing human living space. Overcrowding of animals and humans together raises concerns of public health and animal welfare.

Holding grounds

Holding grounds will be needed if animals are bulked (or quarantined) before distribution. When an organization is buying animals, it may either a) hold them while it purchases the total required number; or b) buy animals in small groups and distribute them soon after purchase. If a trader is obtaining the animals, it must be clear who is responsible for holding them pending distribution.

If holding facilities are required there will be the additional expense of constructing a safe enclosure and providing feed, water and shelter. There is an increased risk of theft and disease transmission, although holding grounds can act as quarantine areas and can help identify animals incubating disease. They also enable beneficiaries to select their animals from a larger group.

When purchasing from several local markets, it might be feasible to organize smaller holding facilities in each area and then distribute to beneficiaries once a holding ground is full. This avoids the need to keep large numbers of animals together and mixing animals from different markets, thereby reducing the risk of disease and stress. As with quarantine,

there may be justification in providing some prophylactic cover, and labour will be required to look after the animals during the day and guard them at night. When a holding ground houses several groups of animals over time, sanitary measures must be observed, with thorough cleaning of the holding facility between groups.

Support services

Restocking programmes depend upon the availability of local support services, such as veterinarians, CAHWs, livestock traders and feed suppliers, etc. It is important that an intervention's requirement for support services is determined and the actual availability and efficiency of such services adequately assessed. It is equally important that any intervention supports and builds the capacity of local service providers, be they government or private sector, rather than compete with them. Specific support services that may be relevant to a restocking programme may include:

- qualified veterinarians (public or private);
- para-veterinarians (e.g. CAHWs);
- livestock extension agents;
- feed and drug suppliers, veterinary pharmacies;
- market traders;
- relevant local NGOs or CBOs (community organizations).

If possible, a livestock restocking project should be integrated with ongoing development programmes addressing related concerns/needs.

Animal health services

This is one of the most important support services for households with newly acquired animals. Most programmes distribute animals that are healthy and have been vaccinated against prevalent diseases and treated for parasites. Thereafter, responsibility for their health rests with their new owners. It is important therefore that there is access to affordable animal health services. Various aspects of the services should be assessed:

- Are they functioning well?
- Can they be accessed by the target group?
- Are drugs and vaccines available in the area?
- Are services affordable?
- Is the veterinary department active and what is its role?

If no animal health services exist, the feasibility of a restocking programme may be questionable. One option would be for the programme to design, fund and implement an appropriate, sustainable service available to the wider community. However, supporting the establishment of primary animal health services is a major, long-term undertaking that should not be underestimated. Consultation with other agencies active in the area may identify other existing or future programmes that support animal health service provision.

The programme, unless it has its own technical staff, will also require veterinary expertise to inspect animals to be purchased and ensure they are healthy, and to undertake any required treatments and/or quarantine.

Training

People who are less experienced with keeping livestock may need skills and knowledge developed. Training needs should be assessed during the project design phase and built into the activity plan. Additional support can be provided through training in basic animal health care and management, particularly for those who are less familiar with livestock. It is likely that all beneficiaries will benefit from advice on treating parasites, caring for newborn and young animals, and on diseases that can be prevented by vaccination and local animal health services.

Additional inputs

Different projects have distributed food rations, additional animals for sale or exchange, pack animals, basic household items and/or tools to support restocked households. Such inputs aim to help families to avoid having to sell animals to support themselves, to provide them with a source of food until animals are sufficiently productive and, for displaced families, to provide the basic tools they need to return to their former ways of life.

When food rations are provided, care should be taken to minimize the potential for conflict with community members who are not receiving such food, possibly by providing rations for the most vulnerable too. Links must be established with agencies involved in food distribution in the area.

Feed, water and shelter

Feed availability may be a constraint in a drought or when crops and grazing have been destroyed. In such situations restocking may not be appropriate. Likewise, if prior to the emergency an area was already overstocked and offered insufficient feed to maintain existing animals, the sustainability of any proposed restocking programme should be questioned. If feed distribution is justified, it may be viable only if a reasonably small number of animals are to be distributed. Some organizations deliver packages that include an initial stock of animals/birds plus a starter kit consisting of feed (especially where young and growing stock are involved) and some equipment. This is often done in poultry distribution programmes.

Animals need shelter to keep warm or cool and dry while enclosures are required to prevent the spread of disease and to protect them from predators and theft. Where shelters are missing or have been destroyed, building materials (roofing sheets, wire netting, cement, etc.) may be included in a restocking package.

Cost-effectiveness

The cost of restocking programmes can be considerable compared with other interventions, and opinions vary regarding their cost-effectiveness. Small-scale distribution of a few animals is likely to be cost-effective, as operational and animal costs are relatively low and returns may be reasonable. However, care is needed with herd reconstitution programmes involving much larger numbers of animals. When assessing the full costs of a restocking project, the following elements should be considered:

- project operation costs: implementing staff, logistics, monitoring, impact assessment;
- cost of the animals purchased;
- number of families benefiting;
- vaccinations and other treatments;

- feed rations (if being provided);
- shelter materials (if being provided);
- distribution costs: transport, holding grounds/quarantines and stock losses;
- training of beneficiaries;
- support costs from other agencies/government;
- overheads: programme administration and management, contingencies.

Risk assessment

All livestock emergency interventions have inherent risks and it is important that these are, as far as possible, foreseen and assessed. For a restocking programme, potential risks are listed in Table 17.

IMPLEMENTATION

Phasing

A number of distinct phases can be identified in a restocking programme.

Launch

Every opportunity must be taken to inform and communicate with the targeted communities. One or more launch meeting(s) should be organized so that local communities can learn, discuss and agree on all aspects of the intervention. The following are common areas requiring clarification:

- geographical scope;
- selection criteria;

TABLE 17
Risks and mitigation options in restocking

Risk	Mitigation
Disruption and undermining of the local private sector by providing free or competing services (animals, animal health, feed, etc.)	Ensure that the private sector are full partners and beneficiaries in the provision of goods and services
Disruption of market prices from a substantial, external buyer entering the market	Try to purchase animals through existing market channels
Vulnerable and destitute households may not be selected due to their limited capacity to manage livestock	Ensure that other support packages are available, such as cash transfers, food aid
Competition between agencies applying different conditions in the same area	Ensure proper collaboration between implementing agencies together with the local government authorities
Distribution of inappropriate species and/or breeds to beneficiaries	Ensure the local production systems and capacities are fully understood
Potential environmental degradation by introducing more animals than can be supported by local resources	Ensure a proper assessment of the balance between available feed resources and the number of animals that have to be supported
Beneficiaries who do not have the skills and resources to look after them; potential animal welfare issues	Ensure greater attention to selection criteria, supervision and support packages such as training
M & E and impact assessments compromised by poor design, lack of assessment criteria and baseline data	Ensure valuation and impact assessment is an integral component in the design of the programme, with funds specifically allocated

- what will (and will not) be provided by the intervention – number and type of animals to be distributed;
- how will the animals be selected and distributed;
- ownership of the distributed animals;
- responsibilities of the programme to the beneficiaries;
- responsibilities of the beneficiaries for looking after the animals; payment for animal health services; sale and disposal of animals and their offspring;
- details of any repayment scheme – cash amounts, number and type of animal for in-kind repayment schedules, etc.;
- schedules for local meetings;
- monitoring and evaluation plan;
- procedures for how disputes and disagreements are handled.

Pilot Phase (if required)

Once all the stakeholders are clear on their respective roles and responsibilities, it may be advisable to start a pilot phase to test and fine-tune the activities and logistics. Animals should only be distributed in one or two locations (villages or districts) just large enough to ensure that the intervention can be fully tested. Emphasis should be placed on assessing the day-to-day operations, especially the logistics of sourcing, inspecting and distributing animals, as well as community response. When the pilot phase is completed, it should be reviewed and any necessary adjustments made as quickly as possible so that no time is lost in rolling out the full programme. Urgent situations may dictate a more pragmatic approach and a limited pilot phase.

Main Phase

This may involve adding new teams and training more operators to scale up the intervention. It is important that common operating standards and conditions are followed at all the sites.

Throughout the implementation period, it should be ensured that flexibility is built into the design so that the programme can quickly respond to changing circumstance such as the weather, disease outbreaks and market prices for livestock and other commodities. Good communication with the local committees and the beneficiaries is essential to provide rapid and accurate feedback allowing the programme to adapt quickly.

Exit Phase

An **exit strategy** is required to consider how the programme will end – this is important since the end of an emergency is rarely clearly defined and restocking is an intervention that often continues well into the recovery phase. An exit strategy may consider:

- ensuring beneficiaries, community leaders and local authorities are fully informed and understand the exit strategy at the start of the programme;
- ensuring beneficiaries, community leaders and local authorities are fully informed in advance of the closure of the programme;
- who will be responsible for supervising the beneficiaries and their animals, especially if repayment, either in kind or cash, was a condition of the programme;
- finding roles for locally recruited programme staff;

- ensuring the community is involved in any evaluation and informed of the results and lessons learned.

Evaluation Phase

When the proposed activities are completed, a participatory evaluation should be undertaken. It is important that its findings and conclusions are documented so that the lessons learned can be used to improve future interventions. Ideally, although regrettably, this rarely happens, post-intervention impact assessments should be undertaken at least one year later to assess the real impact of intervention on the targeted beneficiaries. More information on evaluation and impact assessment can be found later in this chapter and in Chapter 10.

Coordination

Although the benefits of a coordinated approach are widely understood, it is often hard to reach agreement on the roles and responsibilities of the various players. A lack of coordination can seriously undermine a programme. For example, if one agency is giving out livestock as gifts and another is using a loan system, this can result in inter-agency competition over sourcing, and create antagonism between recipient communities. Too many donors competing for the same breeding stock can result in shortages, price inflation and the purchase of poor-quality animals. Some agencies may be better placed than others to provide support services, such as animal health assistance. Others may be able to offer marketing support or advice on low-cost animal shelters.

Restocking Committee

A multi-disciplinary/multi-agency restocking committee is best placed to oversee a restocking programme. Membership of the committee may include those directly involved, such as a senior local administrator, the district veterinarian officer, livestock experts, local livestock traders and farmer/herder representatives from the targeted communities. Some successful and well-motivated committees have played an important role in other respects such as helping with livestock purchase and monitoring beneficiary families. Other committees have allocated one seat for a beneficiaries' representative to ensure that recipients' interests were represented.

The committee should meet regularly so that it can quickly start operations and respond efficiently and effectively to issues as they arise. Minutes of all meetings should be kept as a record for subsequent reviews and evaluations. The roles and responsibilities of such committees commonly include:

- reviewing the objectives, goals, expectations and risks associated with the intervention;
- deciding the scale of the intervention – how many households, how many (and types) of animals to be distributed;
- profiling the project's beneficiaries;
- the pros and cons of the different restocking options and conditions;
- cultural factors, especially regarding the owning and gifting of animals;
- logistical and operational issues that will need to be resolved;

- how monitoring and evaluation considerations will be handled;
- how the team will operate, with individual and group responsibilities clearly defined;
- supervision and monitoring of restocking activities with the implementing agency;
- selection of beneficiaries (advising on criteria and selection method);
- monitoring livestock purchases to ensure correct size, age, sex and condition;
- assessing the fitness of animals to be distributed, and participating in distribution with the government livestock department/project;
- monitoring recipients, herd growth, and use of livestock, and adherence to monitoring conditions imposed on the sale of restocked animals.

Local site committees

Committees should be established at each site (a contiguous area that could be a village, council area or even the district) where the restocking will be carried out. This will allow community leaders, beneficiary representatives and local councillors to meet regularly with the programme to provide feedback, raise concerns and resolve disputes. Where appropriate, at least 25 percent of the committee members should be women, to ensure their views and experience are fully taken into account. Local committees should meet at convenient times and places for farmers and women to participate.

Beneficiary responsibilities

The programme must ensure that recipients fully understand what the programme involves and what their responsibilities are. Information may need to be given on:

- any restrictions on the ownership, sale or disposal of the original animals;
- any restrictions on the ownership, sale or disposal of subsequent offspring;
- any repayment-in-kind schemes: number and sex of offspring, time scale, etc.;
- requirements for looking after the animals: feed, water, shelter and animal health;
- participation in any monitoring and evaluation;
- procedures in the event of death or theft of animals;
- responsibilities of the programme to the beneficiaries;
- to whom are the beneficiaries responsible regarding the programme (agency, local authorities, local committee, etc.).

Where conditions are imposed, a simple letter of agreement is helpful in setting out the key responsibilities of the beneficiaries and the implementing agency. It should be written in the local language so that beneficiaries who cannot read can refer to the letter with help from others. A witness from the local committee or a local leader should also countersign it. It is advisable to ask the local administration to be represented at these meetings so that everyone is aware of the terms and conditions. Copies of the agreement should be kept by the programme and it is useful for the local administration to retain a copy.

Purchase, inspection, transportation and distribution of animals

Specifications

Whether animals are bought locally or by traders, they all need to be physically examined to ensure they are healthy and meet the conditions of sale as agreed with the local community and beneficiaries (age, sex, breed/type, etc.). This is often done by the local veterinary

department, which should have the experience necessary to diagnose the major diseases in the area and to help with decisions regarding vaccinations and any other prophylactic cover required. Organizations which do not have specialized staff will be entirely reliant on government or private veterinarians. It can be helpful to have a community representative present to ensure that beneficiary interests are taken into account. The specifications for the animals to be purchased usually include:

- species
- breed or type
- sex
- age
- physiological condition (pregnant, non-pregnant) and sometimes parity (number of previous births)
- weight range
- physical appearance and health (see following "Inspection criteria")
- country/region of origin.

It is good practice for technical staff from the programme and/or veterinary department to accompany a beneficiary or trader when purchasing animals to ensure that the animals are healthy and fit to be moved. If beneficiaries are to buy the animals directly from the local market or a fair, a system has to be arranged for ensuring that all the animals are inspected, vaccinated, treated for parasites and tagged/marked for future identification before they are taken away. This is best done in a simple holding area where the veterinarian undertakes the necessary tasks. When beneficiaries are buying the animals directly, it is harder to monitor the animals being purchased, so beneficiaries have to agree to present the animals to the veterinary staff after purchase. Having the programme pay for this service may provide the necessary incentive, but it is likely that some animals will not be presented.

Inspection criteria.

The following criteria are commonly used when inspecting animals for purchase and will usually form the basis for the original specifications:

- age – based on teeth and general appearance;
- parity – the number of pregnancies a female has had;
- breed/type – does the animal have the general characteristics (size, colour, horned or polled, etc.) of the type of animal being purchased;
- sex – male, females, castrates;
- weight – standards will vary by species, breed, age and sex. Weighing can be done by weigh crates (cattle, sheep and goats, pigs, buffalo), hand scales (sheep and goats), weigh bands (a calibrated tape that measures the girth of an animals and estimates its weight). It may be sufficient just to weigh a representative sample of the animals. In many circumstances, assessing body condition score may be the practical option.
- Physical appearance:
  - general body condition: emaciated, skinny, medium, fat. Some livestock professionals may use a "condition scoring" scheme which ranks animals from 0 (emaciated) to 5 (over-fat) (see Annex 1).

- eyes – bright and free of infection;
- nasal areas free of mucosal discharge;
- beaks undamaged;
- teeth – correct number for age – missing or long; withdrawn gums are a sign of old age;
- no sign of anaemia, i.e. very pale mucus membranes around the eyes and gums;
- skin, fleece, hair or feathers free of wounds or signs of external parasites;
- clean tail area with no sign of diarrhoea;
- correct number of teats with no signs of abnormalities in females;
- two, well-proportioned testicles free of abnormalities in uncastrated males;
- genital area (vagina, penis and penal sheath, cloaca) free of abnormalities and pus;
- feet – no signs of lameness or overgrown, misshapen hooves, feet, claws;
- any obvious signs of pregnancy.

Identification

Once animals have been purchased, it can be helpful to identify them. However, this can be time-consuming, adds more expense and may compromise welfare, so identification should only be considered if individual animals are to be monitored regularly. Temporary identification is more welfare-friendly. Some animals may already have brands or ear notches which can be recorded. Available identification techniques include:

Permanent identification:

- **Ear tags** (numbered and coloured) are available in larger sizes suitable for cattle and smaller ones for animals such as sheep, goats and pigs. These are reasonably permanent if correctly applied but if a more secure and permanent solution is required, double tagging in both ears is an option. A record needs to be kept of each tag number with basic information regarding owner, species, sex and age, etc. The programme should ensure that it has an adequate supply of tags and applicators and that staff are properly trained to use them. Ear tags are generally not used for equids due to welfare considerations.
- **Ear notching** is where a specific shape is permanently cut or stamped out of different areas of the outer ear. Special pliers need to be used by trained operators, with a local anaesthetic and antiseptic spray. Ear notching identifies a batch of animals but not individual animals. High welfare standards must be maintained throughout this procedure.
- **Branding** of ruminants and equids is not recommended. To be applied correctly and humanely requires skilled personnel and the proper equipment, otherwise there are animal welfare concerns.

Temporary identification:

- **Temporary colour marks** (lasting a few days to a week) can be provided with wax marking sticks, special marking paint/dyes or aerosol cans of paint/dye applied to the skin, fleece or horns.
- **Neck chains** with tags.

Temporary identification techniques are cheap and usually easy to implement, though problems can result when identification is lost, removed or unclear, so careful thought needs to be given to the aim of identifying the animals during planning. Probably of greatest importance is that temporary identification allows good standards of animal welfare to be maintained.

If a household is only receiving one donkey or a mule, or a milking cow, noting the animal's colour and main markings and features can also provide a means of future identification.

Livestock transport

Transport will be needed if animals are brought in from outside the area, and if a trader is contracted to do the purchasing, he/she will be expected to organize transport. Close attention must be paid to transport arrangements to ensure good animal welfare standards are maintained and that animals arrive with the minimum of stress, loss or damage. Again, project or local veterinary staff, together with a community representative accompanying the trader, can supervise the transport arrangements. Attention must be given to:

- avoiding packing animals either so tightly or loosely as to cause discomfort and injury;
- providing sufficient ventilation and shade;
- ensuring sufficient stops for watering, feeding and, if necessary, milking;
- a maximum number of hours' travel per day and a minimum number of hours' rest should be stipulated.

Also important is to ensure adequate cleaning of trucks before animals are loaded and after they are unloaded. Ideally they should be washed with a pressure hose and disinfectant but this is not always possible. As a very minimum, trucks should be swept clean. This decreases the risk of transmitting diseases between groups of animals, especially when trucks are likely to carry animals from a number of areas, possibly with a range of different diseases.

Quarantine

If animals are being purchased from outside the programme area or from areas with known disease risks, it may be necessary to quarantine them before they are distributed. The local veterinary authorities will advise if this is necessary and what conditions apply

Livestock distribution

If beneficiaries do not choose their own animals in the market, then a fair system for making selections is required. Whatever system is used, it needs to be discussed and agreed between the programme, the local committee and the beneficiaries to avoid misunderstandings and complaints during distribution. Examples of distribution methods include:

- Beneficiaries draw lots to decide the order in which they will choose animals. Everyone selects a few animals in turn and then waits for their turn to come around again, etc. until everyone has their correct share.
- Animals are distributed through a lottery system, with each animal or group of animals selected and given to a beneficiary whose name is drawn at random. This is repeated until all the animals have been distributed.
- Beneficiaries are divided into groups and one group at a time is provided with livestock. This system has the advantage of simplifying the logistics and making livestock purchasing easier.

TABLE 18
Stakeholders' responsibilities in restocking programmes

Stakeholder	Possible responsibilities
Local committee	Helping set criteria for beneficiary selection, and livestock purchase and distribution; a major role in implementing these, such as dealing with problems and reporting major issues to the project; helping monitor beneficiaries, track loan repayments in cash or animals, and undertake evaluations
Veterinary department and primary animal health care providers	Animal health checks at purchase or in quarantine; ensuring animal welfare standards are maintained throughout; identifying unsuitable animals; vaccinations and treatment for parasites; statutory disease control and outbreak reporting in distributed stock; animal health services
Local leaders	A major role in facilitating the process, linking the programme and the community; identifying potential beneficiaries, monitoring
Beneficiaries	Obtaining treatment for sick animals; ensuring good animal welfare; respecting post-distribution restrictions on sale/gifts of animals; monitoring and evaluation; repaying loans
Community	Selecting the local site committee; helping with beneficiary selection, and respecting the final decision on this; providing animals for beneficiaries if matching system used; monitoring and evaluation
Project	Overall budget management; coordination of stakeholders; ensuring criteria for selection, purchase, distribution, support and monitoring are followed; ensuring animal welfare standards; helping to resolve major issues; organizing evaluations and impact assessments; facilitating stakeholder involvement

Beneficiaries should also be clear about the date, time and location of distribution. It is always important to cross-check beneficiaries' identities – each beneficiary should bring his/her programme registration document and some form of ID. If no formal identification is available, verification can be made by community leaders or other witnesses. Details (permanent or temporary tag numbers) of the animals gifted need to be recorded.

On receiving the animals, beneficiaries must sign (or thumb-print) a receipt, which is then countersigned by a local witness and a programme staff member. Any beneficiary who does not turn up for the distribution can be allowed to join another group if possible, or given another opportunity to take their pick.

Management and supervision of restocking programmes

Overall management and coordination of a restocking programme is the responsibility of the main implementing agency. Other interested parties can also share some of the responsibility, including the beneficiaries themselves, community leaders – usually through a local committee – the multidisciplinary/agency restocking committee, veterinary/livestock department staff and the local administration. It is important that roles and responsibilities are clearly defined and agreed at the start of the programme.

Beneficiaries and the local committee need to know where to go for help, information and advice, and to report problems. For example, beneficiaries should be informed about where to obtain assistance if animals are sick, or where to report an animal's death.

NOTES ON MONITORING, EVALUATION AND IMPACT ASSESSMENT

The evidence base for restocking programmes still needs to be expanded, which makes monitoring and impact assessments particularly important. Impact assessments are by no means routine in all restocking programmes – often it is not practical to assess numerous, relatively small interventions. In such cases, implementing agencies may consider undertaking impact assessments on a number of separate but similar interventions.

Monitoring and evaluation

Due to the length of livestock distribution projects, monitoring needs to be carried out at least two years after distribution. As well as assessing the progress of the project, monitoring should also provide information on the availability and suitability of support such as veterinary services. Such information can help identify areas that need additional support, such as further training of CAHWs, support the veterinary department to provide vaccinations to prevent annual disease outbreaks, and identify ways of ensuring that CAHWs have access to quality drugs.

Monitoring is more likely to be successful if the changes that people hope to see from livestock distribution are discussed at the start of the project and a few key success indicators are agreed. Progress can then be assessed against these, and the project adjusted if necessary.

Twice-yearly monitoring is probably sufficient for information collection, but households need more regular contact to deal with issues arising in the first few months after receiving livestock, such as access to animal health care, and livestock welfare and management. Monitoring visits can be linked to seasonal production calendars, such as lambing time, as a way of obtaining first-hand information. In some projects, monitoring is carried out by the selection committee; in others by selected local monitors, together with government animal health/production staff; and in others by the project. If local monitors are being used, the project must consider paying them, and budget accordingly.

With mobile communities, when livestock and households move seasonally, monitoring can be particularly challenging and it may be possible to undertake monitoring visits at only certain key times of year. In such situations, service providers (government and private) can be used to collect monitoring data. CAHWs can have a particularly important role to play here as they are likely to have the most frequent contacts, but remuneration would need to be agreed.

Qualitative and quantitative data are both useful, and complement each other. Simple forms can be used to collect quantitative information about disease cases, treatments, vaccinations, deworming, and numbers of births and deaths in the distributed animals.

The type of monitoring information that can be gathered includes:

- number and types of animals distributed;
- number and types of recipient households;
- changes in household herd size and composition;
- animal health provided; treatments and recovery rates;
- mortality rates;
- production data: births, milk, eggs, animal/bird sales;
- how restocked families are managing with their animals; labour demands, animal health care, expenses, access to feed and water, problematic issues;
- progress with loan/gift repayments.

Involving the community in the design of the monitoring programme can help identify sensitivities about specific types of information that need to be collected and how best to overcome such problems. For example, many pastoral groups do not like direct questioning about the number of animals in their herds; participatory interviews, if done well, can provide information on herd growth and numbers without directly asking these questions.

Meetings with beneficiaries and other key stakeholders such as local government and local service providers can give recognition to the role they have played in the project, as well as building community and local government capacity and learning.

Impact assessment

Impact assessments are important for determining the actual benefits of a restocking programme, the cost-benefits, and the reasons for what worked and what did not.

Examples of impact indicators used by some restocking programmes:

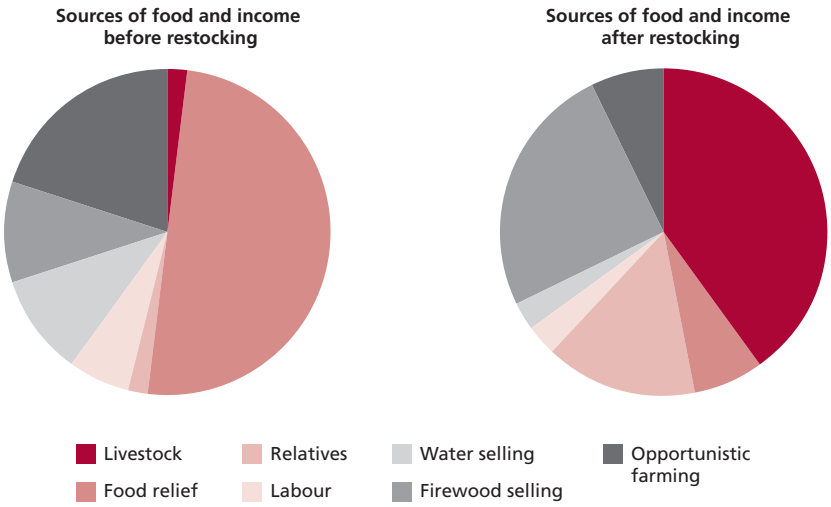
- change in animal numbers;
- impact on livelihoods and assets through livelihoods data (sources of income and food, assets, socio-economic standing, change in livelihood practices);
- impact on different family members (men, women and children);
- future aspirations;
- impact on markets;
- natural resources and land use;
- impact on the wider community;
- cost-effectiveness and opportunity costs.

The information provided below (see Figure 2) shows how participatory tools (in this case proportional piling) can yield relevant data for assessing impact.

CHECKLIST
Baseline information:

- What phase has the emergency reached?
- What species and numbers of animals were held by the affected households prior to the emergency?
- What was the impact of the emergency on the affected households: how many animals remain and what condition are they in?
- Are there suitable animals available for purchase?
- Are there sufficient natural feed resources (grazing, crop residues and by-products) to support a restocking programme?
- Are there traditional/cultural restocking strategies that can be built on?
- What local institutions and support services (animal health) exist that can support and facilitate restocking?
- Have relevant infrastructure requirements (markets, roads, water and electricity) been adequately defined?

FIGURE 2
Sources and proportions of household food and income before and after restocking using proportional piling techniques in the Fik zone of Somali Region, Ethiopia in 2005



Source: Wekesa, 2005

Design considerations:

- Have the relevant sections of LEGS been read?
- Is restocking the most appropriate intervention – have alternatives being explored (see LEGS Participatory Response Identification Matrix)?
- Will the animals be provided as a gift or a loan?
- Have the loan conditions (repayments) been agreed?
- How will any deaths or thefts of animals be handled?
- Have the expected objectives/outcomes and outputs been adequately thought through – are they SMART?
- Is the scale and scope of the emergency and its implications fully understood?
- Have national, provincial or district disaster response committees been established?
- Will restocking be undertaken in conjunction with other interventions?
- What potential partners (government, international or national NGOs, CBOs) are operating in the area?
- Is there scope for collaboration – can a coordination forum be established?
- Is there an existing mechanism for restocking households that have lost animals?
- Is the proposed timescale realistic?
- Have animal welfare issues been considered?
- Is there a link to a longer rehabilitation or development programme?

- Is there sufficient flexibility in the design to divert funds to other activities, if circumstances change?
- Is there an exit strategy – who will supervise any future loan repayments?
- Have monitoring, evaluation and impact assessment requirements been taken into account?

Preparation:

- Has an emergency livestock response committees been established?
- Has a needs assessment been undertaken?
- Has a restocking committee been established – does it have the necessary skills and expertise?
- Have local site committees been established?
- Have the appropriate restocking options been discussed and agreed with the community?
- Has the scale of the proposed programme (geographical area, number of beneficiaries, number and type of animals to the purchased, etc.) been adequately defined?
- Are the required skills available locally to support the programme: will people need training or do skills have to be brought in?
- Do the recipient households have the time, labour, skills, feed and water to support additional animals?
- Are there particular hotspots that can be identified and prioritized?
- Are the beneficiaries (including women) and local institutions/authorities adequately represented in the programme?
- Has the selection (and selection criteria) of beneficiaries been discussed and agreed with key stakeholders?
- Have the beneficiaries and key stakeholders (local authorities) been fully informed about the proposed intervention and how it will operate?
- Do local contractual agreements need to be prepared – are they clear and unambiguous?
- Is there a mechanism in place for resolving disputes?
- Have the monitoring requirements of the programme being adequately covered?
- Have potential risks been adequately assessed?

Selecting, purchasing and distributing animals

- Have the most appropriate list of species and breeds/types been agreed ?
- Have the specifications and inspection criteria (age, sex, condition, health, parity, etc.) for purchasing the animals been agreed?
- Who will inspect the animals – do they have the necessary skills and equipment?
- Do livestock fairs need to be arranged?
- Are there conditions attached to receiving animals (repayments in kind, etc.) – do the recipients fully understand them?
- What checks will be made on the specifications and health of the animals – who will undertake them?
- Where and how will the animals be purchased?

- Will animals have to be transported – are transport arrangements adequate?
- How will the animals be identified (ear tags, etc.)?
- How will the animals be distributed to the beneficiaries?
- Is there any need for quarantine, have the local veterinary authorities been involved?
- Are holding facilities required?
- Who will be responsible for follow-up and supporting the recipient households – do they have the skills, equipment and facilities to do the job?

Monitoring and evaluation

- Is there adequate baseline information available, or does it need to be collected?
- Are donors' requirements regarding monitoring, evaluation and impact assessment fully understood and incorporated?
- Have the monitoring procedures been agreed?
- Have the information parameters to be collected been agreed?
- Is monitoring and evaluation an integral component of project design and has it been adequately funded?
- Have realistic impact indicators been agreed?
- Is an impact assessment envisaged and has it been adequately financed?

Chapter 10
Monitoring, evaluation and impact assessment

INTRODUCTION

This chapter aims to provide a practical approach for designing and implementing the monitoring and evaluation (M&E) component of emergency livestock projects. It relates directly to the LEGS common standard: "Monitoring and evaluation are conducted to check and refine implementation as necessary, as well as draw lessons for future programming."

Recognition is given to the field-level operational and funding realities of disaster contexts and the day-to-day difficulties faced by relief and livestock workers, while the following pages also show how M&E and impact assessment can be improved. It is assumed that in all types of emergencies – rapid-onset, slow-onset or complex – experiences and lessons learned should inform future programming. In the absence of a learning approach, the tendency is to repeat interventions without having a full understanding of their impact. Impact assessment should be used, regardless of the size of a project in terms of geographical coverage, number of beneficiaries or level of funding. In large, integrated programmes it is possible to assess specific livestock-related activities.

Definitions

Various terms are used in the assessment of emergency livestock projects:

- **Monitoring** is the systematic measurement of a project over time. It usually involves the regular collection of information. It allows changes to be made during the project, while also providing information for periodic reviews, impact assessments or evaluations.
- A **review** is an assessment of a project at a specific point in time. It can focus on particular aspects of the project, and involves a more detailed analysis of issues than is possible with monitoring alone. A review is conducted in response to a specific issue or problem that has arisen.
- An **evaluation** is a comprehensive, usually formal, assessment of a project. Typically, it relates project activities and achievements to project objectives, so the value of an evaluation depends partly on the clarity and relevance of the stated project objectives. Evaluation can also assess the efficiency of work in relation to resources, particularly financial inputs, and can look at the sustainability and long-term implications of projects. Evaluations are performed fairly infrequently, and usually take place at the end of projects.
- An **impact assessment** looks at a project's effects on people, the environment or institutions. It identifies the changes that have occurred in people's livelihoods during a project, and determines whether and how these changes relate to project activities. Humanitarian and development agencies often refer to the link between project activities and impact as "attribution", which is similar to the more scientific terms "association" or "causation".

TABLE 19
Examples of process and impact indicators for emergency livestock interventions

Type of livestock intervention	Process indicators	Impact indicators
Commercial destocking	Number of cattle purchased	Use of income derived from destocking by recipient households
Slaughter destocking	Number of female-headed households receiving dried meat	Nutritional contribution of dried meat consumed by children
Livestock feed supplementation	Weight of livestock concentrate feed fed per day, per livestock species	Mortality in fed versus unfed animals
Emergency water supply	Number of wells rehabilitated	Proportion of livestock receiving minimum recommended water intake, by species
Livestock shelter	Number of shelters constructed	Mortality in sheltered versus unsheltered animals
Veterinary care	Volume of oxytetracycline delivered to village clinics	Proportion of livestock recovering from diseases treated by oxytetracycline
Restocking	Number of households receiving sheep and goats	Use of income derived from sale of offspring

Both routine and one-off assessments require the use of measurement indicators. There are two main types of indicators:

- **Process indicators** measure the implementation of project activities, or what is being done. Most emergency livestock projects focus on process indicators, which is relatively easy, as it involves the simple counting of items or people, such as the number of bottles of medicine provided to a veterinary worker. Process indicators are important because they often relate to project expenditure, and are therefore used for financial accountability.
- **Impact indicators** measure the end result or final impact of project activities. In general, they are not well defined or properly used by livestock projects.

Common constraints to evaluation and impact assessment

Discussion with relief and livestock workers indicates a number of common constraints to the effective evaluation and impact assessment of emergency livestock projects. These constraints are listed in Table 20 along with approaches for addressing each and the section of the guidelines that provides further advice.

In addition, there are organizational and institutional factors that hinder assessment. For example, many field workers and programme managers express concerns about donor reporting requirements, which focus heavily on the reporting of project activities, often quantitatively. They also note that some donors are reluctant to fund end-of-project evaluations or impact assessments. Practitioners also describe conditions within their own organizations in which senior management do not support systematic evaluation or impact assessment. These problems are not specific to livestock interventions in emergencies, but reflect wider weaknesses in humanitarian action. An underlying assumption of these guidelines is that all actors involved in emergency livestock interventions should

TABLE 20
Solutions for common constraints to evaluation and impact assessment of emergency livestock interventions

Constraint	Solution
"We do not know what the project was supposed to achieve, so it is difficult to evaluate."	➤ See section on Measuring *SMART objectives*.
"We do not have enough time or funds for monitoring and evaluation."	Plan and budget for monitoring and evaluation at the proposal stage. ➤ See section on *Meaningful indicators*.
"We do not have any baseline data."	Options include: • collection of critical baseline indicators during an initial, rapid participatory assessment; • retrospective approaches, triangulated by secondary data and project monitoring data. ➤ See sections on *When to measure process; when to measure impact; and Use of participatory methods and attribution*.
"We do not really know what 'impact' means."	Think about the ultimate aim of the project in terms of people's livelihoods. Ask community members how they think the project might affect them in terms of indicators such as food consumption, income, and protection of livestock assets. ➤ See section on *Selecting the impact indicators*.
"Ethically, we cannot use control groups to assess impact."	It is often possible to identify control groups within target populations. ➤ See section on *Use of participatory methods and attribution*.
"A lot of impact is qualitative and therefore difficult to measure."	Use systematic, repeated scoring or ranking methods. ➤ See section on *Use of participatory methods and attribution*.
"It is difficult to measure changes in livestock health due to better feed or veterinary care."	In areas where there is a long history of livestock keeping, indigenous knowledge is usually extensive – use participatory methods to measure the changes. ➤ See section on *Defining the boundaries of the project in time and space*.
"People prefer not to tell us how many animals they have, or how much money they are making."	Use proportional methods that avoid absolute measure of wealth or income; triangulate. ➤ See section on *Use of participatory methods and attribution*.
"We expect impact after the project ends."	Although some impacts may occur after a project, where there is no impact during a project the project objectives might be questioned. In an impact assessment, include questions about the future benefits that might be expected.

strive continuously to refine and improve programming, and that this requires regular evaluation and an understanding of the impact of interventions on people, institutions and the environment.

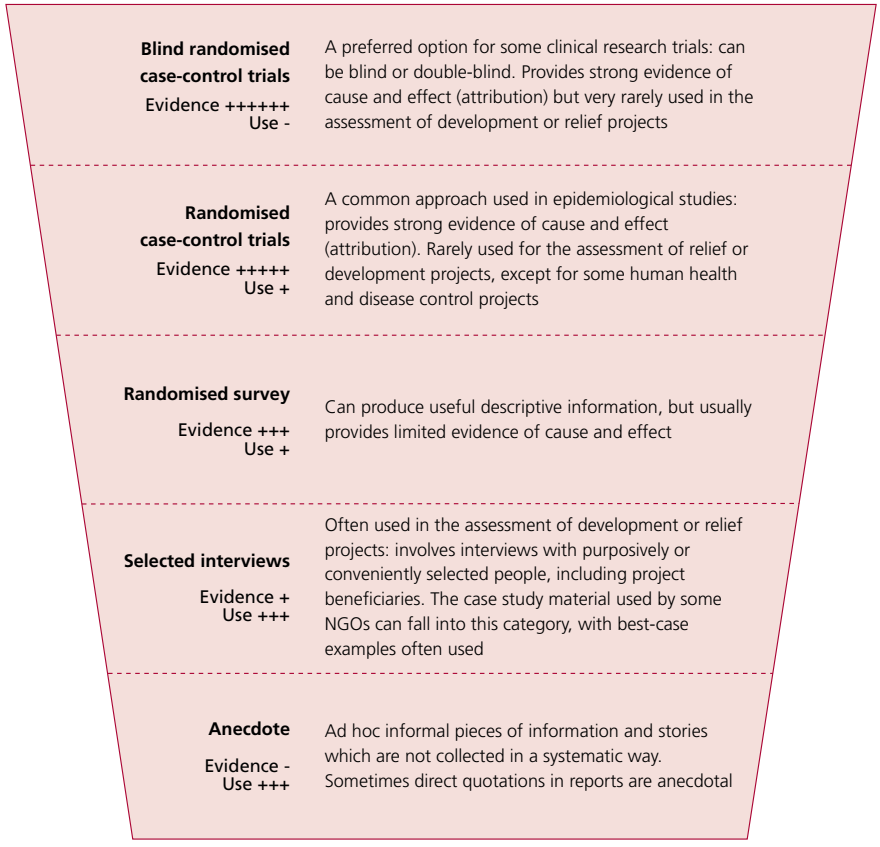
Users of information and evidence

Approaches to evaluation and impact assessment can depend on the end users of the information. In general, users such as field staff working for CBOs and NGOs, who work day-to-day at the community level, are often confident that qualitative evaluation is sufficient. Evaluation methods might include collation of monitoring data, focus group discussions, individual interviews and strengths, weaknesses, opportunities and threats (SWOT) analysis. In these situations, the information is intended primarily for local use on a small scale, and its validity is cross-checked against

monitoring data, the experience of field workers and prolonged observations in the field. This process can also inform country programmes and approaches. This type of local evaluation is often cost-effective, timely and appropriate, and can lead to revised programming that is well-grounded in field realities. Occasionally however, more systematic approaches are also needed.

Moving from field-level to country or regional offices and to the operational or funding policies of donors, governments, United Nations agencies and NGOs, information requirements change. More central actors often want assessments that include a mix of qualitative and quantitative data, and that apply to wider areas. However, although many of these actors use evaluations to inform their decisions, most evaluations of emergency livestock interventions are highly subjective and not particularly convincing in terms of evidence – the most common approach to assessing impact is to carry out a limited number of interviews with selected informants (see Figure 3). Using this figure as a point of reference, the challenge for many organizations is to improve the level of evidence generated by project

FIGURE 3
A hierarchy of evidence for the assessment of emergency livestock projects



assessments, while keeping assessment approaches and methods user-friendly and appropriate to difficult operational conditions and funding constraints. A further consideration is the need to involve local people in monitoring, evaluation and impact assessment, as outlined in the *Humanitarian Charter and Minimum Standards in Disaster Response* (the Sphere handbook) and the LEGS handbook.

MONITORING

Measuring SMART objectives

A monitoring system for an emergency livestock project should enable a project manager to track the implementation of project activities, monitor expenditure, and identify and rectify problems as they emerge. Collated, well-organized monitoring data are also useful for reviews, evaluations and impact assessments.

A useful first step in designing a monitoring system is to refer to the project objectives and ensure that they are specific, measurable, achievable, relevant and time-bound (SMART). Objectives that fit the SMART criteria and that are clearly defined and well-written automatically point to key indicators for measuring the objectives. An example is provided in the Box 11.

However, many projects tend to overlook the measurement of objectives, and focus on monitoring project activities only. Activity-level monitoring indicators might include the amount, type and monetary value of the livestock feed purchased and distributed. The tracking of feed purchase and distribution is important for monitoring implementation and financial accounting, but will not provide direct information on the achievement of project objectives. Many livestock emergency projects have a long list of monitoring indicators at the activity level, and relatively few – if any – for measuring the overall project objectives.

A project has to include both objective- and activity-level monitoring indicators. In general, indicators for measuring objectives should include both impact and process indicators, whereas activity-level indicators need only be process indicators.

Meaningful indicators

Many M&E reports from emergency livestock projects record levels of activity and impact as absolute figures, for example, "10 000 cattle were vaccinated" or "1 500 sheep and goats received supplementary feed". To some readers this kind of data is impressive, as the figures cited seem to be large, and to reflect a high level of activity. However, unless this kind of data is related to some sort of denominator for the animal population in question, the level of activity on its own can be misleading.

In complex emergencies, where interventions such as veterinary treatment or vaccination campaigns are repeated over many years, the reporting of activity against population is important for developing a disease control strategy. Unless the strategies developed take account of the basic epidemiology and economics of specific diseases, one-off and apparently large-scale interventions can have limited impact. For some epizootic diseases, sub-optimal vaccination coverage may encourage the disease to become endemic.

BOX 11

SMART objectives and monitoring indicators for a livestock feed supplementation project

Assume that an NGO is planning an emergency livestock feed supplementation project during drought. The NGO describes the objective for the project as: "To protect livestock during drought and enhance post-drought recovery." This is not a SMART objective because it is too vague and therefore difficult to measure.

A better SMART objective would be: "In two districts, reduce mortality by at least 25 percent in the core small ruminant herds owned by 50 percent of the poorest households by the end of the project." This objective is:

- specific, because it specifies the project area and the types of livestock and household to be targeted;
- measurable, because it defines the geographical boundaries of the project and quantifies the anticipated impact in terms of mortality and proportion of households;
- achievable, because the proposed reduction in mortality is based on previous evaluations showing that a 25 percent reduction in mortality is realistic;
- relevant, because it targets the poorest households and is based on the types of livestock owned by these households;
- time-bound, because it specifies that the impact will occur within the life of the project.

Inherent to this SMART objective are key monitoring indicators such as:

- the geographical areas where the project activities are implemented:
- the types of livestock fed, by species, age and sex;
- the number of livestock fed, and the period of feeding;
- the mortality in fed versus unfed livestock;
- the number or proportion of poor households targeted.

BOX 12

Meaningful indicators

Imagine that a monitoring or evaluation report explains the success of an emergency livestock treatment programme by referring to the prophylactic administration of 2 000 doses of anthelmintic (de-worming medicine) to sheep and goats in a disaster-affected area. On first sight, this might seem to be a valuable intervention. However, the report does not provide an estimate of the sheep and goat population or the estimated prevalence of clinical helminthosis (worms) in that population. Now assume that sheep and goats in the area number approximately 40 000 animals and that the prevalence of clinical condition due to worms is 15 percent, so 6 000 animals are affected. The coverage of the intervention in terms of animals requiring treatment was 33 percent. Rather than reporting only the absolute number of treatments, it would have been more useful to report the number of treatments against the number of sick animals, or the proportion of sick animals treated.

When to measure process; when to measure impact

As a general rule, process monitoring can be conducted monthly during an emergency livestock project as there is usually sufficient project activity in a month to warrant investment in reporting of activities. In contrast, the measurement of impact is often best left to the end of a project or, in complex emergencies, can be conducted annually, for the following reasons:

- Operational, logistics and time constraints hinder the regular collection of information on impact. For example, monthly impact monitoring would require visits to selected livestock herds and households, and the use of time-consuming questionnaires or participatory methods. This type of monitoring is rarely conducted in livestock development projects in relatively stable work environments, and is especially problematic in emergencies. Logistics issues are compounded in pastoralist areas, where households may be mobile and difficult to track or reach.
- For some livestock projects, impact may not be evident within a month, owing to the nature of the project. For example, in a restocking project, key impacts are most likely to occur after animals have produced offspring. Monitoring these animals each month during pregnancy is not cost-effective and provides limited information on impact.
- For most emergency livestock projects, impact can be measured with reasonable accuracy towards or at the end of the project. The modest added value of monthly impact monitoring is not usually justified relative to the additional time and resource requirements.
- End-of-project measurement of impact indicators can be triangulated (cross-checked) against collated process monitoring information.

Unless an agency has special experience of long-term (longitudinal) impact monitoring in emergencies, it should focus on the collection of process indicators in a monitoring system. When collated, this information can be used to support an evaluation or impact assessment at the end of the project. For a given SMART objective, the monitoring system can focus on the process indicators for that objective, whereas the evaluation can include both process and impact indicators. During monitoring, specific impact indicators can be measured, when this does not require substantial additional time or resource inputs over and above the collection of process monitoring information. As a general rule, it is usually better to measure a limited number of process indicators properly, rather than to be over-ambitious in designing an elaborate monitoring system that cannot be implemented and generates no information at all.

Baseline data

One of the key issues affecting the way agencies monitor and assess livestock projects is the perceived absence of baseline data. For example, in many areas where humanitarian crises occur, baseline data on livestock populations or disease prevalence are unknown or unreliable. It is often impossible to use conventional surveys in emergency contexts, owing to the time, resources and technical expertise required and, in some situations, a variety of access, security and logistics constraints. Aid workers and livestock professionals often cite the problem of limited baseline data as a reason for not conducting evaluations or impact assessments. However, recent experience show that the absence of conventional baseline data need not prevent a reasonably strong evaluation process. There are at least three

TABLE 21
Collection of baseline data using rapid participatory assessment

	Examples of baseline information
Participatory mapping	Spatial boundaries of communities and potential projects – *useful for all types of intervention*
	Accessibility of services, service providers, markets, livestock feed, livestock water sources – *useful for destocking, livestock feed, veterinary, water and restocking interventions*
Proportional piling*	Herd structure by species, age, sex; identification of core herd – *useful for destocking and livestock feed interventions*
	Livestock mortality by species and cause, normal periods and during disasters – *useful for livestock feed, water and veterinary interventions*
	Disease prevalence by species and disease, normal periods and during disasters – *useful for veterinary interventions*
	Relative impact of different livestock diseases on livelihoods, using indicators such as milk production, market value, transport
	Sources of household income and food – u*seful for destocking, veterinary and restocking interventions*
Wealth ranking*	Definition of wealth groups, livestock holdings by wealth group, proportion of households by wealth group – *useful for interventions targeting poorer households*
Matrix scoring*	Comparison of different veterinary service providers against indicators such as accessibility, availability, affordability, acceptance and quality – *useful for veterinary interventions*

* When standardized and repeated, this method can produce numerical data that can be summarized using conventional statistics. For more information on these methods and examples see *RRA Notes*, 1994; Bayer and Waters-Bayer, 2002; Catley, 2005.

ways to address baseline limitations: rapid participatory needs assessment; retrospective baselines; and case-control studies.

Rapid participatory needs assessment

Very useful baseline data can be collected using rapid participatory assessment approaches. These approaches are recommended by the LEGS Project, and are already used by some agencies during initial needs assessment and analysis of possible interventions. Much of the information collected can be used as a baseline. Table 21 provides examples of baseline data produced through participatory methods.

In livestock interventions that aim to improve services such as veterinary care, the following five key indicators of service provision can be used:

- **Accessibility** is the physical distance between livestock keepers and the nearest trained service provider, (e.g. a community-based animal health worker) or fixed-point facility (e.g. a veterinary pharmacy). This distance can be measured in kilometres or travel time.
- **Availability** is a measure of how widely usable a service is in an area. An area may have many veterinarians, but if they are all concentrated in a main town, the service is available but not accessible to rural people. In contrast, a veterinary worker may be close to livestock keepers, but if they work only one day a week, they are accessible but not available. Availability can be measured using hours of availability per week.

The range and quantity of required items such as veterinary medicines are further measures of availability.

- **Affordability** is people's ability to pay for services. Given the need to target vulnerable groups during emergencies, assessment of affordability should include examination of poorer people's capacity to pay for services. For veterinary services, comparing the cost of veterinary care with the local market value of animals provides useful insights into affordability and the benefit-cost of treatment.
- **Acceptance** relates to the cultural and political acceptance of services and service providers, and is influenced by sociocultural norms, ethnicity, gender, language capabilities and other factors.
- **Quality** of service can be measured by the level of training received by service providers, their technical knowledge and skills, their communication skills, and the quality and range of items or equipment at their disposal.

All of these indicators of service provision can be measured as baselines using the participatory methods listed in Table 21, together with direct observation of veterinary facilities and semi-structured interviews.

Retrospective baselines

This approach is used during evaluation or impact assessment, and requires community informants to describe a situation at the start of a project. The approach works well when informants have strong knowledge of livestock management and health, and information can be triangulated against process monitoring data. Retrospective baselines are discussed in more detail in the section on *Participatory approaches*.

Case-control studies

Case-control studies compare the impact of an intervention on a target population with conditions among a population that has not received the intervention. In humanitarian crises, various ethical, logistics and study design issues limit the use of case-control studies. For example, deliberately excluding a community from a relief intervention so that it can act as a control group contradicts basic humanitarian principles. However, this approach has some application in impact assessment, and is discussed in more detail in the section on *Use of participatory methods and attribution*.

Participatory monitoring

Community participation is a core element of disaster response; the Sphere handbook emphasises the importance of a "people-centred approach", and the first core standard in the LEGS handbook is: "The disaster-affected population actively participates in the assessment, design, implementation, monitoring and evaluation of the livestock programme." This first standard highlights the importance of participation, including in M&E. However, experience from development projects indicates that although participatory monitoring is often advocated, it is often difficult to include local people in a systematic monitoring system. In emergencies, the LEGS Project recognizes that people may not have time for regular monitoring activities, and will usually be fully occupied trying to survive and to protect their livelihoods.

In such situations, a compromise is to include consultations and meetings with community members in the monitoring system. Such interactions need not take the form of formalized and repeated questionnaire surveys, but can use interviews and community meetings throughout the project. Community members are well placed to observe how a project is being implemented, identify strengths and weaknesses, and offer suggestions for improving activities. The monitoring system should recognize these local observations, and combine conversations and interviews with community members with the measurement of process indicators. Regarding the frequency of community-level dialogue, the two broad options are to commit to a set number of interviews or meetings each month or to conduct one-off interviews and meetings. As an important part of the overall monitoring system, community-level conversations and interviews should be recorded, but this is often one of the weakest areas of project monitoring. As many monitoring formats focus heavily on recording numerical data, field staff are not always accustomed to recording qualitative information in the form of narrative notes. Such records do not need to be lengthy, and can be in the form of summarized notes, key issues and action points.

Monitoring design

When all of these issues are considered, a monitoring system for an emergency livestock project should focus on measuring process indicators for SMART objectives and related activities, and include community-level consultations. The design of the monitoring system can then be based on the following steps:

Step 1: Identify monitoring indicators

Monitoring indicators can be identified through reference to the project objectives and the activities required to achieve each one. A review of the baseline data obtained through the initial participatory assessment or from secondary data can also inform the selection of monitoring indicators. Examples of process and impact monitoring indicators for different emergency livestock interventions are provided in Table 22, which assumes that the monitoring will focus on process measurements.

Step 2: Decide how to involve community members in monitoring

As outlined in the section on Participatory monitoring, the monitoring system can include specified numbers of interviews and/or community meetings each month, or it can be more ad hoc. The number of interviews and the selection of interviewees depend on the objectives of the project, the mode of implementation and the information required. The design of interviews and meetings tends to depend on the experience of field staff and their knowledge of the communities and interventions. With very experienced staff, the interviews can be conversational and provide opportunities for local people to comment on the project and provide suggestions for refinement and improvement. With less experienced staff, a structured or semi-structured checklist of questions may be needed to remind them of the key areas to be covered.

Step 3: Decide how often to monitor and whom to consult

When the monitoring system focuses on the measurement of activities using process indicators, monthly collation and reporting of information is usually appropriate. Records of

community meetings or individual interviews are most easily submitted at the same time as standardized monitoring forms containing more numerical process data. There is no standard way of determining the number of people to involve in community-level consultations. Some livestock interventions, such as water or feed provision, may be organized around fixed locations, where users of the intervention can be easily consulted. Some projects work with existing community-based groups or establish local committees specifically for the design and delivery of the intervention, and these local groups can either be tasked with collecting some monitoring data or can be consulted by project staff. For small-scale projects, for example involving three to five communities or villages, it should be possible to consult local groups or individuals in each community each month.

For large-scale interventions involving many communities, community-level consultations should aim to be representative of the overall project. Conventional research, studies and surveys often use quantitative statistical approaches to identify a representative sample of groups or individuals. In emergency contexts and for routine monitoring, this approach is rarely used, and project staff make judgements about whom to consult, with judgements often based on resource and time limitations, which are compounded by security and access issues in some situations. For example, in a slaughter destocking intervention involving 20 villages, a monitoring system that involved only one village each month would be viewed as deficient by most observers, especially if the same village was visited every month. In this example, approximately five or more village-level groups and beneficiaries should be consulted each month, with different villages being visited the following month.

In common with any process that collects information from local people, interviews conducted during project monitoring are subject to bias. Project managers need to be aware of these biases, and include ways of cross-checking monitoring information. This can be done through ad hoc visits to observe project activities and talk to people who may not be involved in the routine monitoring, such as non-beneficiaries.

Step 4: Design monitoring forms

The systematic collection of data during monitoring requires the use of standardized reporting forms. For most interventions, a single page will cover most of the information needed. Forms should be designed and tested with the field workers who will use them. In situations and interventions where monitoring involves illiterate workers, monitoring forms that require a picture to be marked can be used. Examples of monitoring forms are provided in Annex 4A.

Step 5: Collate monitoring information

For end-of-project evaluations and impact assessments, collation of monitoring data can provide an overall picture of what has been implemented, with whom and where. This information can assist evaluators in deciding whether project objectives have been achieved; in impact assessment, it can be used to cross-check (triangulate) impact information against actual activities and levels of implementation. This cross-checking process is explained in more detail in the section on *Use of participatory methods and attribution*. Collated monitoring information can also assist benefit-cost analysis.

Links to official monitoring systems

For certain interventions, the project monitoring system should be linked to official government systems. The most common example is community-based livestock disease surveillance, in which disease reports provided by CAHWs or other veterinary para-professionals can contribute to official government disease surveillance. LEGS provides the following guidance on routine monitoring: "Monitoring veterinary workers' clinical activities can contribute to a livestock disease surveillance system by recording livestock disease events and treatment or control measures. Such data are most useful if livestock morbidity and mortality by species and disease are recorded in relation to the population at risk. Monitoring tasks should be designed in collaboration with government authorities where possible."

EVALUATION

An evaluation is a detailed assessment of a project, which usually focuses on project objectives: have the objectives been achieved, and if not, why not? Evaluations can also look at issues of project efficiency and the effective use of financial, human or other resources. An increasingly common economic approach is the use of benefit-cost analysis (BCA), but this is not recommended as a stand-alone method and should be combined with other types of evaluation or impact assessment (see section *Benefit-cost analysis*). Some evaluations also assess the project's relevance: a project might have achieved its objectives and been designed and implemented efficiently, but was it the right project relative to the needs on the ground?

When monitoring systems are well designed and properly implemented, evaluation can be a relatively straightforward process because it focuses on project objectives. If a project's monitoring system has successfully identified and set key indicators of change related to objectives, much of the evaluation process can involve summarizing and analysing the monitoring data. Other evaluation activities can then focus on cross-checking this information and considering broader issues affecting the project. Conversely, when project documents express objectives poorly, evaluation can be very difficult, because it is not clear what the project was trying to achieve.

In emergency livestock interventions, evaluations are usually conducted at the end of a project. However, in complex emergencies with livestock projects implemented back-to-back over many years, an evaluation conducted before the end of a project cycle can inform the design of the next cycle.

Evaluating objectives versus measuring impact

An evaluation only reveals information about a project's impact on people's livelihoods if its objectives are stated appropriately. For example, by measuring results against the objective of "vaccinating 5 000 livestock against important epidemic diseases", an evaluator cannot draw direct conclusions about the effect of the vaccination programme on human livelihoods. Unless a project specifically states what the intended benefit is at the community, household or individual level, assessment of the objective is unlikely to say much about impact.

In most crises, the aim of humanitarian assistance should be to protect people's lives and livelihoods; this in turn requires assessment of the effect of a project on human survival, health and nutrition, household assets and the status of local services and markets needed for rapid recovery. Following the LEGS livelihoods approach, it is assumed that the objectives of most

emergency livestock interventions could be stated in terms of impacts on the people affected by the crisis. For example, the objective of a livestock feed supplementation intervention might be to "protect the key livestock assets of 500 households during three months of drought, by maintaining a core breeding herd". In this approach, evaluation and impact assessment are very similar. When project objectives do not specifically define benefits to people, evaluation and impact assessment can be regarded as two separate but related processes.

To date, most emergency livestock projects are designed without explicit mention of livelihoods benefits. This chapter therefore contains separate sections on evaluation and impact assessment, but recognizes that the two processes can be combined in future livelihoods-based projects.

Defining the terms of reference for an evaluation

The terms of reference for an evaluation state what the evaluation should achieve, the methods to be used, and the form of the final report or other deliverable products, with a time frame for completion. In common with a project proposal, clearly defined terms of reference help all those involved to achieve a common understanding of the process and its intended outcomes.

The terms of reference can be arranged according to a set of key generic questions, which apply to almost any emergency livestock intervention:

- Were the project objectives achieved and how did levels of achievement relate to aspects of project design or implementation?
- If project objectives were not achieved, what were the causes of this and how were design or implementation problems addressed during the project?
- Were the project objectives relevant to the operational and policy context, and to the main needs and capacities of the target communities? If not, what objectives might have been more appropriate?
- What are the main lessons learned from the project for future programming or best practice?

Depending on the intervention, there are also a wide range of additional subsidiary questions, which might look at specific aspects of the project that are of interest to agency staff or partners.

Who should evaluate the project?

Consideration needs to be given to whether internal or external evaluators should be used. Internal evaluators are usually agency or project staff who may know the project well but who may be less objective than outsiders. External evaluators are usually consultants contracted specifically for the purpose of the evaluation. They can be relatively costly, but might bring new insights and help develop a more independent evaluation.

Many NGOs, private consulting firms and individuals claim to offer external evaluation services. There is considerable variation in the skills and knowledge that they can bring to projects, and the following are two useful rules when choosing an external evaluator:

- Ask to see previous evaluation reports. Do these reflect the type of skills and knowledge that could usefully be applied to this project? Are they well-written, comprehensive, analytical and presented in a professional manner?

- Ask other organizations about their experiences with external evaluators. Can they recommend people they have worked with successfully?

In addition to internal and external evaluators, other people can contribute to, or learn from, an evaluation so an evaluation team might include community representatives, such as women's group members; community elders; members of community-based organizations; NGO staff; private-sector workers; government staff, including personnel from central offices if the project aims to influence policy; external evaluators and technical specialists (social development, gender, economists) and donor staff.

When emergency livestock projects are implemented by NGOs in partnership with government, it is useful to invite local government staff to participate in the evaluation. If the project aims to influence policy, then senior-level staff could also be asked to take part.

Evaluation design and methods

Most evaluations involve two main processes: 1) a review of project documents and monitoring reports; and 2) the use of various data collection methods such as interviews or group discussions to cross-check project documents and allow more in-depth examination of specific issues.

Review of project documents and monitoring data

An important activity in any evaluation is a review of project documents and other literature relating to the project or project area. Evaluation team members should have access to the original rapid assessment report (or equivalent document), the project feasibility study, the project proposal (with project objectives and activities), and monitoring and progress reports. Other documents, such as letters of understanding between implementing partners, minutes of meetings, training manuals and activity reports, should also be made available. In addition to these, it can be useful for evaluators to view other literature on the area in question, such as accounts of socio-economic conditions and human food security, and more specific descriptions of livestock production and the role of livestock in human livelihoods.

However, for some areas this kind of information can be extremely limited or very outdated, such as in conflict and post-conflict situations, where government facilities and records may have been destroyed. In other areas, very few formal surveys or studies may ever have been conducted. Despite the potential problems and limitations of secondary data, the review of documents has at least two important functions:

- It enables the evaluators to determine how clearly the project is described. Projects with poorly defined objectives, vague activities or limited monitoring data tend to be more difficult to evaluate.
- It provides information derived from other sources for cross-checking.

A thorough evaluation often makes frequent and accurate reference to the project and secondary literature. For example, direct transcription of project objectives and activities can be useful for describing the project in the evaluation report.

Common data collection and analysis methods for evaluations

Interviews and discussions can vary from informal conversations and discussions, to individual case studies, to formal questionnaire surveys. All of these methods are valuable and

commonly used evaluation tools. Techniques for conducting interviews, questionnaires and discussions are described in other books and manuals. The following are some of the main points to note:

- The skills, attitude and behaviour of the interviewer (and translator) are major determinants of the value of interviews, whether informal or semi-structured interviews or more structured questionnaire surveys. The relationship that develops between the interviewer and the informant has an important influence on the quality of the resulting information. Insensitivity to cultural norms, badly worded or poorly articulated questions, non-attentive listening behaviour and inexperience with open or probing questions can limit the value of interview methods.
- Interview techniques are simple to practise and fine-tune using such techniques as role play before the evaluation.

A few specific interviewing, discussion and analytical methods are described in the following paragraphs. These methods can also be used for impact assessment and will generate only limited evidence unless repeated systematically and representatively.

Structured interviews – In a structured interview, all of the questions are predetermined and usually presented as a questionnaire. This approach allows information to be collected systematically and does not require interviewers who are experienced in the use of open or probing questions. Structured interviews tend to be biased towards the perspectives and priorities of outsiders since the questions are formulated in advance. An evaluation questionnaire designed by veterinarians would probably include questions on the project's impacts on animal production, and may overlook other forms of impact, such as those related to the sociocultural uses of livestock. Even when questionnaires contain well-thought-out questions, they are still subject to interviewer bias and can easily become data-driven.

Semi-structured interviews – In a semi-structured interview, a number of key questions are defined but there is scope for following up interesting lines of enquiry that emerge from informants' responses. This type of interview requires interviewers with more skill, the confidence to enable discussions to develop, and experience with open and probing questions. When used well, semi-structured interviews have the advantage of being both systematic and flexible. The use of key questions enables information from different informants to be collated and compared, while more spontaneous questions give informants greater opportunity to influence how the discussion develops.

Individual case studies – These are detailed accounts of a person's history, experiences, livelihood, interaction with a project, and hopes for the future. As far as possible, this type of case study is a close transcript of what an informant actually says, with minimum editing. The main strengths of case studies are that they reflect the complexity of people's lives in their own words. This can help outsiders to understand the diverse and often difficult circumstances in which people live, and the relative importance of a particular project compared with other needs and services. When using individual case studies, it is important to interview people from different social and income groups. Some agencies tend to overuse the case study method, and select only best-case examples that are not representative of the entire project. Although this approach may be good for publicity, it rarely has much impact on best practice or policy. The method requires good interviewing and translation skills.

Focus group discussions – These are conducted with small groups of up to 20 people and are based on a single or narrow range of topics. The composition of the focus group can vary from people with similar interests, social status or identity, to mixed groups of people who are likely to hold differing views and opinions. In evaluations of emergency livestock interventions, topics for focus group discussions might include ways of ensuring early response to drought, or the effectiveness of veterinary voucher schemes. Good facilitation skills are required for focus group discussions, to ensure that people do not digress too far from the main subject and that each member of the group has the opportunity to contribute.

SWOT analysis – Several analytical tools assist project evaluators with collating key information and identifying areas of further work. A popular tool is the analysis of project strengths, weaknesses, opportunities and threats (SWOT analysis). This is usually conducted with a group of people such as key stakeholders in a project. The process involves brainstorming on each of the following four features:

- ***Strengths*** – The good things that have happened during the project, which can be specific activities, events, new or stronger relationships and other positive aspects of a project.
- ***Weaknesses*** – The shortcomings of the project; the plans that were not put into effect, and the mistakes that were made.
- ***Opportunities*** – Given the current situation and what has been learned about the project, what should be done in the future? How can strengths be built and weaknesses reduced?
- ***Threats*** – What factors might prevent achievement of the project's aims? These can include external, political, environmental or economic constraints.

IMPACT ASSESSMENT

An impact assessment of an emergency livestock project can be a stand-alone activity or combined with a project evaluation as a subset of questions looking specifically at impact. In development projects, various levels and types of impact can be considered, such as those at the household level, those on the environment and those on organizations, institutions or policies. Impacts can be positive, neutral or negative. Despite many years of methodological adaptation and debate in development circles, there is no standard way of defining or assessing impact, and the approaches and methods used vary considerably according to the needs of the actors and contexts concerned. In emergency situations too, there is no standard way of measuring impact, and this is generally one of the weakest aspects of humanitarian intervention.

Before deciding to embark on an impact assessment, it is often useful to conduct a rapid internal review of the intervention or project and to decide whether it was implemented as planned, or at least to the extent that its impact at the household or individual-recipient level might be measured. An intervention that faced numerous difficulties during implementation or that was known to have major flaws may not be worth assessing. For example, if a livestock feed supplementation project delivered only 20 percent of the planned amount of feed, which arrived at project sites six weeks late – when many livestock had already died and remaining animals had been moved out of the project area – it is unlikely that an assessment would produce much useful information. Another consideration is the timing of the assessment.

Depending on the type of intervention and the way it was designed, the assessment should be timed for when a reasonable level of impact might be expected to have occurred.

Conventional approaches: questionnaire surveys

A conventional approach to impact assessment uses conventional data collection methods and assessment design, and takes the form of either regular impact monitoring during a project, or a post-project assessment. In either case, the standard data collection tool is a questionnaire, and the definitions of impact and the prioritization of issues tend to be controlled by the assessors and reflected in the questions used in the questionnaire. Questionnaire surveys tend not to be participatory. The objectives of the assessment, the methods and the data analysis are usually handled by the assessment team, and results may not be shared or discussed with target communities. Questionnaires can be useful for collecting some types of quantitative data using standardized or coded questions. Certain types of qualitative data may also be collected, depending very much on the enumerator's experience, interviewing skills and capacity to record the information.

Questionnaire surveys should be designed and implemented with best-practice principles in mind, as summarized in the following paragraphs.

Target population and sampling methods – Questionnaire surveys are usually regarded as most rigorous when used with representative random samples of respondents, although purposive samples can also be used. A common weakness in assessment reports is failure to describe the sampling method or even the number of respondents. This makes it difficult for readers to judge how representative of the project area the results are – they may be biased by selection of more successful project locations or recipients.

Questionnaire design – This includes the choice of questions to be asked, their precise wording and ordering, and the title, layout and appearance of the questionnaire. Question types are usually categorized as open (or open-ended), closed (or closed-ended) and semi-open-ended, depending on the level of freedom offered to the informant. Sensitive livestock- or livelihood-related questions, such as number of animals owned or amount of income earned, should not be among the first questions: ideally, they should be replaced by indirect questions or methods (e.g. proportional piling, described in the section on *Use of participatory methods and attribution*). Questionnaires that are too long and that ask confusing or sensitive questions are unlikely to produce reliable or valid results.

Administration – In humanitarian situations, questionnaires are most likely to be administered through personal interviews with local people in project, and sometimes non-project, areas. This means that enumerators have to be well-trained and supervised, and their selection should take account of possible bias. For example, project staff may be inclined, either consciously or subconsciously, to encourage answers that show a high level of project impact.

Reliability and validity – A reliable questionnaire will produce consistent results. Reliability can therefore be assessed by repeating questions to the same informant, asking similar questions of the same informant, and other approaches. Validity is the extent to which answers reflect the true situation, so can be checked against an independent, reliable dataset. In humanitarian livestock-based interventions, it may be possible to verify an informant's responses to some questions but not others. For example, in an area where people are sedentary, own few animals and keep these animals close to their homes, it

might be possible to observe directly the number of offspring produced by the breeding stock provided by a restocking project. However, it may be inappropriate to request to see the cash earned from the sale of some of the offspring or by other means.

Questionnaires need to be pre-tested to assess interviewers' and interviewees' understanding of the questions and the language used, and any necessary amendments should be made before use.

Participatory approaches

Systematic impact assessment has rarely been conducted in humanitarian livestock interventions for several methodological and organizational reasons. However, over the last ten years, a number of impact assessment approaches have evolved that aim to involve communities in measuring and attributing impact. These participatory approaches were first used in development projects in the early 1990s in such sectors as human health and natural resource management, and were a logical extension of the use of participatory approaches for project design. A simple but important methodological development was the adaptation of participatory methods to measure changes in a community over time (temporal changes) and relate these changes to project activities (attribution). Some workers also started to repeat participatory methods and use scoring or ranking methods to produce datasets that could be analysed statistically. Much of this work was done in the Horn of Africa and was used for the assessment of livestock interventions in complex emergencies or during drought. Although the data from this approach can be similar to those produced by questionnaire surveys, participatory approaches encourage greater community involvement, thereby following the guidance of both the LEGS handbook and the Sphere handbook. For some types of question, participatory methods also produce better-quality results and analysis. This section uses experience from these assessments to present a seven-part process for participatory impact assessment (PIA).

Defining the questions for the impact assessment

Many participatory assessments have focused on impact at the household level. The general approach has been to identify important links between livestock and human livelihoods, and to determine how changes in livestock markets, health or production affect indicators such as human nutrition, value of livestock assets, or the uses of cash derived from the sale of livestock or their products. These types of impact are fundamental to human livelihoods and food security, and therefore very relevant to the assessment of livestock interventions in humanitarian crises. A well-designed livestock project has clearly defined objectives. An impact assessment should also have clear objectives, which are commonly expressed as a series of key questions. An important stage of impact assessment is prioritizing the questions, agreeing which should be asked, and focusing on collecting and analysing information that answers these.

In an assessment that examines household-level benefits or changes related to livestock, it is necessary to know how communities use livestock and how these uses vary according to wealth or gender. If this type of information was not collected during the initial rapid assessment for project design, simple questioning of local people individually or in groups can be used to identify and prioritize the benefits associated with livestock keeping. The interview process can be supported with ranking or scoring methods, as shown in the example in Box 13.

In Box 13, milk and marriage were perceived locally as the two main benefits of livestock rearing. An impact assessment in this area might therefore focus on questions such as: what was the impact of the project on milk consumption and human nutrition? What was the project's impact on women and girls, in terms of marriages and the related social and economic effects?

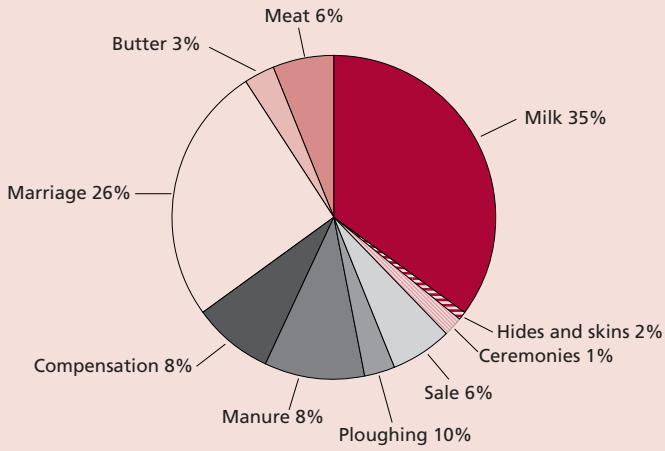
As a second example, a PIA for a post-drought intervention that provides sheep or goats to poor female-headed households may require answers to only three questions:

1) What are the project's impacts, if any, on the livelihoods of the women involved?

BOX 13

Benefits provided by livestock in Akop Payam, Tonj County, ex-southern Sudan: potential indicators for measuring the impact of livestock interventions

The NGO *Vétérinaires sans Frontières*, Belgium decided to invest in participatory monitoring of a community-based animal health project in the complex emergency of then southern Sudan in 1999. This project was implemented with an agropastoral Dinka community. In order to understand local perceptions of the benefits provided by livestock, a simple proportional piling tool was used with five different groups of informants. The results are presented below as a pie chart. When discussing the results with informants, men in Toic Lou noted how "Everyone depends on milk like a drug. It makes people fat and healthy," and women in Panhial explained that "Milk brings health and if healthy, one can marry." Milk and marriage seemed to be two key indicators of project impact for this community.



The method used was proportional piling using 100 seeds per informant group. In this community, marriage required payment of cattle to the bride's father; compensation payments (e.g. for injury caused to another person) involved fines of cattle; kinship support included loans or gifts of livestock or milk to needy relatives.

Source: Catley, 1999

2) What are the project's impacts, if any, on the nutritional status of the women's children?

3) How might the project be changed to improve its impact in the future?

In contrast to these examples, many assessments try to ask too many questions – it is always better to ask a few questions well, rather than many questions poorly. In general, and given the context of most emergency livestock projects, a participatory assessment should avoid trying to obtain answers for more than five key questions.

Defining the project boundaries in time and space

Any livestock intervention aims to provide benefits in a specific area over a defined period. It is important that all those involved in a PIA have a clear understanding of where a project took place and when. This is particularly important in areas where different agencies are working simultaneously or when a single agency is implementing several interventions or projects back-to-back, possibly with some overlap in the timing of inputs. Unless everyone understands the specific time and place covered by the intervention, information on impact can easily become confused, as it may relate to more than one intervention or more than one agency.

The geographical limits, or spatial boundaries, of an intervention can be defined during the early stages of a PIA, using participatory mapping with communities. A detailed methodology for participatory mapping is available online.[38] This method is usually used only once for each target village or community, with a group of key informants.

The time limits, or temporal boundaries, of a project can be determined by timelines. A timeline is an oral history of a community that relates the start and end of an intervention to key events in the area, as perceived by local people. In addition to placing the project within a specific time frame, this method is also useful when using before-and-after methods (see the section on *Use of participatory methods and attribution*). In slow-onset emergencies such as drought, a timeline will also show the timeliness of a response by reference to indicators of rainfall, movements of people or livestock, livestock deaths or other indicators. This method is usually used only once for each target village or community, with a group of key informants.

Selecting the impact indicators

Which impact indicators to use depends on the questions for the assessment. Indicators may have been identified when designing the project monitoring system, but usually they are specific to the PIA. The indicators must be clearly defined and understood by both the assessors and the informants, as confusion over the meaning of an indicator can affect its measurement. Indicators should also focus on final impacts at the household level, rather than on preliminary impacts. For example, for a destocking intervention in a pastoralist area during drought, an impact indicator might be "amount of cash acquired from the sale of livestock", but a better impact indicator would be "uses of cash acquired from the sale of livestock". In general, the more specific the wording of an indicator the more likely it is to be easily understood and impact measured accurately. Examples of weak and strong impact indicators are provided in Table 22. The M&E checklists at the end of each chapter in the LEGS handbook includes examples of impact indicators for each technical intervention.

[38] http://www.participatoryepidemiology.info/userfiles/PE-Guide-electronic-copy.pdf.

TABLE 22
Examples of questions and impact indicators for use in impact assessments

Example of assessment question	Weak impact indicator*	Strong impact indicator
Commercial destocking How did the project affect the livelihoods of people during the drought?	Amount of cash households acquire from sales of livestock to traders working with the project	Uses of cash acquired from sales of livestock, e.g. on food, medical care, livestock care or other items
Slaughter destocking How did the project affect the nutritional status of women and children?	Amount of fresh meat distributed to each household	Amount of meat consumed by women and children
Livestock feed supplementation during drought How did the project affect households' capacity to retain key breeding stock for post-drought recovery?	Amount of feed consumed by adult cows	Mortality rate in cows receiving feed compared with that in cows not receiving feed
Emergency veterinary care How did the project affect the livelihoods of livestock keepers?	Incidence of livestock diseases before and after the project	Changes in household milk consumption resulting from reduced livestock disease
Restocking intervention How did the project affect the nutritional status of children under 5 years of age?	Milk offtake from goats provided by the project	Volume of milk from project goats consumed by children under 5

* Some of these indicators might also be categorized as process indicators.

The examples in Table 22 illustrate a common misperception among livestock workers that measuring the impact on livestock automatically means measuring the impact on their owners or users. Maintained or increased livestock production due to a project intervention does not necessarily result in livelihoods improvement. For example, if milk production is maintained owing to a livestock feed project, the important impact indicators relate to what happens to the milk. Is it consumed, and if so, by whom? Is it sold, and if so, how is the cash used? Asking these kinds of question helps identify cases where extra milk in a household is not being utilized (and is therefore not having a livelihoods impact). Using these approaches to identify impact indicators can also reveal negative impacts. For example, in an insecure environment, having more livestock assets may place people at greater risk of violence from armed raids.

Strong impact indicators can be either qualitative or quantitative; and when identifying indicators, a potentially good indicator should not be rejected because impact may be difficult to measure. As shown later, nearly all indicators can be applied using participatory methods, and cross-checked or triangulated. This is particularly important when considering apparently abstract impact indicators such as trust within a community, the voice women have in community meetings, hope for the future, dignity, and confidence to invest in livestock. All of these types of indicator are relevant to many emergency livestock interventions, and when combined with measures of financial assets or food security help to build a comprehensive picture of changes during a project.

Use of participatory methods and attribution

As indicated in Figure 3, the level of evidence produced by an assessment depends on the design of the assessment and the approach used to show attribution. While in conventional

research settings it may be possible to use approaches such as randomized case-control studies, in humanitarian contexts these approaches are not always feasible or needed, due to resource, logistics, ethical and technical reasons. At the same time, an assessment that covers a large area or many communities is unlikely to be of much value if it uses interviews or discussions in only one location with a single informant. Assessment teams working in an emergency or post-emergency context therefore need to compromise between using a conventional, randomized and representative sample of informants or locations, and ending up with too few informants.

Although there are no clear rules governing assessment design, the options for agencies seeking to move away from anecdote and ad hoc interviews (Figure 3) and to produce stronger evidence of impact include:

- a before-and-after comparison of key indicators with findings triangulated against project monitoring data;
- a comparison of indicators in populations receiving and not receiving the intervention(s);
- a comparison of different interventions;
- combinations of the three.

These approaches are described in following subsections. Each of these options encompasses the concept of comparison. A before-and-after design uses a retrospective baseline and compares two points in time. A design that uses a control group compares changes in the control group with changes in the intervention group. A comparison of different interventions assumes that the intervention being assessed can be usefully compared against pre-existing services or inputs, or those provided by other actors.

One of the reasons why so many projects focus on measuring activity rather than impact is because most process indicators for activities are quantitative and relatively easy to use. During a livestock feeding project it is easy to count the number of bales of hay delivered. In a veterinary project it is easy to count the volume or value of medicines provided, or the number of people trained. In contrast, the measurement of impact often means assessing indicators that are difficult to operate using conventional approaches.

Taking the examples in Table 22, the indicator for the feed supplementation project is cattle mortality. In theory, a good monitoring system for this project would measure cattle deaths over time, so that by the end of the project, the data collected over weeks or months would simply be collated to give an overall figure. In practice however, this kind of monitoring is very rarely done in emergency situations, which raises the question of how to measure impact. Using the example of the veterinary project in Table 22, it would be useful to know the impact of livestock diseases on household-level milk consumption, and how improved disease prevention or treatment affected this consumption. In theory it would be possible to design a monitoring system that collects the required data, but in practice – especially in emergency contexts – this is unlikely.

The use of PIA methods can overcome some of the practical difficulties of using conventional measures of impact in emergencies, while also following the Sphere handbook and the LEGS Project standards for involving communities in the assessment of humanitarian interventions. When selecting and using participatory methods, a key point is that almost any quantitative or qualitative impact indicator can be applied numerically, using simple

scoring or ranking methods. Although some academics might perceive such methods as too subjective or soft, ranking and scoring are commonly used in epidemiological and economic studies to collect expert opinion, and are widely reported in peer-reviewed journals.

For emergency livestock projects, impact indicators showing measurable results using ranking or scoring methods include:

- in livestock feed supplementation projects, the body condition of livestock receiving supplementary feed, and livestock mortality;
- in emergency slaughter and meat distribution projects, the local acceptance of fresh or dried meat relative to other types of food, such as food aid;
- in veterinary projects, the impact of livestock diseases on livelihoods indicators, such as household milk consumption;
- in restocking projects, changes in the consumption of goats' milk by children, or the improved social status of women who own goats.

Assessments using before-and-after approaches and methods

Before-and-after participatory methods are particularly useful when no baseline data are available, as is common in emergency livestock projects. Two useful before-and-after participatory methods for impact assessment are described in the following paragraphs: before-and-after scoring, and before-and-after proportional piling. The following are common features of these methods:

- The methods require a before-and-after comparison, in which data from an indicator is measured at the start of project and then measured again at the end of the project. In the absence of baseline data, the before measurement is made retrospectively by informants, assisted by a timeline to specify the point in time when the project started.
- The methods are qualitative. Although perceptions are recorded numerically, the numbers are arbitrary and analysis of the results usually focuses on changes and trends between two points in time, rather than on the numbers themselves. After scoring, informants should always be asked to explain the reasoning behind their scores. These explanations are a core part of these methods and should be recorded.
- The methods can be applied to a wide range of indicators, including those for trust, confidence, capacity and security.
- The use of simple diagrams allows the methods to be used with illiterate informants: no written text is needed.
- The methods can be used with individual informants or groups. They can be incorporated into questionnaires or used as part of focus group discussions.
- Systematic repetition of these qualitative methods produces datasets that can be analysed statistically. Repetition need not be extensive, and as few as six sets of data can be summarized statistically and assessed for reliability.
- Results are triangulated against project monitoring data – this is important for validating the data.
- The methods need to be pre-tested in the areas where they are to be used. The explanation of each method needs to be practised and clear, and methods should be used in local languages with trained facilitators. Local cultural and social norms and practices may require certain methods to be adapted.

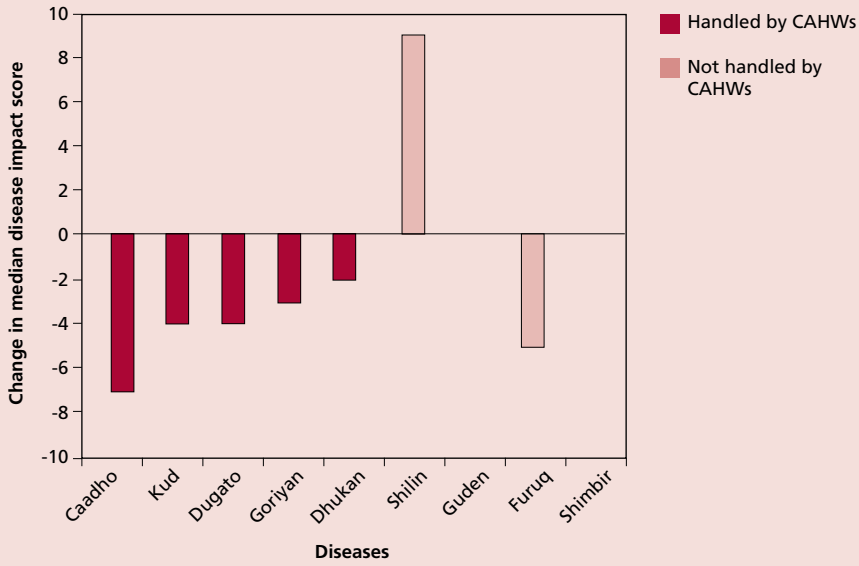
Before-and-after scoring – This method requires informants to score an item or service at the start of an intervention, and then again at the end of an intervention. A simple scoring system can be used, such as scores between 0 (the lowest) and 10 (the highest), and counters such as seeds or stones can be used too. An important part of any scoring system is to ensure that the item being scored is clearly understood by the informant(s), and that the scoring system is clear. An example of using simple before-and-after scoring is provided in Box 14.

Before-and-after proportional piling – This is similar to simple scoring but allows several items to be scored simultaneously and compared. The method starts with 100 counters, so it can measure more subtle changes than a simple scoring method of 0 to 10.

BOX 14

Use of simple scoring in impact assessment: changes in disease impact scores for camel diseases handled and not handled by CAHWs in Ethiopia

In this example, ten informant groups from different villages were asked to score the impact of camel diseases on their livelihoods at the start of a CAHW project, and then again 36 months later. A scoring system of 0 (very low impact) to 10 (very high impact) was used. A negative score reflects a reduction in disease and a positive score an increase in disease. The graph shows the change in the median (average) impact score between the two points in time for each disease. The graph also compares the changing impact in disease handled by CAHWs versus those not handled by CAHWs.



Source: Admassu *et al.*, 2005

Proportional piling can be particularly useful in producing direct measures of sensitive indicators. For example, while informants are often unwilling to state absolute levels of income before and after a project, they are usually willing to explain changes in income in terms of proportional changes, such as a 15 percent increase or a 5 percent decrease. Two examples of before-and-after proportional piling are shown in Box 15 and Figure 4.

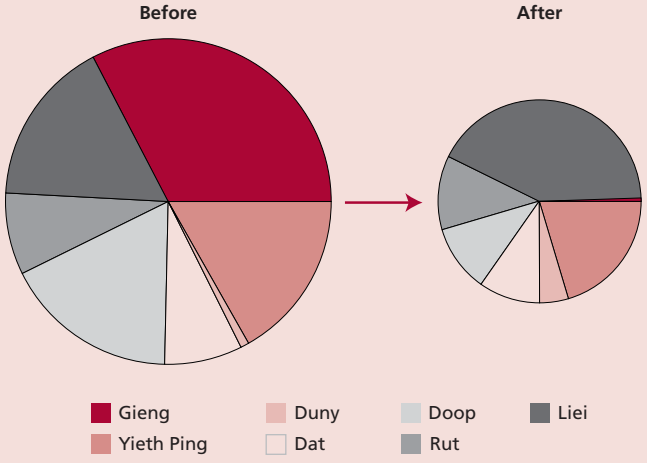
Attribution issues – Before-and-after methods are subject to important forms of bias, such as recall bias. Before-and-after methods should therefore be used in combination with the following five assessment components:

BOX 15

Before-and-after proportional piling: changing patterns of cattle diseases in Nyal, South Sudan, 1996-1999

The pie charts below show results derived from six informant groups. Each group was asked to name important cattle diseases before the onset of a CAHW project in 1996 and with reference to a timeline. They were asked to show the relative importance of the diseases by dividing 100 seeds against the diseases. Informants were then asked to consider the situation at the time of the assessment in 1999. Using the piles of seeds which were already in front of them showing the situation in 1996, they were asked to add seeds or remove seeds from each pile, or leave the piles untouched, to show the situation in 1999.

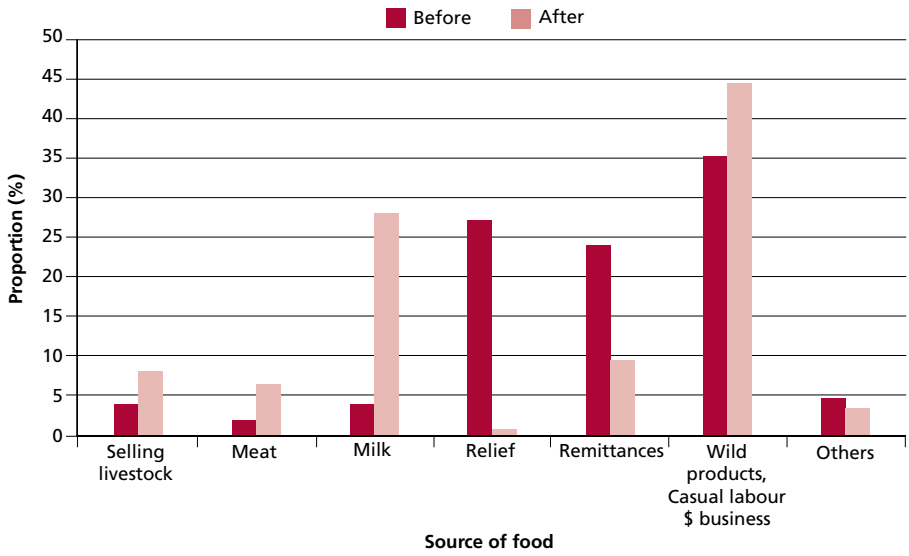
The level of agreement between the six informant groups was assessed using a non-parametric test, the Kendal coefficient of concordance (W). This was a measure of the reliability of the method and the results were W = 0.61, $p<0.01$; there was significant level of agreement between the informant groups.



Diseases (Nuer–English): *Gieng* – rinderpest; *Liei* - mixed parasitism; *Rut* - haemorrhagic septicaemia; *Doop* – CBPP; *Dat* – FMD; *Duny* - ephemeral fever; *Yieth piny* - sudden death

Source: Catley, 1999

FIGURE 4
Use of before-and-after proportional piling in impact assessment: changing patterns of food sources for restocked households (from Lotira, 2004)



- **Timelines** – These are important for clarifying the exact points in time when a project started and ended (or the time of the assessment).
- **Measurement** of agreement and/or data spread – When scoring methods are standardized and repeated, it is possible to assess the level of agreement among individual community members or groups, depending on how the method is used. The assumption behind such measurement is that if people with similar socio-economic characteristics receive similar interventions (in terms of design and implementation), they will tend to rate the intervention in a similar way. Examples are provided in the paragraph on Statistical tests in the section on Sampling and statistics.
- **Statistical comparison of two points in time** – When using before-and-after methods it is possible to determine whether the measurements of an indicator at two points in time are statistically different. For non-parametric data, a statistical comparison of two medians is used; for parametric data, a statistical comparison of two means is used. Examples are provided in the paragraph on *Statistical tests*.
- **Attribution ranking or scoring** – This method is best used immediately after a before-and-after scoring or proportional piling method. For example, if through the use of one of these methods informants show a positive change in an impact indicator, they can be asked to list all the factors that they associate with this positive change. They are then asked to rank (or score) these factors in order of importance.

TABLE 23
Attribution ranking of the relative importance of factors associated with improved animal health in southern Ethiopia

Factors pastoralists associate with improved animal health	Median rank
Increased usage of modern veterinary drugs due to community's changed attitude towards modern veterinary services	1
Biannual vaccination for communicable diseases by CAHWs and government animal health technicians	2
Good rain and better availability of pasture	3
Reduced herd mobility and herd mixing due to increasing settlement	4

N = 10 informant groups; $W = 0.75$; $p < 0.001$.

Source: Admassu *et al.*, 2005

An example is shown in Table 23. Attribution, ranking or scoring helps assessors to understand how changes in a community relate to various factors, processes or influences, only some of which are controlled by the project.

- **Triangulation** – In emergency livestock interventions, a certain outcome might be expected because of the technical nature of the intervention. If an intervention is technically well designed, properly implemented and reaches an appropriate number of livestock, it should generate the expected outcome. In impact assessment, triangulation compares the changes measured using participatory methods with the design and implementation of project activities, and determines whether the two sets of information are consistent. Although it is largely a qualitative process, triangulation is central to explaining the impact (or lack of impact) of an intervention, and the validity of results derived from participatory methods. Examples of triangulation are provided in Box 16. Of the five assessment components listed in this section, triangulation is the most important. It should also be relatively easy to conduct because much of the information on project design and implementation should be available from project proposals and monitoring reports.

Control-based approaches and methods

Many readers will already be familiar with the concept of a control group, as this is commonly used in research design for scientific studies. However, in humanitarian situations, the concept of a control group is problematic because it implies the deliberate exclusion of people from an intervention to act as a control, and this contradicts humanitarian principles. Furthermore, even when a control group with similar socio-economic characteristics to the intervention group can be identified, an agency working in one area during an emergency has limited control over programmes run by other actors in other areas: in other words, the control group cannot be controlled. For studies that are narrowly focused on specific aspects of disease control there are various study design options for dealing with variable conditions in control areas, but these approaches require specialized technical expertise that is beyond most humanitarian agencies.

Despite the general constraints on the use of control groups in impact assessment in emergencies, for livestock interventions it is often possible to identify a control group within

BOX 16

Triangulation and causation: the case of livestock vaccination

Example: Vaccination worked

During a participatory assessment of veterinary interventions in southern Sudan in 1999, a before-and-after proportional piling method indicated a dramatic reduction in the incidence of a disease called gieng, or rinderpest. This change is shown in Box 15, where the large red segment in the "before" pie chart disappears in the "after" pie chart.

To triangulate this finding, the assessors examined rinderpest vaccination records for the previous three years, and assessed the design and implementation of vaccination programmes during that period. Based on this assessment, the veterinarians in the team concluded that vaccinations had been conducted properly and that, biologically, a substantial reduction in rinderpest outbreaks would be expected. Therefore, the results of the participatory method were consistent with a technical review of the intervention. The results were further triangulated against rinderpest surveillance data that showed no rinderpest outbreaks in the area during the previous two years.

Sources: Catley, 1999; Catley *et al.*, 2009

a project or adjacent area. Some livestock interventions are not designed to target all livestock, but only a subset of a livestock population. For example, a commercial destocking project at the onset of drought does not usually aim to remove all the livestock from an area, but instead to support some offtake while providing a cash transfer to protect a core herd. Livestock feed or veterinary interventions may target certain types of livestock as a result of a particular technical strategy, the targeting of more vulnerable households, or resource limitations. In restocking programmes, the performance of restocked households can often be compared with that of non-restocked households.

Matching is an important principle in the design of impact assessments that use control groups. This means that the areas, households or individuals (people or animals) used as controls should match the intervention areas, households or individuals as closely as possible. The control and the intervention groups should have similar ecological and socio-economic characteristics, and be subject to a similar crisis or emergency within a similar political and operational context.

If the criteria for a control group can be met, this approach to assessment design can produce a relatively high level of evidence compared with other approaches (Figure 3). Furthermore, control-based assessments do not necessarily require large sample sizes or complicated sampling procedures, and results can be analysed using fairly simple statistical tests.

Area-based control groups – When impact assessments compare areas with intervention and those without, frustration in the control areas is a possible source of bias because people know that they have been excluded from assistance. This can be a difficult issue to handle, as informants may exaggerate responses with the aim of attracting support in

future crises. Consequently, the control groups used in assessments of emergency livestock projects are often best found within a project area, and where communities generally know that certain livestock or households are excluded from interventions for technical or resource reasons. Area-based approaches also have logistics and resource implications, as time and money has to be allocated to accessing the control areas. In some humanitarian crises, these constraints are major concerns and prevent this kind of assessment design.

Within-project control groups – Ideally, the design of livestock interventions should be based on effective consultations with community members and representatives, as advised by both the Sphere handbook and LEGS. Activities such as rapid participatory assessments and community-led selection of aid recipients help to ensure participation and transparency. In these situations, local people are well aware of the limitations, such as the number of households selected and the exclusion of some households that matched the selection criteria because of resource constraints. Livestock keepers or users should also be aware of the technical rationale for an intervention, and that some projects do not aim to reach all types of livestock.

In other situations, livestock keepers may choose not to participate in a particular intervention, such as a vaccination programme, or may select only certain animals to be vaccinated rather than the entire herd. Again in Ethiopia, an impact assessment of vaccination programmes during drought was designed on the basis that within a given area some livestock were vaccinated while others were not. Results are shown in Table 24.

A third type of within-project control arises from the technical nature of the intervention itself. For example, in a veterinary project using CAHWs, they may be tasked with treating only a selection of important diseases, rather than all diseases. The assumption would be that the impact on livelihoods of the diseases handled by CAHWs should fall, with that of diseases not handled by CAHWs being used as a control.

In common with before-and-after assessment design, control-based assessments should include triangulation with project design and monitoring information. Although a statistical analysis of impacts in control and intervention groups may show an association between intervention and impact, this should be supported (or not) by a technical review of the project design and level of activity, and a biological reasoning for causation.

Comparing different interventions, services or items using matrix scoring

Matrix scoring allows a set of items, interventions or services to be compared against a set of characteristics or indicators. The method is useful when there is no baseline for a project or no standard against which to measure an intervention. When agencies implement several interventions, the method can compare these interventions. In common with simple scoring and proportional piling, an important element of matrix scoring is the reasoning informants provide to explain their scores.

Table 25 provides an example of matrix scoring. The aim was to compare the different interventions used by different agencies during drought in a pastoralist area of Ethiopia, and to examine possible combinations of interventions for future droughts.

Sampling and statistics

The technical aspects of sampling methods, sample sizes and statistical analysis cannot be fully covered in this manual, and readers are directed to standard epidemiology and social

TABLE 24
Use of within-project control groups: mortality in vaccinated and non-vaccinated Afar pastoral herds in Ethiopia

	Mean mortality (%) (95% confidence interval)			
	Normal year		Drought year	
Livestock species and disease	Vaccinated	Non-vaccinated	Vaccinated	Non-vaccinated
Cattle (n = 60 herds)				
Anthrax	1.7 (0, 3.39)	1.7 (1.09, 2.38)	0.9 (0, 2.13)	2.5 (1.17, 3.89)
Blackleg	0.6 (0, 1.50)	0.9 (0, 2.07)	1.3 (0, 2.76)	0.2 (0, 0.47)
Pasteurellosis	1.4 (0.19, 2.64)	0.5 (0.23, 0.86)	4.3 (1.55, 7.13)	2.2 (0.73, 3.60)
CBPP	3.4 (1.13, 5.71)	2.4 (1.59, 3.15)	na	3.8 (2.88, 4.79)
Sheep and goats (n = 60 herds)				
Anthrax	na	0.4 (0.01, 0.729)	0 (0, 0)	0.8 (0, 1.66)
Pasteurellosis	na	1.1 (0.61, 1.66)	5.2 (2.05, 8.33)	2.4 (1.11, 3.71)
CBPP	na	2.5 (1.36, 3.64)	na	4.1 (3.06, 5.17)

na = not applicable/no vaccination conducted; CBPP = contagious bovine pleuropneumonia; CCPP = contagious caprine pleuropneumonia.

Source: Catley *et al.*, 2014

science texts for detailed descriptions of the various options. It is evident that very few systematic impact assessments of livestock interventions in humanitarian crises have been conducted, and this may be because of the practical difficulty of applying conventional sampling and statistical analyses in emergency contexts. The following paragraphs do not aim to provide authoritative guidance on these aspects of assessment design, but are instead based on actual assessments in the field and approaches that proved to be feasible under certain operational and resource constraints.

Sampling method and sample size - When designing an impact assessment, agency staff are often hindered by too many options and issues concerning sampling methods and sample size: how should informants be selected, and how many? A common perception is that scientific or rigorous assessment requires a large random sample of informants, and is therefore beyond the resource and technical capacities of most implementing agencies. However, as the examples in this manual show, approaches to sampling depend on the questions asked in the assessment, the level of evidence required, and the assessment design. In some assessments, a reasonable level of evidence can arise from comparisons of a small number of interventions and control groups (e.g. Table 25), so even for local NGOs with limited resources, useful impact assessment is possible. In some cases, results have been presented in peer-reviewed journals, indicating that a degree of independent quality control has been applied to these assessments.

In an ideal situation, random sampling is used because it produces a sample that is representative and unbiased. This is the preferred option for many scientific studies, owing to its objective sample selection process and because results from a sample can be extrapolated to the wider population from which the sample was drawn. Despite these benefits,

TABLE 25
Use of matrix scoring in impact assessment: comparison of livestock and other interventions during drought in southern Ethiopia (from Abebe *et al.*, 2008)

	Mean scores (95% ci) for interventions							
Indicators	**De-stocking**	**Veterinary support**	**Animal feed**	**Food aid**	**Water supply**	**Labour (Safety net)**	**Credit**	**Others**
"Helps us to cope with the effect of drought"	9.1 (8.5, 9.7)	3.5 (3.2, 3.9)	5.7 (5.1, 6.2)	6.9 (6.5, 7.4)	3.0 (2.4, 3.6)	0.8 (0.5, 1.1)	0.5 (0.2, 0.8)	0.4 (0.2, 0.7)
"Helps fast recovery and rebuilding herd"	11.1 (10.5,11.7)	4.4 (3.9, 4.9)	5.7 (5.0, 6.3)	4.9 (4.4, 5.6)	1.9 (1.5, 2.4)	0.9 (0.5, 1.4)	0.6 (0.1, 1.1)	0.4 (0.1, 0.7)
"Helps the livestock to survive"	10.3 (9.5, 11.2)	4.9 (4.4, 5.4)	8.9 (8.1, 9.7)	2.3 (1.8, 2.8)	2.8 (2.2, 3.5)	0.2 (0.1, 0.4)	0.3 (0.1, 0.6)	0.2 (0.0, 0.4)
"Saves human life better"	9.8 (8.9, 10.6)	2.4 (1.9, 2.8)	3.7 (3.1, 4.3)	8.8 (8.1, 9.6)	3.6 (2.9, 4.3)	0.9 (0.5, 1.3)	0.5 (0.2, 0.9)	0.2 (0.0, 0.4)
"Benefits the poor most"	7.6 (6.7, 8.6)	1.9 (1.6, 2.3)	3.2 (2.5, 3.8)	11.0 (10.1,11.9)	3.7 (2.8, 4.3)	1.6 (0.9, 2.2)	0.7 (0.3, 1.1)	0.5 (0.1, 0.8)
"Socially and culturally accepted"	11.5 (10.6,12.4)	5.1 (4.7, 5.6)	5.8 (5.1, 6.4)	3.4 (2.8, 3.9)	2.6 (2.1, 3.2)	0.9 (0.5, 1.4)	0.3 (0.1, 0.5)	0.3 (0.1, 0.5)
"Timely and available"	8.4 (7.8, 9.0)	3.3 (2.9, 3.7)	4.3 (3.9, 4.6)	8.5 (7.9, 9.1)	3.5 (2.8, 4.1)	1.2 (0.7, 1.7)	0.5 (0.2, 0.8)	0.3 (0.1, 0.5)
Overall preference	10.6 (9.9, 11.2)	4.2 (3.8, 4.6)	6.2 (5.5, 6.9)	4.7 (4.1, 5.2)	2.6 (2.1, 3.2)	1.0 (0.5, 1.5)	0.4 (0.1, 0.6)	0.3 (0.1, 0.6)

n = 114 households; results derived from matrix scoring of each indicator using 30 stones; mean scores (95% CI) are shown in each cell. The black dots represent the stones used during the matrix scoring.

the mathematical formulae used to calculate sample size often include judgemental elements such as the expected level of change in the population concerned. In general, the higher the level of change, the smaller the sample size needed to detect the change within a specified level of statistical confidence. However, the levels of error used in sample size calculation are based on statistical convention, so it is possible to produce results that are statistically significant but biologically irrelevant, and vice versa (Box 17).

These aspects of random sampling highlight the importance of understanding the nature of an intervention, the effects it is likely to have, and the operational context. For most emergency interventions, qualitative explanations and insights are also needed, to provide the reasoning behind quantitative analysis. Formulae for calculating sample sizes are provided in Annex 4B.

BOX 17

Statistical significance versus nutritional and livelihoods significance in restocking projects

Example 1: Children drink milk

Assume that a before-and-after method is used to measure the absolute consumption of milk by children under five years of age in households restocked with sheep and goats. The assessment uses the method with 50 households and 200 children, selected randomly. Analysis of the results shows that milk consumption increased among the children, but that in terms of millilitres the increase was not statistically significant relative to the pre-project situation. The assessors initially concluded that the restocking intervention was not a useful approach for improving child nutrition.

The assessors then looked in more detail at the volume of goats' milk consumed by the children and analysed this intake in terms of the recommended daily allowances (RDAs) for important macro and micronutrients. This analysis showed that the mean volume of goats' milk consumed before the project was insufficient in terms of key micronutrients, while the mean volume consumed after the project did reach RDAs, and that these micronutrients were not available from other food sources. Without further statistical analysis, the assessors concluded that the restocking was a useful contribution to child nutrition.

This example raises numerous assessment design issues, including the importance of asking the right questions at the design stage. However, it also shows how a change in milk consumption was insignificant in terms of a statistical analysis of milk volume, but *clinically significant* in terms of child nutrition.

Example 2: Livestock, voice and status

Assume that a restocking project provides six female sheep and goats to poor female-headed households as part of a post-conflict recovery programme. A before-and-after scoring method is used with 12 groups of women to compare income from livestock sales before and after the project. The results show no statistically significant change in income from livestock over the 12-month period. In a feedback meeting with project staff and women participants, the assessors explain that the project had no impact and the women confirm that they had yet to sell any offspring or milk from their animals. However, they also contest the conclusions of the assessors. They explain that the ownership of sheep and goats had allowed them to renew important social relationships in the community, represent themselves at community meetings, and receive credit from local service providers. In their view, their livelihoods have significantly improved since the start of the project.

When considering different sampling options, a useful starting point is to review the three main sampling methods summarized in Table 26.

In many real-life humanitarian situations, a random sample may not be needed for impact assessment of livestock interventions – a purposive sample is sufficient. Examples include assessments where the extrapolation of findings to a wider area is not a priority, or where security problems prevent access or hinder meaningful interaction with local

TABLE 26
Sampling options for evaluation and impact assessment

Type of sampling	Description	Assessments using this approach fully or in part
Random (probability sampling)	Based on the principle that any location or informant has an equal chance of being selected	Commercial destocking, Ethiopia (Abebe *et al*., 2008)
	Generally viewed as the most representative type of sampling, and therefore the most rigorous	Restocking, Kenya (Lotira, 2004)
	Allows results from the sample to be extrapolated to the wider project area	Veterinary services, Afghanistan (Schreuder *et al*., 1996a, Schreuder *et al*., 1996b)
	Can be used in humanitarian contexts when lists of targeted households are available, and when all selected locations or households are accessible	
	Sample size(s) are determined using mathematical formulae that include the level of statistical confidence (error) required and estimates of the amount of change expected in the population concerned	
	Tends to be less participatory than other approaches	
	Randomization can miss key informants, i.e. individuals with particular knowledge about an area or project	
Purposive (non-probability sampling)	Uses the judgement of community representatives, project staff or assessors to select representative locations and/or informants	Veterinary services, Ethiopia (Admassu et al. 2005)
	Useful when no sampling frame is available	Feed supplementation (Bekele and Abera, 2008)
	Moderately rigorous if conducted well, and if clear criteria for sampling are described and followed	
	Can include a comparison of impacts in areas judged to have weak, moderate or strong implementation	
	Can be participatory if community members are involved in selecting assessment site and informants	
	Subject to bias, particularly towards more successful project areas or households	
Convenience (non-probability sampling)	Samples easily accessible locations or informants	Various assessments
	The least rigorous sampling option, and unlikely to be representative, particularly in larger projects	
	Commonly used, especially in wet seasons with poor road access, or in insecure areas	

people. For some assessments where an in-project control group is present, a comparison of intervention and control groups can involve as few as ten purposively selected, matched groups, and results are analysed using conventional non-parametric statistical tests. When using this approach, sample size is often determined by the statistical test and the number of repetitions required to achieve the required level of statistical significance.

Statistical tests

The following are the three main principles governing the use of statistical tests for impact assessment in humanitarian situations:

- The more complex the statistical tests used, the less likely that either agency staff or community members will understand the results, and the more likely that academics or researchers will contest the findings on methodological grounds.
- For assessments designed with random sampling and relevant sample sizes, the data are assumed to be normally distributed and parametric statistical tests are used.
- For assessments designed with purposive sampling and small sample sizes, the data are assumed not to be normally distributed and non-parametric statistical tests are used.

Here is one example:

Assessment of veterinary services (Admassu *et al.*, 2005) – A CAHW project was implemented in 30 drought-prone villages. An impact assessment was designed based on a purposive sample of ten villages with group discussions in each village. A before-and-after scoring method was used in each village, requiring groups of informants to score the overall livelihoods impacts of important livestock diseases before and after the project. The scores were summarized as median scores, and presented graphically (Box 14). A comparison of scores for diseases handled and not handled by the CAHWs was conducted using a non-parametric test, the Wilcoxon signed-ranks test Z. The results showed a significant reduction in livelihoods impact scores for diseases of small ruminants, cattle and camels handled by CAHWs. In contrast, for diseases not handled by CAHWs there were significant changes in livelihoods impact scores.

The results were triangulated using a matrix scoring method that required informants to compare different veterinary service providers using a list of indicators. Results were summarized as median scores and ranges, and the level of agreement among the ten groups of informants was assessed using a non-parametric test, the Kendal coefficient of concordance (*W)*, (Table 27).

Analysis, feedback and reporting

An important step in a PIA is the initial analysis and collation of key information and findings, followed by discussion and verification of the results with local stakeholders. This step has at least two benefits:

1) Sharing results with community members and local project or government staff helps to avoid the resentment seen, for example, when assessment teams collect large amounts of information but do not send reports back to people on the ground.
2) A local feedback session can be used to verify the provisional results and often provides further information to explain the findings.

Feedback can take place at workshops in a project location, and should take account of preferred local languages and familiarity with certain types of information and presentation. Complicated statistical analyses and results should usually be avoided, and most results can be summarized on flip charts or handouts. Following these feedback and verification processes, a final report is produced and disseminated. Detailed guidance on report writing is provided in Annex 4C.

BENEFIT-COST ANALYSIS

The role of benefit-cost analysis

Benefit-cost analysis (BCA) is a tool for predicting or measuring the economic benefits of an investment, such as a donor's contribution to an emergency livestock project. A BCA

TABLE 27
Summarized matrix scoring of service providers (Admassu *et al.*, 2005)

Indicator	Median score (range) for service provider				
	Government veterinary service	Drug dealers (black market)	Traditional medicine	CAHWs	Others
"Service is near to us, so our animals are treated quickly" (*W*=0.69***)	11(6-15)	0 (0-16)	0 (0-2)	15 (7-22)	0 (0-0)
"Service always has medicines available" (*W*=0.94***)	2 (2-6)	8 (4-10)	4 (2-6)	14 (10-20)	1 (0-4)
"The quality of medicines is good" (*W*=0.66***)	7 (1-10)	4 (2-13)	4 (3-9)	12 (7-19)	0 (0-2)
"Our animals usually recover if we use this service" (*W*=0.73***)	1 (1-3)	5 (1-17)	4 (2-8)	19 (6-23)	2 (1-3)
"We get good advice from the service provider" (*W*=0.62***)	1 (0-4)	7 (1-10)	7 (3-9)	12 (5-15)	4 (2-14)
"This service can treat all our animal health problems" (*W*=0.69***)	5 (3-12)	4 (0-15)	9 (0-18)	11 (5-23)	0 (0-0)
"This service is affordable" (*W*=0.76***)	0 (0-6)	6 (0-19)	4 (2-10)	18 (4-24)	2 (0-2)
"We trust this service provider" (*W*=0.62***)	0 (0-11)	7 (0-11)	4 (2-7)	16 (5-18)	2 (1-5)
"The community supports this service" (*W*=0.54**)	0 (0-0)	3 (0-16)	7 (4-12)	15 (4-23)	0 (0-9)
"Increase in service usage" (*W*=0.62***)	3 (0-11)	0 (0-3)	3 (0-9)	20 (5-24)	2 (0-5)

Number of informant groups = 10; *W* = Kendal coefficient of concordance (**p<0.01; ***p<0.001). W values vary from 0 to 1; the higher the value, the higher the level of agreement between informants.

measures and values the benefits of an intervention in aiding recipients, and compares these benefits with the costs of the intervention. For livestock interventions in humanitarian contexts, some benefits are relatively easy to quantify, because livestock have a market value and produce items, such as milk, which also have a market value. However, many important livelihood benefits arising from these interventions are difficult to value in monetary terms. These include types of social capital such as local networks and relationships, and aspects of human well-being such as confidence or dignity. In addition, some livestock interventions can lead to benefits such as helping to sustain local markets or service providers during an emergency, but these too are difficult to quantify. BCA should therefore not be used as a stand-alone tool, but as a useful complement to an evaluation or impact assessment.

Approaches, methods and examples

A BCA as part of an evaluation or impact assessment requires estimates of benefits and costs. Estimation of benefits usually focuses on the types of impact that can be assigned monetary values with reasonable confidence. In livestock projects, these include reduced livestock deaths (e.g. in supplementary feeding or veterinary interventions), cash acquired from the sale of livestock (e.g. in commercial destocking, slaughter destocking or restocking), and cash acquired from sale of livestock products such as milk or eggs (e.g. in restocking projects).

TABLE 28
Approximate benefit-cost ratio for the commercial destocking intervention in Moyale *woreda*, Ethiopia

	Costs	
Benefits (US$)	**Item**	**Cost (US$)**
20 000 cattle purchased at average of EB 438/US$50.34 each, resulting in EB 8.76 million/**US$1.01 million** cash transfer	**Save the Children US costs:**	
	Staff salaries	5 090
	Vehicle costs	7 472
	Workshops/meetings	1 150
	Temporary hire	542
	Per diem	161
	Administrative support	100
	Subtotal	14 515
	SC US overhead @17%	2 468
	Total SC US costs	*16 983*
	Marketing department costs: *Staff and vehicle provision – estimate*	*7 500*
	Total costs	**24 483**

The benefit-cost estimation was calculated by dividing the value of the cash transfer derived from cattle purchases by the total costs incurred by the implementing agencies. Therefore, the benefit-cost was: US$1 010 000/US$24 483 = 41:1.

The number of cattle purchased – 20 000 – is based on estimates by the two traders involved in the destocking.

Two loans, valued at US$50 000, were provided to traders. These were fully repaid so were not included in the costs.

To quantify these types of impacts, data from impact assessments and project monitoring reports can be very useful: two examples are provided below.

Cost estimations in a BCA can be derived from project budgets, records of expenditure and estimates of staff time and agency overheads. As all of these costs should feature in one form or another in the routine financial reporting systems of most organizations, this information is usually fairly easy to obtain.

Example 1: Estimating benefits from project monitoring data (Abebe et al., 2008)
In a commercial destocking project during drought, traders were organized to buy cattle from pastoralists. The project monitoring data indicated that each participating household received an average of US$186 from the sale of cattle and that the transfer of cash to households in all project areas totalled US$1.01 million. This figure was used as the known monetary benefit of the intervention. Details of the BCA calculation are shown in Table 28.

Example 2: Estimating benefits from impact assessment data (Bekele and Abera, 2008)
An impact assessment of a supplementary feeding programme for cattle included estimates of mortality in fed and unfed cattle. The difference in mortality in these two groups of cattle was then used as a benefit that could be associated with the feed programme: local market

TABLE 29
Benefit-cost analysis of supplementary feeding at Web feeding centre

Item	Amount (US$)
Costs	
Cost of cattle feed = 67 days x 800 cows	17 900
Transport costs for feed	13 326
Loading and unloading costs	0
Vehicle rent	260
Enumerator and CAHW	507
NGO technical and administration staff costs	666
Other costs	1 038
NGO overheads	3 369
Total costs	*36 067*
Benefits	
Value of cattle losses prevented in feeding centre = (mortality in control group – mortality in fed group) x US$163[1]	*13 040*
Value of improved body condition of cows, end May 2008 = number of fed cattle with improved condition x US$109[2]	*44 616*
Value of milk = 3 664 litres x US$0.33, over 67 days in feeding centre[3]	*1 209*
Value of calves delivered and survived in feeding centre = 118 calves x US$54.30[4]	*6 407*
Total benefits	*65 272*
Benefit-cost ratio	**1.8:1**

[1] Estimated market value of US$163/head.
[2] Difference in prices of cattle in poor and in moderate condition; condition of unfed cattle did not improve during the drought.
[3] Measure of milk produced by fed cows, multiplied by market value of milk.
[4] Market value of calves produced by fed cows; unfed cows were unable to sustain calves during the drought.

prices were used to assign an economic value to the cattle that otherwise would have died. The assessment also examined differences in body condition in fed and unfed cattle, and assigned a market value to the improved body condition of cattle in the feeding centres. Other benefits included the milk and calves produced by cows in the feeding centres; cows outside the feeding centres dried up and did not deliver calves. The detailed BCA for one of the less successful feeding centres is shown in Table 29.

When interpreting BCA results, a positive benefit-cost ratio is one in which benefits exceed costs. On first viewing, a high level of benefit against costs indicates that a project is very beneficial in economic terms. However, when comparing different interventions it is also useful to consider how they are affected by any changes in costs or benefits, e.g. can an intervention withstand the sort of increases in costs and decreases in benefits that may occur during implementation? Not only should an intervention achieve a clear benefit over cost, but it should also be robust in the face of fluctuations in local market conditions.

Sensitivity analysis is a tool used to predict changes in a benefit-cost ratio when input costs rise or benefits decrease. The example shown in Table 30 uses the benefit-cost ratio from Table 29. The results show that although the benefit-cost ratio for the intervention was a relatively low 1.76:1, it was a reasonably robust intervention and the benefits were

TABLE 30
Sensitivity analysis for the benefit-cost of supplementary feeding at Web

Changes in cattle mortality, condition and cost of feeding	Benefit-cost (proportional change relative to field model)				
	Field model	Cattle and milk market values at end of drought			
		Increase of 10%	Increase of 20%	Decrease of 10%	Decrease of 20%
Field model	1.76	1.94 (10%)	2.11 (20%)	1.58 (-10%)	1.41 (-20%)
Cattle mortality					
Increase by 10%	1.66 (-5.7%)	1.82 (3.5%)	1.99 (13%)	1.49 (-15.3%)	1.32 (-25%)
Increase by 20%	1.55 (-11.9%)	1.70 (-3.5%)	1.86 (5.7%)	1.39 (-21%)	1.24 (-29.5%)
Cattle body condition					
Increase by 10%	1.88 (6.8%)	2.07 (17.6%)	2.26 (28.4%)	1.96 (11.4%)	1.51 (-14.2%)
Increase by 20%	2.00 (13.6%)	2.20 (25%)	2.40 (36.4%)	2.07 (17.6%)	1.60 (-9.1%)
Cost of feeding					
Increase by 10%	1.67 (-5.1%)	1.84 (4.5%)	2.01 (14.2%)	1.50 (-14.8%)	1.34 (-23.9%)
Increase by 20%	1.59 (-9.7%)	1.75 (-0.6%)	1.91 (8.5%)	1.43 (-18.8%)	1.27 (-27.8%)

Source: Bekele and Abera, 2008

still positive when feed prices increased by 20 percent or the market value of cattle and milk fell by 20 percent.

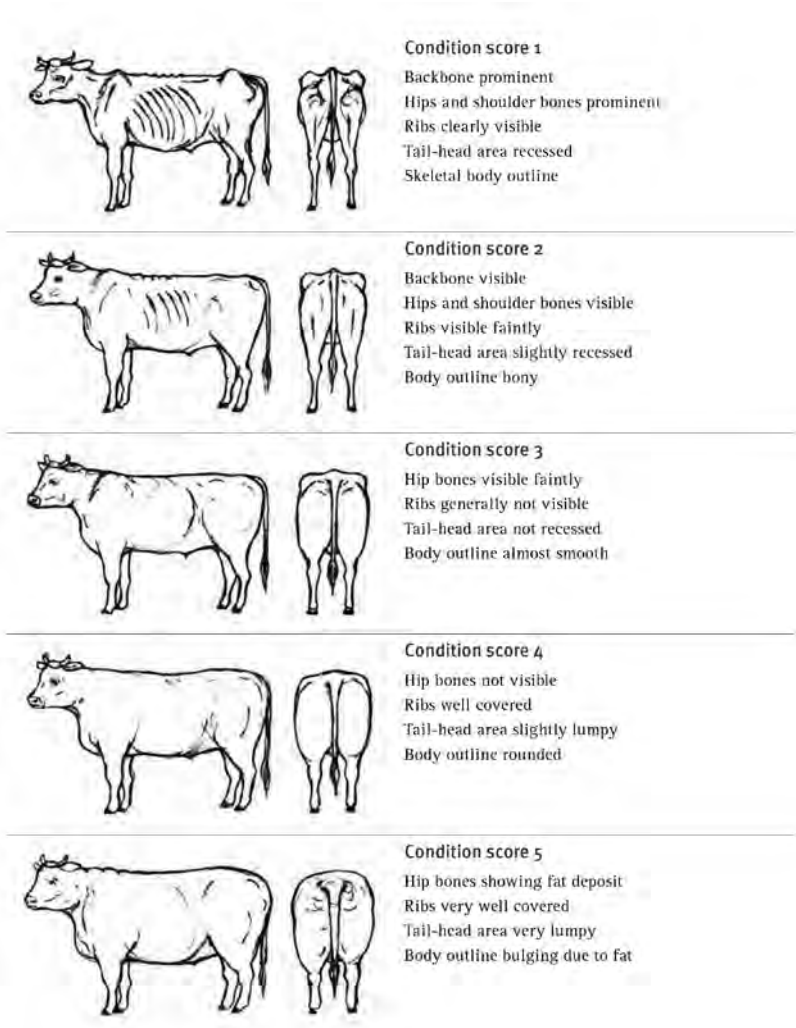
CONCLUSION

The review process used during the development of the LEGS handbook indicated a dearth of evidence-based evaluation or impact assessment for emergency livestock projects. Although a range of organizational and methodological challenges tend to hinder impact assessment, a growing body of approaches and methods is now emerging, enabling stakeholders to move beyond anecdote and ad hoc interviews towards more systematic and convincing approaches. Central to this recent trend has been the use of PIA as a flexible approach that combines the benefits of local knowledge and perceptions with robust methods, analysis and cross-checking. There is a need to apply and use these approaches further and to work with communities to assess livestock projects in disasters, feed results into future programmes, and continue to improve accountability and best practices.

Annex 1

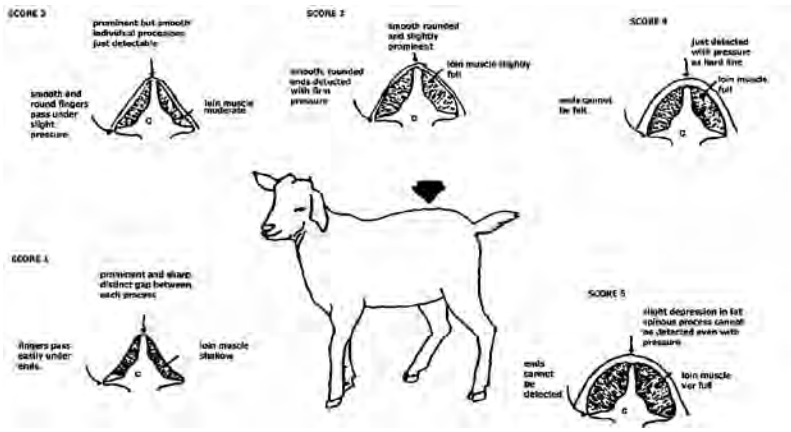
Destocking/Provision of livestock: body condition scoring

Cattle body condition scoring



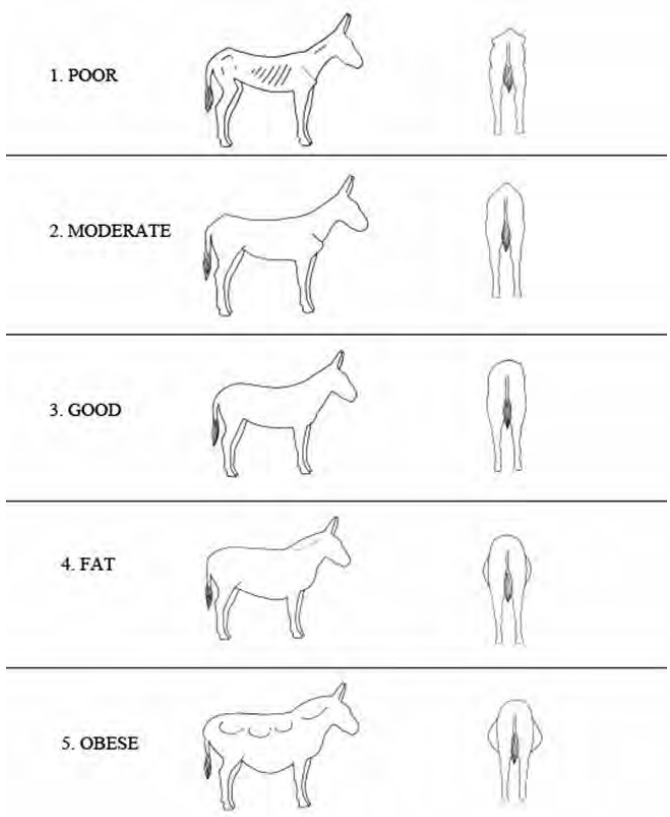
Source: http://www.daff.qld.gov.au/__data/assets/pdf_file/0015/53520/Animal-HD-Investigation-Condition-scores.pdf

Goat body condition scoring



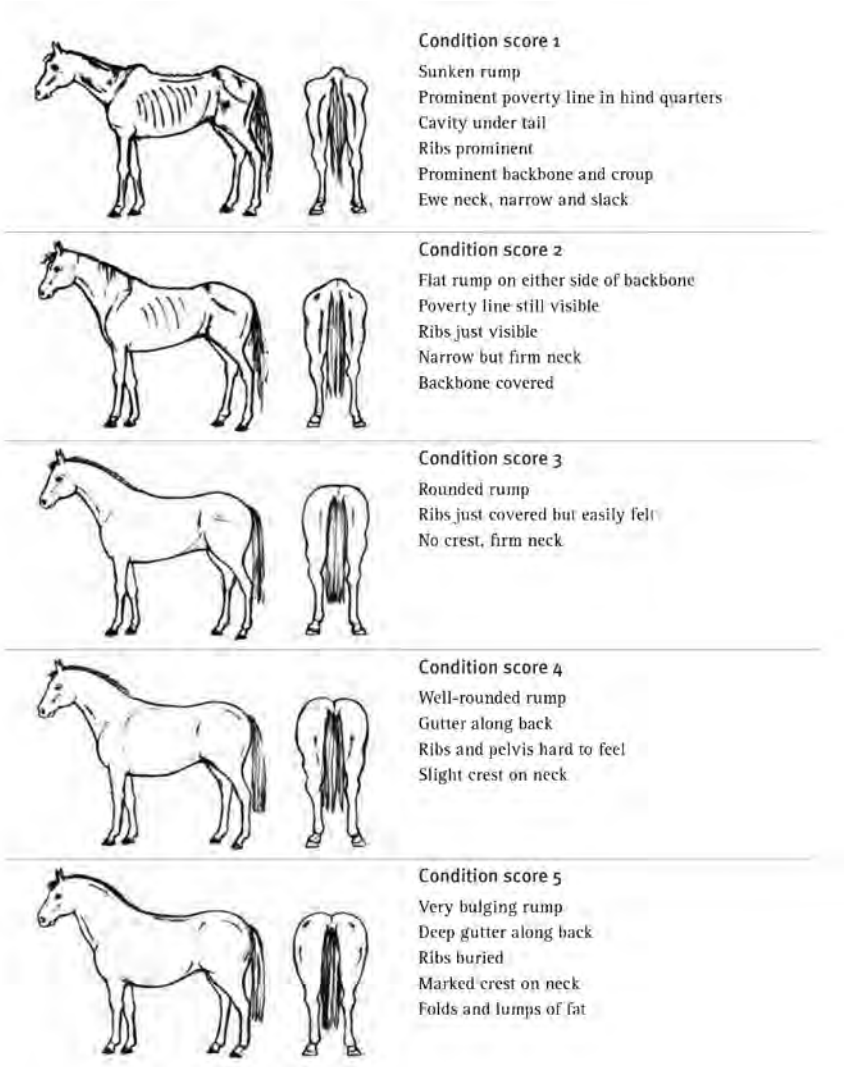
Source: http://www.fao.org/wairdocs/ilri/x5536e/x5536e0a.gif

Donkey body condition scoring



Source: http://www.gov.scot/publications/2007/10/16091227/4

Horse body condition scoring



Source: http://www.daff.qld.gov.au/__data/assets/pdf_file/0015/53520/Animal-HD-Investigation-Condition-scores.pdf

Annex 2A
Veterinary Support: Clinical Vet. Services – Common drugs

Veterinarians and qualified veterinary para-professionals require supplies of the basic medicines and equipment to allow them to do their work. The following lists provide an overview of the range of medicines commonly used for treating livestock, with species-specific information, though this is by no means a comprehensive list. Care must be taken to ensure that the correct medicines are used for each species as some medicines can be dangerous to certain species. This also applies to equipment – **veterinary advice is essential when procuring and using medicines and the following notes are provided as general guidance only**. Any country-specific rules on the use of drugs and equipment by the various cadres of veterinary personnel should be adhered to. Veterinary personnel should always refer to a medicine formulary text to check which species of animal can be treated with a particular drug, the correct dosage and any contraindications.

ANTIBIOTICS

A key point to be considered when using antibiotics is that microbial resistance to antibiotics is increasing and underdosing or unnecessary use of antibiotics will add to this problem.

- **Oxytetracycline 30%** is a readily available broad-spectrum, long-acting injectable antibiotic often used for large and small ruminants. It can treat a range of bacterial diseases, including pneumonia, haemorrhagic septicaemia, black quarter, mastitis and metritis. It can also be effective against diseases caused by blood parasites such as babesiosis (tick fever), and East Coast Fever, and intestinal parasites such as coccidia. It is used in all animals and chickens, **but it should not be used in equids as it can cause injection-site necrosis.** Oxytetracycline is also available in different concentrations as an injectable solution, oral powder, ointment, topical powder or spray.
- **Oxytetracycline 5% or 10% should be used for equids** but this is short-acting and therefore will need several doses. It can be effective for respiratory diseases and diseases caused by blood parasites.
- **Penicillin** is a narrow-spectrum antibiotic often mixed with **streptomycin** to broaden the spectrum. Diseases treated with penicillin include wounds, respiratory infections, tetanus, anthrax, mastitis, black quarter, metritis, abscesses and foot rot. It is available as an injection, uterine pessaries or intra-mammary preparation. **Pen/strep** can be used in ruminants, pigs and camels.
- **Trimethoprim** is a broad-spectrum antibiotic usually combined with a sulphonamide antibiotic which is frequently used for treating equids, and can be effective for treating ulcerative lymphangitis as well as urinary tract and respiratory infections.
- **Horses** often have a reaction at the site of an antibiotic injection (painful swelling) and

therefore only antibiotics that are recommended for horses should be used. If possible, oral antibiotics are preferable for equids. **Oil-based injectable antibiotics should be avoided in horses.**

- **Camels** can be a problem because many antibiotics do not have dosage directions for them. **If no guidance is available, use the guide for cattle.**
- **Antibiotic eye ointment (without steroids)** for treating eye infections are available in a range of preparations and can be used in all species. Steroids in antibiotic eye ointments are contraindicated for treating infections as they will exacerbate a corneal ulcer, if present.

ANTI-INFLAMMATORY DRUGS

- **Hyoscine** is an anti-spasmodic which is sometimes combined with the pain reliever **dipyrone** (a non-steroidal anti-inflammatory) to treat colic in horses and also diarrhoea in cattle.
- **Flunixin and meloxicam** are anti-inflammatories used for treating a range of conditions including colic in equids and lameness in equids and ruminants.
- **Phenylbutazone** is often used for treating lameness in equids.

Again for equids, oral preparations are preferable to injectables.

ANTIPARASITICIDES (INTERNAL AND EXTERNAL)

Anthelmintics

Although anthelmintic resistance is becoming common for all **benzimidazoles,** they are still widely used and available. They include:

- **Albendazole** controls roundworms in the digestive system and adult liver fluke in ruminants, equids and camels. It is available either as a liquid or bolus.
- **Fenbendazole and mebendazole** both control roundworms in the digestive system of equids and camels and **fenbendazole** can also be used for treating lungworm in ruminants and equids.

Other commonly used anthelmintics include:

- **Levamisole** controls most roundworms of the digestive tract and the eye worm in ruminants. It is not as effective for intestinal worms as **albendazole** and does not control fluke. It is a liquid given by mouth but is also available in injectable form.
- **Ivermectin** is active against a wide variety of external (especially mange) and internal parasites but it is more expensive. It is available as an injection, as a pour-on preparation for the skin for ruminants, pigs and camels or as an oral preparation for use in equids.
- **Piperazine** is active against roundworms and ascarid worms in poultry and is given in feed or water.

Insecticides

- **Malathion** is effective against various ectoparasites such as mites, fleas, ticks and lice and it is often used as a dusting powder for poultry.
- **Acaricides** are used to control ticks mainly in ruminants and are available as a liquid concentrate to dilute for spraying or dipping, a liquid pour on, a powder for

dissolving in water as a wash, or a topical ointment. **Deltamethrin** is a common preparation used as a pour-on (trade names: Spot On®, Butox®). **Amitraz** (trade names: Aludex®, Tacktic®) is a common preparation used for spraying or washing.

Equids are easily poisoned or killed by some insecticides, e.g. Amitraz causes severe colic. Benzene hexachloride (trade name: Gammatox) is safe to use in equids for treating mange.

Anti-protozoal drugs

- **Trypanocides are** drugs used for treating trypanosomosis. Some of these drugs are very specialized and can only be obtained from a few legal sources. Several different drugs are available, such as Ethidium® (**homidium bromide**), Samorin (**isometamidium chloride**) and Berenil (**diminazene**) and Cymerlasan (**melarsamine**) for use in camels. These drugs can be injectable (liquid or a sterile rehydratable power) or tablets. Ethidium, Berenil and Samorin can be used in cattle and can also be used with care in equids (**equids have lower tolerance levels than cattle and can have severe injection-site reactions**).
- **Imidocarb diproprionate** (Imizol®): This is used for treating anaplasmosis and babesiosis, both of which are caused by protozoa in the bloodstream. Great care should be taken when treating equids as the therapeutic range of these drugs is very narrow and expert advice should be sought.
- **Multi-vitamins:** These usually come as injectable preparations and can help the **recovery of debilitated animals when used in conjunction with a balanced diet.**
- **Drugs for colic and constipation:** Their use depends on the species of animal. All the following can be used in equids depending on the cause of the colic – **liquid paraffin, linseed oil, magnesium sulphate and castor oil. Magnesium sulphate** (Epsom salts) can also be used for relieving bloat in ruminants and treating animals that have eaten poisonous substances. When medicine has to be given by stomach tube, as is often the case for colic, this must be done by a veterinarian or trained assistant.
- **Antiseptics:** common ones include **tincture of iodine** (maximum concentration of 0.1%), **savlon, denatured alcohol and gentian violet**. These can be used for either cleaning or treating wounds, depending on the medicine. **Salt water** (two teaspoons in one litre of water) is a cheap and effective way of cleaning wounds.
- **Petroleum jelly is** a cheap way of managing wounds, pressure sores and cracked heels.
- **Zinc oxide ointment is good for managing wounds after cleaning.**
- **Alcohol/surgical spirit** is used for cleaning equipment.

Annex 2B

Veterinary Support: Clinical Vet. Services – Content of a medical kit for a Community Animal Health Worker

This is a suggested list of veterinary medicines that can be used by Community Animal Health Workers. Recommendations made in this publication on the role and responsibilities of CAHWs are only applicable in countries where the status of CAHWs is recognized by relevant authorities. Moreover, the actual drugs used by CAHWs will depend on specific country legislation.

- Oxytetracycline 30%
- Oxytetracycline 5% or 10% for equids
- Penicillin
- Trimethorpim with sulphonamides (for treating equids)
- Albendazole
- Ivermectin
- Trypanocides: ethidium (homidium bromide), berenil (isometamidium chloride), cymerlasan (melarsamine for use in camels).
- Malathion
- Deltamethrin or Amitraz
- Multi-vitamins
- Petroleum jelly
- Savlon or iodine
- Surgical spirit
- Zinc oxide

Clinical equipment depends on the species of animal but may include:

- plastic treatment syringes – can be resterilized
- treatment needles (can be resterilized, though this is not recommended for equids):
  - ruminants 14, 16 and 18 gauge
  - equids 18, 19 and 20 gauge
  - camels 17 gauge
  - pigs 14, 16, and 18 gauge
  - poultry 25 and 27 gauge
- automatic vaccination syringe 20 ml
- vaccination needle for automatic syringe (gauge appropriate for species)
- Burdizzo for large animals (bovines only – **should never been used for equids**)

- Burdizzo for goats/sheep
- hoof knife
- clinical thermometer
- casting rope or for use as a halter
- cotton wool
- scissors
- scalpel blades
- dehorning wire
- metal container for sterilizing equipment

Annex 2C
Veterinary Support: Public-Sector Vet. Functions – Dog population management

During civil conflicts and in particular with the displacement of human populations into camps, dog populations, if left unmanaged, can become an additional hygiene and public health concern. Dogs generally follow displaced persons, roaming in and around the camps in search of food. If human bodies are left in abandoned villages and towns, dogs will readily scavenge on the corpses and often come back at night to the camps. Dogs which have somebody in the camp they can relate to can be differentiated from those dogs that do not. While dogs can provide protection for their owners and their children in camps they can also represent a health risk through:

- dog-bites, attacking people;
- spread of diseases such as rabies and other zoonotic diseases (e.g. leptospirosis);
- free-roaming and scavenging dogs will also feed on human bodies.

POSSIBLE INTERVENTIONS

Rabies awareness and dog-bite prevention

The general public needs to be made aware of the risks of free-roaming dogs and the possible spread of rabies. It needs to be informed on how to prevent dog-bites and what to do when bitten (e.g. wound washing with plenty of soap and water, and reporting to a medical post).

Dog rabies vaccination and taking responsibility for owned dogs

Vaccinating dogs is the best way to prevent rabies. As many as possible should therefore be given vaccinations against rabies and clearly marked, (e.g. collar, paint, ear mark) to avoid duplication.

Dog population control through culling

While the elimination of dogs is not promoted, in a major crisis situation and where public health is at serious risk due to high numbers of stray dogs, the dog population may be reduced as an emergency measure. It should be clear that this is not a sustainable long-term solution.

In the past, strychnine was commonly used to eliminate unwanted dogs, but this practice is no longer permitted due to the risks posed by the poison. It causes a slow and agonizing death, endangers handlers as it is very toxic, and presents environmental risks, killing any non-target species that come into contact with it.

Under certain circumstances the shooting of dogs can be the only viable solution and this has to be conducted with extreme care and the consent of the different parties/stakeholders involved. It should only be undertaken by army/police or wildlife departments in a professional and humane way.

The OIE Terrestrial Animal Health Code provides further information on options for stray dog population control. More information on methods of euthanasia for dogs can be found in Chapter 7.7 of the Code. See: http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.7.7.htm

Annex 2D
Veterinary Support: Public-Sector Vet. Functions – Carcass disposal

BURIAL

Burial represents the most common form of carcass disposal. It requires the least expertise, is easy to organize and implement and is usually the cheapest alternative.

Resources needed are excavation equipment (basic hand tools or machinery), cover material (usually the material obtained in the excavation process) and lime. In case of less conducive soil types, a bottom layer (e.g. clay) might be needed to reduce environmental damage.

Implementation is relatively simple but does require some care. The best way to dig burial pits is with an excavator, which can construct long, deep pits with vertical sides. Advantages include the ability to store topsoil separate from subsoil. The equipment can be used to fill the pit with carcasses or other materials, and close it without disturbing the carcasses. Loaders, bulldozers, road graders and backhoes – or manual labour for small jobs – may be used if excavators are unavailable. Cash or food-for-work programmes could be a viable option to combine carcass disposal with livelihoods support.

Pits must be deep enough to ensure that after placing the carcasses in them, the cover material can be built up to a depth of 1.5–2 metres minimum. The thick cover will seal the carcasses from the environment, prevent scavengers from digging them out and prevent the cover material being washed away by rain. The base of a pit must be at least 1 m above the water table. Allow a fill capacity of about 1.5 m^3 for each adult bovine or five adult sheep. For example, a pit 3 m wide and 5 m deep filled with carcasses to within 2.5 m of ground level will accommodate five adult cattle per linear metre ($3 \times 2.5 \times 1 = 7.5$ m^3; 7.5/1.5 = 5 cattle or 25 sheep).

With the process of decomposition, carcasses tend to bloat due to substantial gas production. This is a particular problem with large ruminants as it can cause carcasses to move up to the surface in burial sites. In order to prevent this happening, puncturing of carcasses should be considered before placing them in the pit.

Covering the carcasses with lime is a requirement, since it protects the carcasses from being uncovered by carnivores. A lime covering will also prevent earthworms from bringing contaminated material to the surface after pit closure. Cover the carcasses with soil (400 mm is suggested), and add an unbroken layer of slaked lime – Ca (OH)2 – before filling is completed. Lime should not be placed directly on carcasses, because in wet conditions it can slow or prevent decomposition.

Inspection of the burial site after closure is recommended so that appropriate action can be taken in the event of seepage or other problems. The objective is that the site should return to its original condition. Before restocking is permitted, the burial site should be inspected again to ensure that there is no possible biological or physical danger to stock.

This would normally be several months after pit closure.

Larger burial sites should certainly be planned with more care and a proper bottom layer must be included as well as groundwater monitoring wells. Disposal through burial does have limitations however, as when the number of carcasses is very high that it is impossible to find enough safe burial sites or machinery. In such cases, carcass incineration often remains the only option.

INCINERATION

The various methods of incineration are all relatively cheap and efficient.[39]

The main component required for incineration is fuel to activate and complete the burning. Local availability will govern the type and amount of fuels. The following can be used as a guide per adult large animal:

- heavy timber: 3 pieces, 2.5 m × 100 mm × 75 mm;
- straw: 3 bales;
- small timber: 35 kg;
- coal: 200 kg;
- liquid fuel (diesel, not petrol): 5 litres.

Fuel requirements may be estimated on the basis of one adult cattle carcass being equivalent to four adult pigs or shorn sheep, or three adult woolly sheep. Tyres and other plastic or rubber material are used to burn carcasses but due to environmental implications this should be avoided as it creates pollution and toxic fumes.

Excavation equipment of the type mentioned above is needed if open-pit burning is opted for.

For **implementation**, site selection is of particular importance as an open fire can be a direct threat to settlements or landscapes prone to bushfires. Open-air burning needs carcasses to be placed on top of sufficient combustible material, making sure that the arrangement of fuel and carcasses allows adequate air flow to enter the pyre from below. That will achieve the hottest fire and the most complete combustion in the shortest time. The firebed should be sited at right angles to the direction of the prevailing wind to maximize ventilation. Space for air can be provided by digging trenches under the pyre and/or elevating the firebed. Fuel supplies should be stacked upwind and the fire built from that side; carcasses should be loaded from the opposite side. The width of the firebed is governed by the size of carcasses to be burned: allow 2.5 m and for the length, allow 1 m per adult cattle.

Pit burning, also known as air-curtain incineration, is a technique for burning material in a pit, using fan-forced air. The equipment consists of a high-capacity fan, usually driven by a diesel engine, and ducts to deliver the air, which may be preheated, into the long side of a trench. The angle of the airflow creates a curtain of air that acts as a top for the incinerator and provides oxygen that induces high combustion temperatures. Hot air recirculates in the pit, achieving complete combustion. Additional fuel is required to initiate combustion but once the fire is burning, fuel requirement is reduced. Pit burners are suitable for continuous operation on a relatively small scale and have the advantage of being transportable. They appear to be especially suitable for pigs and fat sheep.

[39] Information adapted from http://www.fao.org/docrep/004/y0660e/Y0660E00.htm#TOC

COMPOSTING

If performed properly, composting of carcasses represents a viable option for carcass disposal, with several benefits. It avoids the need for digging pits as well as potential groundwater pollution and converts the lost carcass into valuable fertilizer. Of the three described methods for carcass disposal, composting is the most environmentally friendly option. Temperatures reached during composting are adequate to kill most viral pathogens including influenza viruses (e.g. HPAI virus). It can be undertaken with carcasses of all livestock species, but if a large number of animals needs to be disposed of, it becomes viable only for small species. The main challenge is that composting requires greater expertise, takes longer and is more labour- and input-intensive than other methods. In addition, extreme dry or wet weather impairs the process.

The required inputs are determined by the materials needed to fence off or protect the composting area from scavengers. In addition, organic matter needs to be available in large quantities to build a pad with which to cover the carcasses completely. This organic matter is usually a mix of components such as sawdust, hay, straw, manure, wood shavings and leaves. Water might be required if composting is performed under dry conditions. A long-stem thermometer is useful for monitoring the composting process.

During the implementation, the carcass is placed on a bed of organic material and amply covered. Carcasses should be punctured to avoid bloating. The internal temperature of the pile will rise during the first two days and will increase up to 70 °C within 14 days. When the temperature starts dropping, the heap should then be mixed, including all the carcass remains, which provides more oxygen for the composting process to start again. Generally, the process of composting takes six weeks to several months depending on the size of the carcasses.

Annex 3A
Provision of feed to ruminants during emergencies: using value coefficients

The **value coefficients** represent respectively the energy and protein densities of feeds. Any supplementary feeding programme should try to ensure that at least one feed from each group is available. In some situations, some roughage feed may still be available in which case a protein feed may be all that is needed to balance the ration for ruminants.

The tables below can support two methods of making benefit-cost comparisons combining available feeds:

THE RAPID "TRAFFIC LIGHT" SYSTEM

To allow for a rapid evaluation of the potential contribution of different feeds in a given situation, these have been categorized according to a "traffic light" system:

●	High concentration of energy or protein
●	Moderate concentration of energy or protein
●	Low concentration of energy or protein

Feeds in the tables below are listed in different feed groups, and colours are given for each feed. The following broad rules apply to help select feeds:

- If feeds are similar in cost, select a green feed in preference to an amber feed, likewise an amber feed in preference to a red feed.
- If feeds have traffic lights of the same colour, select the feed that is the cheapest.
- If feeds have the same colour and the same cost, use any of the feeds or a mixture.
- If feeds have the same or different colours and differ greatly in cost, consider using the value coefficient method.

THE COMPARISON OF VALUE COEFFICIENTS

The traffic light system can be used without resorting to calculations. However, it may not always be possible to distinguish feeds using this system alone.

To make the cost-benefit analysis more precise, the **value coefficients** in the tables below may be used. The value coefficient is an indicator of the relative nutritive value of the feed when compared to the very best sources of energy and protein (which would have a value coefficient of 10). A high value coefficient indicates a feed that is a good source of

energy (or protein) while a low value indicates a relatively poor source. Value coefficients are calculated separately for energy or protein feeds (i.e. feeds whose value is principally as either an energy or a protein source).

It may be that a feed can appear in both the energy and protein databases (e.g. maize grain which would have a higher value coefficient for energy and a lesser one for protein).

The following example illustrates the use of the value coefficient method to compare the relative cost benefits of three candidate protein feeds:

Feed name	Feeding value (as-fed)	Value coefficient (A)	Cost at location (B)	Compare (A x B)
Cottonseed meal	●	9	**189**	**1701**
Rapeseed, meal	●	7	**135**	**945**
Sesame seed meal	●	8	**150**	**1200**

In this case, it would be difficult to use the traffic light method to decide which would be the most cost-effective meal to use since all these meals are similar in nutritive value.

To make the comparison using the value coefficient method:

- Enter the cost at location (i.e. the cost feed delivered to the animals) for each feed that is being considered.
- Multiply each delivered cost by the corresponding value coefficient and enter the results in the table (see illustration above).
- Compare the results of this calculation for each feed. The feed with the smallest value is likely to be the most cost-effective feed to use.

The results for rapeseed meal and sesame seed meal are not very different. However, rapeseed meal would appear the more cost-effective option. Although cottonseed cake has better nutritional quality, its high cost means that it is not likely to be as cost-effective as the other two meals.

Energy feeds may be compared in exactly the same way.

The value coefficients can be used for any class of livestock as they describe the relative quality of the feeds and are not absolute values.

Tables to make benefit-cost comparisons for preparation of ruminant feeding programmes during emergencies

Energy Feeds					
Feed name	**Feeding value (as-fed)**	**Value coefficient (A)**	**Notes**	**Cost at location (B)**	**Compare (A x B) The feed with the smallest value is likely to be the most cost-effective**
Concentrates (seeds and brans) [1]					
Barley, *Hordeum vulgare*	🟢	9			
Barley – bran	🟢	8			
Cowpea, *Vigna sinensis*	🟢	9			
Maize, *Zea mays*	🟢	10			
Maize – bran	🟢	8			
Millet, *Panicum* spp.	🟢	8			
Oats, *Avena sativa*	🟢	8			
Rice, *Oryza sativa*	🟠	9			
Rice – bran	🟠	7			
Rye, *Secale cereal*	🟢	9			
Rye – bran	🟢	8			
Wheat, *Triticum aestivum*	🟢	10			
Wheat – middlings, white	🟢	8			
Wheat – bran	🟠	7			
Vetch, ***Vicia sativa***	🟢	9			
Pea, *Pisum sativum* – bran	🟢	8			
Hays and sun-cured roughages [2]					
Alfalfa, *Medicago sativa*, bloom	🟠	6			
Alfalfa, *Medicago sativa*, postbloom	🟠	5			
Clover, red, *Trifolium pratense*, bloom	🟠	6			
Clover, red, *Trifolium pratense*, postbloom	🔴	5			
Clover, red, *Trifolium repens*, bloom	🟠	6			
Clover, white, *Trifolium resupinatum*, bloom	🟠	6			
Cow pea, *Vigna sinensis*	🟠	6			

cont.

[1] *The brans listed in this feed category are also reasonably good source of protein and could be mixed with roughages in emergency situations*

[2] *Listed feedstuffs in this feed category are also reasonably good source of protein and in emergency situations could form a sole diet*

Energy Feeds *(cont.)*					
Feed name	**Feeding value (as-fed)**	**Value coefficient (A)**	**Notes**	**Cost at location (B)**	**Compare (A x B) The feed with the smallest value is likely to be the most cost-effective**
Millet, *Panicum miliaceum*	●	6			
Oats, *Avena Sativa*, prebloom	●	6			
Oats-vetch, *Avena sativa* + *Vicia sativa*, bloom	●	6			
Oats-vetch, *Avena sativa* + *Vicia sativa*, postbloom	●	5			
Peanut, *Arachis hypogaea*, mature	●	6			
Soybean, *Glycine max*, late bloom	●	6			
Sudan grass, Sorghum bicolour	●	5			
Teff, *Eragrostis tef*, postbloom	●	6			
Mixed hay	●	6			
Fresh grasses					
Andropogon	●	5			
Brachiaria	●	5			
Napier grass	●	5			
Panicum	●	4			
Setaria	●	4			
Rhodes grass	●	4			
Star grass	●	4			
Veld grass	●	4			
Guatemala grass	●	4			
Fresh forages					
Banana, Musa spp., whole plant	●	7			
Cowpea, Vigna sinensis, early/full bloom	●	7			
Maize, Zea mays, milk stage	●	7			
Maize, Zea mays, dough stage	●	7			
Maize, Zea mays, mature	●	7			
Millet, Panicum miliaceum	●	6			
Oats, Avena sativa, prebloom	●	7			

cont.

Energy Feeds *(cont.)*					
Feed name	**Feeding value (as-fed)**	**Value coefficient (A)**	**Notes**	**Cost at location (B)**	**Compare (A x B) The feed with the smallest value is likely to be the most cost-effective**
Sorghum, Sorghum vulgare	🟠	7			
Sudan grass, Sorghum bicolor, prebloom	🟠	7			
Sudan grass, bloom	🟠	6			
Sudan grass, late bloom	🟠	6			
Sugar beet leaves, Beta vulgaris	🟠	7			
Sugar cane, Saccharum officinarum, whole plant	🟠	6			
Sugar cane, tops, mature	🟠	6			
Sunflower, *Helianthus annuus*, early bloom	🟠	6			
Vetch, sweet, Hedysarum coron	🟠	6			
Crop residues					
Barley, Hordeum vulgare	🔴	5			
Barley, NaOH-treated	🔴	5			
Barley, ammonia-treated	🔴	5			
Cocoa-hulls, Theobroma cacao	🔴	5			
Linseed, Linum usitatiss	🔴	4			
Maize, Zea mays	🔴	5			
Millet, Panicum miliaceum	🔴	5			
Oats, Avena sativa	🔴	4			
Oats, ammonia-treated	🔴	5			
Oats – hulls	🔴	4			
Peas, Pisum sativum	🔴	5			
Rice, Oryza sativa	🔴	4			
Rice – hulls	🔴	1			
Soy, Glycine max	🔴	4			
Wheat, Triticum aestivum	🔴	4			
Wheat, NaOH-treated	🔴	5			
Wheat, ammonia-treated	🔴	5			
Wheat – hulls	🔴	3			
Soy bean – hulls, dried	🟠	7			

cont.

Energy Feeds *(cont.)*					
Feed name	**Feeding value (as-fed)**	**Value coefficient (A)**	**Notes**	**Cost at location (B)**	**Compare (A x B) The feed with the smallest value is likely to be the most cost-effective**
Agroindustrial by-products					
Citrus pulp, dried	🟢	9			
Molasses, sugar beet	🟢	8			
Molasses, sugar cane	🟢	8			
Pineapple cannery residue, dried	🟠	7			
Sugar beet pulp, fresh	🟢	8			
Sugar beet pulp, ensiled	🟠	7			
Sugar beet pulp, pressed/ensiled	🟢	8			
Sugar beet pulp, dried	🟢	8			

Value coefficient of energy for feedstuff (F) = Round(9 * ((ME(F) - $ME_{(min)}$) / ($ME_{(max)}$ - $ME_{(min)}$))) + 1. The data used are presented in Appendix 5. The metabolizable energy (ME) for ruminants was taken for the calculations, and minimum ($ME_{(min)}$) and maximum ($ME_{(max)}$) values were 1.8 and 14.6 MJ/kg dry matter in the database (Appendix 6). ME(F) is metabolizable energy of the feedstuff in MJ/kg dry matter.

Protein Feeds					
Feed name	**Feeding value (as-fed)**	**Value coefficient (A)**	**Notes**	**Cost at location (B)**	**Compare (A x B)**
Concentrates (agroindustrial by-products)					
Coconut, *Cocos nucifera*, extracted meal	🟠	4			
Coconut, cake	🟠	4			
Cottonseed, *Gossypium* spp., decorticated extracted meal	🟢	9			
Cottonseed, decorticated cake	🟢	8			
Cottonseed, partly decorticated extracted meal	🟢	7			
Cottonseed, partly decorticated extracted cake	🟢	7			
Groundnut, *Arachis hypogaea*, dehulled, extracted meal	🟢	9			
Groundnut, dehulled, cake	🟢	9			
Groundnut, partly dehulled and extracted meal	🟢	9			
Groundnut, partly dehulled cake	🟢	8			
Linseed, *Linum usitatissim*, extracted meal	🟢	7			
Linseed cake	🟠	6			
Mustard, *Sinapis alba*, extracted meal	🟢	7			
Mustard seed cake	🟢	7			
Olive, *Olea europaea*, extracted meal	🔴	2			
Olive cake	🔴	2			
Palm kernel, *Elaeis guineensis* extracted meal	🟠	4			
Palm kernel cake	🟠	4			
Rapeseed, *Brassica napus*, extracted meal	🟢	7			
Rapeseed cake	🟢	7			
Safflower seed, *Carthamus tinctorius*, extracted meal	🟠	5			
Safflower cake (both partly deulled)	🟠	4			
Sesame seed, *Sesamum indicum*, extracted meal	🟢	8			
Sesame cake	🟢	8			
Soybean, *Glycine max*, toasted, extracted meal	🟢	9			
Soybean toasted cake (both unhulled)	🟢	7			

cont.

Protein Feeds *(cont.)*					
Feed name	**Feeding value (as-fed)**	**Value coefficient (A)**	**Notes**	**Cost at location (B)**	**Compare (A x B)**
Sunflower, *Helianthus annuus*, partly dehulled extracted meal	🟢	7			
Sunflower, partly dehulled cake	🟢	7			
Sunflower, dehulled extracted meal	🟢	7			
Sunflower, dehulled cake	🟢	9			
Yeast, brewer's, *Saccharomyces cerevisiae*, fresh	🟢	10			
Maize-gluten feed	🟠	5			
Brewers grains, fresh	🟠	5			
Brewers grains, ensiled	🟠	4			
Distillers grains, barley	🟠	5			
Distillers grains, maize	🟠	5			
Distillers grains, milo	🟠	5			
Distillers grains, wheat	🟠	6			
Malt sprouts, dried	🟠	5			
Fresh forages [1]					
Alfalfa, *Medicago sativa*, prebloom	🟠	4			
Alfalfa, *Medicago sativa*, bloom	🟠	4			
Alfalfa, *Medicago sativa*, postbloom	🔴	3			
Berseem, *Trifolium alexandrium*, bloom	🟠	4			
Berseem, *Trifolium alexandrium*, post bloom	🔴	3			
Clover, red, *Trifolium pratense*, bloom	🔴	3			
Clover, white, *Trifolium pratense*, bloom	🟠	4			
Clover, red, *Trifolium incarnatum*, bloom	🔴	3			
Clover, red, *Trifolium resupinatum*, bloom	🟠	4			
Lupins, white, *Lupinus albus,* bloom	🟠	4			
Lupins, blue, *Lupinus angustifolius*, bloom	🟠	4			
Lupins, yellow, *Lupinus luteus,* bloom	🟠	4			
Soybean, *Glycine max,* full bloom	🔴	3			
Soybean, *Glycine max*, dough stage	🔴	3			
Vetch, common, *Vicia sativa*, bloom	🟠	5			

cont.

[1] Listed feedstuffs in this feed category are also reasonably good sources of energy

Protein Feeds *(cont.)*					
Feed name	**Feeding value (as-fed)**	**Value coefficient (A)**	**Notes**	**Cost at location (B)**	**Compare (A x B)**
Cowpea, *Vigna sinensis*	●	5			
Pea, *Pisum sativum*	●	5			
Tree leaves and browses					
Sesbania grandiflora	●	4			
Leucaena leucocephala	●	4			
Gliricidia sepium	●	4			
Acacia catechu	●	4			
Saltbrush, *Atriplex nummulaia*	●	4			
Brans and grains					
Barley, *Hordeum vulgare*	●	2			
Barley – bran	●	3			
Cowpea, *Vigna sinensis*	●	5			
Maize, *Zea mays*	●	2			
Maize – bran	●	3			
Millet, *Panicum* spp.	●	2			
Oats, *Avena sativa*	●	3			
Rice, *Oryza sativa*	●	2			
Rice – bran	●	3			
Rye, *Secale cereal*	●	2			
Rye – bran	●	3			
Wheat, *Triticum aestivum*	●	3			
Wheat – middlings, white	●	3			
Wheat – bran	●	3			
Pea, *Pisum sativum* – bran	●	3			

Note: The above-listed feedstuffs in this feed category are also good source of energy. Since these are easier to transport and procure, these could be used as a source of protein in emergency situations and given as a supplement with roughages (see Section 3.3.4 for an example). If available, oil seed cakes/meals should be preferred over grains as protein supplements with roughages.

Value coefficient of protein for feedstuff (F) = Round (9 * ((CP(F) - $CP_{(min)}$ / ($CP_{(max)}$ - $CP_{(min)}$))) + 1. The data used are presented in Appendix 5. The crude protein (CP) content was taken for the calculations, and minimum ($CP_{(min)}$) and maximum ($CP_{(max)}$) values were 25 and 596 g/kg dry in the database (Appendix 5). CP(F) is crude protein of the feedstuff in g/kg dry mater.

Annex 3B
Provision of feed to ruminants during emergencies: rationing

Once the programme objectives have been established, these can be used to guide the design of specific feed allowances for the target animals. This is the process of rationing.

This section describes two approaches to rationing:

- Using guideline tables;
- Combining guidelines tables with value coefficients.

Both methods must be regarded as rough and ready. They require little detailed information to implement but can only be expected to give a rough guide to optimal levels of feeding (combining guidelines tables with value coefficients introduces a little more precision).

For this reason, monitoring the performance of animals should be used to fine-tune the ration based on the specific production objectives. This can usually be achieved by making small changes to the quantities fed and completely redesigning rations should not be necessary. More complex rationing systems are available.

RATIONING USING GUIDELINE TABLES

The tables below may be used directly to establish the quantities of feed required to meet each of the four production objectives (see Chapter 6). For each species (cattle and buffalo, sheep and goats), rations based on hay alone, or hay fed in combination with a concentrate, are provided.

- Blank columns in the roughage feeding tables indicate that achieving a particular production objective is not feasible. Blank columns in the roughage-supplement tables indicate that a production objective can almost certainly be achieved more cheaply by using hay on its own.
- If required, the proportions of roughage and supplements in the ration may be adjusted by assuming that supplement is approximately twice as nutritious as roughage. Thus a combination of 4.5 kg of roughage and 0.5 kg of supplement is roughly equivalent to 3.5 kg of roughage and 1.0 kg of supplement.
- Hay has been used as the reference roughage as it is probably the most commonly available basal feed available in supplementary feeding programmes. The tables may be adjusted for use with fresh grass forming the basal roughage by multiplying the roughage (hay) allowances by 3, or for use with crop residues by multiplying the roughage allowances by 1.5.

Cattle and buffalo (kg feed, as-fed/day)

		Production Objective							
Roughage		**Restrict weight loss**		**Maintain bodyweight**		**Recover lost bodyweight**		**Increase production levels**	
Small animal (< 250 kg)		< 3.5		< 4.2					
Medium animal (250 – 450 kg)		3.5 – 6.3		4.2 – 7.5					
Large animal (> 450 kg)		> 6.3		> 7.5					
		Production Objective							
Roughage	**Concentrate**	**Restrict weight loss**		**Maintain bodyweight**		**Recover lost bodyweight**		**Increase production levels**	
Small animal (< 250 kg)				< 3.2	0.5	<3.2	0.8	< 3.2	1.2
Medium animal (250 – 450 kg)				3.2 – 5.7	0.5–0.9	3.2 – 5.7	0.8–1.5	3.2 – 5.7	2.2
Large animal (> 450 kg)				> 5.7	>0.9	> 5.7	> 1.5	> 5.7	> 2.2

Sheep and Goats (kg feed, as-fed/day)

		Production Objective							
Roughage		**Restrict weight loss**		**Maintain bodyweight**		**Recover lost bodyweight**		**Increase production levels**	
Small animal (50 kg)		0.7		0.9					
Large animal (100 kg)		1.4		1.8					
		Production Objective							
Roughage	**Concentrate**	**Restrict weight loss**		**Maintain bodyweight**		**Recover lost bodyweight**		**Increase production levels**	
Small animal (50 kg)				0.7	0.1	0.7	0.2	0.7	0.50
Large animal (100 kg)				1.4	0.2	1.4	0.4	1.4	1.0

NOTES FOR FEEDING RUMINANTS

- Dry matter requirement of animals:
  - Restrict weight loss: approximately 1.25% of the body weight.
  - Maintain body weight: approximately 1.50% of the body weight.
  - Recover lost body weight: approximately 2.0% of body weight.
  - Increase production level: up to 3% of the body weight.
  - The figures in the tables are "as-fed" and NOT on dry matter basis. The dry matter was assumed to be 90%.
- Dry matter supply from medium quality roughage up to 1.5% of the body weight can meet the maintenance requirement. Medium quality roughages are those that contain metabolizable energy of 8 MJ/kg dry matter supply and crude protein of 80 g/kg dry matter. Any green fodder at the mid-bloom stage may be considered as medium-quality roughage. Fodder harvested at pre-flowering stages can be considered as high-quality roughage with metabolizable energy content of 10 MJ/kg and crude protein content of 100–120 g/kg. Fodder harvested after seed formation and residues of cereal crops can be considered as low-quality roughage with metabolizable energy content of 6 MJ/kg dry matter and crude protein content of 20 to 50 g/kg dry matter supply.

- Animals can eat dry matter up to 3.5 percent of the body weight depending on the nutritional quality of the diet and level of production. But animals cannot eat dry matter up to 3.5 percent of their body mass per day if the feed has high water content.
- Since roughage is cheaper than concentrates, and roughages are usually the locally available feed resources and the roughage component in the diet of herbivorous animals is a necessity, dry matter requirement should be met from roughages first. This should be followed by assessment of (i) the quantity of nutrients supplied from the roughage, and (ii) need to supplement a concentrate to meet the nutrient demand for a specific function.
- Only when necessary (i.e. when nutrient requirements cannot be met from roughages), substitution of concentrates for roughages can be made at the rate of 1 kg of concentrate for every 2 kg of roughage as indicated. In some emergencies, if a concentrate is easier to truck in and availability of roughage is insufficient, 1 kg of roughage could be replaced by 0.5 kg of the supplement. However, care must be taken that roughage in the total diet is not less than 30%. A typical concentrate could have the following composition (g/kg dry matter): crude protein 120–160, metabolizable energy 8.0–10.5 MJ, crude fibre 120–300, ash 40–70, calcium 7–11 and phosphorus 4–6. Aflatoxin B1 level in the concentrate should be < 20 ppb.
- Low-quality roughages need to be supplemented with concentrate (ME 10 MJ/kg dry matter and CP 16 percent dry matter) at 1 kg per day for maintenance plus 1 kg for every 2 kg of milk production or 300 g of body weight gain for cattle.
- The ratio of roughage to concentrate (as dry matter) can vary from 100:0 for maintenance to 35:65 as production level increases.
- Feeding ad lib of medium quality of roughage (ME 8 MJ/kg dry matter and CP 10 percent dry matter) will be adequate to produce 2 to 5 kg of milk.
- Low-quality roughage intake is often restricted to 1.0–1.25 percent of the body weight and hence cannot meet the maintenance requirement. If the quality of roughage is good, maintenance requirement can be met by feeding only roughage.

The same approach can be used for camels (a pseudo-ruminant) and equids:

Camels (kg feed, as-fed/day)

		Production Objective							
Roughage		**Restrict weight loss**		**Maintain bodyweight**		**Recover lost bodyweight**		**Increase production levels**	
Small animal (400 kg)		5.6		6.7		9.0			
Large animal (800 kg)		11.2		13.5		18.0			
		Production Objective							
Roughage	**Concentrate**	**Restrict weight loss**		**Maintain bodyweight**		**Recover lost bodyweight**		**Increase production levels**	
Small animal (400 kg)				5.7	0.5	6.0	1.0	6.0	2.0
Large animal (800 kg)					1.0		2.0		4.0

Equids (kg feed, as-fed/day)

Roughage	Production Objective: Restrict weight loss	Maintain bodyweight	Recover lost bodyweight	Increase production levels
Small animal (400 kg)	5.6	6.7	9.0	
Large animal (600 kg)	8.4	10.0	18.0	

Roughage	Concentrate	Production Objective: Restrict weight loss		Maintain bodyweight		Recover lost bodyweight		Increase production levels	
Small animal (400 kg)				5.7	0.5	6.0	1.0	6.0	2.0
Large animal (800 kg)				8.6	0.8	9.0	1.5	9.0	3.0

RATIONING BY ADJUSTING TABULATED RATIONS USING VALUE COEFFICIENTS

Adjusting the results from the tables above to take greater account of differences in feed quality will help make more efficient use of available resources and is more likely to result in rations that meets the production objective.

Template:

1	Type of animal		
2	Production objective		
		Roughage (energy source)*	**Concentrate (protein source)***
3	Quantities (Q_R and Q_P in 2nd and 3rd column respectively)		
4	Name of feed used		
5	Value coefficient (VC_R and VC_P in 2nd and 3rd column respectively)		
6	Adjusted quantities for concentrate, AQ_P		$(6 \times Q_P)/ VC_P$
7	Adjusted quantities for roughage	$[Q_R-(AQ_P-Q_P)]$	

Methodology:

- In 1 and 2, enter the details of the ration.
- In 3, copy the quantities of roughage and concentrate required from tables in Annex 3A.
- In 4, enter the names of the feeds that you have decided to use.
- In 5, copy their Value coefficients from the tables above in Annex 3B.
- Complete the calculation in 6 and 7 to produce the adjusted quantity of concentrate and then of roughage.

Example:

1	Type of animal	Medium cow (250 kg body weight)	
2	Production objective	Maintain body weight	
		Roughage (energy source)*	**Concentrate (protein source)***
3	Quantities (Q_R and Q_P in 2nd and 3rd column respectively)	3.2	0.5
4	Name of feed used	Mixed hay	Maize bran
5	Value coefficient (VC_R and VC_P in 2nd and 3rd column respectively)	6	3
6	Adjusted quantities for concentrate, AQ_P		$(6 \times Q_P)/ VC_P =$ **1.0**
7	Adjusted quantities for roughage	$[Q_R-(AQ_P-Q_P)] =$ **2.7**	

* Value coefficients for both roughage and concentrate are taken as 6, representing medium quality hay and a typical concentrate ration containing approximately 160 g crude protein/kg dry matter.

Annex 3C

Provision of feed to ruminants during emergencies: manufacturing urea-molasses blocks

As the name suggests, these are blocks containing urea, molasses, vitamins and minerals. The ingredients are designed to provide a wide range of nutrients to cover all potential deficiencies.

Feeding urea-molasses multi-nutrient blocks is a convenient and inexpensive method of providing a range of nutrients either indirectly to the rumen microbes or directly to the animal. Blocks are good supplements for ruminants on low-quality roughages (straws, stovers and hays), pastures or rangelands. When high-quality roughages such as alfalfa hay or fresh grass are fed, there is generally no nutritional advantage in offering urea-molasses multi-nutrient blocks.

Turning the ingredients into a solid ensures that the animal consumes small amounts of the block during the day, licking it for a controlled supply of nutrients and energy.

These must only be used for ruminants over six months old as urea is toxic to other species and to pre-ruminant young.

COMPOSITION OF UREA-MOLASSES MULTI-NUTRIENT BLOCKS

The blocks generally contain urea, agro-industrial by-products, vitamins and minerals. An example is given below. The cost of the block production depends largely on the cost and availability of the ingredients and labour.

Constituents	Composition (%)
Molasses	40
Urea	8
Wheat or rice bran	35
Cement	10
Salt	4
Slaked lime (feed lime)	2
Monocalcium phosphate	1

Molasses is a concentrated plant juice, derived mainly from sugar cane, which provides energy as well as a range of trace minerals and vitamins. Urea provides nitrogen. Cereal

bran is high in phosphorus, trace minerals and a range of vitamins. Oilseed cakes/meals are a good source of phosphorus and proteins. Salt and lime provide much of the macro mineral requirements. Cement acts as a binder.

Molasses – The consistency of the molasses is important and depends on the quantity of sugar contained. Expressed as a percentage, it is called the Brix value and can be measured with a small pocket refractometer. Good hardening requires a molasses of a Brix value of 80 or more. Molasses coming directly from the factory usually exceeds this value. Molasses should **not** be diluted with water to make it easier to handle as this leads to problems with solidifying the block. When ordering molasses from the sugar factory specify "undiluted" molasses and check the BRIX value when the molasses is received.

Urea – Urea used is generally of fertilizer grade. Since urea absorbs water it is possible that lumps may form in the sacks during storage. In order to prevent excessive consumption of urea such lumps must be crushed before being introduced into the mixture.

Salt – The salt in the mixture is ordinary salt (NaCl). Even though salt is not toxic it is better to prevent lumps in the mixture.

Cement – Cement used in the blocks is ordinary building cement. To obtain a good setting, cement needs a minimum quantity of water of 30 to 40 percent (3-4 litres of water for each 10 kg of cement) on a weight-for-weight basis.

Lime – Lime gives a better (quicker) setting time and hardness than cement. However, price and availability may restrict its use in certain countries.

Bran – Bran, apart from its nutritive value, gives structure to the block. All kinds of bran can be used. If bran is not available it can be replaced by other fibre sources such as ground straw, bagasse (the fibrous matter remaining after sugar cane or sorghum stalks are crushed for juice extraction) or peanut hulls.

Other components – The basic formula contains only components which are essential for the block to improve the utilization of roughages. If a specific nutrient deficiency is known, it is possible to include ingredients to redress a specific deficiency, e.g. minerals.

Urea-molasses blocks may be manufactured on a small, medium or large scale depending on demand. Regardless of scale, the method of manufacture is essentially the same – the difference being the quantities and equipment used. Experiences shows that blocks weighing 5 kg are most appropriate for feeding dairy cattle under smallholder situations. Assuming a daily intake of around 500 g/cow, each block will last for 10 days.

Mixing ingredients

If adequate labour is available and only few blocks (50 to 150) are needed, then manual mixing is possible. However, for producing larger numbers (150+ blocks/day) a concrete mixer is recommended. The order in which ingredients are introduced is important. The recommended sequence is: molasses→urea→salt→minerals→cement→bran.

Moulding

Moulds are needed to set the blocks. The most appropriate for small-scale production are made from slotted wooden planks, allowing easy assembly and removal. A mould measuring 25 x 15 x 10 cm will make a block weighing 4.5–5.0 kg. The frame can be removed after a day to facilitate drying.

Drying blocks

Blocks must not be exposed to direct sunlight, but placed under a shade with good ventilation. After 72–96 hours the blocks are dry enough to be transported. Further information on block technology can be obtained from IAEA TECDOC 1495[40] and FAO Animal Production and Health Paper 164.[41]

HOW TO UTILIZE UREA-MOLASSES MULTI-NUTRIENT BLOCKS

Urea-molasses blocks are supplements and should **not be fed alone**. A minimum quantity of roughage is needed to ensure that the animals do not consume too much urea, possibly leading to urea poisoning. The purpose of the block is to improve the utilisation of roughage and not to replace it.

The full daily ration (e.g. 500–600 g/day per adult cow or female buffalo) should be introduced slowly over a period of 7–10 days. This is particularly important where animals have suffered a degree of underfeeding as intake can be more rapid than usual. After an adaptation period, animals will adjust their intakes to 500–600 g/day for cattle and 80–100 g/day for sheep and goats

[40] http://www-naweb.iaea.org/nafa/aph/public/aph-multinutrient-blocks.html

[41] ftp://ftp.fao.org/docrep/fao/010/a0242e/a0242e00.pdf

Annex 4A

M&E: Examples of monitoring forms for emergency livestock interventions

MONITORING FORM FOR A COMMERCIAL DESTOCKING INTERVENTION

Location: _____

Date of sale: _____

Name of livestock owner: _____

Name of buyer/trader: _____

Approximate number of livestock owned by livestock type: _____

Number and type of livestock sold: _____

Price of livestock by type of livestock sold: _____

Total payment received by seller: _____

Anticipated uses of cash by seller: _____

MONITORING FORM FOR A FOUR-WEEK CATTLE SUPPLEMENTARY FEED INTERVENTION

This form includes both process and impact indicators:

- The process indicators are the names (and number) of the livestock owners, types and number of cattle fed, and the amount of feed used.
- The impact indicators are the number of cattle deaths.

Note that by recording mortality in both fed and unfed cattle, this format can be used to measure impact by comparing mortality in the two groups. Similarly, it enables a benefit-cost analysis to be conducted after the intervention.

Weekly Emergency Feed Distribution Recording Form

Name of Feeding Site:

Name of livestock owner	Type of cattle fed	Number fed	Number not fed	Amount of concentrate feed provided (kg) by week				Number of cattle deaths over the 4-week period		Feed distributor observations during follow-up at end of the week
				1	2	3	4	Fed cattle	Unfed cattle	

MONITORING FORM FOR TREATMENT OF WORMS IN SMALL RUMINANTS, FOR USE BY ILLITERATE COMMUNITY-BASED ANIMAL HEALTH WORKERS

On this form, the CAHW marks a circle for each animal treated during the reporting period.

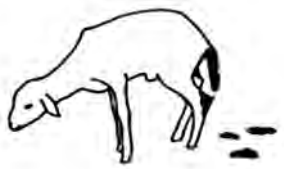
To be completed by CAHW supervisor

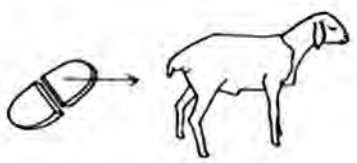
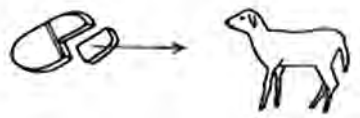
Name of CAHW: _____

Area: _____

Reporting period: _____

Treatment against gastrointestinal worms



Adult	**Young animal**
	
O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O

MONITORING FORM FOR USE WITH LITERATE CAHWS

Name of CAHW: _____

Area: _____

Reporting period: _____

Date	Name of Owner	Location	Livestock type	Disease	Number of animals treated	Medicine	Quantity of medicine used	Price of medicine

Note that this form focuses on process indicators. Data on the number of animals treated is a process measurement. A better indicator would be "number of animals treated/ number of animals affected by the disease".

Annex 4B
M&E: Calculating sample sizes

A SIMPLE CALCULATION FOR THE SIZE OF A RANDOM SAMPLE, FOR USE IN BEFORE-AND-AFTER ASSESSMENTS

Assume that a local NGO implements a slaughter destocking project during drought in five villages with similar ecological and socio-economic characteristics, and with 40 female-headed households targeted in each village (total 200 households). Also assume that the project aims to ensure that in 75% of targeted households, the proportional income from livestock sales will increase by at least 50% during the drought period.

In each village, the number of sampled households "n" is as follows:

$$n = (1-(1-CL)^{1/D}.(N-(\frac{D-1}{2}))$$

Where:

N = average number of target households in a village

D = minimum number of targeted households meeting income change requirement

CL = confidence level of 95%.

Using this formula, 2.5 households should be sampled in each village. This figure can be rounded up to three households per village, or a total of 15 households. In each village, three households should be randomly selected from the list of 40 households.

RANDOM SAMPLE SIZE ESTIMATION FOR USE WITH CONTROL-BASED ASSESSMENTS

Assume that following a flood, an international agency aims to reduce mortality in sheep and goats by vaccinating them against pasteurellosis. It is planned that up to 50% of herds will be covered by the vaccination programme. An impact assessment aims to measure mortality in vaccinated and non-vaccinated herds, and assumes that by using a proportional piling method and timeline, herd owners can describe mortality in their herds for a six-month period after the flood.

Sample sizes "n" for vaccinated and non-vaccinated animals can be calculated using the formula below.

$$n = \frac{\{M_{\alpha/2}\sqrt{2p(1-p)} + M_{\beta}\sqrt{p_1(1-p_1)+p_2(1-p_2)}\ \}^2}{(p_2-p_1)^2}$$

p_1 = pasteurellosis mortality in unvaccinated herds, assumed to be 5%

p_2 = pasteurellosis mortality in vaccinated herds, assumed to be 1%

$p = (p_1+p_2)/_2$

$M\alpha/_2$ = multiplier associated with the required significance level α, set at 5% so α = 0.05; M_α = 1.64; the hypothesis is one-tailed

M_β = multiplier associated with β, the probability of a Type II error; confidence of detecting difference = 80%, test power (1-β) = 0.80, β = 0.20 and M_β = 0.84

Using this formula, 223 animals should be sampled from both the vaccinated and non-vaccinated population (total 446 animals).

The same formula can be used to calculate sample sizes for a control-based impact assessment of a livestock supplementary feeding project which aims to compare mortality in fed and unfed animals.

Annex 4C
M&E: Guidance on writing an evaluation or impact assessment report

Evaluations and impact assessments can require a great deal of organization and effort, but they are key learning events for implementing agencies and donors. However, many of the lessons learned can easily be lost or forgotten if experiences are not properly documented and shared with relevant stakeholders.

In the long term, the report will be the main reference document for the evaluation. The way that information from an evaluation is collated and presented is partly dependent on the intended target audience because – as previously noted – different stakeholders tend to have different information needs and criteria for assessing the value of reports. There is no standard style for presenting information but when producing a report it is useful to consider the following:

The report structure – A report should follow a logical structure, similar to the way that a scientific paper is organized, i.e. summary (or abstract), introduction, methods, results, discussion and references (or bibliography).

Regardless of the quality of the report, some readers will only read the summary and perhaps skim through other sections. Therefore, a good summary of key findings and recommendations is one of the most important sections of a report. It is often useful to organize the summary according to specific terms of reference or impact assessment questions, and even add a note to each main point such as: "This point addresses item ***xx*** of the terms of reference". The summary can also include cross-references to parts of the main body of the report where more detailed information on a particular issue can be found.

Introduction – The introduction should provide background information on the project and the project area. This should include notes on the broader political, economic, social and environmental context in which the project operates. The project objectives and terms of reference for an evaluation, or key questions for an impact assessment, can also be mentioned in the introduction.

Methods and results – Well-presented methods and results sections enable readers to make an independent analysis of the information and, if necessary, compare their own interpretation of the data with the analysis provided in the discussion section of the report. Some data can be summarized as tables and diagrams in the results section, and the complete data provided in annexes. When data is analysed statistically, the statistical test that is used should be clearly stated.

Discussion – The discussion section of the report should present an analysis of the findings. This part of the report should also relate project events and experiences to the

broader setting of the project, such as the general economic situation, political events, the policy environment, donor strategies, etc. This type of analysis is important for placing the project in a given, often complex context and helps to avoid the view that projects exist in isolation from the wider world.

Length of the report – How long should the report be? In most cases, there is a compromise between making a report succinct enough to be read, and yet comprehensive enough to demonstrate that a thorough assessment has been conducted. As a general rule, few people will read a long report. Therefore, keep the report concise and to the point, link findings and recommendations to the terms of reference or question, and avoid digressions. Twenty to 30 pages are sufficient for the main report, and annexes can be used to present additional information.

General presentation – A report that looks professional and well-organized, with clear headings, type and diagrams is more likely to be read than a cramped or cluttered report. Use a type font that is easy to read and avoid fancy borders or other graphics that distract from the main writing and pictures in the report. Carefully check the spelling and grammar in the report and use a good photocopier to make clear, neat copies. The overall presentation and look of the report has a big influence on how it will be received and the extent to which it is read. Reports with strong plastic covers last longer than unbound reports held together by staples.

Writing style – Reports are easier and more interesting to read if they are written in an active style, rather than a formal or scientific way. Try to use short sentences and avoid long words. Technical words can be included but should be explained in a glossary or footnotes. For example, some livestock disease names (e.g. trypanosomosis) can be tricky for non-veterinary readers. Numerous writing and formatting devices can be used to break up large blocks of text and make key points easy to find. These include the use of bullet points and text boxes. Also, direct quotations from interviews can be used to enliven a report.

Use of pictures and diagrams – Pictures and diagrams enliven a report and present information that is cumbersome to describe using text. For example, it is much easier to draw a map than describe the positions of villages, roads or other features with words alone. Computer software now enables colourful and sophisticated graphs and other diagrams to be produced relatively easily and added to reports. Graphs are useful for summarizing and visualizing information, but simple black and white graphs that are easy to understand are often a better option than complicated three-dimensional, multicoloured graphs that do not photocopy well. Pie charts are particularly useful for summarizing information visually.

Timing – Try to produce the report within a reasonable time frame, for example, within one month of the end of the fieldwork. This helps to ensure that reports are acted upon and can build on the momentum and interest for improvement that an evaluation can initiate. Reports that are submitted after many months can easily be out of date.

The draft report: seeking feedback and checking the report's contents – As some evaluations and assessments involve multiple players it is useful to distribute a draft copy of the report for feedback and comments. This is particularly important if the report contains information that may be contentious because it provides an opportunity for people to challenge the points in question. If necessary, these comments can be included in the

report in order to present two sides of a discussion. Another way to obtain feedback is to organize community workshops in which the main findings and recommendations of the report are presented and discussed.

Distributing the report – The project and assessment teams should produce a list of agencies and individuals who should receive a copy of the report. A brief letter should be produced to accompany the report.

Producing a special summary report or newsletter for community-based groups – In order to share findings and recommendations with the community in general, newsletters can be used. These can summarize the main points of the evaluation, say who was involved, and can be made more appealing if photographs, cartoons or direct quotations are included.

Presentations at meetings and conferences – In addition to producing a written account, verbal presentations at workshops or conferences can be used to present findings to a wider audience and seek ideas from others.

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P	–	Portuguese			
R	–	Russian	Mk	–	Macedonian
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16. Preparation of foot-and-mouth disease contingency plans, 2002 (E)
17. Recognizing Rift Valley Fever, 2003 (E)

This FAO manual provides technical advice and guidelines for each of the livestock interventions most common during emergency response to natural and human-induced disasters. These are: destocking, veterinary support, provision of feed, provision of water, shelters and provision of livestock. There is also a chapter on the use of cash transfer and one on monitoring, evaluation and assessing the impact of emergency livestock projects. The manual complements the *Livestock Emergency Guidelines and Standards* (LEGS) handbook (www.livestock-emergency.net/).

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