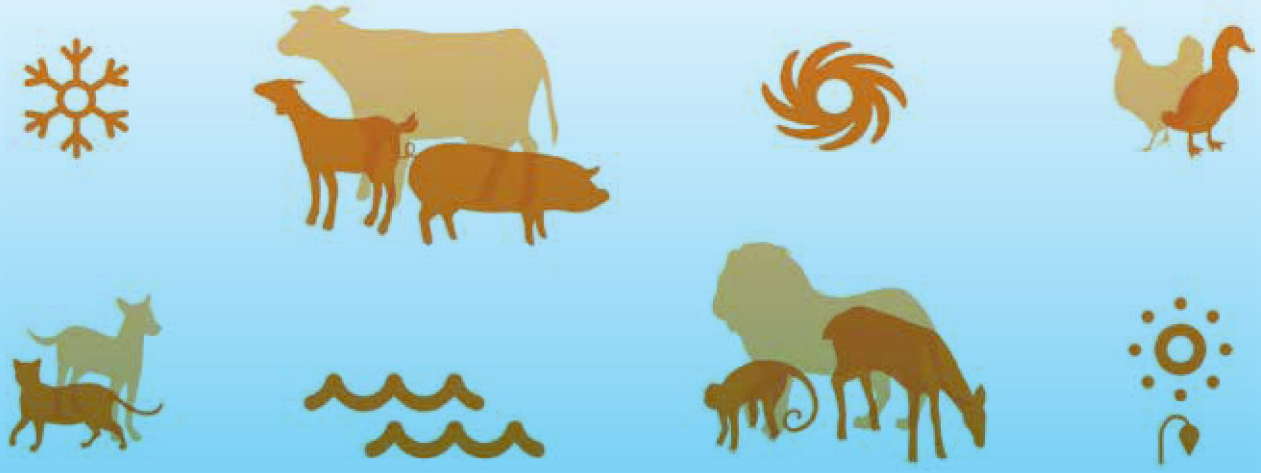
Management of Animals in Emergencies

A VETERINARIANS HANDBOOK FOR DISASTER MANAGEMENT



बिहार राज्य आपदा प्रबंधन प्राधिकरण

BIHAR STATE DISASTER MANAGEMENT AUTHORITY

(आपदा प्रबंधन विभाग, बिहार सरकार)

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प्रस्तावना

बिहार एक बहु–आपदा प्रवण राज्य है, जहाँ सभी तरह की प्राकृतिक एवं मानव जनित आपदाएं घटित होती है। यह राज्य जहाँ एक ओर लगभग हर वर्ष बाढ़ के प्रकोप को झेलता है वहीं दूसरी ओर सुखाड़, अग्निकांड, शीतलहर एवं लू इत्यादि आपदाओं से भी इस राज्य का एक बड़ा भू–भाग प्रभावित रहता है। इन आपदाओं से मानव ही नही बल्कि पशु भी प्रभावित होते है और आपदाओं की स्थिति में मानव के साथ–साथ पशु संसाधन की भी बड़े पैमाने पर क्षति होती है। यद्यपि की आपदाओं को घटित होने से रोका तो नही जा सकता है, किन्तु इनसे होने वाली क्षति को कम करने के लिए पशु चिकित्सकों का कौशल विकास कर तथा आपदाओं के खतरों की पहचान कर पशुधन की सुरक्षा का समुचित प्रबंधन किया जा सकता है।

प्रस्तुत पुस्तिका पशु एवं मत्स्य संसाधन विभाग के पशु चिकित्सा पदाधिकारियों के क्षमतावर्द्धन के उद्देश्य से "Management of Animals in Emergencies" विषय पर बाढ़ सुरक्षा सप्ताह (01–07 जून 2018) में 04–07 जून 2018 से आरंभ होने वाले चार दिवसीय पशु चिकित्सा पदाधिकारियों के प्रशिक्षण कार्यक्रम के लिए तैयार किया गया है। इस पुस्तिका के माध्यम से आपातकालीन परिस्थितिओं में पशुधन की सुरक्षा, बचाव एवं उनके पुनर्वास की नई–नई वैज्ञानिक तकनीकियों की बारिकियों से पशु चिकित्सकों का ज्ञान वर्द्धन कर पशुधन की सुरक्षा सुनिश्चित की जा सकती है।

मुझे आशा ही नही वरन पूर्ण विश्वास है कि इस पुस्तिका का सदुपयोग कर बिहार के पशु एवं मत्स्य संसाधन विभाग के पशु चिकित्सा पदाधिकारियों द्वारा बहु आपदा से प्रभावित पशुधन की सुरक्षा एवं समुचित प्रबंधन करने में सफल होंगे।

(व्यास जी)

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Message

Bihar is facing consequences of flood and draught time and again the livestock wealth of state plays significant role in improving the economy of the state as well as alleviation of rural poverty and malnutrition. In present scenario, livestock farming integrated with agriculture can help the farmers to enhance their livelihood, and economy.

The veterinary profession in India has a tradition of being present in disaster struck areas at the time of need providing relief not only to affected livestock but in many cases to the "man behind animals" as well. Natural calamities like flood, draught, storms and heat strokes are phenomenon which affect the livestock and wild life.

I am happy to know that Bihar Animal Sciences University (Patna) and World Animal Protection (New Delhi) have prepared a handbook entitled ***"Management of Animals in Emergency"*** with the help of BSDMA. I trust the handbook will be useful for field veterinarians and other functionaries who are engaged in handling emergency situations. It would enhance their technical skill to mitigate the adverse impact and save the precious lives of animals effectively during different phases of disaster.

I appreciate the efforts devoted by the editorial committee in preparing the manuscript in a comprehensive, simple, practical and interesting manner.

(Rameshwar Singh)

Dr. N. Vijaya Lakshmi, I.A.S., Ph.D.
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संदेश

विदित है कि बिहार राज्य एक बहुआपदा प्रवण राज्य है। प्रतिवर्ष यहाँ बाढ़ एवं सुखाड़ के अलावा अन्य आपदाएँ भी आती रहती है। आपदाओं की स्थिति में मानव के साथ–साथ पशु संसाधन की भी बड़े पैमाने पर क्षति होती है। आपदाओं को रोकना तो कठिन है किन्तु इनसे होने वाली क्षति को हम कर्मियों का कौशल विकास करके अपेक्षाकृत कम कर सकते है। इसी उद्देश्य को ध्यान में रखकर पशु चिकित्सा पदाधिकारियों के क्षमतावर्द्धन हेतु "Management of Animals in Emergencies" नामक पुस्तिका बिहार राज्य आपदा प्रबंधन प्राधिकरण, बिहार पशु विज्ञान विश्वविद्यालय, पटना तथा पशु एवं मत्स्य संसाधन विभाग, बिहार के सहयोग से प्रकाशित किया जा रहा है।

प्रस्तुत पुस्तिका आपातकालीन परिस्थितियों में पशुधन की सुरक्षा, बचाव एवं पुनर्वास के नवीनतम तकनीकों के बारीकियों को पशु चिकित्साधिकारियों तक पहुँचाने में सार्थक होगी, जिसके फलस्वरूप आपदा के प्रभाव को न्यूनिकृत किया जा सकेगा।

मैं इस पुस्तिका के सम्पादक मंडली को इसके सफल, सुग्राहय एवं सारगर्भित प्रकाशन हेतु किए गए प्रयास की सराहना करती हूँ एवं बधाई देती हूँ एवं आशा करती हूँ कि इसमें दिये गये जानकारी सर्वसाधारण के लिए उपलब्ध रहेगा और आपदाओं के समय में जनोपयोगी साबित होगा।

(डॉ एन0 विजयलक्ष्मी)

बिहार राज्य आपदा प्रबंधन प्राधिकरण

द्वितीय तल, पंत भवन, बेली रोड, पटना–800 001

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सदस्य

संदेश

बिहार एक बहु–आपदा प्रवण राज्य होने के कारण इस राज्य में प्राकृतिक एवं मानव जनित आपदाएं हर वर्ष घटित होते रहती है। बाढ़, सुखाड़, अग्निकांड, शीतलहर एवं लू इत्यादि जैसी आपदाओं के प्रकोप से मानव के साथ–साथ पशुधन भी प्रभावित होते हैं। पशुधन को आपदाओं से समुचित सुरक्षा एवं प्रबंधन प्रदान करने की नितांत आवश्यकता है और इसी के मद्देनजर बिहार पशु एवं मत्स्य संसाधन विभाग के पशु चिकित्सा पदाधिकारियों के प्रशिक्षण की आवश्यकता महसूस की गई है।

बिहार राज्य आपदा प्रबंधन प्राधिकरण के द्वारा प्रतिवर्ष दिनांक 01–07 जून में बाढ़ सुरक्षा सप्ताह मनाया जाता है जिसके अंतर्गत आपदा जोखिम न्यूनीकरण के बहुत से कार्यक्रमों का क्रियान्वयन किया जाता है। इसी कड़ी में पशु एवं मत्स्य संसाधन विभाग के पशु चिकित्सा पदाधिकारियों को "Management of Animals in Emergencies" विषय पर दिनांक 04 जून 2018 से चार दिवसीय प्रशिक्षण कार्यक्रम का आरंभ किया जा रहा है और इसी के संदर्भ में प्रस्तुत पुस्तिका तैयार की गयी है। इस पुस्तिका के माध्यम से प्रस्तावित प्रशिक्षण कार्यक्रम में बिहार के सभी पशु चिकित्सा पदाधिकारियों को आपदा की स्थिति में पशुधन की सुरक्षा एवं समुचित प्रबंधन की वैज्ञानिक तकनीकियों की जानकारी उपलब्ध कराये जाने का लक्ष्य है।

आशा है कि बिहार के सभी प्रशिक्षु पशु चिकित्सा पदाधिकारी इस पुस्तिका का लाभ उठायेंगे और बहु आपदा से प्रभावित पशुधन की सुरक्षा एवं प्रबंधन करने में कामयाब होंगे।

(पी0 एन0 राय)
सदस्य

Gajender K Sharma,
Country Director
World Animal Protection India

Message

I would like to express my sincere gratitude to Bihar State Disaster Management Authority (BSDMA), Department of Animal Husbandry, Government of Bihar, Bihar Animal Science University and Policy Perspective Foundation (PPF) for extending their cooperation and support to organize this training. It's a moment of pride for us to see India lead the world in the field of Animal Disaster Management.

When disasters strike, it doesn't discriminate - every year, hundreds of thousands of animals and people alike get affected and suffer its terrible effects: fear, stress, hunger, thirst, illness, injury and death.

We know, health and wellbeing of people and animals are intrinsically linked. People need their animals to be safe and healthy, so that they can survive, move on and rebuild their lives. Animals too need people to care and protect them from suffering and injuries. We have inherited a culture where animals have always been central to our lives, so much so that Mahatma Gandhi said that "the greatness of a nation and its moral progress can be judged by the way its animals are treated". So, it is time for us to ensure that animals are considered and protected and we do so by including them in all district, state and national disaster management plans and programmes.

We need sustainable solutions and preparedness in disaster management to be able to protect not just people but animals too. People rely on livestock for their survival and care for their animals' health and wellbeing. Our experience has witnessed the reality of situations, where people are not willing to evacuate before ensuring adequate provisions for their animals and let go of their animals even in life threating situations.

At World Animal Protection we have been safeguarding animals from disasters around the globe for more than 50 years. When disaster strikes and animals suffer, we are there to bring immediate relief. In India we have been bringing that relief since 2008 Kosi Floods in Bihar. This isn't just an animal issue – people desperately need healthy animals in order to survive and to rebuild their lives. By helping animals, we know we are helping people too.

I strongly believe that this training will build technical expertise of state animal husbandry officials to protect animals in disasters.

On behalf of World Animal Protection I wish all the participants a very successful training!

Disclaimer : The contents and views expressed in this handbook are those of the authors and do not necessarily reflect the views and policies of the Bihar State Disaster Management Authority (BSDMA), World Animal Protection, Bihar Animal Sciences University (BASU), Policy Perspective Foundation (PPF) or the Government of Bihar.

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4 days Training of Veterinary Doctors on "Management of Animals in Emergencies"

Organized by:

Bihar State Disaster Management Authority (BSDMA)
Bihar Animal Sciences University, Patna
Animal & Fisheries Resources Dept, Bihar
World Animal Protection (WAP)
Policy Perspectives Foundation (PPF)
Venue: Veterinary Emergency Response Unit, Bihar Veterinary College, Patna

Registration & Inaugural session 10.00 AM to 11.00 AM

Technical Sessions

Day 1

Session	Topic	Duration
1	Guest Lecture by an eminent Expert	11.00 -12.00 PM
2	Introduction to DM and VERU	12.00 – 12.50 PM
TEA BREAK		12.50. 01.00 PM
3	Disaster Impact on Animals and Legal Frame work in ADM	01.00 -02.00 PM
LUNCH BREAK		02.00-03.00 PM
4	Principles of Disaster Management	03.00 -04.00 PM
5	Disaster Assessment and operational planning	04.00 – 05.00 PM
DAY 2		
1	Deployment and post intervention Responsibilities	10.00 -11.30 AM
2	Animal Handling and transportation in Disasters	11.30 – 01.00 pm
LUNCH BREAK		01.00 -02.00 PM
3	Role of DAH in Flood & Draught etc.	02.00 -03.30 PM

TEA BREAK		03.30 -03.40 PM
4	Emergency animals shelters, equipment's and Veterinary triage	03.40 -05.00PM
DAY 3		
1	Feeding and water supply to animals in disaster	10.00 -11.30 AM
2	Safety, security and trauma management	11.30 – 01.00 pm
LUNCH BREAK		01.00 -02.00 PM
3	Community preparedness for MAE and LEGS	02.00 -03.30 PM
TEA BREAK		03.30 -03.40 PM
4	Infectious disease in Disaster	03.40 -05.00PM
DAY 4		
1	Disease control, bio-security and emergency medicines in disaster	10.00 -11.30 AM
2	DRR and preparedness planning for Draught, Flood and Heat	11.30 – 01.00 PM
LUNCH BREAK		01.00 -02.00 PM
3	Carcass disposal in emergencies	02.00 -03.00 PM
TEA BREAK		03.00 -03.10 PM
4	Management of wildlife in emergencies	03.10 -04.00 PM
5	Final Evaluation and Wrap up.	04.00 -05.00 PM

Contents

Acronyms

AI	Artificial Insemination / Avian Influenza
A&FRD	Animal & Fisheries Resources Development
AWBI	Animal Welfare Board of India
BASU	Bihar Animal Sciences University
BVC	Bihar Veterinary College
COVAS	College of Veterinary & Animal Sciences
CPDO	Central Poultry Development Organization
CPDO&TI	Central Poultry Development Organization & Training Institute
CPMF	Central Para Military Force
CVSc	College of Veterinary Sciences
CVSAH	College of Veterinary Science & Animal Husbandry
CWC	Central Water Commission
DAH	Department of Animal Husbandry
DAHDF/DADF	Department of Animal Husbandry, Dairying & Fisheries
DANA	Disaster Assessment & Needs Analysis
DOLR	Department of Labour Resources
DART	Disaster Assessment & Response Team
DMD	Disaster Management Department
DRR	Disaster Risk Reduction
DOEF	Department of Environment & Forest
EMDAT	Emergency Dataabase
FPI	Food Processing Industries
GDP	Gross Domestic Product
GIS	Geographic Information System
GLIDEnumber	Global Identifier Number
IVRI	Indian Veterinary Research Institute

LEGS	Livestock Emergency Guidelines & Standards
MDGs	Millennium Development Goals
MEDEVAC	Medical Evacuation
MHA	Ministry of Home Affairs
M&E	Monitoring & Evaluation
NADRES	National Animal Disease Referral Expert System
NDDB	National Dairy Development Board
NDMA	National Disaster Management Authority
NDRF	National Disaster Response Force
NDRI	National Dairy Research Institute
NIDM	National Institute of Disaster Management
NPBBDD	National Programme for Bovine Breeding & Dairy Development
NSPAAD	National Surveillance Programme for Aquatic Animals Diseases
OIE	World Organization for Animal Health
PIR	Post Intervention Report
PPE	Personal Protective Equipment
PPF	Policy Perspectives Foundation
PRI	Panchayati Raj Institution
RKVY	Rashtriya Krishi Vikas Yojana
RVC	Remount & Veterinary Corps
SDGs	Sustainable Development Goals
SDRF	State Disaster Response Force
TANUVAS	Tamil Nadu Veterinary & Animal Sciences University
UNFCCC	United Nations Framework Convention on Climate Change
VERU	Veterinary Emergency Response Unit
WAHIS	World Animal Health Information System
WAP	World Animal Protection
WRD	Water Resource Department

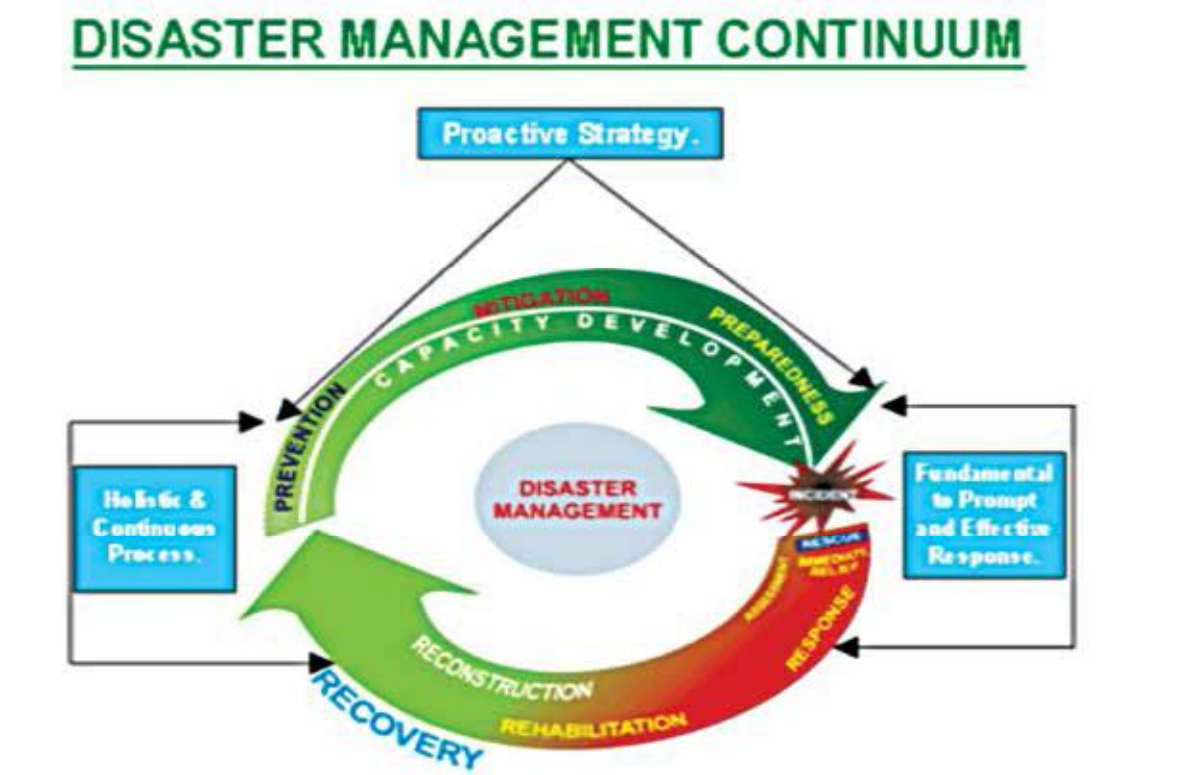
Overview of the Handbook

Background

India has been traditionally vulnerable to natural disasters on account of its unique geo-climatic conditions. Floods, droughts, cyclones, earthquakes and landslides have been recurrent phenomena. About 60% of the landmass is prone to earthquakes of various intensities; over 40 million hectares is prone to floods; about 8% of the total area is prone to cyclones and 68% of the area is susceptible to drought. In the decade 1990-2000, an average of about 4344 people lost their lives and about 30 million people were affected by disasters every year. The loss in terms of private, community and public assets has been astronomical.

In recent years, biological disasters including emerging and reemerging infections have assumed serious dimensions as they pose a greater threat to health, environment and national security. The risks and vulnerabilities of our food chain and agricultural sector to Agroterrorism, which involves the deliberate introduction of plant or animal pathogens with the intent of undermining socio-economic stability, are increasingly being viewed as a potential economic threat. Intensive animal husbandry practices coupled with transborder movement of animal products have also increased the chances of spread of Zoonotic diseases with serious consequences to human health. The specter of pandemics such as Swine Flu (H1N1) and Bird Flu (H5N1) engulfing our subcontinent and beyond poses new challenges to the skills and capacities of the government and society.

There is a need to create veterinary public health teaching and training institutions in every state. Field epidemiology training for animal health professionals and training for field workers needs to be augmented to make the field staff fully competent to support outbreak investigation and response. There is need to identify and train Rapid Response Teams (RRTs) in all districts to respond to any threat of outbreak. The orientation of Veterinary doctors to the detection of suspected cases and detection of early warning signals of disease may help in instituting rapid response to an outbreak situation. Veterinary hospitals and Veterinary college hospitals in major cities and state capitals are not equipped to handle deliberate or natural outbreak of pandemic potential diseases. These hospitals have a significant scope for expansion and advancement. All hospitals are required to adopt procedures of quality accreditation.



The Sendai Framework for Disaster Risk Reduction 2015–2030 represents a major shift in how DRR is conceptualized. It focuses on disaster risk management rather than disaster management, emphasizing the protection of livelihoods as well as saving people and property. The Sendai Framework in particular includes a clear commitment to the protection of livelihoods and productive assets. Countries now need to incorporate animal protection into DRR policies, plans and activities to reduce economic losses and safeguard livelihoods.

Animals are more to their owners than simple commodities. They are productive assets requiring protection and care to preserve their productive quality. Animals also represent more than food. They provide livelihoods, cultural identity and companionship. But implementing Sendai doesn't stop with policy. This is why the veterinary professionals need to take active measures to foster a culture of disaster preparedness.

Hazard Profile of Bihar

Bihar's topography is marked by a number of perennial and non-perennial rivers of which, those originating from Nepal are known to carry high sediment loads that are then deposited on the plains of Bihar. A majority of the rainfall in this region is concentrated in the 3 months of monsoon during which the flow of rivers increases up to 50 times causing floods in Bihar. An estimated 73% per cent of the total land area in Bihar is vulnerable to flood. Annual flooding in Bihar accounts for about 30-40% of the flood damages in India; 22.1% of the total flood affected population in India

is reported to be located within the state of Bihar. 28 districts of Bihar fall under most flood prone and flood prone districts.

Bihar is located in the high seismic zone that falls on the boundary of the tectonic plate joining the Himalayan tectonic plate near the Bihar-Nepal Border and has six sub-surface fault lines moving towards the Gangetic planes in four directions. Of the 38 districts, 8 districts fall in seismic zone V while 24 districts fall in seismic zone IV and 6 districts in seismic zone III with most districts falling under multiple seismic zones (i.e. either seismic zone V & IV or seismic zone IV & III). The state has in the past experienced major earthquakes; the worst was the 1934 earthquake in which more than 10,000 people lost their lives, followed by 1988 earthquake.

Though the climate of Bihar is favourable for production of various crops, the agriculture of the state is dependent on behaviour of monsoon and distribution of rainfall. Although the average rainfall in the state is 1120 mm, considerable variations occur between the different parts of the State. Large part of the state is now increasingly vulnerable to drought due to climate change. In the absence of adequate rainfall, most part of Bihar including North Bihar which is prone to floods faces drought situations. South and South West Bihar are more vulnerable and often experiences severe drought situations.

The state is also prone to cold and heat waves, Cyclonic storms (high speed winds) and other human-induced hazards like fire, epidemics, road / boat accidents, stampedes etc. Incidences of fire are mainly local in nature but have a severe impact on villages. Since a majority of Kucha houses have thatch roofs and wooden structures, in the summer months when winds are high, fires from the traditional stoves spread to damage entire villages.

About the Handbook

The handbook is a reference and guidance for veterinarians working in managing disasters. The knowledge, expertise and practices explained in this handbook will provide useful guidance in understanding disaster risk management related skills and shall also help in building the capacity of the veterinarians.

The handbook is developed jointly by World Animal Protection, BASU, BSDMA, PPF and Government of Bihar by compiling, documenting and providing information on strategies, policies and best practices related to protecting animals in disasters. The handbook also discusses existing challenges and gaps for undertaking research and development activities. The handbook comprises of 8 chapters.

The handbook also provides references to further information and list of annexes comprising of all the tools and templates required for veterinarians to adopt and use during implementation of disaster management programmes.

Chapter 1:

Concepts in Disaster Management

1.1. Disaster Management

Hazard: Any agent that has the potential to cause harm/damage to a vulnerable target (humans, animals, property, or the environment).

Disaster: An event or series of events, which gives rise to casualties and damage or loss of properties, infrastructure, environment, essential services or means of livelihood on such a scale which is beyond the normal capacity of the affected community to cope with.

Capacity: All the strengths, attributes and resources available within a community, organization or society to manage and reduce disaster risks and strengthen resilience.

Vulnerability: Characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard. There are many aspects of vulnerability, arising from various physical, social, economic, and environmental factors.

Risk: Is associated with the community's inability to cope with a particular situation.

The below formula helps to assess and measure the level of risk prevailing in a particular area or community by understanding the hazard, vulnerability and capacity to cope with the situation.

"Risk = Hazard X Vulnerability (– or/) Capacity"

"Disaster means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural man-made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area".

Disaster Management Act, 2005

Pre-Disaster Phase: Prevention, Mitigation and Preparedness

Post-Disaster Phase: Response, Rehabilitation and Reconstruction

Disaster Management Cycle: Disaster management is a protocol which not only responds to disasters but also prepares for them. Gained from experience, resources are beginning to bring together expertise in animal health and welfare issues and the socio-economic impact a disaster would pose on the interdependent relationship between animal and human. The comprehensive approach to disaster management embraces strategies in Prevention, Preparedness, Response and Recovery (PPRR).

Prevention: Regulatory and physical measures to ensure that emergencies are prevented. Prevention includes activities which prevent an emergency. The identification of regional farming techniques could be vital in the prevention phase. For example, rotating animal pastures and preventing the grazing of livestock in particular areas which are prone to disasters during seasonal weather changes would also reduce risk. Veterinary services can also be strengthened as an activity of mitigation, especially in the case of potential disease outbreaks. In addition, overgrazing of pastures in times prior to disasters significantly decreases the resilience to cope, especially if further impairment of pasture occurs as a consequence of disasters such as floods and drought. Therefore destocking should be advised in areas prone to overgrazing. Importantly, mitigation also includes a significant amount of public education and awareness. Furthermore, addressing public perception should also be included in mitigation in order to reduce risk.

Preparedness: Arrangements to ensure that, should a disaster occur, all those resources and services which may be needed to cope with the effects, can be rapidly mobilized and deployed. Preparedness is defined as being prepared to handle an emergency. This includes plans to save both animal and human life, as well as the livelihoods of communities in disaster prone areas. Early warning systems are often developed and communities shown how to prepare for a disaster by encouraging vaccination programs, strengthening and securing animal shelters, develop methods of evacuating animals safely, helped with sufficient storage of food and water and identifying their animals easily so they can be reunited in the chance of a disaster striking.

Response: Aggregate of decisions and measures to (1) contain or mitigate the effects of a disastrous event to prevent any further loss of life and/or property, (2) restore order in its immediate aftermath, and (3) re-establish normality through reconstruction and re-rehabilitation shortly thereafter. These are set of activities implemented after the impact of a disaster in order to assess the needs, reduce the suffering, limit the spread and the consequences of the disaster, and open the way to rehabilitation. NDRF and SDRF teams help in rapid deployment of relief programmes. Static and

mobile emergency veterinary clinics and search and rescue operations are often part of the early response phase, as is provision of emergency food, temporary shelters and reuniting of animal and owner wherever possible. Response activities often need to be approved and guided by the government, whilst operations which are related to the control of disease need to be referred with the World Organization for Animal Health (OIE).

Recovery: The coordinated process of supporting disaster-affected communities in reconstructing their physical infrastructure and restoration of emotional, social, economic and physical well-being. The fourth phase of disaster management centres on recovery after an emergency and once the immediate danger is over, it is also often considered the most important phase. It includes action taken to return the situation back to normal or furthermore, safer than before. Restoring veterinary care in the community is essential. Importantly, the aftermath can be used to put in place plans for the response of future disastrous situations in the area, these can then become models for preventive and preparation work elsewhere.

Evacuation: The immediate and urgent movement of people and animals away from the threat or actual occurrence of a hazard.

Epidemiology: Is the science that studies the patterns, causes, and effects of health and disease conditions in defined populations. It is the cornerstone of public health, and informs policy decisions and evidence-based practice by identifying risk factors for disease and targets for preventive healthcare.

Zoonosis: Infectious diseases of animals, that can naturally be transmitted to humans, and vice versa.

Bioterrorism: Is terrorism involving the intentional release or dissemination of biological agents. These agents are bacteria, viruses or toxins and may be in a naturally occurring or a human/animal modified forms.

Deployment: The movement of disaster operations team along with all their emergency supplies and required logistical support to the disaster affected areas.

Classification of Disasters:

- Natural, Manmade/Technological and Complex Disasters *(General Classification)*
- Rapid Onset, Slow Onset and Complex Emergencies *(Livestock Emergency Guidelines and Standards-LEGS Classification)*
- Biological, Geophysical, Hydrological, Meteorological, Climatological *(EM-DAT CRED Classification)*

Earthquake: An earthquake is the result of a sudden release of energy in the Earth's crust that creates seismic waves. This results in a sudden violent shaking of the ground, typically causing great destruction, as a result of movements within the earth's crust or volcanic action.

The Pacific Ring of Fire is the most geologically active region of the world. Convergent plate boundaries cause earthquakes and volcanic eruptions all around the Pacific Ocean basin. About 80% of all earthquakes strike this area.

Floods: Flood is an overflow of water that submerges land which is usually dry. Floods can have devastating consequences and can have effects on the economy, environment and people.

- **Natural Causes:** Heavy Rainfall, Snowmelt, Coastal Flooding
- **Manmade Causes:** Deforestation, Poor Water Management, Urbanization

Classification of Floods:

- **Intensity**: Slow Onset, Rapid Onset and Flash Floods
- **Location:** River, Arroyos, Estuarine, Coastal, Urban Floods
- **Other:** Cloud Outbursts, Ice Jam, Muddy Floods, Catastrophic Floods, Etc.

Cyclones: A cyclone is an area of closed, circular fluid motion rotating in the same direction as the Earth. This is usually characterized by inward spiraling winds that rotate counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere of the Earth. Most large-scale cyclonic circulations are centered on areas of low atmospheric pressure and can create devastating impacts on people and animals life, crops, property and infrastructures.

What Causes Cyclones?:

- **Warm Oceans:** Main source of energy for tropical cyclones.
- **Condition:** Sea surface temperature is above 26.5°C.
- **Development:** Relies on favorable wind regimes and persist for several days.
- **Dissipation:** When they can no longer extract sufficient energy from warm ocean water. They lose their source of energy when they move over land or colder oceans. Weakening may also occur if the cyclone moves into an unfavorable wind regime which disrupts the structure of

the system.

Categories of Cyclones:

CATEGORY	WIND SPEED	WAVE HEIGHT	SEA CONDITION
CATEGORY 1: DEPRESSION	31 TO 49 MPH	1.25 TO 4 MTRS	MODERATE TO ROUGH
CATEGORY 2: DEEP DEPRESSION	50 TO 61 MPH	4 TO 6 MTRS	VERY ROUGH
CATEGORY 3: CYCLONIC STORM	62 TO 87 MPH	6 TO 9 MTRS	HIGH
CATEGORY 4: SEVERE CYCLONIC STORM	88 TO 117 MPH	9 TO 14 MTRS	VERY HIGH
CATEGORY 5: VERY SEVERE CYCLONIC STORM	118 TO 221 MPH	ABOVE 14 MTRS	PHENOMENOL
CATEGORY 6: SUPER CYCLONIC STORM	ABOVE 222 MPH	ABOVE 14 MTRS	PHENOMENOL

Landslides: A landslide, also known as a landslip, is a geological phenomenon that includes a wide range of ground movements, such as rock falls, deep failure of slopes and shallow debris flows. Landslides can occur in offshore, coastal and onshore environments. Although the action of gravity is the primary driving force for a landslide to occur, there are other contributing factors affecting the original slope stability. Typically, pre-conditional factors build up specific sub-surface conditions that make the area/slope prone to failure, whereas the actual landslide often requires a trigger before being released.

Causes of Landslides:

- **Factors:** Slope angle, climate, weathering, water content, vegetation, overloading, geology, and slope stability.
- **Natural Causes:** Earthquake Vibrations, Volcanic Eruptions, Prolonged Rainfall, Soil Erosion
- **Manmade Causes:** Deforestation, Quarrying/Mining, Excavation, Constructions

Types of Landslides: Debris Flow, Earthflows, Topple, Slump, Debris Landslide, Shallow Landslide, Deep Seated Landslide, Creep, Fall, Sturzstrom.

Landslide Warning Signs:

- Changes occur in your landscape such as patterns of land movement, small slides, flows, or progressively leaning trees.
- Doors or windows stick or jam for the first time.
- New cracks appear in plaster, tile, brick, or foundations.

- Outside walls or stairs begin pulling away from the building.
- Slowly developing, widening cracks appear on the ground.
- Bulging ground appears at the base of a slope.
- Fences, retaining walls, utility poles, or trees tilt or move.
- A faint rumbling sound that increases in volume is noticeable as the landslide nears.
- Unusual sounds, such as trees cracking or boulders knocking together, might indicate moving debris.

Droughts: Drought is an extended period when a region receives a deficiency in its water supply, whether atmospheric, surface or ground water. A drought can last for months or years, or may be declared after as few as 15 days. Generally, this occurs when a region receives consistently below average precipitation.

Causes of Drought:

Not receiving sufficient rain or snow over a period of time. People can also play a big role in drought. If we use too much water during times of normal rainfall, we might not have enough water when a drought happens. Drought is caused by not only lack of precipitation and high temperatures but also by overuse and overpopulation. Seasonal rainfall deficits cause droughts and often lead to migration of people and livestock.

Categories of Drought:

- **Meteorological drought:** Seasonal rainfall received over an area is less than 25 % of its long term average value, moderate drought 25–50 % and severe drought when the deficit exceeds 50% of the normal.
- **Hydrological drought:** Deficiencies in surface and subsurface water supplies leading to lack of water for normal and specific needs. i.e., increase usage of water diminishes the water reserve.
- **Agricultural drought:** Triggered by Meteorological and Hydrological droughts occurs when soil moisture and rainfall are inadequate during the crop growing season leading to crop stress.
- **Socioeconomic drought:** Occurs when the demand for water exceeds the supply. Examples of this kind of drought include too much irrigation or when low river flow forces hydroelectric

power plant operators to reduce energy production.

Disaster's Impact on Animals

The impact of disasters on animals is devastating and currently they are not being effectively assessed due to lack of system and inadequate resources. However, based on few reports we can have an overview of its impact. As per the CWC's data, on an average 97,000 cattle is lost due to floods and heavy rains alone every year in India based on the statistics from 1953 to 2011.

In India the animals prone to floods are as follows: 38% cattle, 55% buffaloes, 25% sheep, 41% goats, 47% pigs and 8% camels. The animals prone to drought are as follows: 30% cattle, 30% buffaloes, 61% sheep, 35% goats, 17% pigs and 65% camels. The livestock density per 1000 human in drought prone areas is 579 and in flood prone areas is 388 *(Nutrition and Care of Livestock During Natural Disaster, N. Das, 2011).*

Around 70% of rural households depend on livestock farming for supplementary income and 90% of activities related to care and management of livestock are carried out by the family's women folk *(IVRI)*. In disaster the livestock is seen as a victim as well as a hope for the people who are dependent on them for their food, income and livelihood.

Livestock census is conducted once in every five years. The latest is the 19th Livestock Census which was conducted in 2012. However, currently there are no specific systems to assess disaster's impact on animals and their losses by the government which is a major drawback in terms of assessing the animal losses.

Legal Provisions to Protect Animals

The Constitution of India: Under the Section 51 A. it states that "It shall be the duty of every citizen of India [...] (g) to protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures".

Animal Protection Acts: The Prevention of Cruelty to Animals Act of 1960, consolidated in 1982 and The Indian Wildlife (Protection) Act of 1972, amended up to 1993 also provides the scope and necessary opportunities for the protection of animals. In addition to this, different States have their own State Acts that are applicable to protect animals within the States jurisdiction.

National Policy on Disaster Management, 2009: "Animals both domestic as well as wild are exposed to the effects of natural and man-made disasters. It is necessary to devise appropriate measures to protect animals and find means to shelter and feed them during disasters and their

aftermath, through a community effort, to the extent possible. It is pertinent to note that many communities have shown compassion to animals during disasters, and these efforts need to be formalized in the preparedness plans. The Departments/ Ministries of the Government of India such as Animal Husbandry and Dairy Department, Social Justice & Empowerment and the States concerned should devise such measures at all levels".

Chapter 7 Response

7.10.1 Animal Care

National Livestock Policy: "Contingency plans will be prepared to maintain the productivity and welfare of livestock and poultry sector during various types of natural calamities and drought conditions. Such plans would primarily aim at improving veterinary care and making available feed and fodder through greater emphasis on fodder productivity and storage through silage or fodder blocks".

Chapter 13 Animal Health

13.9 Contingency Plan for Disaster Management

1.2. Role of Government

1.2.1. Central Government Ministries Responsible

Ministry of Home Affairs is the Nodal Ministry for all disasters except for few disasters the Nodal Ministries are as follows,

Disaster	Central Government	State Government
Avalancne, Cyclone/ Tornado, Tsunami	Ministry of Home Affairs	DMD
Nuclear Accidents	Ministry of Home Affairs/Department of Atomic Energy	DMD
Forest Fire, Chemical Disasters, Industrial Accidents	Ministry of Environment and Forests	D.EF, DMD, DOLR
Biological Disaster	Minisgtry of Family & Health Welfare	DMD, Health Department
Drought, Hailstorm, Cold Wave & Frost, Pest Attack	Ministry of Agriculture and Cooperation	DMD, Agriculture Department
Disasters in Mines	Ministry of Mines	DMD
Rail Accidents	Ministry of Railways	DMD, Home Department
Road Accidents	Ministry of Road Transport, Highway and Shipping	DMD, Transport Department
Civil Aviation Accidents	Ministry of Civil Aviation	DMD, Home Department
Oil Spill	Coast Guard in coordination with Ministries	
Floods, Lightening, Boat Accidents, Drowning	Ministry of Home Affaris	WRD, DMD
Fire & Heat Wave	Ministry of Home Affairs	DMD, Home Department

Central Government Agencies Responsible for Early Warnings

DISASTERS	GOVERNMENT AGENCIES
Floods	Central Water Commission (CWC) Indian Meteorological Department (IMD)
Cyclone, Avalanche, Earthquake	Indian Meteorological Department (IMD)
Tsunami	Indian National Centre for Ocean Information Services (INCOIS)
Storm Surge	Indian National Centre for Ocean Information Services (INCOIS)
Landslide	Geological Survey of India (GSI)

Specialized Government Agencies

DISASTERS	SPECIALIZATION	GOVERNMENT AGENCIES
All	Search and Rescue	National Disaster Response Force (NDRF)
All	Capacity Building	National Institute of Disaster Management (NIDM)

1.2.2 Role of State Government Department

The **A&FRD** will select preventive action strategies based on the nature and intensity of the disaster's impact on the animal population. Indicative steps for preventive action selection are as follows

- Analyze the hazard
- Determine prevention/ protection action
- Determine public warning
- Determine prevention/ protective action implementation plan

1.3 Pre Disaster Preparedness

1.3.1 Early Warning Plan

Based on forecast by Ministry of Earth Sciences, Indian Meteorological Department, Department of Space, Indian Space Research Organization, Central Water Commission and other agencies for various types of disasters, States/UTs will take preparatory steps to ensure availability of feed, fodder, drinking water, medicine and vaccination for livestock and for required preparedness in the areas of fisheries and aquaculture activities. DADF will also alert the States/UTs for taking appropriate measure as per

the Disaster Management Plan.

1.3.2 Identification of Vulnerability amongst Livestock and Aquaculture Farms

a. (a) State Animal Husbandry and Fisheries Departments have to assess and review the impact of different disasters on livestock and develop surveillance and control strategies using epidemiological information and tools, geographic information systems (GIS) and risk assessment and risk mapping methodology.

b. (b) For identification of resources for rescue and treatment of animals during disasters, States/UTs will take the following measures:

   i. Assess available manpower i.e. Veterinary Doctors, Para veterinarian staff and ancillary staff.

   ii) Review disaster management preparedness of Veterinary medical facilities such as veterinary hospitals, mobile veterinary units, etc.

   iii) Provision of adequate storage of medicine, vaccines, surgical and veterinary appliances, diagnostics, Personal Protective Equipment (PPEs), lifesaving equipment, etc.

   iv) Ensure the logistical requirements such as fuels, lighting equipment, tents, sheds, bedding, trolleys, and material for sanitation, storage of feed and fodder and water.

   v) Arrangements for Ambulance and outreach facility for sick and injured animals.

   vi) Identification of disease diagnostic and control measures for fish diseases.

   vii) Assessment of existing animal handling search and rescue capacity, equipment, infrastructure facilities and related resources available at State and District levels.

1.3.3 Cattle Camps

a. Identification of sites for cattle camps with basic facilities like feed, fodder, water and medicines etc.

b. Promotional herd health care such as nutrition, pregnant animal care, care of new-born and young animal etc.

c. Arrangements for rehabilitation of animals to recover from any trauma or fear.

d. Provision of dry bedding for all the animals including new born.

e. The identified locations should be safe and easy to access by all species of animals.

1.3.4 Pre-Flood Vaccination in Flood Prone Areas:

a. Mass vaccination and deworming of animals for economically important animal diseases prior to monsoon and as per schedule of vaccination against specific diseases.

b. The animals should be identified by proper documentation to avoid duplication after the vaccination programme.

1.3.5 Feed and Fodder Supply

a. DADF will issue detailed advisory to all the States/UTs for taking necessary measures for increasing the availability of fodder based on latest knowledge and technical knowhow in the field of fodder.

b. List of forage grasses, legumes, shrubs and trees for grassland / grazing land improvement on agro-ecological basis which can be grown in different agro-climatic zones of the country prepared by DADF to be shared with States.

c. Regional Fodder Stations located in different agro-climatic zones of the country to provide seeds produced by them to States for growing fodder crops.

d. States to prepare Contingency Plan for adequate supply of fodder and fodder seeds in the affected areas and to monitor fodder prices so that appropriate interventions at the ground level can be made to ensure availability of fodder for livestock.

e. States/UTs should take appropriate measures for safe stocking of the feed and fodder for emergency supply.

1.3.6 Availability of Drinking Water

Ensuring adequate drinking water supply for animals.

1.3.7 Supply of Milk and Milk Products in Disaster Prone Areas

a. State Milk Federations to be advised to hold minimum 10 days inventory in the form of milk powder and white butter to meet out any emergency demand/ shortage.

b. New and alternative milk procurement & supply routes to be developed by

States to provide access for milk and milk products movement during disaster situation.

1.3.8 Fisheries & Aquaculture

a. Protection of inlet and outlet of aquaculture farms and ponds

b. Distress harvesting to mitigate economic losses

c. Preparedness for protection of electrical and mechanical installations in hatcheries and farms

d. Securing brood stock

e. To conserve aquaculture particularly during drought, the following water conservation strategies to be adopted:

   i. Recycling of the effluent water

   ii. Reducing Evapo-transpiration

   iii. Reducing seepage

   iv. Water quality management

   v. Reducing water exchange

f. DADF will assist States/UTs in imparting training to fishers and fish farmers in disaster mitigation measures in collaboration with NDMA, NIDM and other agencies

g. DADF will provide financial assistance to States for conservation and raising awareness about conservation of fisheries resources.

1.3.9 Poultry Management

States/UTs to update information on vulnerable spots/risks related to disasters/ calamities and prepare contingency plan for adequate availability of poultry feed and ingredients.

The following precautions are recommended for the poultry management during disasters:

a) Ensuring adequate water supply for birds. Adding chlorine to water will prohibit the growth of bacteria. This chlorinated water should be stored in large containers, away from sunlight.

b) Farms should be equipped with overhead sprinkler systems, which minimize smoke inhalation, cool the air and reduce the chances of burn injuries.

c) Farms should have enough carriers to evacuate all birds during emergencies.

d) Birds should not be left exposed to smoke and fumes, as they are very sensitive to smoke and fumes and succumb much more quickly than most other animals.

e) Birds should be checked for injury and chemical exposure, and a veterinarian should be consulted if necessary. Any bird showing signs of lethargy, loss of appetite, depression or injury should be examined by a veterinarian.

f) In case birds are moved to a new surroundings, they should not be removed from their cages immediately, as they may be frightened and may fly away. Keeping the birds warm can reduce stress, so if electricity is available, heating should be provided, if not, blankets placed over the cages will have a similar effect.

DAHDF has a dedicated Action Plan for rapid response for prevention, control and containment including surveillance of Avian Influenza (AI) in the country.

1.3.10 Disposal of Carcass

Identification of equipment, logistics, manpower and possible sites for safe disposal of carcass by following zoo sanitary measures.

1.3.11 Capacity Building for Disaster Management

a. Designating State Departments as nodal agency for each specific activity during disasters by the State Governments.

b. Training requirement analysis and Development of training modules for veterinary professionals in collaboration with NDMA and NIDM, NDRF, Veterinary Colleges and NGOs by the State Governments.

c. Training of veterinary personnel, paravets, attendants, SDRF and Civil defence personnel etc. in livestock disaster management.

d. Animal owners to be trained by District Administration, NDRF, SDRF regarding handling of animals during such disasters.

e. Animal Health awareness for animal owners, social workers, volunteers.

f. Conduct of mock exercises on regular basis as per State specific needs based on their DM plan by State Governments.

g. Establishing emergency communication channels, alternate channels like Ham radios.

h. Inclusion of training module on disaster management under the training and

capacity building component of the on-going schemes of the DADF for training of officers, trainers, farmers and cattle owners on mitigation of risk of disaster on livestock and fodder.

i. A module or section on Disaster Management may be incorporated in the relevant trainings of trainers at Central Poultry Development Organization & Training Institute (CPDO&TI), Hessarghatta and also at other CPDOs for disaster time handling by small and marginal farmers as per disaster profile of the region.

1.3.12 Efforts for Community Participation and Mass Mobilisation of Resources in DM

a. 29th October of each year is observed as the disaster mitigation day in fisheries sector. On this particular day, public awareness programme to be organized with participation villagers along with Panchayati Raj Institution (PRI) members to spread awareness about management of fisheries resources during disasters through poster, leaflets, pamphlets etc.

b. States to ensure better and close coordination between various Departments involved in DM and Programme Implementation Agency for different Central and State livestock development schemes in disaster prone areas.

c. Participation of local people and PRI in assessment, design and implementation of State DM Plan.

d. Participation of Veterinary Colleges, NGOs, media, Goshalas, animal welfare organisations and SHGs in disaster management.

e. In case of drought-prone areas the plan for drought preparedness and response should form part of ongoing livestock development schemes with the assumption that periodic droughts will occur during the project cycle.

f. Streamlining/simplification of the procedure for release of assistance in case of emergency.

1.3.13 Animal Population Profile

State-wise Animal population profile and distribution should be prepared and integrate vulnerability map with livestock profile for better disaster management.

1.4 Disaster Response

1.4.1 Effective and Prompt Response

a. The Animal Husbandry Departments at States/UTs will take requisite measures to constitute, train and equip veterinary emergency response units at state and district levels for prompt response to any emergency situation along with SDRF and NDRF. These Veterinary Emergency Response Units maybe trained by NDRF and resource persons from state level veterinary colleges.

b. Community being the first responder, the state level veterinary emergency response units along with SDRF and NDRF will conduct community capacity building and awareness generation programme in the vulnerable areas.

c. Assistance of Civil Defence, NGOs, Veterinary College, SDRF, NDRF, Veterinary Wing of Central Para Military Forces (CPMF) and Remount & Veterinary Corps (RVC) in rescue of livestock.

d. States/UTs will organise cattle shed/shelter for livestock to save them from adverse climatic conditions depending on the nature of disaster like earthquake, cyclone and Tsunami etc,

e. Fluid therapy and treatment of sick/injured animals along with availability of adequate vaccine against prevailing animal diseases and due to impacts of earthquake, flood, tsunami, and drought etc.

1.4.2 Rescue of Animals

f. SDRF, NDRF, Veterinary Wing of CPMFs, RVC and other specialized agencies/ organizations/institutes shall assist State AHDs in livestock rescue and management during different disasters.

g. State AHD will constitute Animal Rescue Teams and provide requisite training to team members.

h. Training of animal owners for rescue of livestock during disaster should be imparted by District Authorities by involving NDRF, SDRF, NGOs and specialized agencies/ organizations in rescue and handling of animals.

i. Arrangements for provision of life saving equipment and rescue of animals, transportation of feed, fodder, medicine and vaccine.

j. Animals to be carefully shifted to suitable safer locations. Poultry birds are

shifted with the help of bamboo cages to temporary pen. The dead birds should be segregated from the live ones.

k. As far as possible the animal camps should be organized near human relief camps so that owners can take care of their animals and manage them better.

1.4.3 Arrangement for Drinking Water for Animals:

a. Ensuring availability of safe and clean drinking water for animals and poultry.

b. Adequate water supply will be ensured by efficient use of available water resources, rehabilitation of existing water resources and transporting of water from outside, if required. Fish farmers to be allowed to draw intake water from the irrigation channel during drought situation

1.4.4 Treatment of injured/sick animals:

a. Arrangement for treatment injured/sick animals and including adlib fluid therapy, preventive vaccination in healthy animals against prevailing disease preventive vaccinations.

b. Shifting of animals from flooded and devastated areas to safer places to save them from diseases.

c. Post-disaster, animals like cattle, buffalo, sheep, goat, pig, dog and poultry need to be de-wormed with suitable broad spectrum anthelmintic to enable animals to regain proper health.

1.4.5 Livestock/Poultry Feed and Fodder Supply

a. During drought, cyclone, flood and hailstorm, State Govts may avail assistance under Feed and Fodder Development, Sub-Mission of National Livestock Mission to augment feed and fodder supply.

b. Eight Regional Fodder Stations located in different agro-climatic zones of the country are producing foundation seeds. Fodder seeds and technical knowhow on fodder will be made available to States by these Stations.

c. Department supports fodder cultivation and post-harvest technologies under the RKVY programme. For mitigation of natural calamities like drought etc Assisted Fodder Development programme has been launched under RKVY, under which financial assistance is provided for growing fodder.

d. To deal with the short term shortage of fodder during Cyclones, sudden floods,

hailstorm and drought, low cost transport arrangements will be coordinated for transportation of fodder from surplus States/Regions to deficit States/ Regions.

e. Department of Animal Husbandry, Dairying & Fisheries will identify fodder surplus states and facilitate agreement between such States and fodder deficit States Seek DAHDF's support for agreement between States for purchase of fodder. Railway Authorities will be roped in for transportation of fodder from surplus to deficit areas.

f. Milk Federations/milk union to be advised to enhance production of cattle feed and fodder blocks to meet the demand of feed and fodder in drought affected areas.

g. Enrichment of straws using urea- molasses treatment to meet protein and energy requirements of animals.

h. States should regulate industrial use of straws so that large quantities of straws are available for feeding animals in drought affected areas. States to establish fodder banks in drought and flood affected areas to meet the demand of farmers in case of emergency.

i. Newer technologies and improved scientific practices for feed and feed fodder preservation for emergency supplies to be adopted. (Refer Annexure-A in the DM Plan).

1.4.6 Maintenance of Sanitation:

a. Disinfection of premises of temporary sheds with bleaching powder, phenol, carbolic acid etc.

b. Carcass/ cadaver should not come in contact with healthy animals.

c. Disinfection and treatment of intake waters and effluent water in aquaculture farms.

1.4.7 Measures Against Epidemics and Diseases During Disaster

a. The most common diseases during drought and flood periods are Foot and Mouth disease, Hemorrhagic septicaemia, Black Quarter, Anthrax, Enterotoxaemia, Coliobacillus, Surra, Trypanosomiasis, Babesiosis, Anaplasmosis, Pox disease, Mastitis, Brucellosis, Ring worm, Ascariasis, Fascioliasis, Microfilariasis, Tick infestation and mange etc. To control and prevent these diseases, following measures are to be adopted

   i. Vaccination: In disaster conditions animals become more susceptible

to diseases due to stress and thus all vaccination schedules should be followed.

ii. Deworming: To check the parasitic infestation regular deworming to be followed.

iii. Disinfection of animal sheds by insecticidal spray: disinfection of animal sheds to be done with the compounds like lime powder, alum, formalin, sodium bicarbonate, Bleaching powder, Copper sulphate, phenol gases like HCN, formaldehyde etc. For control of ticks, flies, mosquitoes, lice etc. various insecticides like methrin, melathion, aldrin, etc. may be used.

b. All infectious aquatic diseases listed In the Prevention and Control of Infectious and Contagious Diseases in Animals Act, 2009 will be actively monitored under National Surveillance Programme for Aquatic Animals Diseases (NSPAAD) and general preventive measures such as liming of ponds, treatment of intake water including chlorination would be adopted.

c. To minimise the losses in aquaculture, the feeding and production strategies would be revised to suit the available conditions.

1.4.8 Supply of Milk and milk products in disaster affected areas:

DADF will coordinate the efforts of States to ensure supply of milk powder, baby food, extra shelf life milk etc. to the affected areas through State Milk Federations and semi-government organisations.

1.5 Post Disaster Plan

1.5.1 Disease Surveillance:

a. Visit of Disease Surveillance Team to disaster affected areas to make active surveillance about any disease occurrence in livestock and aquatic animals.

b. Collection of sample, testing and confirmation of samples and taking necessary steps for preventing spread of infection.

c. States to compile epidemiological and statistical information collected before, during and after disaster and to take preventive actions to monitor preparedness constantly.

d. Intensified surveillance of aquatic animal diseases in the disaster affected areas under National Surveillance Programme for Aquatic Animal Diseases

(NSPAAD)

1.5.2 Disposal of Carcass:

Arrangement for safe disposal of carcass by following zoo sanitary measures and to be made by respective State AH Departments. State AHD will constitute Animal Carcass Retrieval Teams and provide requisite training to team members. Detailed procedure for Disposal of Dead Poultry Birds is at Annexure-B of the DM Plan.

1.5.3 Animal Waste Disposal:

Improper disposal can enhance pest or vector problems. Preparation of compost or digging the manure pit be considered for disposal of animal waste. During prolonged stagnation of flood water, duck rearing and fish farming can be considered as the means of pest control. Small manure gas (or gobar gas) units can also be set up.

1.5.4 Restoration of fisheries infrastructure and resources

a. Reconstruction/renovation of fish ponds and hatcheries
b. Supply of brood stock, seed, fingerlings and feed
c. Providing of boats, nets and fishing equipment

1.5.5 Restocking/ repopulation of Livestock/ Animals

a. Induction of high genetic merit animals
b. Sourcing from: i) Other States, ii) Bull mother farms iii) Central Cattle Breeding Farms
c. Induction of bulls for natural service
    i. Indigenous
    ii. Crossbred
    iii. High Genetic Merit
d. Organizing fertility camps in disaster affected areas to overcome reproductive inefficiency in milch animals so that the calving is not delayed
e. Induction of small ruminants- sheep, goat and pigs
f. Induction of ram, buck and bran for natural service
g. Repopulation of backyard poultry sourcing from Central Poultry Development

Organization and State Poultry Farms.

1.5.6 Extension of Artificial Insemination Services

a. Establishment of MAITRIS

b. Training and retraining of AI workers

c. Provision of AI facilities in veterinary dispensaries without AI facilities

1.5.7 Estrus synchronization of existing bovine population

Assistance to States for conservation and development of their specific indigenous bovine breeds: States/UTs can avail assistance under following programmes/schemes of DADF to conserve and develop their specific indigenous bovine breeds:

a. Existing National Programme for Bovine Breeding & Dairy Development (NPBBDD) for genetic upgradation of bovine population project has a focus on development and conservation of indigenous breeds which are more resistant to environmental fluctuations.

b. "Rashtriya Gokul Mission" an initiative under National Programme for Bovine Breeding and Dairy Development has been launched with the aim to conserve and develop indigenous bovine breeds.

c. National Kamdhenu Breeding Centres are being set up one each in Andhra Pradesh and Madhya Pradesh which will serve as gene banks and repositories of indigenous breeds.

1.5.8 Assistance for Renovation and Maintenance of Milk Processing Plants:

a. States/State Milk Federation may avail financial assistance for establishment/ modification/strengthening of dairy plants, chilling centres marketing infrastructure, organization of new dairy cooperative under National Programme for Bovine Breeding and Dairy Development Scheme of DADF.

b. Dairy Entrepreneurship Development Scheme through which cattle induction can be taken up in the disaster affected areas.

1.6 Role of Veterinarians

Although the role of veterinarian is very broad and required to intervene in the entire disaster management cycle. This section specifically mentions the areas that could be given special focus during undertaking any disaster response interventions.

There are different ways that veterinarians can be integrated into disaster and emergency response. Animal well-being, zoonotic prevention and economic viability is promoted through veterinary involvement as well as increasing personal disaster preparedness among animal owners. The two most important areas for veterinarians to intervene in disaster management related activities are Animal Care and Community Care,

a. Animal Care: Veterinary Care (Vaccination, Treatment, Mobile Clinic, Static Clinic, etc.); Evacuation of Animals (Animal Handling, Transportation, etc.); Search & Rescue of Animals; Feed and Water Supply; Shelter and Settlements

b. Community Care: Disease Prevention (Biosecurity Measures, etc.); Economic Viability and Livelihood Security; Capacity Building and Awareness Generation; Psycho Social Support

In order to undertake veterinary emergency response operations, the following 8 steps are very important.

a. Disaster Monitoring
b. Remote Assessment
c. Disaster Assessment & Needs Analysis (DANA)
d. Disaster Assessment & Response Team (DART)
e. Rapid Repose & Relief Operations/Short term Response (STR)
f. Disaster Risk Reduction/Long Term Response (LTR)
g. Monitoring & Evaluation (M&E)
h. Post Intervention Report (PIR)

These steps guide the veterinarians to remain organized and focused in professionally addressing the needs of animals in disasters.

1.6.1 **Disaster Monitoring:** The first step is to regularly observe the local area for any disaster situations which may occur over time using different disaster monitoring tools/ websites as given below is there are any disaster declaration, emergency appeals, GLIDE Number, impact on animals, etc.

India Meteorological Department:

http://www.imd.gov.in/Welcome%20To%20IMD/Welcome.php

Indian National Centre for Ocean Information Services: http://www.incois.gov.in/portal/index.jsp

Geological Survey of India:

https://www.gsi.gov.in/webcenter/portal/OCBIS?_afrLoop=9766978346482872&_adf.ctrl-state=155biep53y_1#!%40%40%3F_afrLoop%3D9766978346482872%26_adf.ctrl-state%3D155biep53y_5

Central Water Commission: http://cwc.gov.in/

Global Disaster Alert and Coordination System: http://www.gdacs.org/

GLIDE Number: http://www.glidenumber.net/glide/public/search/search.jsp

Pacific Disaster Center: http://www.pdc.org/

1.6.2 Remote Assessment: This step is important to record and compile information from secondary sources before carrying out the actual assessment. The Government, humanitarian and media reports could be referred to compile information regarding the impact. Base on the understanding the role of Government, NGO and other humanitarian actors the missing information is identified. In most cases information related to animals are not highlighted which would require an actual on ground assessment after considering the potential areas, logistic requirements and feasibility to undertake an assessment.

1.6.3 Disaster Assessment & Needs Analysis (DANA): This is the process of recording and compiling first hand information from various stakeholders in the disaster affected areas to analyze the nature of disaster, its impact and to identify the needs for any interventions if required. In order to conduct assessment the assessment checklist, participatory tools and other resources provided in the annexes could be referred to collect the required information. Ideally this should be completed within 4-5 days. Different types of assessments can be carried out depending on the need and period of emergency as given below.

- ✓ Rapid Assessment *(Days/Week)*
- ✓ Joint Rapid Assessment *(Days/Week)*
- ✓ In-Depth Assessment *(First Month)*
- ✓ Continual Assessment *(Monitor Operations)*
- ✓ Impact Assessment *(End of Operations)*

1.6.4 Disaster Assessment & Response Team (DART): Once the assessment is completed

or during the assessment itself identify and formulate a multi disciplinary team (representation of different stakeholders) to avoid bias. The identified veterinary emergency response operations are discussed within the team for better coordination and for planning all the required logistic arrangements.

1.6.4.1 Before Deployment: The key to packing for any disaster response is the "go bag". The basic concept is that you have a pre-packed bag which includes essentials you would need for a disaster response.

- Personal Protective Equipment
- Personal Medical Equipment
- Emergency Veterinary First Aid Kit
- Headlamp, Extra Batteries, Etc.
- Toiletries, Sunscreen, Etc.

Items to be taken along should be based on the place you would be deployed, climate in the area, degree of independence from others you will experience, etc.

Personal Care

- Check if you need to take any vaccination
- Ensure you have taken all your medicines
- All documents required while travelling

Team Management

- Communication equipment with team's contact details
- Security & Risk Management Plan (Visiting Area)
- MEDEVAC Plan (Emergency Medical Services)
- Evacuation Plan (Options for Emergency Evacuation)

Operations Management

- Team briefing about the deployment plan and exit strategy
- Deployment Plan (Situation, Contacts, Team, Schedule, Budget)
- Plan TFA (Travel, Food and Accommodation)
- Communication and Coordination with Local Stakeholders

1.6.5 Rapid Repose & Relief Operations/Short term Response (STR): The objective of the STR is to provide rapid assistance and protect the livestock assets that are affected from disasters. This include all actions and activities (emergency feeding, veterinary treatment, temporary shelter, etc.) identified to facilitate animals and their communities to recover faster and return to normalcy.

1.6.5.1 During Deployment:

Personal Care

- Language, food habits, dressing, culture
- Use Personal Protective Equipment (PPE) whenever required
- If possible try to stay connected with your family, friends and loved ones

Team Management

- Respect local practices, culture and norms
- Always take a secular and socially acceptable stand
- Engage in team building activities to remain relaxed and focused

Operations Management

- Follow the planned schedule of activities
- Keep the organization informed on a daily basis
- Communicate SITREPs (Situation Reports) periodically

1.6.6 Disaster Risk Reduction/Long Term Response (LTR): The objective of the LTR is to protect and rebuild the livestock assets from disasters. This is planned and implemented keeping in mind that the interventions will help communities to cope to future disaster events and break the disaster cycle from re occurrence. This includes activities such as disaster proof animal shelter constructions, awareness programmes, training and capacity building activities, developing disaster management plans, etc.

1.6.7 **Monitoring & Evaluation (M&E):** The objective of the M&E is to assess the intervention's impact on animal and the people who are dependent on the animals for their livelihood. This will provide opportunities for the team to monitor and assess the impact of the intervention.

On-Site Management:

- Sites should always be left undamaged
- All waste should be disposed of appropriately
- Operational signage removed and replaced with information notices
- Loan items prepared for return shipment
- Equipment cleaned and packaged
- Update of asset register

1.6.7.1 After Deployment:

Personal Care

- Take some days off work and have sufficient rest to recover from work stress
- Provide sufficient time for transitioning back to regular day-to-day routines

Team Management

- Share experiences and incorporate the lessons learnt for next deployment
- Acknowledge the support of teammates and identify gaps for improvement (SWOT)

Operations Management

- Implement exit strategy, prepare DANA, PIR, M&E, other relevant reports and share with stakeholders
- Provide information, technical support and referral services to stakeholders

1.6.8 Post Intervention Report (PIR): Finally at the end of the response operation, the final report is prepared to explain about the intervention and its impact created on the animals. It is to also document the lessons learnt and future recommendations for effective response operations.

1.7 Data Collection & Management:

Data: A set of values of qualitative or quantitative variables.

Data is raw material for data processing, data relates to fact, event and transactions. Data refers to unprocessed information. Information is data that has been processed in such a way as to be meaningful to the person who receives it. Information is that which informs, i.e. provides an answer to a question. Data is collected and analyzed to create information suitable for making decisions, while knowledge is derived from extensive amounts of experience dealing with information on a subject.

Types of Data:

- **Primary Data:** The data where we are in direct contact with the informants. Eg. Interviews, Surveys, Direct Observation, Etc.
- **Secondary Data:** The data which were collected by others. Eg. Government Reports, Media, Satellite Images, Etc.

Classification of Data:

Time	Time Line, Seasonality Calendar, Etc.
Space	Mapping, Modeling, Etc.
Preferences	Problem Matrix, Ranking, Needs Analysis, Etc.
Relationships	Venn Diagram, Flow Diagram, Etc.
Boundary	Transect Walk, Etc.

Importance of Data – Decision Making: Wise decision making is based on evidence and data is the backbone of evidence.

Uses of Data in Disaster Management:

- **Disaster Monitoring:** Data from debriefs Eg. Food Delivery, Treatments, Rescues, Etc.
- **Assessment and Planning:** Remote Assessment, DANA, STR, LTR, Etc.
- **Reports:** PIR, Reporting to Funding Bodies, Media Interviews, Etc.
- **Evaluation of the Intervention:** Impact of the Intervention on Animals and People (Eg. Feed Delivered x Tonnes of Food, Assisted x Villages; Vaccinated x Animals Against x Diseases; Treated x Animals in x Areas)

Planning Data Collection: Use the 1 "H" (How) and 5 "W" (What, When, Where, Why & When)

Checklist for Data Collection:

- Who will use the information and how?
- What answers/information should the data supply?
- What data is already available and can it be used to supply the required information?
- What are the crucial data requirements based on the above?
- How can this data be obtained?
- How can the data be obtained within the present budget?

Sources for Data Collection:

- ✓ Affected Communities
- ✓ Local or National Government Authorities
- ✓ UN Organization
- ✓ Red Cross & Red Crescent Movement
- ✓ NGOs and International Organizations
- ✓ International (Bilateral) Response Team
- ✓ Scientific Organizations
- ✓ Media
- ✓ Internet

Types of Data Collection:

Quantitative Data Collection:

- ✓ Census
- ✓ Sample Survey
- ✓ Administrative Data
- ✓ Tracer Studies
- ✓ Participatory Appraisals

Qualitative Data Collection:

- ✓ Questionnaires
- ✓ Interviews
- ✓ Focus Group
- ✓ Observation
- ✓ Participatory Appraisals

Surveys: "A structured representative sample of a population capturing information for a moment in time or trends".

- Good if quantitative data is required Eg. disease prevalence
- Can generate good standardized data sets
- Needs careful design of sampling to produce good data
- Limited capacity to capture qualitative information as closed questions are normally used
- Efficient information capture
- Training requirements for staff that carry out survey limited, but high for planners

Interviews:

- ✓ It broadly explores views
- ✓ If done correctly may be perceived as less invasive than other techniques
- ✓ Difficult to analyse
- ✓ Flexible
- ✓ Can be time consuming
- ✓ Need good communicating skills to get information that is not easily volunteered
- ✓ Interviewer may miss areas that may be useful to be probed or explored more

Types of Interviews: Informal interviews, Semi-structured interviews, Community interviews and Focus Group Discussions/ Interviews

Informal Interviews:

- ✓ Broadly explore people's views
- ✓ Less invasive than other techniques
- ✓ Difficult to analyse data
- ✓ Flexible
- ✓ Time-consuming
- ✓ Need good communication skills
- ✓ May miss some information

Semi Structured Interviews:

- ✓ Interview guide for topics but questions left to interviewer
- ✓ Open-ended questions, additional questions can be asked
- ✓ Still difficult to analyse data

- ✓ Flexible, allow for interviewer discretion
- ✓ Time-consuming
- ✓ Need good communication skills
- ✓ May miss some information

Community Interviews:

- ✓ Requires good planning
- ✓ Held at time when most of community can attend, may need more interviews
- ✓ Needs structured interview guide to keep discussion flowing smoothly
- ✓ Communities must be representative
- ✓ Language should be kept simple, team of interviewers better
- ✓ Need to avoid controversial questions (political, culturally sensitive)
- ✓ Need good communication skills
- ✓ May miss some information, aggregate data collection

Focus Group Discussions (FGD):

- ✓ Small group of people chosen for the contribution they can make (6-10 people), meeting held in privacy, all ideas welcome
- ✓ Allows assessment of interactions in the group, need to be aware of group dynamics
- ✓ Can collect large amounts of data in a short time
- ✓ Free discussion, requires checklist of issues, keep sections to time
- ✓ Can explore culturally sensitive issues
- ✓ Need good communication skills
- ✓ Information needs to be cross checked

Participatory Appraisals:

- A family of tools
- Information is shared in a group setting and discussed to produce some consensus – community control
- Facilitation, with the focus on enabling participants to raise questions and provide answers for themselves

- Many tools make extensive use of visual aids such as pictures, diagrams and maps, therefore accessible to illiterate participants

Examples: Social Mapping, Seasonality Calendar, Venn Diagram, Problem Matrix, Etc.

Observation: Visual Inspection for Sector Specific Assessments, Carried out by specialists on defined sectors e.g. water supply, building safety.

- If possible, fly over the area for aerial view
- Inspection by vehicle, boat, etc.
- Requires experience and knowledge
- Supplemented with more in-depth information later

Sampling: The process of selecting units from a population of interest so that by studying the sample we may fairly generalize our results back to the population from which they were chosen. Sampling methods are classified as either probability or nonprobability. The main purpose of sampling is to ensure that the data is representative.

Simple Random Sampling: Each eligible subject has the same probability of being selected for inclusion in your sample.

Stratified Random Sampling: Divide your sample into subpopulations called "strata" and then use simple random sampling within each stratum.

Cluster Sampling: Uses natural units first like herds, households etc. Then samples units from those, either all, or a randomly selected subsample.

Data Management: Comprises all the disciplines related to managing data as a valuable resource. It is the development and execution of policies, practices and procedures in order to manage the information lifecycle needs of an organization in an effective manner. Data management is the process of controlling the information generated during a project. A practice that focuses on ensuring that only approved roles are able to create, read, update, or delete data.

1.8 Staff & Team Safety in Disasters

Hazards in Disaster Environment:

- **Health Risks:** Staff risky behavior can easily result in catastrophic consequences for the individual staff member and negatively affect others. Some of the health risks while on mission are as follows,

- ✓ Cumulative Stress
- ✓ Malaria
- ✓ Food and Water-Borne Diseases
- ✓ Insect and Vector-Borne Diseases
- ✓ Exacerbation of Chronic Diseases
- ✓ Accidents
- ✓ Injuries
- ✓ Risky Behavior

- **Collapsed Structures:** Highly dangerous, do not go in until classified as safe by specialist. If required to go in, use PPE (steel cap boots, hard hat, whistle, radio, torch, water bottle, high visibility clothing, glasses, sturdy gloves). Command must take strong control of the incident to prevent the situation from quickly deteriorating into a chaotic event.
- **Water Environment:** Be aware of depths, flows, tides, rips, swift water etc., coastal and tidal water, underwater hazards. Wear protective equipment, use waterproof communication equipment. Beware of Snakes and crocodiles.
- **Water Environment – Boats:** Do not trail hands in water, Spot debris, sandbars and reefs, do not enter/exit while engine is running, flotation devices – lifejackets and secure loads on boat.
- **Stress:** Many Circumstances and Images May Lead to Stress. Some signs of stress are as follows,
  - ✓ GIT, cardiovascular signs
  - ✓ Anger
  - ✓ Sleep issues
  - ✓ Concentration changes
  - ✓ Hot flushing
  - ✓ Detachment
  - ✓ Appetite changes
  - ✓ Withdrawal
  - ✓ Frustration
  - ✓ Nightmares

Vaccination for the Team Members:

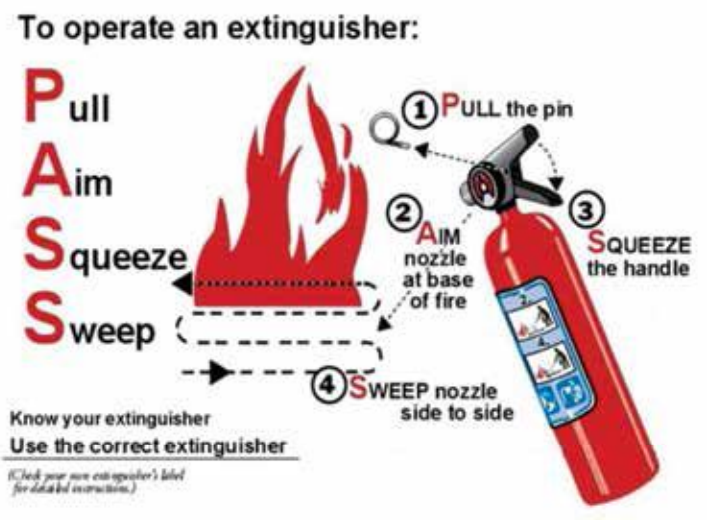
- ✓ Hepatitis A
- ✓ Hepatitis B
- ✓ Japanese Encephalitis
- ✓ Cholera
- ✓ Rabies
- ✓ Tetanus
- ✓ Yellow Fever
- ✓ Polio
- ✓ Typhoid
- ✓ Meningococcal (Meningitis)
- ✓ Diphtheria
- ✓ Whooping Cough
- ✓ Haemophilus Influenza
- ✓ Influenza, etc

Earthquake Safety:

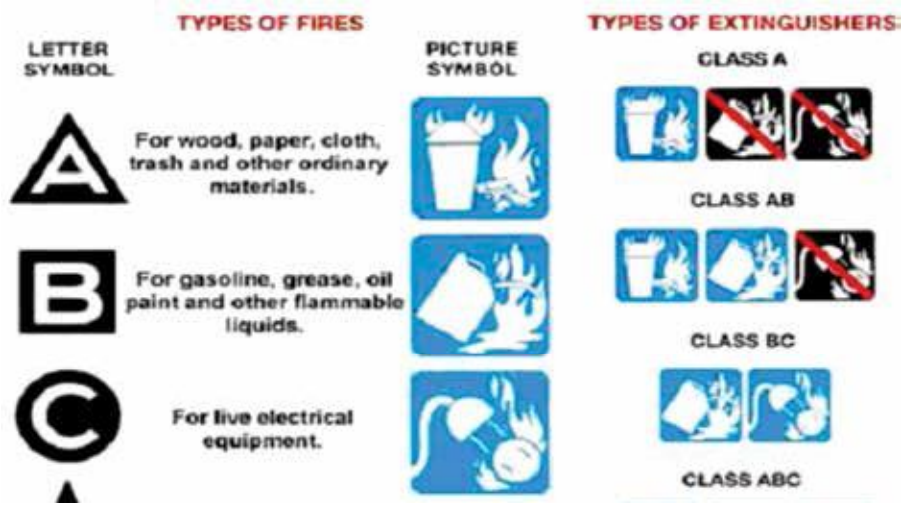
- DROP down onto your hands and knees. This position protects you from falling but allows you to still move if necessary.
- COVER your head and neck under a sturdy table or desk. If there is no shelter nearby, only then should you get down near an interior wall, and cover your head and neck with your arms and hands.
- HOLD ON to your shelter until the shaking stops. Be prepared to move with your shelter if the shaking shifts it around.

Fire Safety: If you or someone near you is on fire, remember – STOP, DROP, and R


AIR
HEAT
FUEL


To operate an extinguisher:
Pull
Aim
Squeeze
Sweep
1 PULL the pin
2 AIM nozzle at base of fire
3 SQUEEZE the handle
4 SWEEP nozzle side to side
Know your extinguisher
Use the correct extinguisher
(Check your own extinguisher's label for detailed instructions.)


1. STOP
Stop where you are
2. DROP
Drop To The Ground
3. ROLL
Cover your face with hands, and roll over and over until the fire is out



Colour	Type
	Water
	Foam
	Dry Powder
	Carbon Dioxide (Co2)
	Blanket

1.9 DRR & Preparedness Planning

Disaster Risk Reduction (DRR) describes measures to curb disaster losses, through minimising hazard, reducing exposure and susceptibility by enhancing coping and adaptive capacity.

Why DRR is Important?

Future loss of animals can be prevented or decreased.

More cost effective, every 1 dollar invested in risk reduction is equivalent to 4-8 US dollars in relief (ISDR).

More sustainable.

The intensity and number of many natural disasters is likely to increase with climate change so preparation will be crucial.

Chapter 2:

Feed & Water Supply

2.1 Types of Feed

Cropping Seasons of India:

The agricultural crop year in India is from July to June. The Indian cropping season is classified into two main seasons (Kharif and Rabi based on monsoon). The terms 'kharif' and 'rabi' originate from Arabic language where Kharif means autumn and Rabi means spring.

1. Kharif Crops: July to October (During South-West Monsoon)

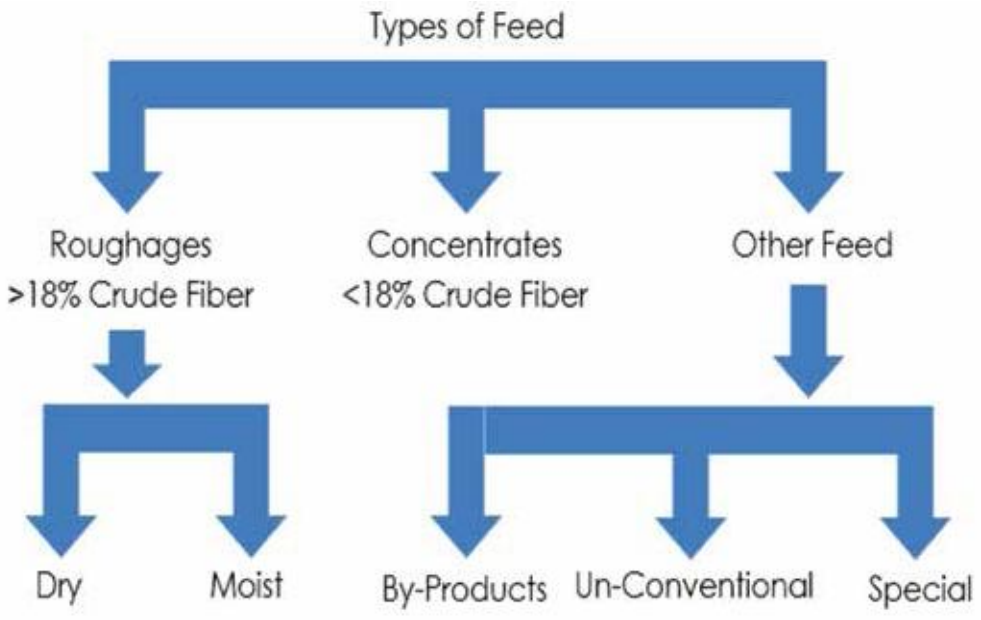
Rice, Maize, Sorghum, Pearl Millet/Bajra, Finger Millet/Ragi (Cereals), Arhar (Pulses), Soyabean, Groundnut (Oil Seeds), Cotton Seeds, Etc.

2. Rabi Crops: October to March (During Winter)

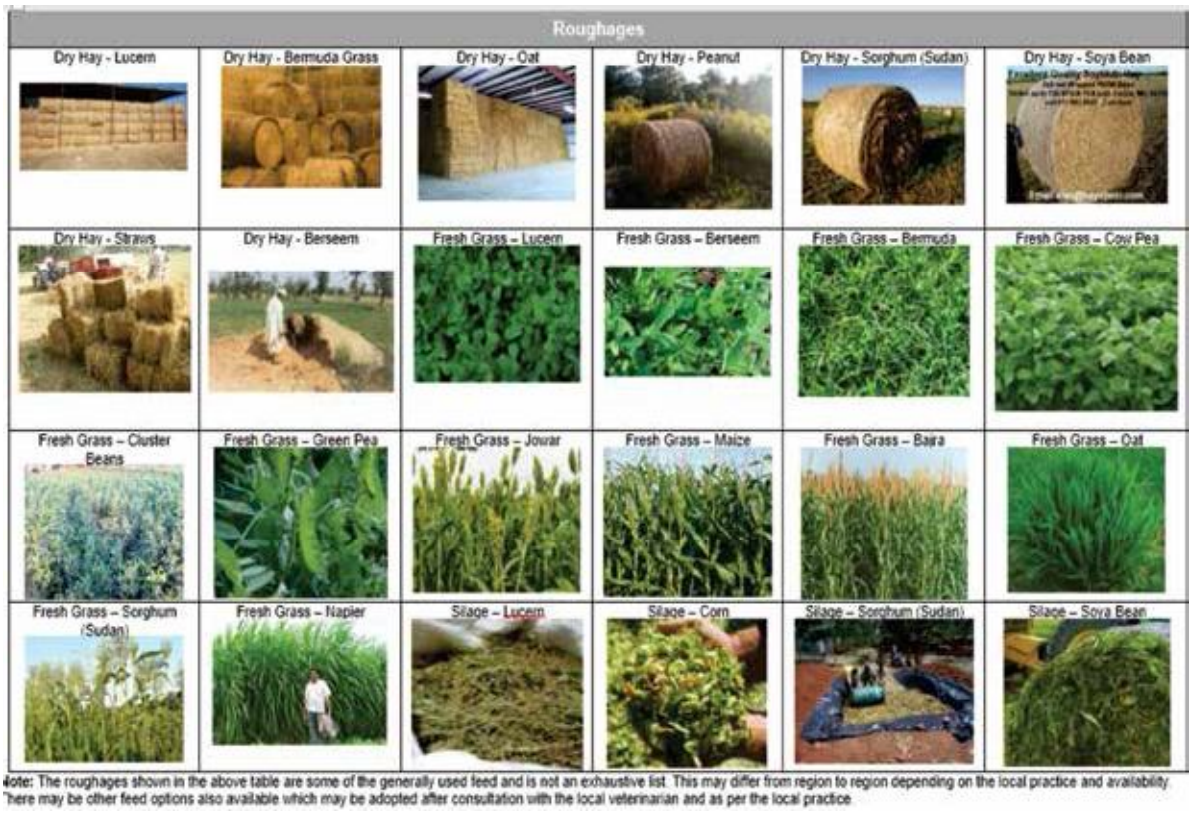
Wheat, Barley, Oats (Cereals), Chickenpea/Gram (Pulses), Linseed, Mustard (Oil Seeds), Etc.

3. Summer Crops: March to June

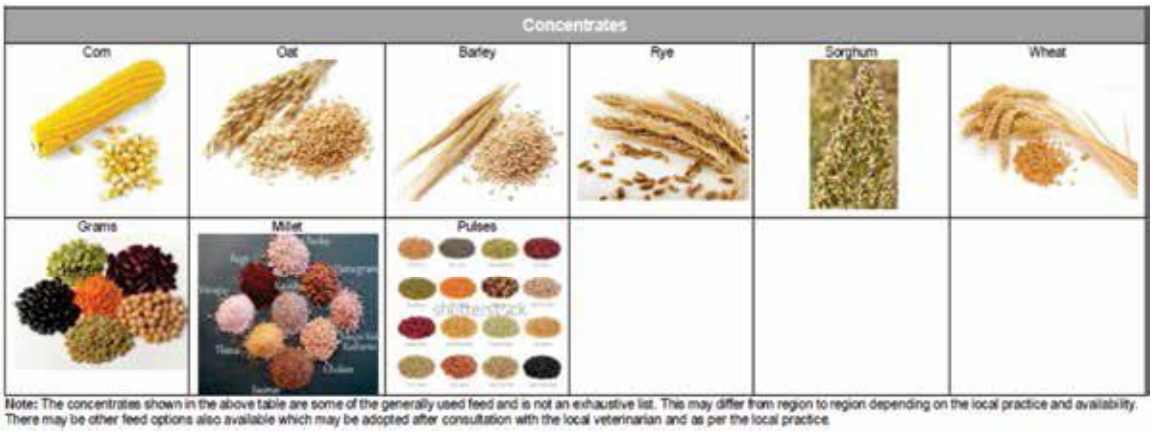
Classification of Feed:



Roughages: Feeds with a low density of nutrients, with crude fiber content over 18% of dry matter, including most fresh and dried forages and fodders.



Concentrates: Feeds that contain a high density of nutrients, usually low in crude fibre content (less than 18% of Dry Matter) and high in total digestible nutrients. The concentrates for animals could be provided in the form of grains.

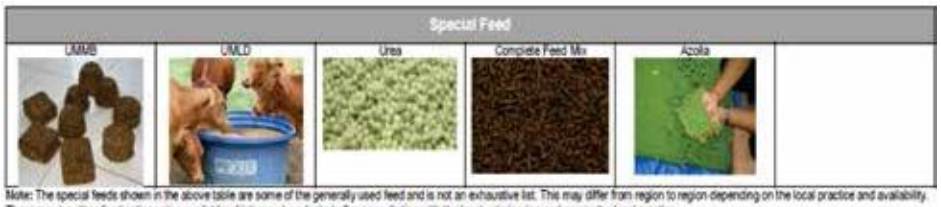


By-Products: A secondary product derived from a manufacturing process or chemical reaction. It is not the primary product or service being produced. A press cake or oil cake are the solids remaining after extracting oil are most commonly used as animal feed.

Un-Conventional Feed: These feed are not a traditional or usual feeding practice, these could be provided in extreme feed scarcity with an objective to save lives of animals and survive in emergencies.

Note: The un-conventional feeds shown in the above table are some of the generally used feed and is not an exhaustive list. This may differ from region to region depending on the local practice and availability. There may be other feed options also available which may be adopted after consultation with the local veterinarian and as per the local practice.

Special Feed: Convenient in transporting, stocking and distributing in the disaster affected areas and help in saving lives of animals in emergencies.



Note: The special feeds shown in the above table are some of the generally used feed and is not an exhaustive list. This may differ from region to region depending on the local practice and availability. There may be other feed options also available which may be adopted after consultation with the local veterinarian and as per the local practice.

Maintenance Ration: The ration which allows the animal to stay alive during extreme conditions (ie., support life with no product, no gain, no loss of body substance). This is very important for maintaining stock especially during acute shortage of feed.

Maintenance Ration: 2-2.5 Kg Concentrate for 100 kg body weight (2/3rd Roughages and 1/3rd Concentrates)

Production Ration: The amount of feed mixture which is given to a growing, working or producing animal over and above its maintenance need is known as production ration.

Production Ration: 1 Kg Concentrate/2.5 Kg Milk in addition to the Maintenance Ration i.e., 2-2.5 Kg Concentrate for 100 kg body weight (2/3rd Roughages and 1/3rd Concentrates)

Feeding Strategies During Disaster

In the calamities, there are acute shortage of feed, fodder and drinking water for livestock. Transportation of feed and fodder for animals becomes more difficult to the affected areas. However, this has to be done on top priority for saving of animals' life. The feeding strategies can be developed with the following objectives:

- ✓ To feed animals for maintenance that ensures survival of animals.
- ✓ To feed productive stock, such as pregnant and lactating cows preferentially.

In such conditions, livestock are to be fed with the locally available industrial waste, different tree leaves or improving the coarse roughage which will be able to support the life of the animals. It is useful to produce complete feed for use during calamities. Biologically the use of complete feeds with an appropriate balance of roughage and concentrates may lead to better utilization of locally available crop residues agricultural by-products and waste. The transport of complete feed is easy and low in cost. Animals maintained on malnutrition condition for prolonged period are supposed to suffer from different diseases and immunity of animals goes down. So immediately, when during Disaster the scarcity period is over, animals should be adequately fed taking care of supplementation of different minerals and vitamins. Uromol, urea-molasses bagasse or ureamolasses diet should be

preferably offered to animals on the same day to avoid fermentation and infections through flies.

Feeding Strategies During Scarcity Period: Livestock producers generally have three main options for meeting the nutrient requirements of animals during drought or fodder scarcity periods. The first is to provide supplemental feed to ensure that the animals have adequate energy, protein, vitamins, and minerals. The second is to reduce the nutrient requirements of the animal to a point where the requirements can be met with available feed. Reductions in stocking rate.

Providing Supplemental Feeds During Droughts

- **Energy:** During drought conditions, energy may be the most limiting nutrient for grazing animals. Several options are available for supplying energy to animals on drought stressed pasture. Hay, grain, and crop processing byproducts such as molasses can be used to supply energy. Low quality forages can be processed suitably increase their digestibility and protein content.
- **Protein:** Pastures under drought conditions may be deficient in protein. If these conditions occur during the breeding season, reductions in pregnancy rate can occur. This can be corrected by providing supplemental crude protein in the form of soybean meal, sunflower meal, safflower meal, ground nut oil cake or NPN sources.
- **Minerals:** The same salt and mineral mixture should be provided during drought as during normal conditions. However, during drought phosphorus supplementation is even more critical. A mixture of 50 percent trace mineralized salt and 50 percent dicalcium phosphate supplied free choice to the herd will meet the phosphorus requirement. The salt mixture should be placed close to stock watering locations.
- **Vitamin A:** Lack of vitamin A may become a problem when animals are grazed on drought affected pastures during the summer. Vitamin A is lacking in forages growing under drought conditions. Animals should receive vitamin A and D supplements. Available crop residues such as straws, stovers, and other by-products of crop production can be used for stretching tight feed supplies during drought conditions. Top feed resources such as tree leaves, pods, bark etc play an important role during drought conditions.

Reducing Nutrient Requirements of the Herd: Lactation represents the greatest nutrient demand for animals during a production cycle. Lactation increases demand for energy, protein, and other nutrients. One of the simplest ways to reduce nutrient requirements is to wean the young ones. This practice can cut nutrient requirements by one-third to one-half depending on milk production of the animal. Early weaned animals can achieve adequate rates of growth if given access to a high quality ration. Dry animals will eat less than lactating animal's further reducing demand on

feed. By removing the nutrient requirements for lactation, growth and reproduction will receive a greater proportion of the nutrients available.

Dry Lot Feeding: If pasture conditions are extremely poor, producers may consider feeding animals in dry lot. This may be more cost effective than supplementation.

2.2 Thumb Rule for Feeding Animals

Cattle should consume a minimum of 1-2% of their body weight per day of roughage. In general, grass or grass hay is best. Alternatives to grass hay are legume hay or pelleted or cubed roughage.

Cattle

- ✓ A 350 Kg Dry Cow needs 5 Kg Dry Matter (Eg., Hay) Per Day
- ✓ "A Calf Needs Half"

Goat

- ✓ A 30 Kg Dry Goat needs 1 Kg Dry Matter Per Day
- ✓ Late Pregnancy or Early Lactation: Double It!

Ruminants Will Need PEF:

1. Protein
2. Energy
3. Fiber

Protein and Energy: Important for mid to long term, especially in growing stock. Protein meals (Eg. Cottonseed) are safer and better than additives (Eg. Urea). Block licks are **NOT** appropriate.

Fiber: Minimum 30% of total intake, fresh pasture may be very low (5%), low fiber can result in illness. **Low fiber + excess concentrates can result in death within hours.**

Supplements:

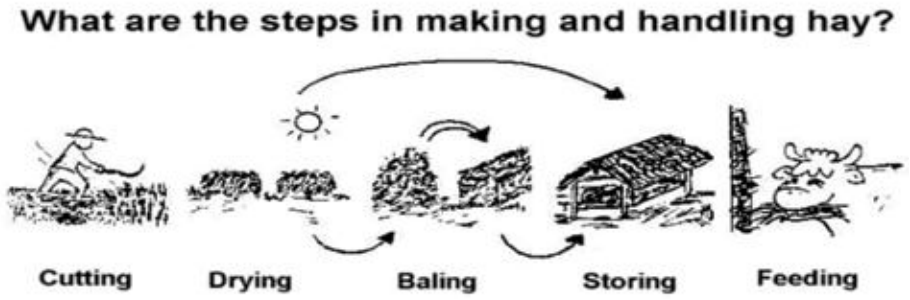
- ✓ High Grain Diets – Add Calcium (Eg. Lime, approximately 1.5%) and Salt.
- ✓ Maintain Fiber, Minimum 30% and make Changes SLOWLY!!

Administering Nutrients:

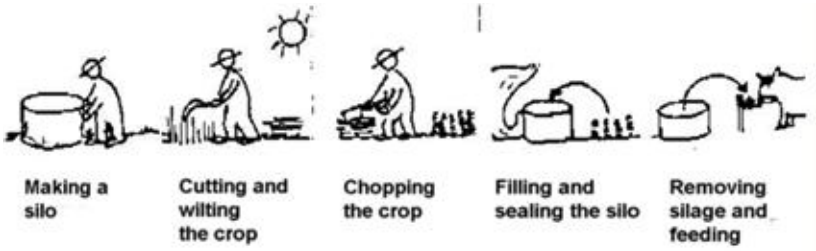
1. Oral (PO = Per OS)
2. Intra Gastric (IG)
3. Intra Venous (IV)

2.3 Feeding Strategies

1. Hay Making: Hay is grass, legumes or other herbaceous plants that have been cut, dried, and stored for use as animal fodder. Hay can be fed for grazing livestock such as cattle, horses, goats, and sheep. Hay is also fed to pets such as rabbits and guinea Pigs. Pigs may be fed hay, but they do not digest effectively as in case of herbivorous.



2. Silage Making: Silage is grass or other green fodder compacted and stored in airtight conditions, typically in a silo, without first being dried, and used as animal feed in the winter or in any extreme conditions.



3. Urea Molasses Mineral Block (UMMB): UMMB supplement has beneficial effects in improving the efficiency of livestock production. It has been proven that the block is a handy supplement that can be immediately given to animals in the event of calamities where availability of feeds and grasses for animals are affected.

Ingredients	Parts/100 kg Mixture
Molasses	36.0
Rice bran	38.0
Urea	10.0
Cement	8.0
Salt	1.9
Dicalcium phosphate	2.0
Trace minerals	0.1
Water	4.0
Total	100.0

4. Urea Molasses Liquid Diet (UMLD):

- Urea is completely dissolved in water
- Molasses is taken in a wooden container
- Urea solution is poured with simultaneous mixing into the container containing molasses
- Salt and mineral mixture are sprinkled over the molasses and mixed thoroughly to ensure uniform mixing.
- During winter heating of this liquid is required prior to feeding

Ingredients	Parts
Urea	2.5
Water	2.5
Mineral mixture	2
Salt	1
Sugarcane molasses	92
Vitamin a and D 3	25 g / 100 Kg feed

5. Complete Feed Blocks

- Roughages chaffed blended with concentrates, binding agent added and made as blocks.
- Easy for transporting and storing the blocks in the feed banks.

Feed Requirements for Cows

Animals Type	Status of Animal	Water Per Day*	Feed Per Day
Dairy Cows	Production	7-9 gallon	20 lb hay
	Dry cows	7-9 gallon	20 lb
	Heifer	3-6 gallon	8-12 lb hay
	Cow with Calf	8-9 gallon	12-18 lb legume hay
	Calf (400 lb)	4-6 gallon	8-12 lb legume hay

**Higher amount of water supply for summer months.*

Feed Requirements for Swines & Sheep

Animals Type	Status of Animal	Water Per Day*	Feed Per Day
Swine	Brood sow with litter	4 gall	8 lb grain
	Brood sow (pregnant)	3 gall	2 lb grain
	Gilt or boar	1 gallon	3 lb grain
Sheep	Ewe with lamb	1 gallon	5 lb hay
	Ewe (dry)	3 qt	3 lb hay
	Weanling lamb	2 qt	3lb hay

**Higher amount of water supply for summer months.*

Feed Requirements for Poultry, Horses, Cats & Dogs

Animals Type	Status of Animal	Water Per Day*	Feed Per Day
Poultry al	Layers	5 gallon / 100 birds	17 lb / 100 birds
	Broilers	5 gal / 100 birds	10 lb/100 birds
	Turkeys	12 gal / 100 birds	40 lb / 100 birds
Horses	All breeds	5-12 gal / 1000 lb	20 lb hay / 1000 lb
Cats & dog	All breeds	1 qt / animal	Ad libitum dry food

**Higher amount of water supply for summer months.*

Feeding Requirement for animals in disaster management

Animals			Feed/day
Dairy cows & buffaloes			
In production	2.50 -4.00 kg concentrate	20 kg green fodder (if available)	5-7 kg dry fodder
Dry	1.50 -2.50 kg concentrate	18 kg green fodder (if available)	4-6 kg dry fodder
Heifers	1.0 -2.00 kg concentrate	14 kg green fodder (if available)	3-5 kg dry fodder
Pregnant	2.00 - 3.00 kg concentrate	18 kg green fodder (if available)	4-6 kg dry fodder
Calf (one year)	1.0- 1.50 kg calf concentrate	5-7 kg green fodder (if available)	1-2.5 kg dry fodder
Swine			
Brood sow with litter	2.5 – 4.00 Kg swine feed (or)		3-4 kg grain feed
Brood sow (pregnant)	1.5 – 2.00 Kg swine feed (or)		1-2 kg grain feed
60-70 kg gilt or boar	2.00 – 3.00 Kg swine feed (or)		2-3.5 kg grain feed
Sheep			
Ewe with lamb	250-400 g concentrate	+ grazing if possible	1.00-2.3 kg dry fodder
Ewe, dry	250-400 g concentrate	+ grazing if possible	1.00-2.3 kg dry fodder
Weaning lamb	100-150 g concentrate	+ grazing if possible	0.500-1.00-2.3 kg dry fodder
Poultry			
Layers	8 kg /100 birds		
Boilers	5 kg /100 birds		
Turkeys	18 kg /100 birds		
Horses			
All breeds	3.00-4.00 horse ration		9 kg hay/454 kg

2.4 List of Regional Fodder Stations

- Director, Regional Station for Forage Production and Demonstration, Post Office Textile Mills, Hissar-125002, Haryana, Tele.No. 01662-259184(O), 259541(R).
- Director Incharge, Regional Station for Forage Production and Demonstration, Avadi (Alamadhi) P.O. Cattle farm, via Red hills, Chennai-52. Tele.No. 044-6310360(O), 6418122(R).
- Director Incharge, Regional Station for Forage Production and Demonstration, Pahadi Sharif, via Keshavgiri, Hyderabad-500005 (A.P), Tele. No. 08415-265635(O), 265366(R).
- Director Incharge, Regional Station for Forage Production and Demonstration, P.O. Netaji Subhas Sanatorium, Distt. Nadia, West Bengal-741251. Tele.No. 033-25828425(O), 25828626(R).
- Director, Regional Station for Forage Production and Demonstration, Palej, Distt. Gandhinagar 382355, Tele.No. 079- 23261273(O), 23260106(R).
- Director Incharge, Regional Station for Forage Production and Demonstration, Suratgarh-335804 Rajasthan. Tele.No. 01509-268047(O), 268048(R).
- Director Incharge, Regional Station for Forage Production and Demonstration, 618/A, Camp Office, Gandhinagar, Jammu-180004. Tele. No. 0191-2457698 (O), 2439453 (R).

2.5 Drinking Water for Animals During Disaster

Providing enough quality water is essential for livestock during any disaster. Because water makes up 80% of the blood, regulates body temperature and is vital for organ functions such as digestion, waste removal and the absorption of nutrients. The daily water needs of livestock varies significantly among animal species. The animal' s size and growth stage will have a strong influence on daily water intake. Consumption rates can be affected by environmental and management factors. Air temperature, relative humidity and the level of animal exertion or production level are examples of these factors. The quality of the water, which includes temperature, salinity and impurities affecting taste and odour, will also have an effect. An adequate supply of quality water for affected stock is extremely important. It is better to provide animals with free access to water and feed as per the requirements as mentioned below.

Cattle and Buffalo

Cattle and Buffalo	Water Requirement Range(L/day)	Average Typical Water Use (L/day)
calves (1-4 months)	4.9-13.2	9
heifers (5-24 months)	14.4-36.3	25
Milking	68-83	115
Dry	34-49	41

Swine

Swine	Weight Range (kg)	Water Requirement Range (L/day)	Average Typica ter Use (L/d
Weaner	7-22	1.0-3.2	2.0
Feeder pig	23-36	3.2-4.5	4.5
	36-70	4.5-7.3	4.5

Swine	Weight Range (kg)	Water Requirement Range (L/day)	Average Typica ter Use (L/d
	70-110	7.3-10	9
Gestating sow/boar	-	13.6-17.2	15
Lactating sow	-	18.1-22.7	20

Horses: Typically consume 2-3 kg of water per kilogram of dry feed. They drink more in hot weather and while doing heavy work.

Frame size (weight)	Water Requirement Range (L/day)	Average Water Use (L/day)
Small	13-20	16.5
Medium	26-39	32.5
Large	39-59	49

Sheep: Grazing sheep, particularly in the cooler seasons of the year, can require relatively little additional water beyond what they receive through forage. Hot, drier weather, however, will result in increased water intake.

Animal Type	Weight Range (kg)	Water Requirement Range (L/day)	Average Typical Wa-ter Use (L/day)
Feeder lamb	27-50	3.6-5.2	4.4
Gestating meat ewe/ram	80	4.0-6.5	5.25
Lactating meat ewe plus unweaned offspring	80+	9.0-10.5	10
Gestating dairy ewe/ram	90	4.4-7.1	5.75
Lactating dairy ewe	90	9.4-11.4	10.4

Chicken: If air temperatures exceed 30°C or (87°F), the expected water consumption can increase by 50% above normal consumption rates. Poultry are unable to sweat as a means of regulating body temperature.

Chicken Broiler Age (weeks)	Water Requirement (L/1,000 birds/day)	
	21°C	32°C
1-4	50-260	50-415
5-8	345-470	550-770
Winter, fall, spring	280	
Summer	450	

Chicken Type	Weight Range (kg)	Water Requirement Range (L/1,000 birds/day)	Average Typical Water Use (L/1,000 birds/day)
Laying hens	1.6-1.9	180-320	250
Pullets	0.05-1.5	30-180	105
Broiler breeders	3.0-3.5	180-320	250

Turkeys

Turkey Age (weeks)	Water Requirement (L/1,000 birds/day)	
	10°C-21°C	27°C-35°C
1-7	38-327	38-448
8-14	403-737	508-1,063
15-21	747-795	1,077-1,139

Includes spillage losses (typically 2% or less of total consumption).

Turkey type	Average Typical Water Use (L/1,000 birds/day)	
	Fall/Winter/Spring	Summer
Broiler turkey	296	402
Heavy hens	431	600
Turkey toms	513	723

Rabbits, Mink and Alternate Livestock

Animal Type	Weight Range (kg)	Estimated Typical Water Use (L/day)
Rabbit - gestating doe	4.5 kg	0.35
Rabbit - doe (with litter), prior to weaning	8.5 kg[b]	1.02

Animal Type	Weight Range (kg)	Estimated Typical Water Use (L/day)
Rabbit - 6-wk fryers	1.0 kg	0.30
Rabbit 12-wk fryers	2.3 kg	0.64

Chapter 3:

Veterinary Service

3.1 Disaster Veterinary Medicine

The subject of Disaster Management has grown many folds. Each episode of disasters taught us many lessons and helped us to pace our response as well as specialize in different fields of disaster management. One integral part of disaster preparedness is Disaster Veterinary Medicine (DVM). The evolution of the Disaster Veterinary Medicine and the Veterinarian□s role in the overall spectrum of disaster management had been highest since the last 10 years. Each country has specific veterinary organisations to deal with emergency and disaster preparedness. In USA a major role is played by the association of veterinarians (AVMA) while in France the veterinary response to disasters is based mostly on the activities of the Vetèrinaires Sapeur Pompiers (Veterinary Fire Brigades).

Emerging issues arising after 9/11 attacks and SARS experience, as well as environmental emergencies, and the implication concerning the role of veterinary medicine in disasters are increasingly being analysed and discussed. In India, no major Veterinary Organisation or Institute is specializing in such developmental agenda and that remains unfulfilled till date. Our Veterinary Universities and Colleges should help to fill the need through unique initiatives that require all of its students as well as staff to receive disaster training, providing a new generation of leaders in veterinary medicine and disaster response.

3.1.1 Infectious Diseases in Disasters

Epidemiological Triangle: The Epidemiologic Triangle consists of three components, with the Host at the top point and the Agent and the Environment at the other two points of an equilateral triangle. Each component must be analysed and understood to comprehend and predict patterns of disease. Changes in any component will alter the existing equilibrium to increase or decrease the frequency of a disease.

During disasters an increase of stress related diseases may be observed. Animals that usually carry the disease without clinical symptoms may be return to excreting increased amounts of the disease agents and therefore increase the transmission to other animals (Eg. Salmonella). Animals whose immune system is impaired due to the stress experienced in disasters can start to show clinical signs or succumb to diseases that were non-symptomatic previously.

Reasons for Disease Outbreak: Disasters do not usually cause new diseases but can lead to increased transmission and outbreaks because of the following reasons,

- **Host:** Stress, Wounds
- **Agent:** Better Survival Condition
- **Environment:** Displacement, Mixing of Normally Separate Groups, Better Survival Condition, Altered Vector Distributions

Trans Boundary Animal Diseases (TBAD): Diseases that are of significant economic, trade and/or food security importance for a considerable number of countries; which can easily spread to other countries and reach epidemic proportions; and where control/management, including exclusion, requires cooperation between several countries. *FAO*

The majority of TBADs are viral in origin, and while not specifically associated with flooding or other disasters it is important to be aware of their potential to spread in stressed, contained animal populations, and to cause subsequent problems for affected rural populations.

They threaten food security through serious loss of animal protein and/or loss of draught animal power for cropping; it also causes major production losses for livestock products such as meat; milk and other dairy products; wool and other fibers and skins and hides, thereby reducing farm incomes.

Examples of TBADs: Rinderpest, Foot & Mouth Disease (FMD), Rift Valley Fever (RVF), Bovine Spongiform Encephalopathy (BSE), Contagious Bovine Pleuro Pneumonia (CBPP), Classical Swine Fever (CSF), African Swine Fever, Highly Pathogenic Avian Influenza (HPAI), Peste de Petits Ruminants (PPR), New Castle Disease (NCD)

Zoonotic Diseases: Any infectious agents that are transmissible from vertebrate animals to humans and vice versa. *WHO 1959*

More than 150 infections are recognized as zoonotic. Recently, researchers have determined that more than 70% of emerging infectious diseases in people actually come from animals. Eg. Ebola, SARS, H1N1, Etc. *CDC*. Early recognition of epidemics of a zoonotic disease is important for its control. Examples of zoonotic disease are as follows,

- ✓ Leptospirosis
- ✓ Anthrax
- ✓ Salmonellosis
- ✓ Rabies

- ✓ Bovine Spongiform Encephalopathy (BSE)
- ✓ Highly Pathogenic Avian Influenza (HPAI)
- ✓ Avian Influenza/Bird Flu
- ✓ Swine Flu
- ✓ Bovine Tuberculosis (TB)
- ✓ Brucellosis
- ✓ Glanders
- ✓ Tick Fever
- ✓ Ebola

Classification Based on Transmission Patterns

- **Anthropozoonosis:** Animals to Humans, Eg: Rabies
- **Zooanthroponosis:** Humans to Animals, Eg: Tuberculosis
- **Amphixenosis:** Animals to Humans and Humans to Animals, Eg: Influenza

Classification Based on Usual Reservoir Host

- **Direct Zoonosis (Eg, Rabies):** Host is a Single Vertebrate Animal Species.
- **Cyclo Zoonosis (Eg, Echinococcosis/Hydatidosis):** Host is two Vertebrate Animal Species.
- **Meta Zoonosis (Eg, Equine Encephalitis):** Host is a Vertebrate and Invertebrate Animal Species.
- **Sapro Zoonosis (Eg, Botulism):** Host is a Vertebrate Animal Species and Non-animate Development Site.

Classification Based on Causative Agents:

- **Bacteria:** Listeriosis, Campylobacteriosis
- **Viral:** Encephalitis, Rift Valley Fever, Rabies
- **Parasitic:** Trichinosis, Toxoplasmosis
- **Mycotic:** Ringworm, Histoplasmosis

Classification Based on Specific Risk Groups

- **Occupational:** Abattoir Workers (Anthrax, Psittacosis)

- **Recreational:** Campers (Giardiasis)
- **Health Care Workers:** Veterinarians (Rabies, Cryptosporidiosis)
- **Immunosuppressed Persons:** AIDS Affected Persons (Toxoplasmosis)

List of Bacterial Diseases:

- **Clostridial Infections:** Tetanus, Botulism, Black Quarter (BQ), Enterotoxaemia
- **Secondary Infections Post Trauma:** Respiratory, Skin, Mastitis
- **Haemhorragic Septicaemia**
- **Foot Rot**
- **Erysipelas**

3.1.2 Steps to Deal with Infectious Diseases:

Step 1: Determine What Might Be There

- Check available information before deployment
- Sources of data on prevalence/outbreaks - WAHID, Handistatus II, Promed, EMPRESS, NADRES, etc.
- Local animal health services

Step 2: Be Prepared

- Collect information from OIE guidelines for diseases likely to be encountered
- Clinical signs, diagnosis, differentials, treatment/control options

Step 3: Guidance from National Animal Health

- What measures should be taken by relief personnel?
- Collaboration with Animal Health Services?
- Vaccinations, treatments, biosecurity measures?

3.1.3 Disease Diagnosis in the Field: Three Common Scenarios

1. **Minimal Facilities:** Microscope, simple stains, McMaster slides, salt solutions, sample collection equipment. Anthrax is probably the only bacterial infection that simple laboratory facilities could diagnose, i.e. use of McFadyean's polychrome methylene blue stain to identify the bacteria in blood smears. Parasite diagnosis, identification of worms and eggs

2. **Temporary Laboratory Facilities:** Need to have SOPs for sample collection. Observe biosecurity protocols, particularly if dealing with a potential TBD. Liaise with laboratory if possible. Need refrigeration for some samples. Need a comprehensive sample kit (Syringes, needles, swabs, transport media, containers, 10% formalin, microscope slides, plastic bags, scalpel, forceps, scissors, knives, gloves etc).
3. **Poor Access to Permanent Laboratory Facilities:** Need to adopt to local conditions and it is important to use long-acting, broad-spectrum antibiotics in the field if possible, as the infectious agents are usually unknown and animals may only be seen once.

Triage: Triage is a French word trier, means to sort. It is a method of quickly identifying the animals which have life-threatening injuries/ disease conditions and which have the best chance of surviving. Triage includes pre-hospital and hospital triage.

Pre-Hospital Triage

- Attention to the Call for help.
- Alerting the oncoming traffic.
- Rescue of animals from the spot.
- Moving the animal to safe location.
- Check whether the airway is patent - Extend head and Neck; wipe mucus, blood or vomitus from the mouth.
- In unconscious animal, maintain head and neck stability.

If there is no evidence of breathing or gum color is blue, begin mouth to nose breathing 15-20 / minute. If there is no sign of cardiac function, begin external cardiac compression 80-120/ minute. If any haemorrhage, apply firm pressure using a clean cloth, towel, paper towel, feminine hygiene product etc. Cover any external wounds using a bandage material soaked in warm water. If any obvious fracture, immobilize the area with homemade splints. If there are burn injuries, place wet cool towels over the burned area. Remove and replace as the compress warms to body temperature. In case of shivering or shock, wrap the animal with available material to conserve heat. In case of heat stroke, cool the animal with room temperature wet towel (not cold) and transport to clinic.

Preparation for Transport:

- Call ahead for emergency veterinary service before reaching veterinary hospital
- Line upholstery.

- Move the animal patient carefully.
- Drive the vehicle/ambulance safely.

Hospital Triage: Involves Five Steps

Step 1: Recognition of Life-Threatening Disease

Step 2: Be prepared

Step 3: Establish a Triage classification system

Step 4: Arrival at the Veterinary Clinic

Step 5: Patient stabilization

Step 1: Recognition of Life-Threatening Disease:

- Goal should be to select and triage the patients that have serious traumatic injury / acute illness.
- Without recognition of life threatening processes and their potential sequela, one can't effectively triage patients, which will inevitably result in increasing morbidity and mortality.
- Typically, life threatening conditions are associated with cardiac, pulmonary and neurological disorders, environmental injuries and intra-abdominal disorders.

Step 2: Be prepared:

- Education: Tutorials and conference education of the team members. Practical training sessions on basic and advance life support techniques: endotracheal intubation, positive pressure ventilation, intravenous catheter placement, IV fluid set-up, ECG setup and preparing equipment for centesis.
- 'Emergency Ready Area' Locate in a central area. Equipment should be readily accessible including an oxygen supply, endotracheal tubes, anesthetic equipment, Ambu-bag, IV catheters, IV fluid pumps, needles, syringes, equipment for centesis, emergency drugs and good light source. Clear labelling of drugs and supplies. Replinish the stock levels after each use or on weekly base. Minimum in-house laboratory for diagnosis.
- Team approach.
- SOP (Standard Operating Procedures) – aid in ensuring important diagnostic and treatment steps are not overlooked.

Step 3: Establish a Triage Classification System:

- Based on urgency of needed treatment.
- Can change rapidly during first four hrs of admission.
- If there is a concern regarding a patient, place in more serious class.
- Ensure all staff is aware of your triage system.

Class I: Most seriously ill, should receive treatment within seconds. These include

- Traumatic respiratory failure.
- Cardiopulmonary arrest or airway obstructions.
- All unconscious animals.

Class II: Very seriously ill, critical patients require treatment within minutes (up to 1hr following the onset of severe symptoms).

- ✓ Multiple injuries.
- ✓ Shock or bleeding but has adequate airway and ventilator functions.
- ✓ GI torsions.
- ✓ Burn victims.
- ✓ Penetrating wounds.

Class III: Require definitive management within a few hours.

- ✓ No shock
- ✓ Ventilator and cardiovascular function present.
- ✓ Superficial wounds.
- ✓ Minor trauma.

Class IV: Less Serious.

- ✓ Non- trauma related.
- ✓ Vomiting, diarrhea, or lameness.

Step 4: Arrival at the Veterinary Clinic:

- Receptionist to be trained to recognize life threatening conditions.

- Emotional support of the client.
- Continual update of the client.
- Evaluate within 1 min of arrival at the clinic.
- Acquire a full medical history by a set protocol of questions.

The emergency conditions that require actual field treatment are limited to the most acute and life threatening types of emergencies. These include airway obstruction, pneumothorax, shock, and arterial hemorrhage. Orthopaedic injuries in small animals can be treated by shifting the animals to hospital.

"Crash Cart" – rollaway cart stocked with various emergency supplies includes

Drawer 1 – Airway (Forceps, endotracheal tubes, laryngoscopes) Drawer 2 – Venous Access (Catheters, suture material, saline flush)

Drawer 3 – Emergency Drugs (Dosage chart, needles, syringes, drugs)

Drawer 4 – Respiratory (Tracheotomy tube, chest tubes)

Drawer 5 – IV Fluids (Fluid bags, infusor bags, pump sets)

Miscellaneous Equipment – Blood pressure monitor, ECG, anethestic machine, ventilator, thermometer, etc)

3.1.4 Resuscitation Procedures

Air Way Obstruction: Airway obstruction can result from aspiration of debris or trauma to the airway. Treatment of a complete airway obstruction requires emergency intubation or tracheostomy. The first approach is to pass an endotracheal tube. This is facilitated by use of a laryngoscope to visualize the airway and observe any debris that can be removed. Although the veterinarian should be able to quickly intubate an animal without the use of a laryngoscope, in critical situations one should have the equipment available to increase the likelihood of success; therefore, a laryngoscope should be part of a field medical pack. In cases with partial airway obstruction, oxygen therapy and rapid transport to a veterinary hospital is indicated. Field tracheostomies are heroic measures and should only be attempted in the most critical situations.

In drowning, oxygen therapy is of utmost importance. The most effective treatment in reversing hypoxemia after a submersion injury is continuous positive airway pressure (CPAP) or positive endexpiratory pressure (PEEP).

Pneumothorax: Pneumothorax may develop from either blunt or penetrating trauma. Unless it is a tension pneumothorax, oxygen therapy should be provided. Use of a catheter allows repeated

withdrawal of air during transport while eliminating the risk of lung laceration from repeated thoracocentesis. Small bore catheters may collapse due to pressure of the intercostal muscles and bending of the catheter.

Fluid Therapy: Dehydration can become so severe that it leads to hypovolemia; treatment of these cases requires intravenous fluid administration. Isotonic electrolyte solutions should be used for fluid resuscitation.

Hemorrhage: The first rule in treatment of overt hemorrhage is to stop the bleeding. Direct pressure is the most effective means to control hemorrhage during transport to either the first aid station or veterinary hospital. Clean protective bandage material and an elastic wrap are helpful in emergency control of hemorrhage. When it seems to be ineffective, more padding and more pressure should be applied, with the original bandage left in place.

Emergency Veterinary Triage: Triage means "to sort". It is a system which classifies patients according to urgency for emergency care. The goal is to rapidly identify and treat life-threatening problems. Patients with life-threatening problems are treated without delay; stable patients must wait to be treated. The purpose of triage is to do the greatest good for the largest number of patients.

Veterinary triage is different because of the differences between human and veterinary medicine. Factors responsible for these differences include the following:

- The option of euthanasia
- Little tolerance for fair to poor outcomes of animal
- Transport difficulties
- Limited veterinary medical resources
- Recognizing that the treatment of animals is still dependent upon the animal owner's disposable income

3.1.5 Triage in Veterinary Medicine involves mainly,

- **Field Triage:** Requires experienced veterinarians or rescuers and usually does not involve the individual examination of animals. Field triage is designed to identify animals most likely to benefit from the available care under austere conditions. It divides animals into three categories:
    - **Black:** Those that will likely die regardless of how much care they receive.
    - **Green:** Those that will survive whether or not they receive care.

- **Red:** Those who will benefit significantly from austere interventions.

Triage Color	Triage Category	Explanation
Red	Immediate	Might benefit from austere interventions
Green	Minor	Walking woulded but likely to survive
Black	Dead, dying or euthanatize	Dead, dying or euthanatize

- **Medical Triage:** Done rapidly and involves examining individual animals. One approach is to use the following four physiological criteria (RPPN):
  - ✓ Respiration/minute
  - ✓ Pulse rate/minute
  - ✓ Pulse pressure
  - ✓ Neurological status

Trinage Color	Category	Physiological System Involvement
Red	Immediate	Respiratory, Cardiovascular, (Hypo-thermia, Hyperthermia)
Yellow	Urgent	Cardiovascular, Musculoskeletal, Neu-rological, Abdominal Injuries
Green	Minor	Musculoskeletal, Neurological, Ab-dominal Injuries
Black	Dead, Dying or Euthanasia	Dead or dying when initiallhy assessed, Mortal wounds not compatible with "Quality of Life" issue. Euthanasia.

- Mobile Veterinary Unit Triage

Triage for mass casualties is often directed to the “SAVE” system (Secondary Assessment of Victim Endpoint). Triage for individual casualties “START” (Systems Triage And Rapid Transport).

3.1.6 Emergency Drugs/Supplies Useful During Disasters

Drugs used in Chemical Restraint

Drugs	Action	Dogs and cats	Cattle, Sheep and Goats	Horses
Acepromazine	Sedative	0.01 – 0.05 mg/Kg IM or SC	0.03-0.1 mg/kg IV/ IM / SC	0.044-0.88 mg/kg iv
Xylazine	Sedative	1-3 mg/kg IV	0.05-0.15 mg/kg IV	0.5-1.1mg/Kg IV
Butorphanol	Opioid Sedative	0.1 mg/kg im	0.02-0.04 mg/kg IV/IM	0.02-0.03 mg/Kg IV

Drugs for Emergency Conditions

Drugs	Action	Dogs and cats	Cattle	Horses
Epinephrine	increased peripheral arteriolar vasoconstriction -better coronary & cerebral perfusion	High dose (1:1000) 0.1 mg/ kg low dose (1:10000) 0.01 mg/kg Low dose is preferred @ 0.01 – 0.02 mg / kg IV Bolus. Repeat every 3-5 minutes if required	High dose (1:1000) 0.01-0.02 ml/kg IM low dose (1:10000) 0.1-0.2 ml/kg IM	High dose (1:1000) 0.01-0.02 ml/kg IM low dose (1:10000) 0.1-0.2 ml/kg IM
Atropine	slow heart rate or no heart rate (vagolytic)	0.04mg/kg IV or intra-tracheal. Repeat every 3-5 mins x 3 doses.	0.06-0.12 mg/kg IV,IM,SC	0.01-0.22 mg/kg IV,IM,SC
Sodium bicarbonate	Metabolic acidosis	1mEq/Kg, repeat every 5 minutes	1mEq/Kg, repeat every 5 minutes	1mEq/Kg, repeat every 5 minutes
Furosemide	Diuretics	2-6 mg/kg im,iv,sc	0.5-4 mg/kg IV	0.25-3 mg/kg iv
Mannitol	Diuretics Cerebral edema	1-2 g/kg iv over 30 min	1-3 mg/kg IV	0.25-2.0 mg/Kg IV
Lidocaine	antiarrythmic	2-4 mg/kg as bolus CRI 50µg/Kg/min	-	1.3mg/kg as a bolus 0.05 mg/kg min CRI
Calcium gluconate 10%:100mg/ml:	Hyperkalemia low calcium	50mg/kg (0.5-1.5ml/kg) SLOW bolus	150-250 mg/kg IV	150-250 mg/kg IV
Magnesium (4 MeQ/ml)	Refractory ventricular arrhythmias, prolonged CPR	0.2mEq/kg slowly over 10 minutes	0.04 ml of 25% Epsom Salt Sol/ kg/min IV 0.08 mEq Mg^{2+}/ Kg/min	
Vasopressin 20 units/ml.	Ventricular fibrillation, ventricular tachycardia, PEA	0.2u-0.8u/kg IV (IT:0.4-1.2u/kg) 0.1-0.2mcg/kg IV.	-	-
Diazepam	Seizure	0.2-0.5 mg/kg IV	0.6-1.1 mg/Kg IV	0.04-2.0 mg/kg IV

Drugs Used in Pain Management

Drug	Dogs and cats	Cattle	Horses
Meloxicam	0.2mg/kg SC	0.5mg/kg Iv	0.6 mg/kg iv q^{24hr}
Phenylbutazone	2-20 mg/kg IV	4 mg/kg iv q^{24hr}	2-4.4 mg/kg iv q^{24hr}
Flunixine meglumine	-	1.1- 2.2 mg/kg iv q^{24hr}	0.25-1 mg/kg iv q^{24hr}

Reversal Drugs

Drug	Reversal Agent
Benzodiazepines	Flumazenil- 0.02 1mg/Kg IV
Xylazine	Yohimbine- 0.1 1mg/Kg IV
Medetomidine	Atipamazole- 5 mgml IM
Narcotic	Naloxone- 0.02-0.04 mg/kg IV

Health Concerns: Emergency conditions that lead to the gathering of animals from various operations increases the risk of infectious diseases caused by a multitude of enteric and respiratory disease. Mass medication through the drinking water may be considered for treatment and control of infection. Large ruminants are frequently affected with bloat, diarrhea, and pneumonia during prolonged unusual events. Prevention of most bloat and diarrhea can be accomplished through nutritional management. Pneumonia can be partially prevented through vaccination against respiratory pathogens and providing rest and fresh air during the disaster.

Orthopaedic Triage: Severe traumatic injuries require individual examination and treatment. The lacerations can be treated but fractures are difficult to manage in cattle and euthanasia may be required. Aspirin, given orally at the rate of 3 to 4 boluses (240 mg) every 8 hours or flunixin meglumine (50 mg, IM or IV), can be used to provide analgesia.

Guidelines for Small Ruminants like Sheep and Goats

These animals may become disoriented during the disaster. They will flee from perceived threats and are at risk of injuries during flight. Neonates and juveniles are at higher risk of trampling, exposure, exhaustion, or maternal rejection. They re-group after the disaster, and may form mixed species groups. Males of most species are territorial and should be considered dangerous, both to other males and to humans who enter their perceived territory.

Can often be lead to holding areas by shaking a bucket of feed or by a feed trail. A group of animals may be herded to the holding area by manipulation of a visual barrier such as opaque plastic sheeting or baffle boards. The key is to move SLOWLY and quietly. Fresh water and adequate shade for all members of the herd should be provided.

Unsanitary conditions may develop with time. Enteropathogens (bacteria, especially Salmonella, viruses, and parasites) can be a problem. Since inadequate ventilation can lead to respiratory

problems, totally enclosed environments are not recommended. Most small ruminants can tolerate low temperatures if adequate bedding and shelter from wind, rain, and snow are provided. Humanely destroy and dispose of animals that are moribund, have intractably painful injuries, or that endanger persons or other animals. Return animals to original facilities if intact or arrange for transfer to facilities outside the disaster area.

3.2 Disease Control & Biosecurity Measures

Disease Eradication: Reduction of an infectious disease's prevalence in the global host population to zero.

Disease Prevention: Actions aimed at Eradicating, Eliminating, or Minimizing the Impact of Disease and Disability.

Disease Control: The Reduction of Disease Incidence, Prevalence, Morbidity or Mortality to a Locally Acceptable Level as a Result of Deliberate Efforts; Continued Intervention Measures are Required to Maintain the Reduction.

Biosecurity: A strategic and integrated approach that encompasses the policy and regulatory frameworks (including instruments and activities) that analyze and manage risks in the sectors of food safety, animal life and health, and plant life and health, including associated environmental risk.

Measures to Prevent Diseases in Livestock: Prevention of infections can simply be achieved by protecting the target animal from exposure to infectious doses of the pathogenic microbe.

1. Exclusion:

A. Total Exclusion from Exposure – Eradication

B. Partial Exclusion from Exposure – Prevention

2. Host Resistance

Without question, vaccination has been one of the most important interventions in disease prevention that has ever been developed.

Vaccines for Specific Diseases:

- **Anthrax** – Vaccine for Ruminants/Pigs, Human Vaccine US
- **HS and Clostridial** - Vaccines used in Ruminants
- **Leptospirosis** – Pigs, Dogs, Cattle/Buffalos, Limited serovars

- **Avian Influenza and ND** - Vaccines for Poultry
- **FMD, PPR** – Vaccines Available for Animals
- **Rabies** - Vaccine Available for Animals and Humans
- **Japanese Encephalitis** – Human Vaccine Available
- **Typhoid and Cholera** – Human Vaccines Available

One way to concisely introduce Biosecurity and Biocontainment is to use the acronym IRS (Isolation-Resistance-Sanitation).

Isolation:

- The most common biosecurity risk factor is the movement of animals, such as happens following a natural disaster
- The prevalence of specific infectious agents of concern should be determined for the area, i.e. from government or internet resources (OIE, FAO)
- Rescued animals should be inspected, screened and quarantined for infectious diseases
- A program to routinely and systematically monitor and survey the animals for the presence of important infectious agents should be implemented

These steps are the foundations of Isolation

Quarantine Period- animals should be isolated at least for 40 days.

Resistance

- Disease resistance protects individuals from pathogens in two ways: by preformed mechanisms and by infection-induced responses of the immune system. e.g. infectious agent, climate change etc.

Sanitation:

- Sanitation literally means measures necessary for improving and protecting health and well-being of the people.
- Sanitation is any system that promotes proper disposal of human and animal wastes, proper use of toilet and avoiding open space defecation.

Biosecurity Measures:

- **Functional:** Screening of animals, Quarantine, Cleaning and disinfection, Separation of equipment
- **Structural:** Footbaths, Protective clothing

Wear Protective Clothing & Boots:

- ✓ Clean, disinfect rubber boots
- ✓ Clean overalls
- ✓ Keep extra sets for visitors
- ✓ Change before you return to the relief camp from markets, other villages, farms etc.

Separation of Animals:

- While not always easy, it is important to remember that other animals are the principle source of infectious agents
- Keep animal groups isolated as far as possible
- In particular, new introductions to the camp should be kept separate i.e. in quarantine
- Animals showing signs of illness should be separated immediately and treated appropriately
- Good hygiene is important after handling, or moving between, batches of animals

Create Awareness:

- Communicate biosecurity measures, and the reasons for them, to all team members, other agencies working with the team and animal owners (directly or through workshops community meetings etc.)
- Develop awareness material such as handouts, self explanatory signs, posters etc.

Chapter 4:

Shelter & Settlements

Basic Needs of Animals: They need clean air and water in order to maintain bodily functions. Without these, the animals would become dehydrated and organs would begin to shut down. Food is needed in order to have energy to live and to fight against infections. The shelter is needed to protect an animal from inclement weather, elements, and to keep it safe from predation. Social interaction is needed with other animals in order to procreate its species.

Ways to Help Animals: Fortunately, there are several ways to help in these situations. Shelter is needed for livestock and pets whose families are forced to relocate to temporary housing. For pets provide a foster shelter until the pet can be reunited with the family, that is the ultimate gift of caring. For larger animals, such as horses or cattle, that need foster housing can be provide with emergency housing or in open land. Rescue groups can always be permitted to use volunteers through rescue hotlines, collect and organize donated supplies, and care for sheltered animals. Arrange donation for beddings, blankets, pet food, litter pans, food and water dishes and pet toys for shelter expenses, veterinary fees and much other expenditure.

Shelter for Animals in Disaster Management: If the custodian of the animals is being to remain on their property during an emergency, they will need to decide whether to confine large animals in an available shelter or leave them outdoors and it will depend on the integrity and location of the shelter being used and the type of disaster. Hence information of the available property for the best location for animal sheltering should be applied. Ensure that their animals have access to high areas in case of flooding, as well as to food and clean water. Eg. During Hurricane Andrew, some horses left outside suffered less injury than those placed in shelters. This was because some shelters selected did not withstand the high winds. Horses were injured by collapsing structures and flying objects that may have been avoided on the outside. Another reason for possibly leaving animals unsheltered is because floodwaters that inundate around a barn could trap animals inside causing their drowning.

4.1. Shelter Assessment & Planning

Three important messages:

1. If you don't have to create a shelter **DON'T DO IT!**

2. If you do it, have an **EXIT STRATEGY!**
3. If you do it, think of **BIOSECURITY!**

Why provide shelter for animals in emergencies?

- Protection against extreme weather conditions.
- Ensure health and protection against diseases.
- Protect a population from theft.
- Safeguard human sustainability.
- Allows people to be moved to safety as the psychosocial bond between owners and animals, often interferes with this activity.

In emergencies the animal shelters can be broadly classified into two types,

- **Temporary Animal Shelters**
- **Permanent Animal Shelters**

We need to have answers to the following question for assessing and planning animal shelters,

- What is the situation of existing shelters?
- Estimated animal population (species wise) to be sheltered?
- Is there sufficient land available for setting up temporary/permanent shelters?
- What would be the suitable shelter design, is it disaster resistant and locally acceptable?
- How will the animal shelter be setup/constructed, maintained and managed?
- Have you planned appropriate bio-security measures and the exit strategy if the shelter should be closed?

If available pasture area or other open land meets the following criteria, their livestock may be better outside in the pasture than being placed inside the shelter. A safe pasture or other open land has:

- Native tree species only (Exotic trees uproot easily).
- No overhead power lines or poles.
- No debris or sources of blowing debris.

- No barbed wire fencing. Woven wire fencing is the best.
- At least one acre (0.4 hectares) of open space. Livestock may not be able to avoid blowing debris in smaller spaces.

4.2. Animal Shelter Considerations

Some of the important considerations for setting up animal shelters are as follows,

- **Animals:** Different Animal Species; Animal Identification; Feed, water, veterinary service, etc.
- **Location:** Safe from further risks; Accessibility for animals and owners; Maintenance and waste management
- **Operational Procedures:** Human resources required; Shelter design blueprints; Registers and records

Basics on Animal Housing: Some of the basics on housing animals are as follows,

- **Containment:** Fencing, pens, stalls; Check for sharp objects; Spacing
- **Shelter:** Wind breaks; Ventilation
- **Temperature:** Shade, fans, Warmth
- **Bedding**

To reduce stress & to keep the animals safe, they should be segregated as given below:

✓ Sex
✓ By herd or flock
✓ By species
✓ Mothers and young
✓ Pregnant animals
✓ Isolate sick animals
✓ Appropriate density

Role of Veterinarian in Shelter Management: Veterinary Assessment - (Subjective, Objective, Assessment, Planning - SOAP)

✓ Diagnosis and Testing
✓ Prognosis, Treatment, Vaccinations

- ✓ Euthanasia
- ✓ Reproductive Control of Strays
- ✓ Promote Public Health
- ✓ Behavioral Assessment

Shelter Space Requirements for Cattle

- Enclosed Housing Area/Animal = 75-100 sq. ft.
- Exercise Yard Area/Animal = 100-125 sq. ft.
- Pasture Area/Animal = 1-2 acres
- Type of Housing and Boundary Setback = Open front 3-sided barn. Setback 50 ft.
- Fencing = Barbed wire, Electric Woven wire

Shelter Space Requirements for Small Ruminants

- Enclosed Housing Area/Animal = 20-25 sq. ft.
- Exercise Yard Area/Animal = 50 sq. ft.
- Pasture Area/Animal = 0.2-0.3 acres
- Type of Housing and Boundary Setback = Enclosed barn with removable side panels or windows. Setback 50 ft.
- Fencing = Electric Woven wire

Shelter Space Requirements for Swines/Pigs

- Enclosed Housing Area/Animal = 48 sq. ft. with exercise yard or 100 sq. ft. without exercise yard.
- Exercise Yard Area/Animal = 200 sq. ft.
- Pasture Area/Animal = 12-14 sows/acre/rotational pasture
- Type of Housing and Boundary Setback = Enclosed Barn, huts, shed, hutches or lean-to setback 50 ft.
- Fencing = Electric Plank rail

Shelter Space Requirements for Horses

- Enclosed Housing Area/Animal = Tie stalls 45 sq. ft.; 5’ x 9‘. Box stall 12’ x 8’ or 10’ by 10’.
- Exercise Yard Area/Animal = 200 sq. ft.

- Pasture Area/Animal = 1-2 acres.
- Type of Housing and Boundary Setback = Enclosed ventilated barn or open 3-sided barn. Setback 50 ft.
- Fencing = Electric wooden rail, woven wire.

Shelter Space Requirements for Poultry Birds

- Enclosed Housing Area/Bird = 3-4 sq. ft.
- Exercise Yard Area/Bird = 10 sq. ft.
- Type of Housing and Boundary Setback = Enclosed barn. Setback 50 ft.
- Fencing = Chicken wire.

Shelter Record Maintenance:

- ✓ Animal Arrival
- ✓ Data Entry
- ✓ Animal Identification
- ✓ Veterinary Diagnosis
- ✓ Treatment and Veterinary Care
- ✓ Exit from Temporary Shelter
- ✓ Referral and Follow Up Services

Isolation of Sick Animals: Isolation of sick animals and quarantine new or returning animals should be a priority for the herd's biosecurity.

An isolation or quarantine area should achieve the following objectives:

- Provide an air space, water source, and feed source separate from the rest of your livestock.
- Prevent direct contact with the rest of your livestock.
- Provide a clean, dry, comfortable resting space for the animal(s).
- Provide transition to a new ration.
- Provide adequate restraint facilities for examinations and administration of treatments.
- Allow equipment storage in that area (e.g., shovels, halters, buckets, etc.) for use only in the isolation area.

- Prevent the movement of equipment and manure from the isolation area to other locations with livestock.
- Ensure workers clean hands and boots and change clothes before going to other areas.

Closing the Shelter:

- Leave the location with minimal signs of operation
- Appropriate disposal of waste
- Wherever possible donate unwanted equipment to rebuild local facilities
- Publicize relocation of sheltered animals and contact details.
- Storage or donation of excess food and equipment

Chapter 5:

Animal Handling

5.1. Prerequisites and Safety of Animal Handler

Safe, effective animal handling demands total concentration on the animal you are handling and the knowledge to read the body language that animal is displaying. Taking a few moments to visually assess the animal you are about to handle can make your job both safer and easier.

Characteristics of Predator Animals

- **Vision:** Binocular, Excellent Depth Perception, Eyes Facing Forward
- **Feet:** Claws or Nails
- **Teeth:** Built for Penetration, Biting, Tearing
- **Instincts:** Chase, Hunt, Kill

Characteristics of Prey Animals

- **Vision:** Wide Field of Vision, Eyes Typically Face to the side
- **Feet:** Hooves for Running and Pawing
- **Teeth:** Built for Grazing, Grinding
- **Instincts:** Escape, Run

Some Basic Questions to Answer Before Handling:

- What is the Behavior of the animal?
- Do you have the appropriate Equipment?
- What is the appropriate way to Approach the animal?
- Which Restraining method should be adopted?
- What type of Casting method would be appropriate?

- How will the animal be Transported?
- What is the appropriate method to Release the animal?

5.2. Steps in Animal Handling

The following seven steps or BEAR CaTR are very essential before handling any animal in disasters;

Step 1: Analyze the Animal by Understanding its Behaviors

Step 2: Identify Appropriate Animal Handling Equipment

Step 3: Adopt Recommended Ways to Approach the Animal

Step 4: Adopt the Appropriate Restraining Method

Step 5: Adopt the Appropriate Casting Method

Step 6: Identify Appropriate Mode of Animal Transport

Step 7: Adopt Appropriate Method to Release the Animal

Step 1 : Behavior

Animal behaviour is the reaction of animals to certain stimuli or the manner in which they react to their environment. The study of farm animal behaviour has made major contributions in identifying and helping to solve some of the key problems in the welfare of farm animals, including cattle during disaster. Knowledge and observations of animal behaviour can both help to establish input-based welfare criteria and also serve as outcome-based criteria to protect the animals from disaster.

Step 1 - Behavior: There are several reports on animals showing strange behavior before, during and after disasters, but there is still a lot to be studied. Considering the natural behaviors of different species or breeds enables the animal handler to effectively perform the required task. It also enables the animal handler to encourage the performance of naturally occurring behaviors and also the discontinuance of undesirable behaviors.

Ethology: The scientific and objective study of animal behavior, usually with a focus on behavior under natural conditions.

Dogs: Many canine misbehaviors are born out of instinct, and most arise from either boredom or stress. Aggressive behavior, chasing, marking, and resource guarding are modern manifestations of dogs' early instincts to acquire food and protect their territory and pack. Digging and chewing, on the other hand, are usually the results of boredom. Barking is a little of both. Jumping up and

mouthing are simply examples of one species (dogs) attempting to make a connection using very different forms of communication than another species (humankind) understands.

Cats: Free-ranging cats are active both day and night, although they tend to be slightly more active at night. Chirps and trills are how a mother cat tells her kittens to follow her. Aimed at you, it probably means your cat wants you to follow him, usually to his food bowl. Purring is a sign of contentment (usually). Cats purr whenever they're happy, even while they're eating. Growling, hissing or spitting indicate a cat who is annoyed, frightened, angry or aggressive. Leave this cat alone. A yowl or howl (they sound like loud, drawn-out meows) tells you your cat is in some kind of distress□stuck in a closet, looking for you or in pain.

Goats: A goat herd is very hierarchical, usually with a head male and a herd queen. When mixing a new member into the herd expect disputes to occur for a few days, in the form of rearing and butting. This is whilst the new goat establishes a position amongst the herd. Normally the lower status goats will be the first to argue with the new comer. Although this can appear rough, it is just natural goat behavior. Obviously, from a distance, keep a watch on the mix. If you are worried with the mix, allow them to live side by side for a while before reintroducing them. Goats dislike people grabbing, holding or tugging their horns. In a group, goats use their horns to test strength and protect themselves. If you behave in this way your goat may think you are challenging or threatening them.

Sheep: First dismiss the notion that sheep are a stupid animal. Sheep are best known for their strong flocking (herding) and following instinct. They will run from what frightens them and band together in large groups for protection. When one sheep moves, the rest will follow, even if it is not a good idea. Sheep are a very social animal. In a grazing situation, they need to see other sheep. In fact, ensuring that sheep always have visual contact with other sheep will prevent excess stress when moving or handling them. Even from birth, lambs are taught to follow the older members of the flock. Ewes encourage their lambs to follow. If there is a ram in the flock, he usually leads or lead by the dominant members of the flock.

Pigs: Pigs are social animals that under free-ranging conditions live in groups of approximately eight individuals. The groups typically consist of three sows and their offspring. Boars are solitary. A hierarchy is formed at social maturity. Communication in pigs is mainly vocal; there are ~20 different recognized sounds. The grunt is one of the most common sounds, given in response to familiar sounds or while looking for food (rooting). A short grunt is given when the pig is excited, whereas a long grunt is a contact call and normally associated with pleasurable stimuli. When pigs are aroused they may squeal, and they may scream when hurt. Dominant pigs bark at subordinate pigs as a threat. The tail position indicates the well-being of the pig. A tightly curled tail is an indication of a healthy pig, and a twitching tail indicates skin irritation.

Bovines: Range cattle live in groups of cows and calves; males are often separated until breeding season. Dominance in cattle is based on age, sex, weight, presence of horns, and territoriality. Breed also seems to play a role—heavier dairy cattle are dominant to lighter breeds, while lighter beef cattle are dominant to heavier breeds. Very little is known about vocal communication of cattle; most commonly noted are the moo, call, hoot, and roar. A distressed cow or calf will call or hoot, an aggressive bull may roar, and a hungry calf will give a high-intensity "menh." Under natural conditions, cows cycle throughout the year, with peak activity between May and July and low activity between December and February. The heat cycle is usually 18–24 hr and generally begins in the evening. Parturition normally occurs at night on pasture, and the calf normally starts suckling in <3 hr.

Equines: Horse behavior is best understood from the view that horses are prey animals with a well-developed fight-or-flight response. Their first reaction to a threat is often to flee, although sometimes they stand their ground and defend themselves or their offspring in cases where flight is untenable. Horses are highly social herd animals that prefer to live in a group. Horses communicate in various ways, including vocalizations such as nickering, squealing or whinnying; touch, through mutual grooming or nuzzling; smell; and body language. Horses use a combination of ear position, neck and head height, movement, and foot stomping or tail swishing to communicate.

Camelids: Some special behavioral features of the camel include snapping at other camels without biting them, showing displeasure by stamping feet, running, and occasionally vomiting cud when hurt or excited. They prefer walking in a single file. Camels find comfort in scratching parts of their bodies with their front or hind legs or with their lower incisors. They are also seen rubbing against tree bark and rolling in the sand. Their main vocalizations include a sheep-like bleat used to locate individuals and the breeding gurgle of males, while a whistling noise is produced as a threat noise by males by grinding the teeth together. They are not usually aggressive, with the exception of rutting males. The males of the herd prevent their females from interacting with other bachelor males by standing or walking between them and driving other males away.

Step 2 - Equipment: Animal handling equipment is based on the humane treatment of the animals and to not harm nor kill any animal. Handling of animals during any kind of disaster situation is very risky and requires the technical skills and knowledge to deal with both rescue of the animal and also safety of the animal handler.

Important points to consider while animal handling are;

- Adrenalin, panic and confusion affects both animals and humans psychologically and physiologically.
- The survival instincts of animals during emergency situation can make any animal handling technique ineffective.

- The generally accepted sequence for safety and evacuation is people first, and then pets, then livestock, then property.
- The appropriate disaster management approach may vary depending on emergency situation, type and intensity of the disaster.
- Livestock management priorities during a disaster should mainly focus on only saving lives and not to create any kind of further damage.

Equipment for Animal Handling:

- **Personal Protective Equipment (PPE):** Helmet, Lifejacket, Sturdy/Gum Boots, Gloves, Mask, Goggles, etc.
- **Species Wise Animal Handling Equipment:** Cotton Ropes, Halter, Chain, Bull Nose Leader, Muzzle, Sling, Travis, Twitch, Blinkers, Craddle, Nylon Straps, Equine Stock, Camel Crush, Camel Chute, Gambrel Restrainer, Sheep Chair, Pig Catcher, Hog Shackles, Tarpaulin Sheet, Herding Board, Thick Hand Gloves, Leash Pole, Y-Pole, Hand Snare, Catch Pole Net, Leash & Collar, Muzzle, Smart Collar, Dog Cage, Cat Tongue, Cat Catch Net, Leash & Chest Belt, Smart Collar, Cat Transport Box, Pulley Wheel Set, etc.
- **Vehicles:** JCB Backhoe Loader, JCB Industrial Forklift, Truck, Tractor, etc.
- **Local Resources:** Bamboo poles, cotton ropes (40-50 feet length and half inch thick), cotton cloth/towel, saree, PVC pipes, flat kisan hose pipes, etc.

Dog Handling Equipment:

Note: The equipment shown in the above table are only some of the minimum basic supplies required during emergencies and this is not an exhaustive list of equipment. There are many other materials that are available in the market which also could be used after consultation with the concern veterinarian and as per the local practice.

Name of Equipment	Specification/Use	Quantity
Muzzle (Small, Medium & Large)	To prevent dog bite during handling and treatment	2
Dog Catch/Pole Net	To catch the dogs for treatment or rescue	2
Protection Gloves	To protect the hand by dog or snake bite or any other kind of infection	2
Smart/Elizabeth Collar	To help in wound healing by avoiding dog licking or biting it self	2
Leash	For tying, handling and control	2
Chain	For tying, handling and control	2
Dog Catch Poles	for dog catching for rescue or for other purpose	2
Cages	To keep rescued dog or sick dog	2
Canine Cruiser	For transporting sick or heavy dog	2
Dog Transport Box (Large- 60x 20x28)	For transportation injured or sick dog	2
Y Pole	For resist to dog at a place and increase length of hand	2
Leash Pole	To catch the dog	2
Cloth Muzzling	For tying the dog mouth to prevent bite during dressing or medication	2
Dual Leash Pole	Suitable for big and small size dog to catch	2
Hand Snare	To catch the dog	2
Cage Trap	To restrain the dog	2
Dog Kennels	For keeping more than one dog at places	6
Dog Penning	Cage for keeping dogs	2

Note: The monitoring of all the equipment should be done periodically and the damaged/expired/exhausted stock should be replaced immediately to make it readily available for the veterinary emergency response teams at all times. This is a basic minimum equipment that would be required for rescue operations. However, the type of equipment and the quantity could vary depending on the local practice and requirement.

Cat Handling Equipment:

Note: The equipment shown in the above table are only some of the minimum basic supplies required during emergencies and this is not an exhaustive list of equipment. There are many other materials that are available in the market which also could be used after consultation with the concern veterinarian and as per the local practice.

Name of Equipment	Specification/Use	Quantity
Cat Cage	To capture cat at a place	2
Leash or Chest Belt	Control of cat	2
Smart Collar	Protect wound healings, prevent bite during dressing	2
Towel	Controlling of cat during treatment or rescue	2
Catch pole	To catch the cat	2
Cat Catch Net	To catch the cat	2
Cat Collar	Wear at neck, easy handling and identification of cat	2
Cat Transport Box	For cat transportation	2
Protection Gloves	To protect the hand during cat handling and treatment	2
Cat Tongue	To catch the cat	2

Note: The monitoring of all the equipment should be done periodically and the damaged/expired/exhausted stock should be replaced immediately to make it readily available for the veterinary emergency response teams at all times. This is a basic minimum equipment that would be required for rescue operations. However, the type of equipment and the quantity could vary depending on the local practice and requirement.

Cattle/Buffaloe Handling Equipment:

Note: The equipment shown in the above table are only some of the minimum basic supplies required during emergencies and this is not an exhaustive list of equipment. There are many other materials that are available in the market which also could be used after consultation with the concern veterinarian and as per the local practice.

Name of Equipment	Specification/Use	Quantity
Rope (Cotton/Plastic) 10 mtr	Handling and restraining of cattle	2
Chain	To tie up animal at a place	2
Muzzle	To control the animal to avoid eating harmful substance and prevent bite to handler	2
Halters	For easy control with leash or chain	2
Hoof Knife Set	For trimming away loose dried-out sole	2
Collars	For easy control	2
Cattle Sling	To holding/standing up those animal are fractured or not able stand on their legs with help of chain/pulley	2
Protection Gloves	Use during animal handling to avoid injury	2
Cattle Handling/Warrior Crush	To control the cattle by forcefully enter	2
Saracen Crush	To control the animal	2
Full Access Crush	2340mm long x 840mm wide x 2000mm high for handling cattle	2
Belly Clipping Crush	Both sides open for belly clipping, also handy for putting adopted calves on to suckle etc.	2
Mobile Crush	To control animal and move them at a safe place	2
10 feet Forcing System	10 feet forcing system	2
Fallen Stock Container	Disposal of animal wastes and ensure biosecurity	2
Trevis	To control and examine the animal	2

Note: The monitoring of all the equipment should be done periodically and the damaged/expired/exhausted stock should be replaced immediately to make it readily available for the veterinary emergency response teams at all times. This is a basic minimum equipment that would be required for rescue operations. However, the type of equipment and the quantity could vary depending on the local practice and requirement.

Horse/Donkey/Mule Handling Equipment:

Note: *The equipment shown in the above table are only some of the minimum basic supplies required during emergencies and this is not an exhaustive list of equipment. There are many other materials that are available in the market which also could be used after consultation with the concern veterinarian and as per the local practice.*

Name of Equipment	Specification/Use	Quantity
Cotton or Plastic Rope	Handling and restraining of cattle	2
Horse Muzzle (Small/Medium/Large)	To control the animal to avoid eating harmful substance and prevent bite to handler	2
Mule Muzzle	To control the animal to avoid eating harmful substance and prevent bite to handler	2
Donkey Muzzle	To control the animal to avoid eating harmful substance and prevent bite to handler	2
Head Collar (Small/Medium/Large)	Easy to control with the help of leash applying over head	2
Twitch	To handle the horse by applying twitch at upper lip	2
Leash	Handle the animal with help of collar	2
Blinkers	To control the horse by avoiding to see surroundings at the time of fear and stress	2
Hobbles	To control horse when aggressive by tying hobbles on the front and hind legs of the same side	2
Stirrup Leather	Control by tying this belt at knee	2
Rope Halter	To control horse	2
Chain Shank	To control horse with halter	2
Cradle	To prevent banding of neck and avid horse bite	2
Tail Twitch	To control the horse by tying rope in tail	2
Cross Tie	Helps to keep horse centered in an aisle way/work space, providing easy access to both sides	2
Cribbing Straps	Helps to prevent horse from biting others and bad habits like yawning frequently, etc.	2
Nylon Straps	To aerially lift heavy animals who are trapped in a pit or well	2
Nylon Sling	To aerially lift heavy animals who are trapped in a pit or well	2
Rescue Sling	To aerially lift and transport heavy animals who are trapped in a pit or well	2
Paddock Penning	Safe enclosure for injured horses and to provide restricted grazing, etc.	2
Horse Stock	To ensure safety of the horse and handler during examination	2
Steed Range	Internal stabling of horses in emergencies	6

Note: The monitoring of all the equipment should be done periodically and the damaged/expired/exhausted stock should be replaced immediately to make it readily available for the veterinary emergency response teams at all times. This is a basic minimum equipment that would be required for rescue operations. However, the type of equipment and the quantity could vary depending on the local practice and requirement.

Pig Handling Equipment:

Note: The equipment shown in the above table are only some of the minimum basic supplies required during emergencies and this is not an exhaustive list of equipment. There are many other materials that are available in the market which also could be used after consultation with the concern veterinarian and as per the local practice.

Name of Equipment	Specification/Use	Quantity
Cotton Rope	Control animal by tying their all legs	2
Long Handle Pig Catcher	To catch the pig by fastening rope at neck	2
Pig Cage	To control and secure pigs by keeping under cage	2
Transportation Cage	To use in transportation from risky lace to safe place	2
Snares and Tongs	To catch the pig by its snout/neck	2
Metal Trough	To restraint piglets	2
Portable Squeeze Chute	To restraint pigs	2
Hog Shackles	To restraint pigs legs	2
Herding Board	To guide the pigs in a herd	2
Feeding Trough	To feed the pigs	2
Pig Feeder	To feed the pigs	2
Pig Transport	To transport the pigs	2

Note: The monitoring of all the equipment should be done periodically and the damaged/expired/exhausted stock should be replaced immediately to make it readily available for the veterinary emergency response teams at all times. This is a basic minimum equipment that would be required for rescue operations. However, the type of equipment and the quantity could vary depending on the local practice and requirement.

Goat/Sheep Handling Equipment:

Note: The equipment shown in the above table are only some of the minimum basic supplies required during emergencies and this is not an exhaustive list of equipment. There are many other materials that are available in the market which also could be used after consultation with the concern veterinarian and as per the local practice.

Name of Equipment	Specification/Use	Quantity
Muzzle	To control the animal to avoid eating harmful substance and prevent bite to handler	2
Chute	Handling of animals and feeding	2
Goat Yards	To control the number of goats at a place	2
Large Bugle System	To keep number of sheep / goat at a place	2
Weigh Crates	To weigh the small animals e.g. sheep and goat	2
Dagging Crate	Goat goes up and easy for handling and accessing various sides of the goats	2
Turnover Crates	To turn the animal for wound dressing	2
Trailer	Transporting sheep /goat from risky place to safe.	2
Wool Packing Crates	Helps in packing from sheep	2
Sheep Chair	Helps to trip the hoofs and treat the sheep	2
Gambrel Restrainer	Restrain the sheep	2

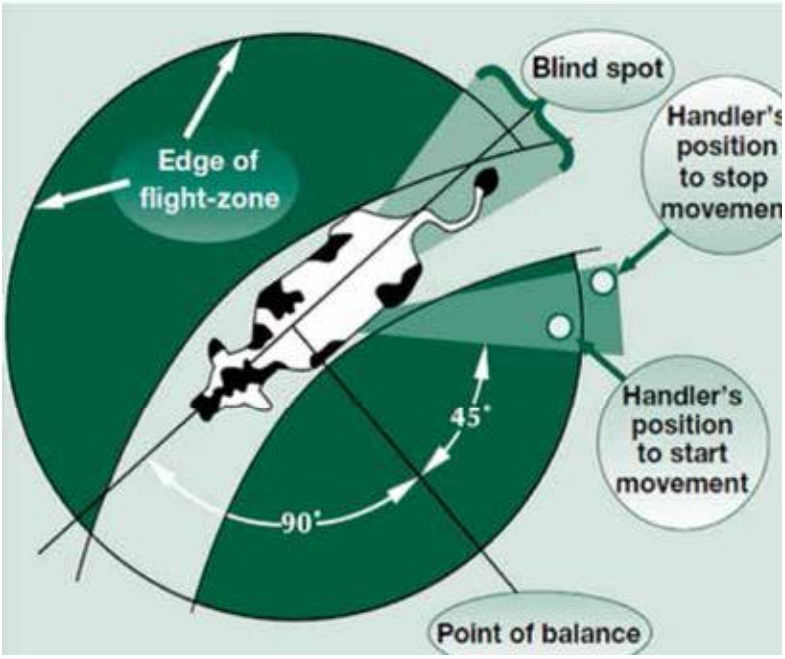
Note: The monitoring of all the equipment should be done periodically and the damaged/expired/exhausted stock should be replaced immediately to make it readily available for the veterinary emergency response teams at all times. This is a basic minimum equipment that would be required for rescue operations. However, the type of equipment and the quantity could vary depending on the local practice and requirement.

Clinical Emergency Equipment:

Note: *The monitoring of all the equipment should be done periodically and the damaged/expired/exhausted stock should be replaced immediately to make it readily available for the veterinary emergency response teams at all times. This is a basic minimum equipment that would be required for rescue operations. However, the type of equipment and the quantity could vary depending on the local practice and requirement.*

Name of Equipment	Specification/Use	Quantity
Blood Gas Analyser	To know the level of Blood Ph, oxygen and carbon dioxide	1
Vital Signs Monitor	To measure vital signs in critical condition. e.g. Body temperature, Respiratory rate, heart rate, BP	1
Holter ECG	Holter ECG	1
Electrocardiography	To know the cardiac anomaly specially in small animals	1
Ultrasound Scanner	To know anomally of internal organ like stomach, liver, kidney etc	1
Ambu Bag	To provide positive pressure ventilation to animals at the time of difficult breathing	1
Homemade Splints for Dog	To use in support of fractured bone	1
Laryngoscope	To examine internal injury of mouth and larynx	1
Opthalmoscope	To examine the internal injury and structure of eyes	1
Electric Microscope	Blood examinations like DLC, TEC and Blood protozoa	1
Stethoscope	To examination of heart, lung and gut sound.	1
Digital X-Ray	To examine the fracture of bones and their location, any internal organ anomaly or affection.	1
X-Ray Viewer	To see the X-ray in light	1
Oxygen Cylinder	Provide oxygen to patient under emergency condition.	1
Hydraulic Table	To animal examination, wound dressing, small surgery	1
Dialyser	Use to analyse blood or remove toxic material.	1
Blood Analyser	Examination of DLC, TLC, Hb	1
Trolley	For shifting injured animals	1
Defibrillator	To treat for life threatening cardiac problems like cardiac arrest	1
Laparoscope	To examine internal organ with help of camera and operate them. Insert through peritoneal cavity.	1
Endoscope	Examination of internal organ. Insert through mouth.	1
Doppler Blood Pressure Monitor		1
Hot Air Oven	To sterilize lab material to maintain hygienic condition.	1
Incubator	Culture, growth and antibiotic sensitivity	1
Autoclave	Sterilize surgical material	1
Centrifuge	To centrifuge blood, serum and faecal sample for examination.	1
Water Bath	For sterilization of instrument in boiling water	1
I/V Fluid Stand	To administer fluid to animals.	1
Surgical Light	Need during surgery for proper focusing	1
Animal Ambulance	Transportation of sick animals	1
Portable Ultrasonography Machine	Transportable at anyplace. To know anomaly of internal organ like stomach, liver, kidney etc	1

Step 3 - Approach: In addition to understanding animal behavior the handler should have the necessary handling equipment and need to approach the animal only after assessing its flight zone and point of balance. The handler should not be anywhere close to the animal's blind spot while approaching the animal.



Flight Zone: The flight zone is an animal's personal space. It is the minimum distance the animal will try to maintain between itself and any perceived threat. The animal will move away when approached.

Point of Balance: The point of balance is usually at the animal's shoulder and it is determined by the animal's wide angle vision. The animal will move forward in a chute or pen when the handler passes the point of balance in the opposite direction.

Blind Spot: Large animals also have a blind spot located directly behind them. Animals cannot see objects in this area and will usually kick if they become aware of any activity in this area.

Dog: Approach slowly (at a relaxed walk). If a nervous dog gets close to you, freeze and look only at the ground (walk backwards slowly). Do not turn and run, if a dog attacks, assume a position of a rock, curl into a rock and protect your face and body. If a growling dog gets close to you, pretend to be a tree, stand still with your hands at your side. Allow the dog to sniff you and it will usually go away. Avoid starring at or approaching head on. Approach sideways and look using your peripheral vision. Avoid pelting if the dog looks nervous or tense. Avoid leaning over the dog's bubble and stay side to the dog. Its ok to pet the dog if he looks relaxed, comes up to you and solicits your attention by rubbing against you.

Cats: To successfully help an injured cat, you must remember it has five weapons; the mouth and four sets of claws. An injured cat is likely to also be frightened especially if it thinks it's being cornered by you so great caution must be taken when approaching the animal. Approach the cat slowly, speaking in a reassuring tone of voice. Move close to the cat without touching it. Stoop down to the cat. While continuing to speak, observe its eyes and body language. If cat is wide-eyed, ears back, growling & hissing, do not attempt to pet it. If the cat is shivering and crouching, attempt to reassure it by petting it, first behind the head. If this is permitted, pet the rest of the head and the neck. Scratching the ears and stroking under the chin is often comforting.

Goats: If they decide you're trying to catch them they won't come to you. Try not to chase the goat, because, being prey animals, this will only make them more scared of you. Let them get used to the environment and you might try taking advantage of their natural curiosity and just sit there, in a non-threatening peaceful fashion and let them approach you. If, and when, they do approach you, offer feed. Go slowly and patiently and don't push the issue to fast. The younger the goat is, the easier it will be to convince them that you are their friend, but a young age is no guarantee they will be tamable. The older they are, the more patience you will need.

Sheep: Approach the sheep slowly and calmly. Approach the sheep between its shoulder and flank (if you approach too close to the head, the sheep will likely be able to duck away from you). Most

sheep will come when they think they are going to get grain to eat. If these don't work, it will be necessary to go out to the field to get the flock and either drive them from behind or lead them with a feed bucket or lead sheep. To move individual sheep, hold the sheep under its jaw and push its dock ("go-button"). If you cannot get close enough to the sheep to grab it under its jaw, you can reach for its hind leg or rear flank.

Swine: Move calmly and quietly increases pig responsiveness. Make sure you are not in the pig's blind spot. To respond to you they need to see you. When moving pigs allow time to explore while limiting distractions.

Cattle: Cattle have panoramic vision which allows them to see everything except what is directly behind them and right in front of their noses. Move calmly, deliberately, and patiently. Avoid quick movements or loud noises that may startle animals. Always leave an escape route when working in close quarters with animals. Avoid startling the animal. Make it aware of your approach before getting too close to it.

Equines: Approach the horse slowly and to make your intentions known - otherwise you might spook him, causing him to rear, kick or run away. To avoid this, you need to let your horse know that you're a friend and that you don't mean him any harm. You can do this by talking softly to him and approaching him from the side. Avoid sneaking up on him, or rather surprising him. Whenever approaching a horse, always speak to him to alert him of your presence. With frequent handling, the flight zone decreases in size and may even disappear. If you want the horse to move backwards, start in front of the point-of-balance and move into the horse's flight zone. If you want the horse to move forward, move into the horse's space from behind the point-of-balance.

Camelids: Camels run in a manner similar to horses rather than cattle. This means that you maneuver the herd from further away than cattle. Because the mobs of camels are scattered and the mob size is often small it is often necessary to accumulate two or more mobs into one and then herd them over considerable distances to yards for capture. The stress of capture causes sweating and further moisture loss. Watering of the camels once captured is highly desirable. If camels are handled quietly and with a minimum of fuss, within a couple of days even feral camels will approach humans in the yard. Walking through the freshly caught camels is recommended as this has a quieting effect on the camels and makes subsequent handling easier.

Step 4 - Restraining: Proper restraint and handling techniques are essential for reducing stress to animals and the handler. There are four types of restraint:

1. Non-contact: voice, eye contact, gesture
2. Manual or physical: using body or devices

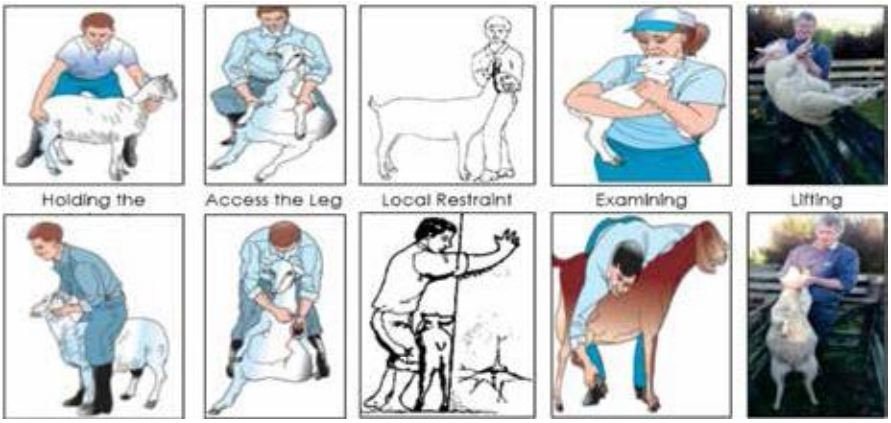
3. Chemical: using tranquilizers or anesthetics
4. Combination methods: using two or more of the previous methods

Three questions before restraining:

1. Which technique available is the best for the patient and procedure?
2. Who is best qualified to do the restraint (without injury to patient & handler)?
3. Where is the best location to restrain the patient?

Restraining Cats:

Restraining Sheep/Goats:



Step 5 - Casting Method The Objective of Animal Casting should be to minimise the chances of injury either the animal or the peopl attending it. It is done to restrain the patients to increase thee ability of a veterinarian and/or technician in completing the vital procedures.

One should adopt the appropriate casting method deeping in view of potential risk that exists with the practice or handling of large animal vaterinary medicine. The following methods can be adopted as per situation and severity of the animal.

A) Burley Method

B) Criss-Cross Method

C) Reuff's Method

Step 6 - Transportation: While transporting it is very important to avoid injury and death of any animal. Measures should be taken to ensure safe and welfare friendly transportation.

Commercial livestock liners are consistently present on roadways, transporting animals to farms, auctions, stockyard, or slaughter as part of the human food chain. Considering large number of animals they may contain, these trailers represents a significant concern when they involved in incidents. Commercial liners are loaded in accordance with animal transport standard, and special consideration is given to the distribution of weight; load size is normally determined by the animal size, species, age of animal, size and design of trailers, weather conditions, condition of animals. A loaded commercial livestock trailer involved in a motor vehicle accident or overturn is one of the most challenging and dangerous incidents for responders. This type if incident requires special equipment and personnel to be brought to scene (e.g., secondary containment, cutting equipment, veterinarian, animal handlers). Handling skills by the on-scene personnel are crucial to preventing injuries when working with large animals.

Specialized response Livestock liner accidents commonly require lengthy on-scene response (4-12 hrs) because the rescue of the animals tends to become complicated, requiring specialized equipment and personnel. Triage and field euthanasia of mortality injured animals is required on most scenes. The carcass of dead animal must be removed from the scène for proper disposal. Factor that increase the time and effort involved as well as the risk of injury include lack of preparedness and training, lack of resources, poor communication with animal-related resources in the local area and presence of too many people on the scene. Trailer design- understanding the design of the animal compartment of the trailer is crucial to an effective response, without this knowledge it can be difficult to effectively and efficiently cut access and egress opening. Communication challenges- noise from injured animal or excited animal hinders the communication inside the trailer.

Tips for Livestock Transport Emergencies

- Crowd control is important to avoid injuries - to people and animals. Keep people away from the scene to prevent frightening the animals.
- Are the animals contained or loose? You will require a plan for both situations.
- Containing the animals is a top priority.
- Remain calm, quiet and safe - always keep an escape route open.

- Evaluate the livestock truck; try to identify damage extent, type and number of animals.
- All animals are unpredictable and dangerous, no matter how clam they may seem.
- Accidents, stress and injuries may alter behaviour significantly. You may need an expert!
- Rescue efforts require expertise, planning and coordination.
- Moving slowly with patience is always best when moving or handling farm animals.

Dogs/Cats: Make sure that your pet is safely enclosed in the vehicle, travel enclosure or container. Keep the door locked. The vehicle, travel enclosure or container should have enough ventilation at all times. Heat and moisture can quickly build up inside unless there is enough air flowing through. Under any circumstances your pet must not be without water for more than 12 hours, or without food for more than 24 hours.

Sheep/Goats: Sheep and goats should be transported using trucks manufactured for livestock transport. Provide adequate ventilation. Non-slip floors to reduce the risk of animals slipping. Allow an average floor area of 0.4 square meter per sheep/goat. A roof is necessary to prevent exposure of animals to the hot sun for long hours. Vehicles should have portable ramp to facilitate loading/offloading.

Swine: The recommended maximal loading pressure under ideal conditions for swine loaded in groups can be described as a hoerl model.

$$\mathbf{y = (37.53)(0.9969)^{W}(W^{0.5008})}$$

y = loading pressure in kg body weight/m^2

W = average animal body weight in kilograms

The maximum ramp angle for pigs should be 20°00'. Pigs should not be fed before transport as the feed ferments and the gas causes pressure on the heart in the thoracic cavity, leading to heart failure and death.

Bovines: The maximum ramp angle for cattle calves should be 20°00' and for adult cattle should be 36°00'. The most important disease associated with transportation of cattle is "shipping fever" which is attributed to the stress caused by transporting calves or cattle form one geographical region to another. The following separations must also be applied:

- Cattle of significantly different sizes or ages.
- Sexually mature males from females.
- Animals with horns from animals without horns.
- Animals hostile to each other.
- Tied animals from untied animals.

Equines: Horses and ponies must be transported in individual stalls. The floor space allowance for road transport of adult horses is 1.75 square meter. The maximum ramp angle for horses should be 20°00'. Observe the equines as frequently as circumstances allow, but not less than once every 6 hours, to check the physical condition of the equines. The floors are to be of non-skid construction or a non-skid material is to be placed on the floor.

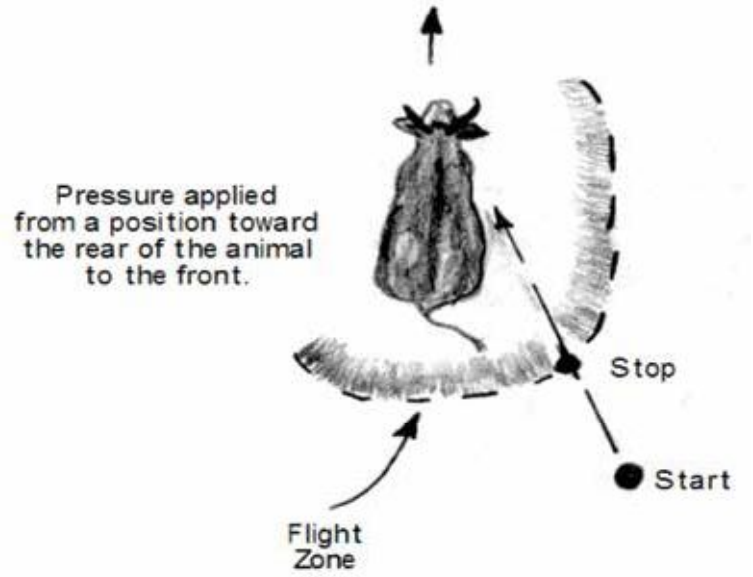
Camelids: Vehicles and facilities must be appropriate to contain camels; and have effective airflow; and have flooring that minimizes the likelihood of injury or of camels slipping or falling; and be free from internal protrusions and other objects that could cause injury; and have sufficient vertical clearance for camels to minimize the risk of injury. Camels should be fed and watered as soon as possible after unloading. The maximum ramp angle for horses should be 20°00'.

Step 7 - Release: For all species, there should be sufficient unloading ramp capacity so trucks can be unloaded promptly. The slope of the ramp should not exceed 20 degrees. For cattle, the recommended stair step dimensions are 3 1/2 inch (9-10cm) rise and a 12-inch (30cm) long tread. For pigs, a 2 1/2 inch (6.35cm) rise and a 10-inch (25cm) tread works well. Ramps for small piglets will need much closer cleat spacing (3 inches/ 8cm). All flooring and ramp surfaces should be non-slip. Many animals are injured on slippery unloading ramps. Animals being transported should be unloaded in a humane way into pens equipped for feeding, water, and rest for at least 5 consecutive hours.

5.3 Rescue of Animals in Different Disaster Scenarios

1. Steve Cote's Stockmanship & Cattle Handling

Goal: Controlling, moving and training cattle for grazing land management.



Three basics to better control,

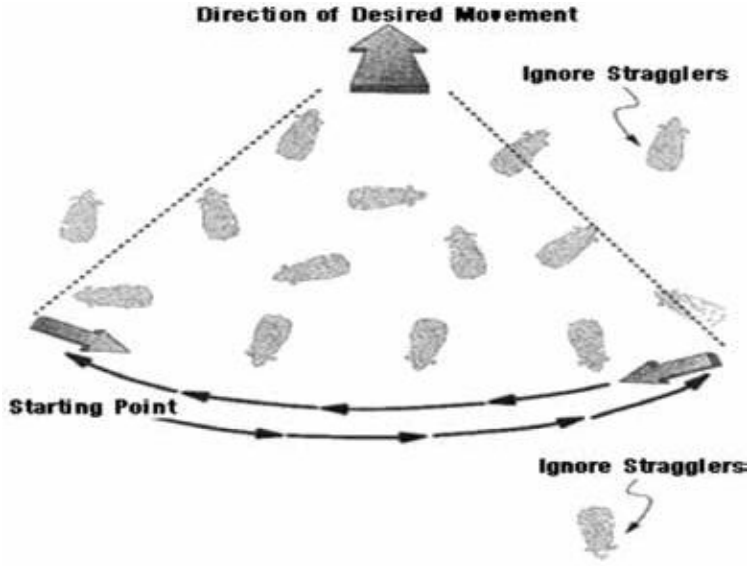
- Use handling techniques or signals that livestock can respond to naturally so they can understand your meaning.
- Stop forcing stock to do what you want. Instead, let them do it by setting it up so they want to do it.
- Stop doing the things that bother livestock like yelling, curving around them, crowding, jamming, and moving fast so they will be comfortable enough to learn quickly and react calmly.

Steps:

- Apply pressure from an angle nearly perpendicular to the side of the cattle to make it move in the desired direction
- Apply pressure from a position toward the rear of the cattle to the front
- By applying too much pressure on the cattle's hip will make the animal turn towards the handler
- By applying pressure on the side of the cattle's head and neck will make the animal turn away from the handler.
- Don't expect that you'll be able to gather and pull a large herd together and place them on the range unless the herd has been well handled first

2. Bud William's Technique of Moving Cattle

Goal: Moving a herd of cattle to a desired location using low stress livestock handling.



Steps:

- Keep the cattle always along with their herd
- Induce loose bunching of the cattle to remain close to the herd
- Maintain the arc of zig zag movement from behind the herd applying pressure gradually and leading them to the desired location
- The arc of the zig zag movement must not exceed a quarter circle
- Do not circle around the cattle, ignore the straying cattle as they will come back to the herd as
- The movement should be straight or a very slight arc confidently applying pressure by the handler
- Stop applying pressure after reaching destination and move to the front of the herd

3. Flossing of Webbing Technique – Horizontal Pull

Goal: Move animal horizontally along the ground.

Steps:

- Safety of the animal handler is always the top priority, always wear the PPE as and when

required.

- Remember to always approach in the safe areas and not in the blind spot of the animal.
- The fire hose/kisan hose or rope is laid on the ground next to the animal's front or hind end.
- There should be at least two people at each end of the holding the fire hose.
- The animal's tail or head is lifted slightly by two people while the team slips the fire hose underneath the hind end
- The teams move toward the centre of the animal and pull rhythmically to floss the webbing underneath until it is threaded to an anchor point.
- Rescuers should pull as gently as possible to avoid friction burns of the animal's skin.

4. Flossing of Webbing Technique – Forward Assist

Goal: Assisting animal to move forward

Steps:

- Safety of the animal handler is always the top priority, always wear the PPE as and when required
- Remember to always approach in the safe areas and not in the blind spot of the animal
- The fire hose/kisan hose is wrapped around the chest of the cattle just behind the shoulder of the animal
- The fire hose is threaded between the front limbs in front of the animal and attached to a vehicle or gently pulled manually by rescuers.

5. Flossing of Webbing Technique – Backward Drag

Goal: Move animal on the ground horizontally backward.

Steps:

- Safety of the animal handler is always the top priority, always wear the PPE as and when required.
- Remember to always approach in the safe areas and not in the blind spot of the animal.
- The fire hose/kisan hose is wrapped around the animal's abdomen at the level of the flank.
- The fire hose is threaded between the rear legs behind the animal and attached to a vehicle or gently pulled manually by rescuers.
- The animal can also be vertically lifted to be shifted to a safe area.

6. Flossing of Webbing Technique – Sideways Drag/Hampshire Slip

Goal: Move animal on the ground horizontally sideways back.

Steps:

- Safety of the animal handler is always the top priority, always wear the PPE as and when required.
- Remember to always approach in the safe areas and not in the blind spot of the animal.
- Two fire hose/kisan hose is pushed under the animal from behind it's back at the spinal column towards its belly chest, then posterior abdomen.
- The free end of the fire hose is pulled back from behind and the animal will remain immobilized as long as pressure is maintained on the hose/rope.

6. Loading/Unloading of Animal in Vehicle for Transportation

Goal: Appropriate method to load/unload animals for safe transportation.

Steps:

- Make a ramp with 20 degree angle from the ground level up to the body of the transportation truck for loading the animals.
- Notice for any sharp objects or structures in the vehicle that could harm animals.
- Place the paddy straws/green grasses as bedding material over the floor of the vehicle.
- Along with the animal owner load the animals one by one in the truck, don't overload maintain adequate space between animals.
- Animals head should be facing the direction of the vehicle movement.
- Animals having horns should be kept separately to avoid fights and injuring other animals.

7. Rescue of Animal from Well/Pit

Goal: Appropriate method to Safely rescue animal from well/pit.

Steps:

- Let animal familiarize with surrounding and observe for any injuries on the animal's body.
- Prepare the pulley structure using the poles above the well/pit and keep the rope ready to be pulled by rescuers.
- Provide feed to animal and request the animal owner to accompany in approaching the animal, don't pull head or neck of the animal.
- Tie rope to the horns of the animal (if no horns, tie to the halter) and securely hold the animal's head.
- Put two rubber belts/tarpaulin sheets around the animal's body one just after the front legs and another before the hind legs.
- Fix the rubber straps/tarpaulin sheets with the rope to be pulled up by the rescuers or by the JCB backhoe loader.

8. Shifting of Injured/Unconscious Animal

Goal: Shift an injured/unconscious animal safely to a desired area.

Steps:

- Assess the surroundings for any further damage that could cause the animal and the handler. Provide feed and water to the animal if required.
- Clear the passage for easy access to animal and also prepare the area you wish to shift the animal.
- Place bamboo poles close the animal's back, place the metal board and turn the animal over the metal board.
- Tie both ends of the metal board on each sides with pair of rescuers holding the rope/strap.
- Gently drag the metal board over the bamboo poles until you reach the desired location.
- If there is insufficient space use JCB forklift to shift the animal/carcass and undertake the necessary first aid/disposal procedure.

9. Rescue of Animal Trapped in Swamp/Mud/Quick Sand

Goal: Safely rescue animal trapped in swamp/mud/quick sand.

Steps:

- Let the animal calm and familiarize with surrounding, observe if there are any injuries.
- Request animal owner to accompany always while approaching the animal and place the bike tube below the animal's head and securely tie it to the halter.
- Don't pull head or neck of animal, tie rope to the horns of the animal (if no horns, tie to the halter).
- Put two nylon straps under the animal's body (easy if you have a nickopolous needle) and securely hold both ends by 4 pairs of rescuers.
- Remove mud from the desired direction using shovel/spade to rescue the animal.
- Place the tarpaulin sheet close to the animal's back and tie the ends to the static ropes by a pair of rescuers.
- The halter is tied to securely hold the hold by the animal owner and lead rescuer.
- Once all are ready simultaneously drag the animal out of the swamp/mud.
- If there are any hurdles in between the pair of rescuers should clear using shovel/spade and facilitate the rescue.

- Provide sufficient time for the animal to take rest in between if stressed and continue the rescue.

10. Rescue of Animal from Water using Boat

Goal: Appropriate method to rescue animal from water using boat.

Steps:

- 2 teams of 4 rescuers each on 2 motor boats go parallel in the water to reach the animal.
- Always approach the animal from sides along with the animal owner.
- Be careful not to take animal close to the motor either in front or back of the boat.
- Throw rope and reach close to the animal and tie animal securely close to the boat.
- One rescuer should firmly hold the animal's head close to the boat above the water. Other rescuers using the rope firmly grasp the animal's body close to the boat.
- Blind fold the animal to avoid stress. Always place and move animal in the direction of boat.
- Remove the blind fold and release the animal once the team reaches the shore.

- Don’t board large animals over boat. It is easier to control and handle animal when more than half of its body is in water.

11. Animal Water Rescue using Floatation Device

Goal: Appropriate method to rescue animal from water using floatation device.

Steps:

- In presence of animal owner tie floatation device/PVC pipes to the animal.
- Gently take animal to the water.
- Rescuer should lead the animal to cross the river to reach other side of the shore.
- Always stand in the side of the animal and don’t’ go near the animal’s blind spot.
- If animal is excited blind fold and lead the animal.
- Always ensure the head of animal is above the floatation device.

Chapter 6:

Carcass Disposal

Carcass: The dead body of an animal, group of animals, or the remains of any dead animal's body parts following a disaster.

Carcasses is an acute problem in disaster especially if the number of animals dying is enormous. Disposal of carcass is to ensure proper sanitation and avoid outbreaks of epidemics. Decaying or rotten carcasses is a heaven for pathogens. It causes major outbreak of infectious diseases and threat to the health security of both human and animals. Appropriate measures should be taken to avoid accidental or deliberate release of highly contagious disease like Bird flu which also can cause many prion related diseases.

6.1. Strategy for Carcass Disposal

Goal: Should Create positive public perception, reduce disease transmission, promote environmental sustainability, economical and practical.

It requires preparation well in advance to get optimum results for effective disposal after assessing all the options. Decision regarding adoption of particular method should be taken based on Environmental and disease considerations, Availability of resources, Cost involved and Socio-cultural considerations. The effective disposal strategies will be those that exploit every available and suitable disposal option to the fullest extent possible, regardless of what those options might be. Special consideration should be given while undertaking disposal of wild life carcasses which is a major reservoir of many zoonotic diseases.

Mortality management requires thinking before death to avoid problems after the fact. Proper disposal of animal carcasses during disasters is required to protect human and animal health as well as environmental health. It is the responsibility of animal or poultry owner for disposing the mortalities within 24-48 hours in environmentally acceptable manner. Carcass disposal should be an integral part with provision of finance from calamity relief fund. Trainings on proper handling, transportation and disposal should be imparted to relevant government staff. Animal carcass

retrieval teams should be constituted with the required capacities and resources to implement safe carcass disposal activities. The following points need to be considered,

- Selection of suitable site for carcass disposal
- Availability of requisite equipment to be acquired by the government
- Plan and organize special equipment for lifting carcasses and digging trenches (tractors, bulldozers, front end loaders excavators, etc.)
- Suitable transport arrangement from retrieval to disposal site by safe route by pooling the vehicles.
- Animal carcass identification systems should be followed for subsequent data collection and compensation to the owners.

Risks due to Improper Carcass Disposal

- Risks to ground and surface water from leach ate
- Risks to human and animal health
- Neighbor/Nuisance complaints
- Pathogens may be present in carcass
- Disease can spread by
    - Runoff from rainfall
    - Direct contact with other animals
    - Scavengers
    - Insects

6.2. Carcass Disposal Methods

There are many methods for disposal of animal carcasses but the choice depends upon the type of disaster and availability of facilities in the disaster affected area. Some of the carcass disposal methods are as follows,

A. Burial

B. Incineration/Burning

C. Composting

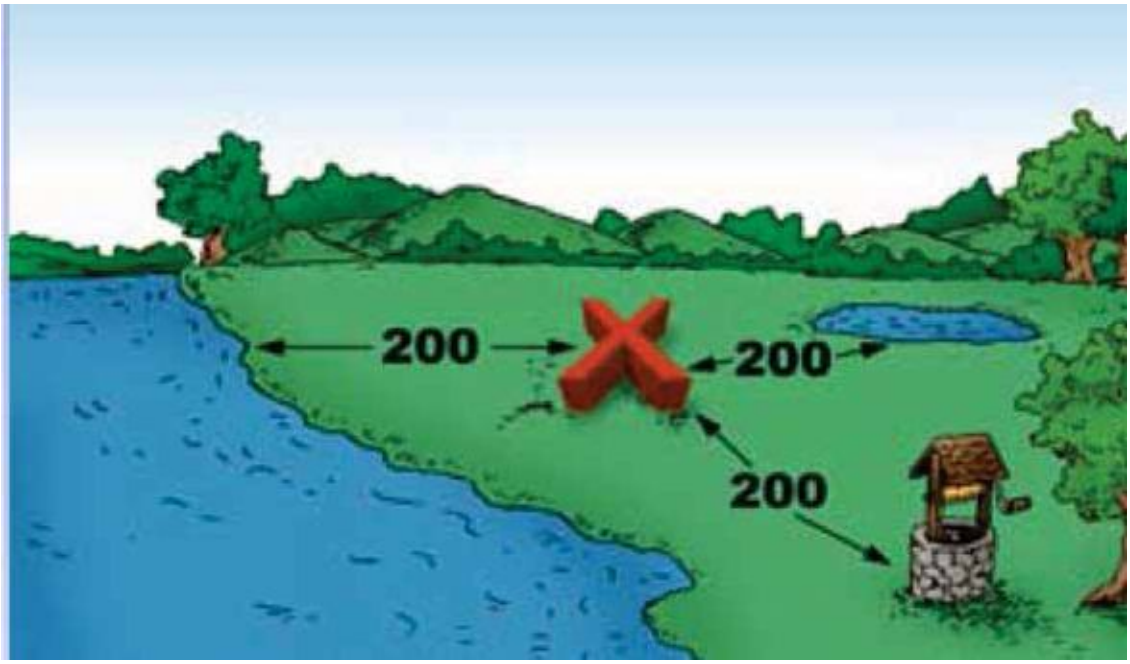
D. Rendering

E. Alkaline Hydrolysis

F. Lactic Acid Fermentation

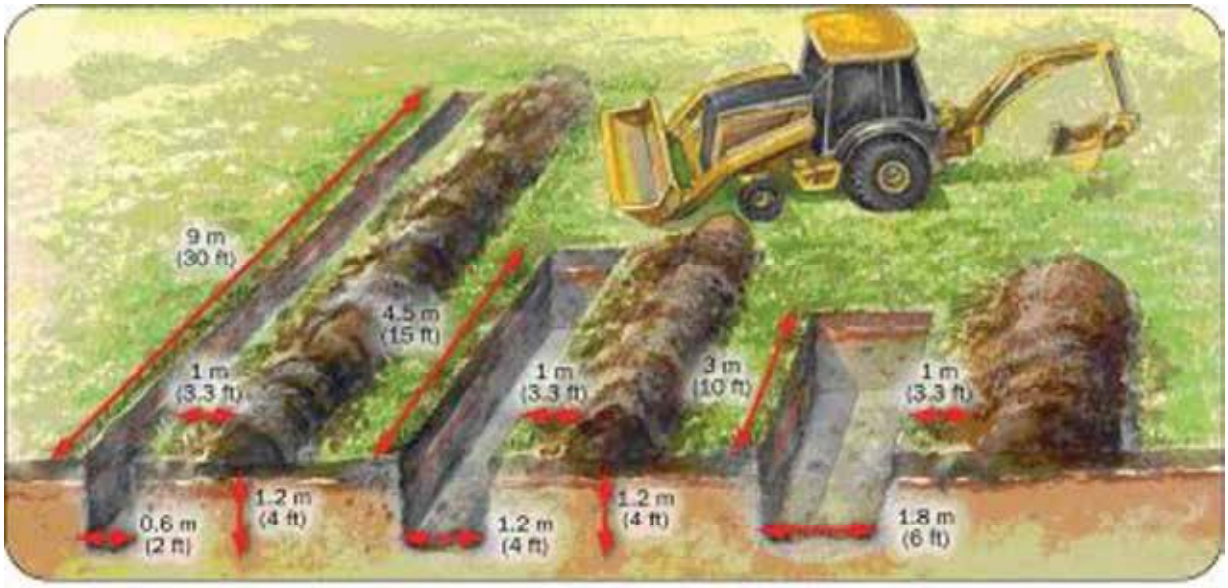
G. Thermal Depolymerization

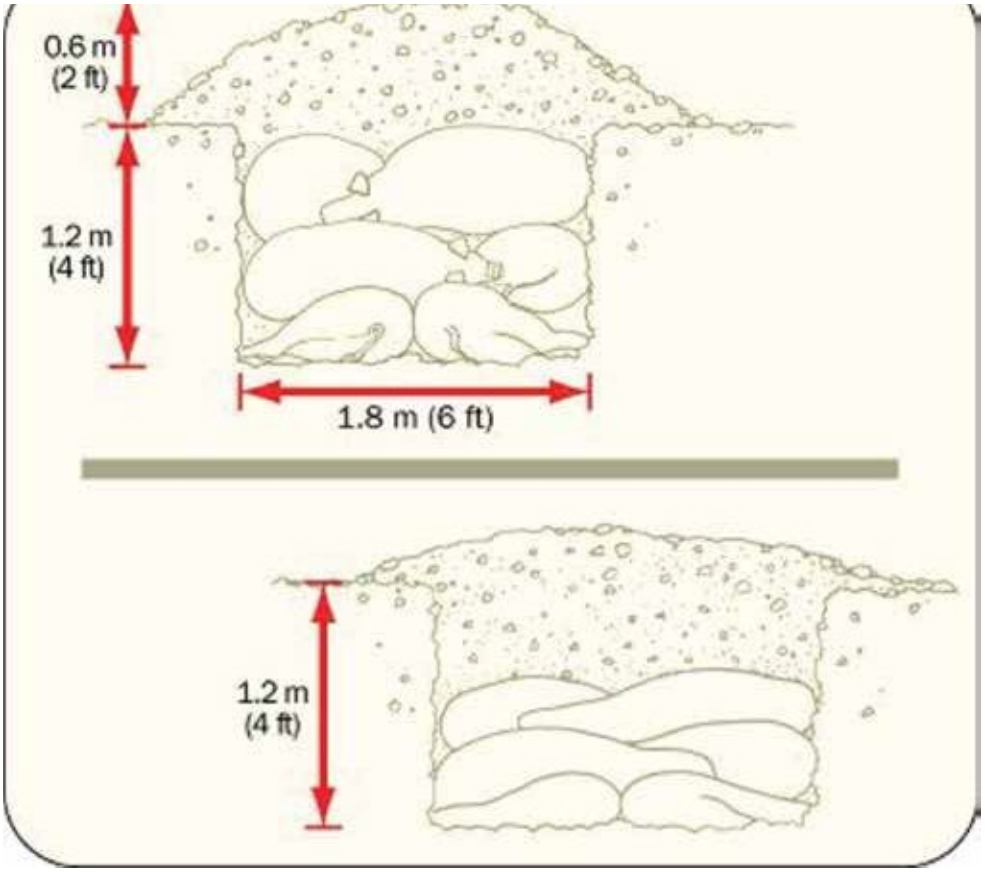
A. Burial: There are two common methods of burial for animal carcasses, 1. Open Pit Method and 2. Closed Pit Method. Generally burial is recognized as the preferred disposal method of choice when infectious agents are involved. It can also be routinely utilized in natural disasters. It is preferred because it is generally quicker, cheaper, environmentally cleaner, easiest to organize, and often the most convenient means of disposing of large numbers of livestock. Disposal by trench burial involves excavating a trough into the earth, placing carcasses in the trench, and covering with the excavated material (backfill). Bleaching powder or calcium hydroxide - layered upon the dead animals (not directly over the body but above a layer of soil) to keep insects away. Followed by vector control programme. Barriers should be erected to prevent assess of wild animals, birds and rodents. Thorny bushes or plants should be grown on mass burial site.\



The areas with sandy or gravelly soil and a shallow ground water table must not be used as burial sites. The bottom of the disposal trench must be 4 feet above any permanent water table, and the trench must be a minimum horizontal distance of 200 feet from the nearest

surface water. Well-drained, at least 200 feet from water sources, sinkholes, seasonal seeps or other landscape features that indicate the area is hydrologically sensitive. The disposal site should be away from any residence, drinking water well, shallow aquifers or areas that may be flooded. This is a good option with bio security point of view.





Advantages:

- Simple, requiring little training
- Quicker, cheaper, environmentally cleaner
- Uses readily available equipment
- Suitable to many locations
- Eliminates the need for transportation of potentially infectious material.

Disadvantages:

- The potential for detrimental environmental effects, specifically water quality issues, as well as the risk of disease agents persisting in the environment.
- Burial serves as a means of placing carcasses "out of site, out of mind" while they decompose, but it does not represent a consistent, validated means of eliminating disease agents.
- Burial may be difficult when the ground is wet.
- Burial of carcasses does not generate a useable by-product of any value as compared to some other disposal options,

Open Pit Method: Most common method used by commercial poultry producers for disposing of dead animals. Poses a threat to groundwater quality. The carcasses can leach contaminants for an undetermined length of time if they do not decompose properly. Ambient temperature and moisture conditions can slow or speed up the degradation process, thus affecting environmental contamination possibilities as well. Open pits are also susceptible to scavenger intrusions which is highly undesirable in disease related disasters.

Closed Pit Method: Freshly closed pits have become the method of choice for the most current disaster situations. By heaping soil on top of the pit, the weight of the soil acts to stop carcasses from rising out of the pit due to gas entrapment, prevents scavengers from digging up carcasses, helps filter out odors, and assists in absorbing the fluids of decomposition.

Approximate dimensions of burial pits based on total weight of deadstock to bury and relative size of animal

Deadstock Size and Type	Pit Dimension	Total Weight to Bury		
		250 kg	1,000 kg	2,500 kg
Small (poultry)	width	0.6 m	0.6 m	0.6 m
	depth	0.9 m	1.2 m	1.2 m
	length	1.2 m	3.6 m	9.0 m
Mid-Size (sheep, goats, swine)	width	1.2 m	1.2 m	1.2 m
	depth	0.9 m	1.2 m	1.2 m
	length	0.6 m	1.8 m	4.5 m
Large (cattle, horses)	width	NA	1.8 m	1.8 m
	Depth	NA	1.2 m	1.2 m
	length	NA	1.2 m	3.0 m

It is a critical component of the decision process when first deciding if burial is a feasible alternative, and secondly where to dispose of the animals. An unacceptable burial site can create health, environmental, and aesthetic problems.

Considerations:

- Access to site
- Facilities available
- Equipment required
- Safety to personnel
- Acceptability to owner of property
- Protection from public view
- Height of water table
- Distance from residences/roads
- Surface slope
- Cultural/historical considerations
- Distance from streams or wells
- Bio security considerations

B. Incineration/Burning: Desirable form of carcass disposal in situations like epidemics of highly infectious disease-eliminates pathogen completely, eg; Anthrax, Hog cholera. Burning of animal carcasses produces a solid waste by-product (bone and ash) that is essentially free of pathogens or putrid material if done properly. There are three types of incineration methods 1. Open-Air Burning, 2.Biological Incineration, 3.Controlled Burning and 4. Body Surface Burning (suitable in flood affected areas).

Limitations in Burning:

- Location of site
- Access to site
- Type of animal carcass involved
- Fuel availability
- Amount of carcasses to burn
- Environmental considerations

Open Air Burning: Requires combustible material such as wood/timber and straw, coal as fuel additives to achieve sufficient temperature to completely consume the carcasses. Smoke from such fires can be high in particulates and/or produce offensive odors if the burn is not complete. The most critical factors in site location for open air burning are the direction of prevailing winds and selecting locations out of sight of public view. The type of animal to be disposed of will also play a critical role in the success of open air burning as the method for consideration. Animals with high fat content such as hogs will burn much faster and with less fuel requirements than poultry who are low in fat, and whose feathers do not burn easily.

Advantages:

- Relatively inexpensive compared to other burning methods.

Disadvantages:

- Labor and fuel intensive nature
- Depend on favorable weather conditions
- Environmental problem
- Poor public perception.
- Method of last resort

Biological Incineration: Efficient disposal method, no pollution or particulates, complete oxidation of the carcasses.

Limitations:

- Cost
- Lack of portability
- Location of existing incinerators
- Capacity restraints
    - Most incinerators are located in urban areas and cannot handle the large amount of carcasses
    - ideal for small numbers of carcasses located in close proximity to their location
    - when the infectious agent must be thoroughly destroyed to avoid environmental contamination

Advantages:

- It is capable of thoroughly destroying TSE-infected carcasses
- It is highly bio secure.

Disadvantages:

- Facilities not available in the disaster affected areas
- Not used for large scale carcass disposal
- Expensive and difficult to operate and manage
- Require expertise.

Controlled Burning: It is a modified open air burning which uses air–curtain incinerators (also called Trench burners). New technology used in many large-scale natural disasters to burn combustible debris. The incinerators consist of large capacity fans driven by diesel engines connected to ducting which delivers the high velocity air down into a long narrow pit or trench. The system delivers air stream at approximately 165 miles per hour down into the pit at an angle

to create a mini-cyclone" within the pit. The continual downward pressure by the incoming air forces the complete destruction (burn) of all material with very little smoke produced at temp of up to 2000º F.

Advantages:

- Portable
- Environmentally friendly (minimal ash or particulates)
- Incinerate vegetative debris from natural disasters (as a fuel source) at the same time the carcasses are consumed.

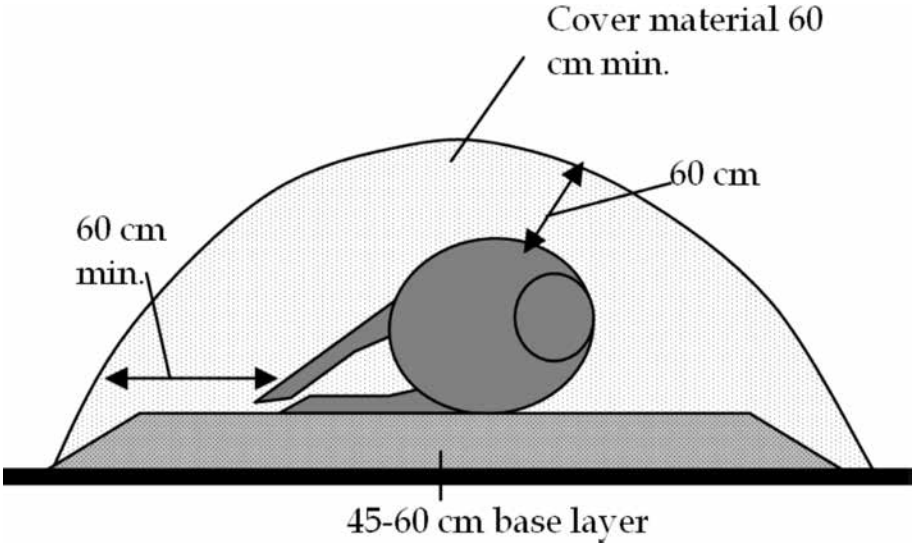
Disadvantages:

- Incinerators are expensive to operate
- Not available in the state or country
- Require excessive fuel depending on the material to be incinerated.
- Air-curtain incinerators are not validated to safely dispose of TSE-infected carcasses.

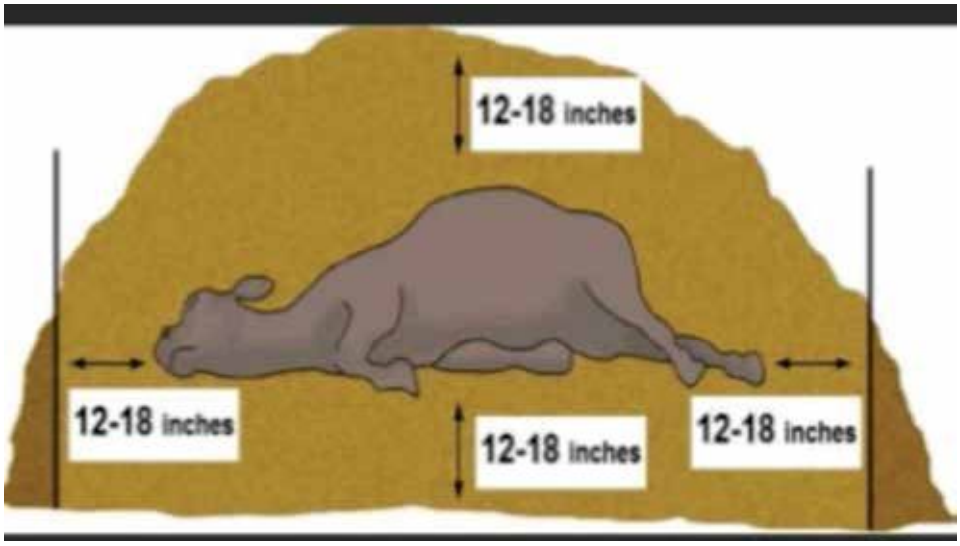
C. Composting: The biological decomposition of animal carcasses in which it is broken down into basic elements (organic matter) by microorganisms, bacteria and fungi under controlled conditions. This is considered environmentally friendly form of carcass disposal and applicable for many natural disasters. Method of disposal for small animal like, poultry, pig and calves. Composting consists of two stages,

- Primary high temperature "active stage"
- Secondary lower-temperature "curing" or "stabilization stage".

Cross-section of a typical windrow or static pile for larger carcasses



A base of 24 inch laying bed of bulky absorbent, organic material like wood chips or hay straw is made and carcass is kept in centre of the bed. Cover carcass with dry, high-carbon material, old silage, sawdust or dry stall bedding. Make sure all residuals are well covered to keep odors down, generate heat or keep vermin or other unwanted animals out of the windrow.



The primary phase of composting takes 2-3 months and the secondary phase another 2-3 months and the end result of the process is the production of carbon dioxide, water vapor, heat and compost. Composting of animal carcasses can occur in either bins or in windrows (deposited in a straight line within a field or pasture). Compost is considered to be one of the more environmentally friendly forms of carcass disposal, because it is in effect a form of recycling.

It is applicable for many natural disaster situations and is routinely used in the commercial poultry industry today as an accepted form of disposal. It can be applied to large animals in some cases, especially swine, but is not appropriate when disease biosecurity is an issue. Composting is not good for large animal carcasses because of the time (3-6 months) it takes to complete the process.

Advantages:

- Initial startup costs are minimal, and the end product can be utilized as fertilizer material or a soil additive.

Disadvantages:

- Slow process (months).
- Requires monitoring throughout the process.
- Not appropriate for disease situations because the causative organisms may not be destroyed immediately.

D. Rendering: Rendering is a process of separating animal fats and proteins. It is an improved method of animal carcass disposal. The recovered proteins are used almost exclusively as animal foodstuffs, while the recovered fats are used both industrially and in animal feeds. There are two primary methods of rendering. The older method uses steam under pressure (with a grinding process) in large closed tanks. A second and newer method is dry rendering, which cooks the material in its own fat by dry heat in open steam-jacketed drums.

Advantages:

- Environmentally friendly method of disposal because it recycles the animal protein from the carcasses back into a usable form as meat or bone meal.

Disadvantages:

- Not economically feasible for poultry and other small animals
- Rendering of sheep carcasses infected with "Scrapie should not be done
- Not appropriate during disease situations because of transportation
- Lack of available rendering facilities

E. Alkaline Hydrolysis: Alkaline hydrolysis or tissue digestion is a relatively new technique for carcass disposal. The process uses alkali (NaOH, KOH) at elevated temperature to convert the animal carcasses to a sterile aqueous solution of amino acids, sugars and soaps. The only solid byproduct of the process is the mineral constituents of the bone and teeth, that are soft enough and sterile as well as safe for disposal by land filling. Alkaline hydrolysis (AH) digestion is utilized because the high temperature and alkaline solution breaks down animal protein and produces a sterile.

Advantages:

- Sterilizes and digests in one operation, is more economical
- Complete destruction of pathogens, including prions,
- Production of limited odor or public nuisances
- Elimination of radioactively contaminated tissues

Disadvantages:

- Capacity constraints for its effective use in large scale disasters
- Not widely available.

F. **Lactic Acid Fermentation:** A means to preserve carcasses until they can be rendered. Carcass can be stored for at least 25 weeks and produce an end product that may be both pathogen-free and nutrient-rich. The process of lactic acid fermentation is simple and requires equipment - a tank and a grinder in which anaerobic fermentation can take place. Carcasses are ground to fine particles, mixed with a fermentable carbohydrate source and culture inoculants, and then added to a fermentation container. Fermentation products can be stored until they are transported. Under optimal conditions, including a fermentation temperature of about 35°C (95°F), the pH of fresh carcasses is reduced to less than 4.5 within 2 days. Fermentation with *L. acidophilus* destroys many bacteria including Salmonella spp.

G. **Thermal Depolymerization:** An advanced process of carcass disposal wherein high heat and pressure are applied for conversion of pre-processed carcasses into a type of fuel oil. It degrades materials at the molecular level so it is effective method for disposal of infected/ diseased carcasses. This latest method is still being researched for its application as an effective disposal method.

Handling of Carcasses: All dead animals should be handled only while wearing gloves. There are several types of gloves including leather, rubber and latex gloves. Avoid direct contact with dead animal's body fluids (blood, urine, feaces). If contact does occur, wash the skin area with soap and water as soon as possible. Avoid contact with dead animals& external parasites (flea and ticks). If possible spray the carcass with flea & tick spray prior to handling. People who are handling animal carcass should be provided in advance with protective clothing. They should spray carcass with disinfectant solutions. Whenever possible grasping hooks or other tools should be used. People should avoid direct contact with their skin, eyes, mouth and nose and if they inadvertently came into direct contact with carcasses they should be allowed to clean up as soon as possible. Carcasses must be double-bagged in heavy black plastic bags. Each bag should weigh more than 20 pounds

Chemicals Used for Cleaning: Trisodium phosphate, sodium carbonate. These chemicals along with hot water facilitate cleaning premises.

Disinfectants Recommended for General Use: Sodium or calcium hypochlorite (200 ppm available chlorine) Iodine Phenol Quaternary ammonium compound (Benzalkonium chloride).

Transportation: Suitable leak-proof and sealable vehicles should be used. They should be checked before loading to ensure that the body and tailgate seals are in good condition. In addition, each transport vehicle should be lined with a layer of polythene in such a

way that the carcasses can be completely enclosed by polythene to prevent leakage of fluids. Cleaning and disinfection procedures applicable to persons and vehicles leaving an infected place must be stringently enforced at the disposal site. All vehicles leaving the site must be thoroughly cleaned and disinfected. All workers must shower and change clothes immediately after completing the task. Other essential visitors and officials must wear disposable protective clothing. All wrapping material that accompanies carcass must be disinfected, baled and safely disposed of by deep burial.

Selection of Appropriate Carcass Disposal Method:

- Determined by the cause of death.
- If infectious organism – Bio security issues are the major concern. Preferred choice is the method that most efficiently prevents further disease spread.
- In natural disasters – the disposal method chosen should be the most environmentally acceptable.
- Logistical considerations (scope of disaster) may also play a factor in the final selection choice.
- Three Criteria to be considered, 1. Biosecurity, 2. Environmental, and 3. Logistical issues.

Chapter 7:

Wildlife Rescue

Do wild animals want human help when they are in trouble? No, because wild animals always consider human presence as dangerous for them and always try to avoid humans.

Reasons for Wildlife Rescue:

- Straying- Social rejection, Infighting, hunger, nuptial urge, Natural calamities, forest fires
- Accidents and injuries
- Predator attacks
- Orphans
- Wild animal traders, poachers, illegal rearing, traditional entertainers

Objectives for Wildlife Rescue:

- Translocation for population management
- Reintroduction in a suitable habitat
- Rescue of strayed wild animals
- Genetic exchanges

Important Considerations:

- Your own safety
- Safety of those assisting you
- Safety of bystanders
- Safety of the animal

7.1. Rescue & Translocation

- Formation of teams
- Identification and herding team – Local Ranger, Binoculars, koonkies
- Vet team - one Leader and 3 assistants (vets), 2 snipers, two armed guards.

- Radio collar team - 2
- Loading team - Machineries, Labour group
- Security team
- Food and water supply team
- Medical team
- Back-up team
- Co-ordination of all the teams- effective communication, leaving space, avoiding crowding and readiness for hard work.

Spotting & Herding:

- Park Ranger
- Marksmen
- Veterinarian
- Koonkies
- Mahouts
- Security
- Communication

Veterinary Team:

- Vets should have legal authority under VCI Act, 1984
- Leader – most experienced, senior
- Team vets- 3
- Snipers-2
- Security guards-2

7.2. Role of Veterinary Team

- Identification of healthy animals
- Capture
- Safety of the animal in all procedures

- After capture - Morphometry, Radio collaring, microchipping, identification marks
- Loading in sledge, sledging, loading in crate
- Transportation and release
- Post release management

Immobilizing Drugs:

- Etorphine (M-99)
- Etorphine +ACP (Immobilon)
- Carfentanil
- Alpha-2 agonists

Checklist for Other Drugs:

- Vit-E & selenium
- TT
- Long acting antibiotic
- Fly repellant antiseptic
- Sedative- ACP, Haloperidol, Azaperone
- Dexamethasone
- Doxapram
- Adrenaline

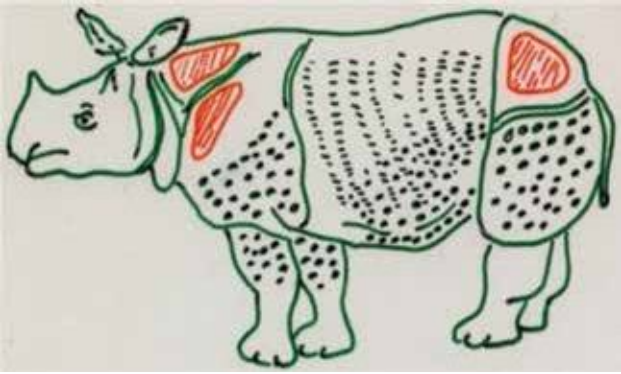
Checklist for Other Equipment:

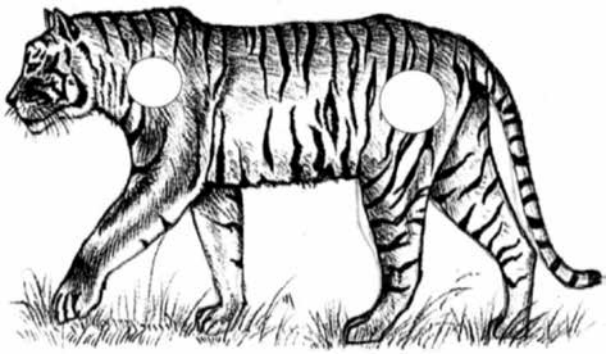
- Prominently marked boxes-8
- Disposable rubber hand gloves
- Water bottle
- Pliers
- Disposable syringes
- Blindfold, cotton plug
- Ear notching, microchipping
- Radio collaring

Basic Equipment for Monitoring:

- Stethoscope
- Thermometer
- Pulse - Oxymeter
- Resuction unit
- Sphygmomanometer
- Others (Cotton wool, antibiotics, sample collection vials, assorted lifesaving drugs, etc.)

Darting Sites:





Apply blind fold over the eyes of the animal, which will make the animal to calm down and will have less stress. Tie the legs with flat ribbon like rope instead of plastic rope. Utmost care should be taken while tying legs, never tie the animal to a post, always use stretcher to carry the injured animal. Transfer the animal into a suitable transportation crate, monitor the animal during transportation and if the animal is fit find out its natural habitat and release.

If the animal enter into human habitation and is unable to find the way out, make a way so that the animal can go back to its natural habitat on its own. Unnecessary handling causes extra stress to the animals.

Masking Human Odour: Application of a layer of mud over the elephant calves body is useful to mask the human odour before attempts of reunion. Smell of human beings leads to rejection by the natal herd.

Management of Snake Bites and Poisoning

Snake bite in animals generally occurs during disasters as the snakes also being pushed out of their hidings due to flood or hurricane. Most of the cases of snake bite have been reported in

dogs and horses (Garg, 2000). Poisoning from snake venom in animals is an emergency which requires immediate attention or otherwise delayed and inadequate treatment may lead to untoward consequences.

The Big Four

There are almost 300 species of snakes native to India but only four are responsible for the majority of deaths due to snake bites. Known as the, "big four," these snakes find themselves often in the middle of human life in homes, businesses and other places where it is unsafe for both the snake and humans. The big four are as follows.

Common Cobra (Naja naja)

The cobra is the most common poisonous snake in India. One can identify Cobras very easily as they raise their head and spread their hood in defense. The coloration varies from dark brown to jet black. Cobras are associated with Indian mythology and are worshipped across the country.

Russell's Viper (Daboia russelli)

It is a thick set, ground dwelling snake with a small conical head and large nostrils. Its colour is dorsum-brown, with three rows of spots along the body and the belly is cream coloured. It lives in grasslands or scrub forest. They are only aggressive once threatened or disturbed. Once agitated, they produce a high pitched hissing sound which is audible from even a few meters away.

Saw Scaled Viper (Echis carinatus)

A small viper found across the Indian sub-Continent, even the slightest disturbance turns them aggressive. The snake makes noise by rubbing its scales together. The venom of this snake is hemotoxic, and very deadly.

Common Krait (Bungarus caeruleus)

The Krait is largely nocturnal in nature, so it becomes very alert during the nighttime. The body is glossy black with paired bands. Usually looking for a cool place to hide, they find their way into homes across the country. Their venom is said to be stronger than that of the cobra. Fatal snakebites are more common in dogs than in other domestic animals. Because of the relatively small size of some dogs in proportion to the amount of venom injected, the bite of even a small snake may be fatal. In dogs and cats, mortality is generally higher in bites to the thoraxor abdomen than bites to the head or extremities. Because of their larger sizes, horses and cattle seldom die as a direct result of snakebite, but deaths may follow bites on the muzzle, head, or neck when dyspnea results from excessive swelling. Serious secondary damage sometimes occurs; livestock bitten near the coronary band may slough a hoof. Snakebite with envenomation is a true emergency.

Rapid examination and appropriate treatment are paramount. Owners should not spend time on first aid other than to keep the animal quiet and limit its activity.

The following commonly touted measures are ineffective and can be potentially harmful: use of ice, cold packs, or sprays; incision and suction; tourniquets; electric shock; hot packs; and delay in presentation for medical treatment (waiting until problems develop). In many instances, the bite has been witnessed, and diagnosis is not a problem. However, fractures, abscesses, spider envenomations, or allergic reactions to insect bites or stings could all potentially be confused with snakebite by the inexperienced eye.

General Symptoms

Nausea, vomiting, malaise, abdominal pain, weakness. drowsiness, prostration

Cardiovascular (Viperidae)

Visual disturbances, dizziness, faintness, collapse, shock, hypotension, cardiac arrhythmias, pulmonary oedema, conjunctival oedema.

Bleeding and Clotting Disorders (Viperidae)

- Bleeding from recent wounds (including fang marks – venepunctures, etc) and from old partly-healed wounds

- Spontaneous systemic bleeding - from gums (Fig 30), epistaxis, bleedinginto the tears, haemoptysis, haematemesis, rectal bleeding or melena, haematuria, vaginal bleeding,bleeding intotheskin(petechiae,purpura,ecchymoses)andmucosae,intracranialhaemorrhage(meningism from subarachnoid haemorrhage, lateralising signs andlor coma from cerebral haemorrhage)

Neurological (Elapidae, Russell's viper)

Drowsiness, paraesthesiae, abnormalities of taste and smell, "heavy" eyelids, external ophthalmoplegia, paralysis of facial muscles and other muscles innervated by the cranial nerves, aphonia, difficulty inswallowing secretions, respiratory and generalised flaccid paralysis Skeletal muscle breakdown (seasnakes, Russell's viper) Generalised pain, stiffness and tenderness of muscles, trismus, myoglobinuria,hyperkalaemia, cardiac arrest, acute renal failure Renal (Viperidae). Loin (lower back) pain, haematuria,haemoglobinuria, myoglobinuria, oligurialanuria, symptoms and signs of uraemia (acidotic breathing,hiccups, nausea, pleuritic chest pain etc)

Endocrine (acute pituitaryladrenal insufficiency) (Russell's viper)

Shock, hypoglycaemia

How to Prevent a Snake Bite?

1. Any unknown snake is potentially dangerous; do not play, avoid any contact with any snake including those of small size, baby, lethargic, dead. A cut off head can keep poisonous activities for several minutes. Make yourself familiar with the description of poisonous snakes in the place where you live.

2. Attention!!! Use torchlight at night – all local poisonous snakes are active in the evening and at night.

   Pay more attention in the forest, close to bushes, tall plants, etc.

3. Snakes usually don't bite you without alarm:

   - Cobra – lifts vertically front part of the body (1/3), opens hood, makes hiss, rushes to the aim.

   - Vipers - make a spiral from a tail, bend like zigzag front part of the body, and make a strong hiss.

4. If you meet a snake, go back slowly, don't do sudden movements, do not turn your back to the snake, do not run, and give the possibility for a snake to go away

First Aid and Treatment

Antivenom administration is the standard therapy for snakebite. Complications often occur following snakebite because of toxic hemorrhagic or neurotoxic effects with secondary bacterial infection. Snake venom is actually a kind of highly evolved salivary secretion which is used to both kill and digest prey. Venom was not made against man. There are two basic types of snake venom. One affects the nerves (venom of cobra and common krait); the other one blood (that of vipers). Polyvalent anti-venom serum is effective against the bites of the Big Four – cobra, saw-scaled viper, common krait, Russell's viper. If a venomous snake bites an animal, just remember two things: don't panic; go to a hospital and get anti-venom serum. Don't waste precious time on quack's remedies, tantra-mantras, jhar-phoons, herbal preparations, etc. In case of snakebite, a well-administered first-aid is vital. Intensive therapy should be instituted as soon as possible, because irreversible effects of venom begin immediately after envenomation.

The bite site(s) should be shaved, and the wounds cleansed thoroughly with germicidal soap. Antivenom is the only direct and specific means of neutralizing snake venom. 10 ml of polyvalent anti-snake venom aniseruma along with 500 mlof 5% dextrose is administered intravenously (Kavitha and Sumathi, 2011). Tetanus antitoxin also should be considered, especially in horses, and other supportive treatment should be administered as needed (eg, blood or plasma transfusions in the case of hemolytic or anticoagulant venoms). Huanget al., (2012) confirmed that after antivenom therapy, 34 patients (28.1%) had secondary infection and among them, 24 (70.6%) patients needed surgical intervention (including wound incision, pusdrainage, debridement, and fasciotomy for necrotizing fasciitis or compartment syndrome). Hence treatment for secondary bacterial infection is mandatory. After conducting Antibiotic sensitivity test, the specific antibiotic may administered to the affected animals. It should be kept in mind that the animal that is actually bitten by poisonous snake should only be treated with Antivenin as they will subjected to syndrome of antivenin-associated serum sickness [Berdoulay et al., (2005)]

Prognosis

The prognosis of snakebite depends on the type and species of snake, location of the bite, size of the victim, degree of envenomation, and the time interval between the bite and the institution of treatment. Animals that survive elapid bites generally make full recoveries, but crotalid bites can result inlongterm sequelae due to tissue necrosis (amputation, loss of function, etc), depending on the severity of the bite and the promptness and aggressiveness of treatment instituted.

Don’ts of Snake Bite

- No ice or any other type of cooling action on the bite. Research has shown it to be potentially harmful.
- No electric cable, string or rubber tourniquets to be used, this cuts off blood flow completely and may result in amputation of the affected limb.
- No electric shock, this method is under study and has yet to be proven effective. It could harm the victim.
- No incision in the bite site. Such measures have NOT been proven useful and causes needless additional injury, loss of blood, infection, waste of time.
- Do not burn the wound, as it would not have any effect on the venom, which has already entered the bloodstream.
- Do not suck the wound with mouth. A suction device may be applied over the bite to help draw venom out of wound without making cuts.
- Potassium permanganate should never be used.

Chapter 8:

Community Preparedness

8.1. Participatory Rural Appraisal (PRA)

Reversal of Learning

It is a participatory decision-making process by the disaster affected communities.

An approach towards empowering the poor and marginalized communities through seeking their participation. It is a family of participatory approaches and methods which emphasize local knowledge and enable local people to do their own appraisal, analysis and planning.

The PRA tools arouse from two main beliefs

- The knowledge and experience of poor and marginalized have value and not to be dismissed as irrelevant or wrong.
- Poor and marginalized have the right to resources traditionally defined by them.

Objectives of PRA

- Stimulate the community to identify the causes of its problems and collective aspirations.
- Facilitate communication with the community.
- Help the community to identify resources, experiences, potential improvement, interests and conflicts.
- Motivate communities to develop self-reliance in project development and management.

Triangulation: Appraising information and verifying the same in three ways known as "Triangulation" or "Cross Examination" which is practiced in application of every participatory tool.

Steps for Conducting PRA

- Setting up of a team comprising facilitator, documenter and observer.
- Checklist for obtaining information depending on the tool.
- Prepare materials for conducting the tool (Charts, sketch pens, papers, etc.)

- Availability of the community to spend time and discuss (date, time and venue).
- Representation of participants (all areas, sectors, age, gender, religion, caste, etc)
- Application of the tools initiated by the team leader (facilitator).
- Documentation of the findings.

Dos and Don'ts of PRA

DON'T	DO
Educate	Facilitate
Tell people what is good and bad	Let people realize for themselves
Offer subsidy	Trigger local action
Promote particular planned designs	Let people innovate simple designs
Be in charge	Hand over to local leaders
Push for, or demand action	Trigger self-mobilization through good facilitation

List of PRA Tools: The list of PRA tools that could be used for creating a village profile are given below, few examples are given in the annex,

- Transect Walk
- Historical Timeline & Trend Changes
- Social Mapping/Modelling
- Seasonality Calendar/Mapping
- Animal Resource Mapping
- Venn/Chappathi Diagram
- Household Veterinary Survey
- Daily Routine Charts
- Pairwise Problem Matrix
- If I Were A Cattle
- Traffic Light Chart
- Participatory Response Identification Matrix (PRIM)
- Wealth Ranking

Limitations of PRA

- Difficulty in getting exact information
- Difficulty in finding the right questions to ask

- Not enough time to spend in the village
- Danger of 'rural development tourism'
- Difficulty in finding the right interdisciplinary team
- Lack of experience of team, lack of skills, facilitation, and conflict negotiation
- Team members do not show the right attitude, fail to listen, and lack respect
- Overlooking opinions /demands of women, particularly by male team members
- PRA becoming a fashionable label to satisfy public, institutional or donors
- Villagers are occupied with livelihood activities
- Villagers give unrealistic answers to receive more support

Documentation of PRA Findings

- The report should be written up and presented as soon as possible.
- Ideally, the first draft should be written 'in the field', while information is still fresh in the mind, before interruptions can occur, and while the team is still together.
- Presenting the results orally is also very important for the PRA team members cannot put down in writing everything they have learned during the fieldwork.
- Share a copy of the results with the community because it belongs to them and they are the owners.

8.2. About LEGS

LEGS is a set of international guidelines and standards for the design, implementation and assessment of livestock interventions to assist people affected by humanitarian crises. LEGS aims to support both the saving of lives and livelihoods, through providing rapid assistance to crisis affected communities through livestock-based interventions; protecting livestock assets and rebuilding livestock assets of crisis affected communities. LEGS reflects agreed good practice of livelihood-based livestock responses.

The structure of the LEGS handbook has been designed to be complementary to the Sphere handbook. LEGS is intended for those who implement emergency interventions in areas where livelihoods are derived in part or in full from livestock, including NGOs, bi-lateral and multi-lateral agencies and governments. LEGS focuses on the overlap between emergencies, livelihoods

and livestock and aims to bring a livelihoods perspective into livestock based disaster relief.

LEGS is founded on a rights based approach, in particular to a right to food and a right to a standard of living. The cross-cutting issues should be integrated into emergency livestock response: gender and social equity; HIV/AIDS; security and protection; environment; participation; preparedness and early response; coordination and advocacy and policy. The LEGS process consists of four key stages: preliminary assessment, response identification; analysis of technical interventions and options; monitoring and evaluation

LEGS Approach and Content

- Livestock are an important asset for people throughout developing regions
- LEGS enables humanitarian actors to design and implement projects which help to protect and/or rebuild livestock assets
- The ultimate objective is to assist people affected by crises through livestock-related interventions

LEGS Does Not Cover:

- Animal epidemics (epizootics or transboundary animal diseases)
- Companion animals (domestic pets)
- High-income countries/regions
- How to conduct rapid assessments of livestock and livelihoods, and identify appropriate interventions

Common Standards:

- Participation
- Response and Coordination
- Initial Assessment
- Targeting
- M&E, Impact Assessment
- Technical Support, Competencies
- Contingency Planning, Early Response
- Advocacy and Policy

Technical Standards:

- Destocking
- Provision of Feed
- Livestock Shelter
- Veterinary Services
- Provision of Water
- Provision of Livestock

The LEGS Approach

- Preliminary Assessment
- Response Identification
- Analysis of Technical Interventions
- Monitoring & Evaluation

The LEGS Tools

Stage 1: Assessment Checklists

Stage 2: Participatory Response Identification Matrix (PRIM)

Stage 3: Implications; Decision Trees; Advantages and Disadvantages; Timing; Standards & Guidelines

Stage 4: Standards & Guidelines, M & E Checklists

The LEGS assessment process

1. The role of livestock in livelihoods,
2. The nature and impact of the emergency,
3. Situation analysis.

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http://nraa.gov.in/

C. International Level

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LEGS Assessment Checklist

LEGS assessment checklist can be used to determine the following,

1. *Role of livestock in livelihood of the people*
2. *Nature and Impact of an emergency (Human and Animal impact)*
3. *Situation Analysis*

1. LEGS Preliminary assessment: Livestock management and role of livestock in livelihoods

Objective: To ascertain whether livestock play a significant role in livelihood of the affected people and the nature of that role if a livestock related response is appropriate and to understand how livestock are managed.

- *1.1. What are the main livelihood strategies in the affected areas in usual times?*
- *1.2. What are the key uses of livestock (food, income, social, draught, transport)?*
- *1.3. What percentage of food is derived from livestock in usual times?*
- *1.4. What percentage of income is derived from livestock in usual times?*
- *1.5. What roles do different household members play with regard to livestock care and management, including use and disposal rights, (note: different livestock species and ages; seasonal variations) with particular reference to gender?*
- *1.6. What customary institutions and leaders are involved in livestock production and natural resource management and what is their role?*
- *1.7. What are the main coping strategies and indicators for 'different times' (for example: famine foods; high livestock slaughter or sales; migration; dispersal of household members; sale of other assets etc.)? Do these strategies have negative implications for future livelihood security?*

Conclusion:

2. Preliminary assessment 2: The nature and impact of the emergency

Objective: To determine whether an emergency response is necessary; understand the initial impact of the disaster on the affected populations; and identify what further information is needed.

- *2.1. What type of emergency is it; rapid onset; slow onset or complex?*
- *2.2. What is the cause of the emergency (drought, flood, war, etc.)?*
- *2.3. What is the history of this type of emergency in this context?*
- *2.4. Which stage has the emergency reached (alert / alarm / emergency / immediate aftermath / recovery etc.)?*
- *2.5. What is the area affected?*
- *2.6. What has been the impact of the disaster on the affected population?*
  - *2.6.1. What is the nutritional status of the affected population?*
  - *2.6.2. What is the prevalence of disease?*
  - *2.6.3. What is the mortality rate?*
  - *2.6.4. What has been the impact on vulnerable groups (for example women, children, people living with HIV/AIDS, particular ethnic groups)?*
  - *2.6.5. Are there signs that the coping strategies/difficult time indicators from question 1.7 are being implemented?*
  - *2.6.6. Has there been significant migration or displacement of (parts of) the affected populations? If so, who is affected and have they taken their livestock with them? What is the impact on the host community?*
- *2.7. What has been the impact of the emergency on livestock management strategies:*
  - *2.7.1. What is the impact on access to grazing?*
  - *2.7.2. What is the impact on access to water resources for livestock?*
  - *2.7.3. What is the impact on daily and seasonal movements?*
  - *2.7.4. What is the impact on livestock traders and key livestock markets?*

2.7.5. What is the impact on livestock services?

2.7.6. What has been the impact on natural resources?

2.7.7. What has been the impact on the gender division of labour?

2.7.8. What plans do the affected population have for their livestock in the future

2.8. What has been the impact of the emergency on livestock (differentiate by species if necessary)

2.8.1. What is the impact on livestock sales?

2.8.2. What is the impact on livestock prices?

2.8.3. Have the terms of trade between livestock and cereal prices changed?

2.8.4. How has livestock condition deteriorated?

2.8.5. Has livestock productivity fallen (off-take of milk, blood, eggs etc.)?

2.8.6. Has livestock morbidity increased?

2.8.7. Has livestock slaughter for home consumption increased?

2.8.8. What is the livestock mortality rate?

2.8.9. Has there been any impact on livestock shelter/enclosures?

2.8.10. What is the scale of these impacts?

2.9. What has been the impact of the emergency on the environment? (The environmental impact of the emergency and of any planned interventions should be carefully assessed. A number of methodologies have been developed for this purpose. See for example the Rapid Environmental Assessment (REA) tool devised by the Benfield UCL Hazard Research Centre and CARE International and the FRAME assessment tool (details in Appendix 2.4 of LEGS Handbook)

2.10. What are the forecast and trends (where relevant) for the forthcoming season (for example anticipated snow, rains, heat, dry season, increasing insecurity, access to food etc)?

Conclusion:

3. Preliminary assessment: Situation analysis

Objective: To gain an understanding of the operating environment, potential logistical constraints and overlap or potential complementarily with other stakeholders.

3.1. Who are the key actors in the affected area and what are they doing?

3.2. Is any stakeholder playing a coordination role?

3.3. What services and facilities are usually available and what has been the impact of the emergency on them (including government administration, markets, and animal production and health services)?

3.4. What resources are available in particular indigenous coping strategies?

3.5. What is the history of disaster response in the affected area, both positive and negative experiences and lessons learned?

3.6. What is the current context (further detailed assessments with regard to these issues may need to be carried out depending on the technical options selected (see technical chapters below). These particular questions become particularly significant (and in some cases 'killer assumptions') in conflict situations)?

3.6.1. How are communications functioning?

3.6.2. What is the security situation?

3.6.3. What are the implications for livestock movement and migration (rights of access, potential conflict)?

3.6.4. What is the key protection issues facing livestock owners?

3.6.5. What is the current infrastructure (roads and transport)?

3.6.6. Are there any cross-border issues?

3.6.7. What are the policy and/or legal constraints affecting livestock related interventions (for example livestock movements or export bans; slaughter laws; taxation policy; licensing regulations; coordination of aid agencies; national disaster management policies; organizational policies of key stakeholders)?

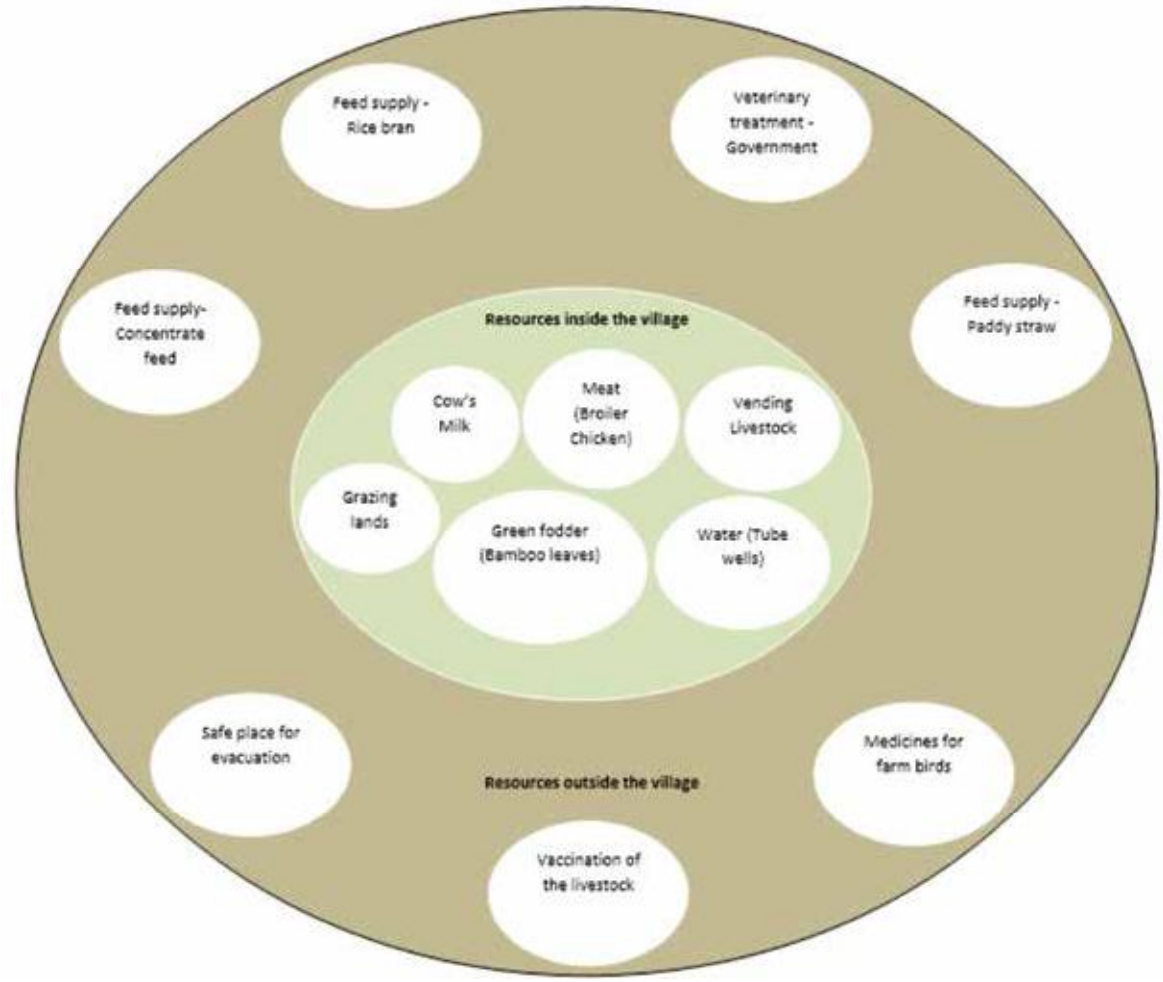
Conclusion:

A. Examples of Participatory Tools

1. Animal Resources Mapping

Purpose: To assess the animal related resources available within the village and their dependency from outside the village.

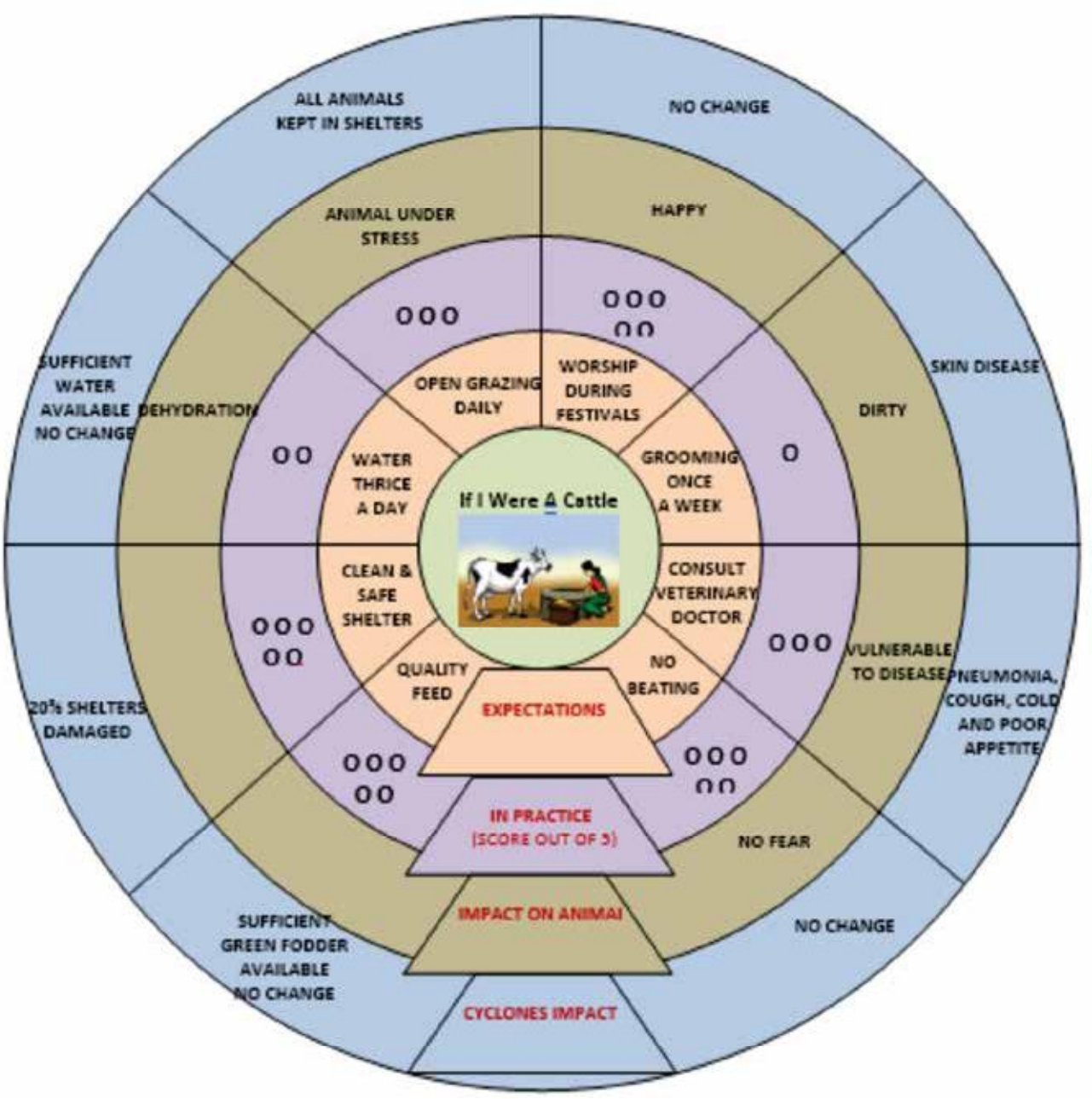
09th July, 2011; 1100 Hrs to 1140 Hrs; Purba Dobandi, East Medinapur District, West Bengal; 12 participants; Facilitator: Hansen Thambi Prem; Documenter: Dr Vichar Nema



2. "If I were a Cattle" Participatory Animal Welfare Need Analysis (PAWNA)

Purpose: To understand practice of community in managing their animals and assess cyclones impact.

16th October, 2013; 1300 Hrs to 1400 Hrs; Village Temple, Bitrubudi, Digahpandi Block, Ganjam District, Odisha; 35 participants; Facilitator: Amulya Nayak; Documenter: Hansen Thambi Prem



Legend: *o – Very Poor; oo – Poor; ooo – Medium; oooo – Good; ooooo – Very Good*

3. "Traffic Light Chart" Participatory Animal Welfare Need Analysis (PAWNA)

Purpose: To assess animal's health condition using health indicators.

16th October, 2013; 1400 Hrs to 1500 Hrs; Village Temple, Bitrubudi, Digahpandi Block, Ganjam District, Odisha; 10 participants; Facilitator: Amulya Nayak; Documenter: Dr Akash Maheshwari

BODY PARTS	HEALTH INDICATORS	CATTLE (Random Sampling)									
		01	02	03	04	05	06	07	08	09	10
 LEGS	Twisted Legs	●	●	●	●	●	●	●	●	●	●
	Swelling Hind	●	●	●	●	●	●	●	●	●	●
	Injury/Wound	●	●	●	●	●	●	●	●	●	●
	Lameness	●	●	●	●	●	●	●	●	●	●
	Stiff Legs	●	●	●	●	●	●	●	●	●	●
 EYES	One Eyed	●	●	●	●	●	●	●	●	●	●
	Whiteness of Eye	●	●	●	●	●	●	●	●	●	●
	Tears	●	●	●	●	●	●	●	●	●	●
	Wound	●	●	●	●	●	●	●	●	●	●
 EARS	Cut/Broken	●	●	●	●	●	●	●	●	●	●
	Droppings from Ears	●	●	●	●	●	●	●	●	●	●
	Fever	●	●	●	●	●	●	●	●	●	●
 MOUTH	Flat Tongue	●	●	●	●	●	●	●	●	●	●
	Snake Like Tongue	●	●	●	●	●	●	●	●	●	●
	Cut	●	●	●	●	●	●	●	●	●	●
	Suffocation	●	●	●	●	●	●	●	●	●	●
 BACK	Wound	●	●	●	●	●	●	●	●	●	●
	Equal Back	●	●	●	●	●	●	●	●	●	●
	Broken Bone	●	●	●	●	●	●	●	●	●	●
	"U" Shaped Back	●	●	●	●	●	●	●	●	●	●
 TAIL	Wound	●	●	●	●	●	●	●	●	●	●
	Fatty	●	●	●	●	●	●	●	●	●	●
	Maggots	●	●	●	●	●	●	●	●	●	●
	Fallen Hairs	●	●	●	●	●	●	●	●	●	●
 STOMACH	Ribs	●	●	●	●	●	●	●	●	●	●
	Wounds	●	●	●	●	●	●	●	●	●	●
	Big Belly	●	●	●	●	●	●	●	●	●	●
	Low Fat	●	●	●	●	●	●	●	●	●	●

Legend: ● *– Healthy;* ● *– Minor Health Issues;* ● *– Major Health Issues*

4. Pair Wise Problem Matrix

Purpose: To list all animal related problems in disasters and prioritize them based on its impact on the total animal population and households being affected.

09th July, 2011; 11:45 Hrs to 12:15 Hrs; Purba Dobandi, East Medinapur District, West Bengal; 10 participants; Facilitator: Hansen Thambi Prem; Documenter: Dr Vichar Nema

PROBLEMS	E-Difficulty in transporting sick animals	D-Cattle suffering from dysentery, HS & BQ	C-Reduced milk production by cattle	B-Insufficient feed supply for cattle	A-Water logging in animal shelters	SCORE	RANK
A-Water logging in animal shelters	A-Water logging in animal shelters	A-Water logging in animal shelters	A-Water logging in animal shelters	A-Water logging in animal shelters	X	04	I
B-Insufficient feed supply for cattle	B-Insufficient feed supply for cattle	B-Insufficient feed supply for cattle	B-Insufficient feed supply for cattle	X	X	03	II
C-Reduced milk production by cattle	C-Reduced milk production by cattle	C-Reduced milk production by cattle	X	X	X	02	III
D-Cattle suffering from dysentery, HS & BQ	D-Cattle suffering from dysentery, HS & BQ	X	X	X	X	01	IV
E-Difficulty in transporting sick animals	X	X	X	X	X	00	V

5. Participatory Response Identification Matrix (PRIM) – Rapid Onset Emergency

Purpose: To identify appropriate livestock based technical intervention for deigning and planning response operation in consultation with all relevant stakeholders.

July 2013; Dharchula Block, Pithoragarh District, Uttarakhand; Consultation with affected communities, in Kalika Gaon village, Village Sarpanch, Department of Animal Husbandry, Local NGO (APAAR) and District Administration; Facilitator: Hansen Thambi Prem

Technical Interventions	Livelihoods Objectives			Emergency Phases		
	Rapid Assistance	Protect Assets	Rebuild Assets	Immediate Aftermath	Early Recovery	Recovery
Destocking	n/a	n/a	n/a			
Veterinary services	**	*****	*****	→	→	→
Feed	**	*****	*****		→	→
Water	*	*	*		→	→
Shelter	**	*****	*****		→	→
Provision of livestock	n/a	n/a	n/a			

Scoring against livelihoods objectives:

*****	Significant benefits/highly appropriate	****	Benefits/appropriate
***	Some benefits	**	A few benefits
*	Very little benefit/not very appropriate	n/a	Not appropriate

Emergency phases:

→ Appropriate timing for the intervention

6. Household Veterinary Survey – Random Sampling

Purpose: To quantitatively assess the animal's health condition, productivity and economic value before (if possible) or during and after disasters.

Survey conducted by World Animal Protection and Department of ARD for cattle in 10% (7 out of 73 houses) of the total houses in Seujia Pathar Village, Machkhowa Block, Dhemaji District, Assam using random sampling method on 20/10/12 between 0900 and 1200 hrs. Facilitator: Dr Sukhan Changmai; Documenter: Hansen Thambi Prem.

Description	H. No. 26				H. No. 38	H. No. 30					H. No. 33					H.No.40			H.No.39	H.No.65		Average		
	C1	C2	C3	C5	C1	C1	C2	C3	C4	C5	C1	C2	C3	C4	C5	C1	C2	C3	C1	C1	C2	Cattle	Adult	Calf
Age in years	5	5	5	0.9	3	7	1.5	5	2	5	1.9	3.5	7	12	8	5	5	3	0	6	6	4.84	5.24	1.20
Number of calving	0	0	2	0	0	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.35	0.39	0.00
Size (Length in Inches)	43	40	38	28	36	42	28.5	40	27	42	39	43	37	42	43	41	37	34	0	43	42	38.28	39.39	28.25
Size (Girth in Inches)	50	55	45	31	43	44.5	33.5	50	21	51	40	52	47	52	53	50	53	42	0	60	58	46.55	48.14	32.25
Live body weight in kg	162	182	116	40	100	125	48	150	18	164	94	175	123	171	182	154	156	90	0	233	212	134.73	144.79	44.27
Selling price in INR	12500	12500	4000	1500	3000	3500	1000	8000	5000	9000	5000	12000	3000	5000	8000	8000	8000	6000	0	17500	17500	7500.00	8194.44	1250.00
Buying price in INR	10000	10000	3000	1000	2500	2000	700	7000	4000	7000	4000	10000	2500	3000	5000	6500	6000	5000	0	10000	10000	5460.00	5972.22	850.00
Milk (ltr per day)	0	0	1	0	0	1.5	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.18	0.19	0.00
Body score	2	2	2	3	3	2	3	3	3	3	4	4	4	4	3	3	3	3	0	4.5	4.5	3.15	3.17	3.00
Name				Bugi		Kajoli	Mutka	Tula	Besa	Kajola						Kajola				Ronga	Boga			

Note: *The formula used for measuring live body weight (in Kg) for cattle and goat is as follows: Length (L) X Girth (G)2 / 300 X 0.451 (i.e., 1 lbs = 0.451 kg).*

Legend: *The body score was ranked based on the following features observed,*

1. *Emaciated animal; Prominent ribs, hide & bound condition; Sharp vertebrae tips; Prominent pin bone; Hollow thigh and buttock; Hollow anal area.*
2. *Thin animal; Ribs are easily felt; Vertebrae are less sharp; Anal area is little filled.*
3. *Average animal; Ribs are felt after applying some pressure; Round pin bone; Vertebrae are not sharply visible; Anal area is filled.*
4. *Heavy animal; Rip cage area covered with fatty layer; Thigh and buttock fully filled.*
5. *Fatty animal; Hip and buttock are convex; Rib cage covered by heavy fatty layer.*

B. List of Veterinary Research Institutes

Central Avian Research Institute (CARI)
https://icar.org.in/cari/

Central Institute for Research on Buffaloes (CIRB)
http://www.cirb.res.in/

Central Institute for Research on Cattle (CIRC)
http://www.circ.org.in/

Central Institute for Research on Goats (CIRG)
http://www.cirg.res.in/

Central Marine Fisheries Research Institute (CMFRI)
http://www.cmfri.org.in/

Central Sheep & Wool Research Institute (CSWRI)
http://www.cswri.res.in/

National Research Centre on Equines (NRCE)
http://nrce.gov.in/contact.php

National Institute of High Security Animal Diseases (NIHSAD)
http://www.nihsad.nic.in/index.htm

National Institute of Biotic Stress Management (NIBSM)
http://www.nibsm.org.in/

National Research Centre on Camel (NRC)
https://nrccamel.icar.gov.in/

National Research Centre on Yak (NRCY)
http://nrcy.icar.gov.in/

National Research Centre on Pig (NRCP)
http://www.nrcp.in/

C. Emergency Numbers

100 Police
101 Fire Service
102 Ambulance
108 Ambulance/Disaster Management Services
112 National Emergency Number (Police, Fire, Ambulance & DM)
139 Rail Enquiry
181 Women Helpline (Domestic Abuse)
1033 Road Accident Emergency Service on National Highway
1060 AIIMS Organ Donation
1066 Anti Poison
1070 Relief Commissioner for Natural Calamities
1072 Rail Accident Emergency Service
1073 Road Accident Emergency Service
1078 National Disaster Management Authority (NDMA)
1091 Women Helpline
1094 Police – Missing Child/Women
1097 Aids Helpline
1098 Child Helpline
1291 Senior Citizen Helpline
1322 Indian Railway Security Helpline
1551 Kisan Call Centre
1906 LPG Leak Helpline
1964 Central Vigilance Commission

D. Online Learning Resources

Build a Better Response: http://www.buildingabetterresponse.org/
ATHA International Humanitarian Law Distance Learning Series: http://atha.se/elearning
Different Needs – Equal Opportunities: http://www.iasc-elearning.org/
Be Ready: Staying Safe During Disasters: https://www.futurelearn.com/courses/natural-disaster-safety#what-is-upgrade
United Nations Online Courses: https://training.dss.un.org/course
IFRC Learning Platform: http://www.ifrc.org/en/get-involved/learning-education-training/learning-platform1/
UNISDR Stop Disasters Game: http://www.stopdisastersgame.org/en/home.html
Beat The Quake Game: http://www.dropcoverholdon.org/beatthequake/game/

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पत्रांक 1प्रा0आ0–06/2016 1354/आ0प्र0
बिहार सरकार
आपदा प्रबंधन विभाग

प्रेषक,

व्यास जी,
प्रधान सचिव।

सेवा में,

जिला पदाधिकारी,
सुपौल, मधेपुरा, शिवहर, सहरसा, खगड़िया, सीतामढ़ी, दरभंगा, मुजफ्फरपुर, मधुबनी, समस्तीपुर, वैशाली, कटिहार, पूर्वी चम्पारण, बेगुसराय, भागलपुर (अति बाढ़ प्रवण 15 जिले)।
बक्सर, सारण (छपरा), नालन्दा (बिहारशरीफ), पूर्णियाँ, अररिया, पश्चिम चम्पारण, शेखपुरा, किशनगंज, पटना, भोजपुर, सिवान, लखीसराय, गोपालगंज (बाढ़ प्रवण जिले) एवं नवादा, मुंगेर, जहानाबाद, रोहतास, कैमूर, औरंगाबाद, अरवल।

पटना–15, दिनांक– 30/3/16

विषयः संभावित बाढ़ 2016 की पूर्व तैयारियों के संबंध में।

महाशय,

उपर्युक्त विषय के संबंध में कहना है कि राज्य के 28 जिले बाढ़ प्रवण माने जाते है। इनमें से 15 अति बाढ़ प्रवण जिले हैं। परन्तु वर्ष 2013 में गंगा नदी में बाढ़ आने के कारण मुंगेर जिला भी बाढ़ से प्रभावित जिला रहा है। इसके अतिरिक्त स्थानीय नदियों यथा पुनपुन, फल्गू, कर्मनाशा एवं सोन नदी में पानी बढ़ जाने के कारण नवादा, जहानाबाद, रोहतास, कैमूर, औरंगाबाद एवं अरवल के भी कुछ हिस्से यदा–कदा बाढ़ से प्रभावित होते रहे है। अतः बाढ़ आने के पूर्व की तैयारियों पर विशेष ध्यान देने की आवश्यकता है। पूर्व में आप सबको बाढ़ आपदा प्रबंधन के लिए मानक संचालन प्रक्रिया (Standard Operating Procedure) भेजी गयी है, जिसमें अद्यतन आदेशों, परिपत्रों, अनुदेशों आदि का संकलन किया गया है। जो परिपत्र पुराने पड़ गए हैं, उनके स्थान पर समय–समय पर विभाग से परिपत्र निर्गत किए जाते रहे हैं। इसके अतिरिक्त मानदर के संबंध में **विभागीय पत्रांक 1973 दिनांक 26.05.2015 द्वारा वर्ष 2015–2020 तक के लिए अद्यतन संशोधित मानदर को परिचारित किया गया है।** सभी अद्यतन परिपत्रों एवं अद्यतन मानदर को विभागीय वेबसाईट www.disastermgmt.bih.nic.in पर अपलोड करते हुए **Circular** के अन्तर्गत रखा गया है। मानक संचालन प्रकिया भी विभागीय website पर अपलोड की गयी है। मानक संचालन प्रक्रिया एवं नए अद्यतन परिपत्रों/ संशोधित मानदर के आलोक में बाढ़ पूर्व तैयारियाँ की जानी है। साथ ही बाढ़ आने की दशा में मानक संचालन प्रकिया के अनुसार बाढ़ आपदा से निपटने हेतु आवश्यक कदम उठाने हैं। परन्तु यदि हमारी तैयारियाँ (Preparation) ससमय पूर्ण हो जाएगी तो बाढ़ आपदा का मुकाबला हम सक्षमता से कर सकेंगे।

बाढ़ पूर्व तैयारियाँ हेतु उठाए जाने वाले कदम निम्नानुसार होंगे :

योजना पूर्व से बना ली जाय। शरण स्थलों पर स्वच्छ पेयजल, शौचालय, मेडिकल कैम्प, पंजीकरण, संचार, प्रकाश, नवजात शिशुओं के टीकाकरण, प्रसव की व्यवस्था, महिलाओं के लिए अलग शौचालय, भोजन बनाने के उपस्कर एवं स्थल, मनोवैज्ञानिक परामर्श, टेन्ट, मच्छरदानी, 6 माह से 2 वर्ष के बच्चों के लिए विशेष भोजन, सेनेटरी किट जैसे–महत्वपूर्ण एवं मानवीय बिन्दुओं पर विशेष रूप से योजनाएं बना ली जाय। अत्यन्त बाढ़ प्रवण जिला में मेगा शिविर लगाने हेतु स्थानों का चयन पूर्व से कर लिया जाय, ताकि आकस्मिकता के समय इसे व्यवहृत किया जा सके।

9. **मानव दवा की व्यवस्था**

जिला पदाधिकारी सिविल सर्जन के परामर्श से आवश्यक दवाओं का आकलन एवं भंडारण सुनिश्चित कर लें। बाढ़ आने की दशा में विभिन्न जल जनित बीमारियों के प्रकोप की संभावना होती है। अतः जिला अस्पतालों/ अनुमंडल एवं रेफरल अस्पतालों/प्राथमिक चिकित्सा केन्द्रों एवं प्राथमिक चिकित्सा उपकेन्द्रों पर सर्प काटने की दवाएं, क्लोरिन टैबलेट, ओ0आर0एस0 घोल के पैकेट, हैलोजन टैबलेट, एन्टी रेबीज की सूईयां, एन्टीबायोटिक दवाएं, ब्लीचिंग पाउडर आदि का पर्याप्त भंडारण कर लिया जाय।

10. **मोबाईल मेडिकल टीम एवं मेडिकल कैम्प**

यथा सम्भव सभी शरण स्थल पर मेडिकल कैम्प के लिए आवश्यक चिकित्सा/पारा मेडिकल स्टाफ उपलब्ध कराये जाएँ। बड़े शरण स्थलों के लिए मेडिकल कैम्प लगाएं तथा शेष शरण स्थलों के लिए मोबाईल मेडिकल टीम गठित करें। प्रत्येक मोबाइल टीम के साथ दो या तीन शरण स्थली सम्बद्ध रहेंगे। सम्बद्ध शरण स्थलों पर मेडिकल टीम की प्रतिनियुक्ति निर्धारित समय से पूर्व ही कर ली जाए।

11. **पशु चारा एवं पशु दवा की व्यवस्था**

बरसात के दौरान/बाढ़ के समय पशुएं विभिन्न प्रकार की बिमारियों के शिकार होते हैं। चयनित शरण स्थली के निकट पशु चिकित्सा शिविर की व्यवस्था सुनिश्चित करें। बाढ़ के दौरान सत्यापन कर यह सुनिश्चित करें कि यह शिविर कार्यरत है। पशु चिकित्सा हेतु आवश्यक दवाओं की उपलब्धता जिला पशुपालन पदाधिकारी के साथ बैठक कर समीक्षा कर लें और आवश्यकतानुसार पशु संसाधन विभाग के परामर्श से उसकी उपलब्धता सुनिश्चित कर लें। बाढ़ प्रवण जिलों में पशु आश्रय स्थल के साथ–साथ पशु–चारा की उपलब्धता एवं आवश्यकता का ऑकलन पूर्व से कर ली जाय ।

12. **शुद्ध पेयजल की व्यवस्था**

बाढ़ प्रभावित गॉवों में शुद्ध पेयजल की व्यवस्था हेतु चापाकल को उँचे स्थानों पर गाड़ने की व्यवस्था तथा पेयजल के परिवहन आदि से संबंधित व्यवस्था पूर्व से ही सुनिश्चित कर ली जाय। पेयजल की शुद्धता को सुनिश्चित करने हेतु पर्याप्त संख्या में क्लोरिन टेबलेट की व्यवस्था कर ली जाए एवं बाढ़ प्रवण पंचायतों में इन टेबलेट्स के उपयोग का प्रशिक्षण लोक स्वास्थ्य अभियंत्रण विभाग के माध्यम से समय–पूर्व सुनिश्चित करा लिया जाए।

अनुलग्नक– 14 (क) (द्रष्टव्य कंडिका 3.30)

(क) जिला /प्रखंड एवं पंचायत स्तर पर बाढ़/ राहत अनुश्रवण–सह–निगरानी समिति के गठन के संबंध में पत्र

पत्र संख्या-1प्रा0आ0-2-0-17/2001 1388 /आ0प्र0 ।

बिहार सरकार.

आपदा प्रबंधन विभाग ।

प्रेषक,

सी0 अशोक वर्धन,

सरकार के सचिव ।

सेवा में,

सभी प्रमंडलीय आयुक्त

सभी जिला पदाधिकारी ।

पटना-15, दिनांक 24/7/04

विषय- जिला प्रखण्ड एवं पंचायत स्तर पर बाढ़/राहत अनुश्रवण-सह-निगरानी समिति के गठन के संबंध में ।

महाशय,

निदेशानुसार सूचित करना है कि आपदा राहत कार्यों को पारदर्शी बनाने एवं जनप्रतिनिधियों की भागीदारी सुनिश्चित करने के अभिप्राय से राज्य सरकार ने बाढ़ राहत कार्यों तथा राहत सामग्रियों के वितरण में पर्यवेक्षण एवं परामर्श हेतु जिला, प्रखण्ड एवं पंचायत स्तर पर निम्न रूप से अलग-अलग राहत अनुश्रवण-सह-निगरानी समिति गठित करने का निर्णय लिया है :-

(क) जिला राहत अनुश्रवण-सह-निगरानी समिति

(I) प्रभारी मंत्री, जिला बीस सूत्री कार्यक्रम कार्यान्वयन समिति-		अध्यक्ष ।
(II) अध्यक्ष, जिला परिषद	-	सदस्य ।
(III) जिला के सभी माननीय सांसद, विधायक, पार्षद एवं प्रखण्ड प्रमुख	-	सदस्य ।
(IV) (सभी राजनैतिक दलों के एक-एक प्रतिनिधि)	-	सदस्य ।
(V) जिला पदाधिकारी	-	सदस्य सचिव ।
(VI) संबंधित विभागों के जिला स्तरीय पदाधिकारी	-	सदस्य ।

(ख) प्रखण्ड राहत अनुश्रवण-सह-निगरानी समिति

(I) प्रखण्ड पंचायत समिति के प्रमुख	-	अध्यक्ष ।
(II) सांसद, विधायक और मुखियागण	-	सदस्य ।
(III) सभी राजनैतिक दलों के एक-एक प्रतिनिधि	-	सदस्य ।
(IV) अंचल अधिकारी	-	सदस्य सचिव ।
(V) संबंधित विभागों के प्रखण्ड स्तरीय पदाधिकारी	-	सदस्य ।

(ग) पंचायत राहत अनुश्रवण-सह-निगरानी समिति

(I) मुखिया	-	अध्यक्ष ।
(II) पंचायत वार्ड के सदस्यगण	-	सदस्य ।
(III) विगत चुनाव में मुखिया पद के लिए हारे हुए		

सरकार के सचिव ।

ज्ञापांक 1388 /आ0प्र0, पटना-15, दिनांक 24/7/04

प्रतिलिपि- आयुक्त एवं सचिव, जन सम्पर्क विभाग, बिहार, पटना को सूचनार्थ एवं आवश्यक कार्यार्थ प्रेषित। अनुरोध है कि अनुश्रवण की उपर्युक्त व्यवस्था को राज्य के बड़े समाचार पत्रों एवं आकाशवाणी में प्रकाशित/प्रसारित कराने की व्यवस्था अवलिम्ब की जाए ।

ह0/-
(सी0 अशोक वर्धन)
सरकार के सचिव ।

ज्ञापांक 1388 /आ0प्र0, पटना-15, दिनांक 24/7/04

प्रतिलिपि- माननीया मुख्य मंत्री के प्रधान सचिव/ मुख्य सचिव, बिहार, पटना को सूचना एवं आवश्यक कार्रवाई हेतु प्रेषित।

ह0/-
(सी0 अशोक वर्धन)
सरकार के सचिव ।

15 अति बाढ़ प्रवण जिलों के नामः—

1. सुपौल
2. मधेपुरा
3. शिवहर
4. सहरसा
5. खगड़िया
6. सीतामढ़ी
7. दरभंगा
8. मुजफ्फरपुर
9. मधुबनी
10. समस्तीपुर
11. वैशाली
12. कटिहार
13. पूर्वी चम्पारण
14. बेगुसराय
15. भागलपुर

The State Disaster Management Plan

Section- V

"The Roles and Responsibilities of & Guidelines for Government Departments & Other Stakeholders"

17. Department of Animal Husbandry

The Department of Animal Husbandry shall be a major support department in case of disaster caused by Earthquake, Flood, Drought, Fire & Cyclonic Storm.

The Department shall prepare livestock related prevention. mitigation and preparedness measures in case of all disasters.

The roles and responsibilities of the department shall be :

A. Disaster Phase wise

A.1. Pre-Disaster

- Formation of DM Cell and manning with senior personnel drawn from key sections of the department.
- Storage of feed and fodder at safe places in flood and drought prone areas and making arrangements for its supply.
- Prepare for the vaccination as well as treatment of livestock through Veterinary Department.
- Formation of a team for Emergency Support Services to livestock like creation of shelter, storage and distribution of fodder, vaccination and medicines during disaster days.

A.2. During Disaster

- Administering vaccination etc. to prevent outbreak of any disease.
- Making arrangements for the sale of milk of disaster affected cattle owners or value addition of the same.
- Arrangements for removal of dead cattle.

A.3. Post Disaster

- Thorough checking of livestock before handing over to the owners.
- In the event of owners not coming forward to claim the livestock, the department shall take decision in consultation with the District Administration.

(h) मानव दवा की उपलब्धता

बाढ आने की दषा में विभिन्न तरह की जल–जनित बीमारियों से बाढ़ प्रभावित क्षेत्र की जनता रोगग्रस्त हो जाती है। सांप काटने की घटनाएँ भी काफी संख्या में होने लगती हैं। अतएव सुनिष्चित किया जाएगा कि जिला अस्पतालों / अनुमंडल एवं रेफरल अस्पतालों/प्राथमिक चिकित्सा केन्द्र एवं प्राथमिक चिकित्सा उप केन्द्रों में पर्याप्त मात्रा में हेलोजन टैबलेट,क्लोरीन टैबलेट दवाईयॉ तथा सांप काटने की सुई उपलब्ध हो। डायरिया की रोक–थाम के लिए ओ0आर0एस0 घोल की पर्याप्त व्यवस्था रखी जाएगी। ब्लीचिंग पाउडर का भी भंडारण रखा जाएगा।

(i) पशु दवा की उपलब्धता

बाढ़ के दौरान पषु विभिन्न प्रकार की बीमारियों के षिकार हो जाते हैं। अतएव पषु चिकित्सा हेतु आवष्यक दवाईयों की उपलब्धता का आकलन पषुपालन विभाग के संबंधित पदाधिकारियों के साथ बैठक कर तैयार कर लिया जाएगा यदि दवा की कमी होगी तो आवष्यकता अनुसार पषु संसाधन एवं मत्स्य विभाग द्वारा दवा की उपलब्धता सुनिष्चित की जाएगी।

(j) पशु चारे की उपलब्धता

बाढ़ के समय पषु चारे की समस्या उत्पन्न हो सकती है। अतएव पषुपालन विभाग के पदाधिकारियों के साथ पषु चारे की उपलब्धता का आकलन कर लिया जाएगा तथा आवष्यकतानुसार पषु एवं मत्स्य संसाधन विभाग के साथ समन्वय स्थापित कर एक जिले से दूसरे जिले अथवा राज्य के बाहर से चारा मंगाने की व्यवस्था की जाएगी। पषु चारा भंडारण हेतु आवष्यक व्यवस्था जिला पषुपालन पदाधिकारी द्वारा की जाएगी।

(k) खाद्यान्न के संधारण हेतु गोदामों का चिन्हिकरण

ऐसा देखा जाता है कि बाढ़ के दौरान मुफ्त खाद्यान्न के वितरण के समय खाद्यान्नों को दूर दराज के क्षेत्रों में ले जाने की आवष्यकता पड़ती है। चूँकि बाढ़ के समय सड़कें क्षतिग्रस्त रहती हैं, अतएव खाद्यान्न के परिवहन में कठिनाई आ सकती है। अतएव पंचायत/प्रखंड स्तरों पर ऐसे सरकारी/निजी भवनों की पहचान कर ली जाएगी जिन्हें मुफ्त खाद्यान्न वितरण हेतु खाद्यान्नों के गोदाम के रूप में व्यवहार में लाया जा सके। ऐसे गोदामों में बाढ़ के पूर्व आवष्यकतानुसार खाद्यान्न के भंडारण हेतु राज्य खाद्य निगम के पदाधिकारियों को प्रोत्साहित किया जाएगा। इसके लिए उन गोदामों का जहां फुडग्रेन बैंक(अनाज बैंक) के रूप में खाद्याान्न

की मनःस्थिति सामान्य नहीं रहती है। अतएव उन्हें मनोवैज्ञानिक परामर्ष उपलब्ध कराने की व्यवस्था की जाए।

3.12 पशु चारे की व्यवस्था

यदि मवेषी पालको द्वारा पषुओं के लिए रखा गया चारा बाढ़ से नष्ट हो गया हो तो आवष्यकतानुसार पषुओं के लिए पषु षिविर का प्रबंध किया जाएगा। ऐसे षिविरों में (पूर्व में आपदा राहत कोष) राज्य आपदा रिस्पौंस कोष के मानदर के अनुसार पषुओं को चारा उपलब्ध कराया जाएगा। राज्य आपदा रिस्पौंस कोष के अन्तर्गत निर्धारित मानदर आपदा प्रबंधन विभाग के बेबसाईट पर उपलब्ध है। साथ ही विभागीय पत्रांक 2462 दिनांक 12.8.07 द्वारा संसूचित है **(अनुलग्नक 10 पर संलग्न)**। मानदर में समय–समय पर होने वाले संषोधनों की जानकारी विभागीय बेबसाइट पर देखी जा सकती है।

3.13 पशु स्वास्थ्य की देख–भाल

बाढ़ के दौरान पषुओं को जल जनित रोग हो जाते है। अतएव उन्हें जल जनित रोगों से बचाने एवं उनके स्वास्थ्य की देख–भाल करने हेतु मोबाईल पषु चिकित्सा टीमें कार्यरत रहेगी जो गॉव/पंचायतों में घूम–घूम कर टीकाकरण एवं दवा आदि देने का कार्य करेंगी

3.14 गर्भवती माताओं/धातृ माताओं की देख–भाल

बाढ़ के दौरान गर्भवती महिलाओं तथा धातृ माताओं को कई तरह की कठिनाईयों का सामना करना पड़ता है। अतएव बाढ़ग्रस्त क्षेत्रों में कार्यरत मोबाईल मेडिकल टीमों को इस कोटि के महिलाओं के स्वास्थ्य पर विषेष रूप से ध्यान देने की आवष्यकता होगी। अतएव बाल विकास परियोजना पदाधिकारी मोबाईल मेडिकल टीमों को इस कोटि के महिलाओं की सूची उपलब्ध करा देंगे ताकि गॉव/पंचायत स्तर पर अपने भ्रमण के दौरान मोबाईल मेडिकल टीमें उनके स्वास्थ्य का विषेष ध्यान रख सकें। शरण स्थलों/राहत षिविरों में धातृ प्रसव होने को स्थिति में जच्चा– बच्चा के स्वास्थ्य परीक्षण, नवजात षिषु का टीकाकरण एवं धातृ माता के लिए पौष्टिक आहार की व्यवस्था विषेष रूप से की जाएगी। साथ ही नवजात षिषु के जन्म का पंजीकरण कर लिया जाएगा।

3.15 पय जल की व्यवस्था

विभिन्न शरण स्थलों जहां बाढ़ पीड़ित स्वयं शरण लेते हैं उन शरण स्थलों तथा राहत षिविरों में पीने के पानी तथा अस्थायी शौचालय तथा मोबाईल मेडिकल टीमों की व्यवस्था की जाएगी। बाढ़ प्रभावित क्षेत्रों में यदि पीने के पानी का संकट हो तो वहाँ भी पीने के पानी की व्यवस्था की जाएगी। इस कार्य का उत्तरदायित्व लोक स्वास्थ्य अभियंत्रण विभाग का होगा।

की मनःस्थिति सामान्य नहीं रहती है। अतएव उन्हें मनोवैज्ञानिक परामर्ष उपलब्ध कराने की व्यवस्था की जाए।

3.12 पशु चारे की व्यवस्था

यदि मवेषी पालको द्वारा पषुओं के लिए रखा गया चारा बाढ़ से नष्ट हो गया हो तो आवष्यकतानुसार पषुओं के लिए पषु षिविर का प्रबंध किया जाएगा। ऐसे षिविरों में (पूर्व में आपदा राहत कोष) राज्य आपदा रिस्पौंस कोष के मानदर के अनुसार पषुओं को चारा उपलब्ध कराया जाएगा। राज्य आपदा रिस्पौंस कोष के अन्तर्गत निर्धारित मानदर आपदा प्रबंधन विभाग के बेबसाईट पर उपलब्ध है। साथ ही विभागीय पत्रांक 2462 दिनांक 12.8.07 द्वारा संसूचित है **(अनुलग्नक 10 पर संलग्न)**। मानदर में समय–समय पर होने वाले संषोधनों की जानकारी विभागीय बेबसाइट पर देखी जा सकती है।

3.13 पशु स्वास्थ्य की देख–भाल

बाढ़ के दौरान पषुओं को जल जनित रोग हो जाते है। अतएव उन्हें जल जनित रोगों से बचाने एवं उनके स्वास्थ्य की देख–भाल करने हेतु मोबाईल पषु चिकित्सा टीमें कार्यरत रहेगी जो गॉव/पंचायतों में घूम–घूम कर टीकाकरण एवं दवा आदि देने का कार्य करेंगी

3.14 गर्भवती माताओं/धातृ माताओं की देख–भाल

बाढ़ के दौरान गर्भवती महिलाओं तथा धातृ माताओं को कई तरह की कठिनाईयों का सामना करना पड़ता है। अतएव बाढ़ग्रस्त क्षेत्रों में कार्यरत मोबाईल मेडिकल टीमों को इस कोटि के महिलाओं के स्वास्थ्य पर विषेष रूप से ध्यान देने की आवष्यकता होगी। अतएव बाल विकास परियोजना पदाधिकारी मोबाईल मेडिकल टीमों को इस कोटि के महिलाओं की सूची उपलब्ध करा देंगे ताकि गॉव/पंचायत स्तर पर अपने भ्रमण के दौरान मोबाईल मेडिकल टीमें उनके स्वास्थ्य का विषेष ध्यान रख सकें। शरण स्थलों/राहत षिविरों में धातृ प्रसव होने को स्थिति में जच्चा– बच्चा के स्वास्थ्य परीक्षण, नवजात षिषु का टीकाकरण एवं धातृ माता के लिए पौष्टिक आहार की व्यवस्था विषेष रूप से की जाएगी। साथ ही नवजात षिषु के जन्म का पंजीकरण कर लिया जाएगा।

3.15 पय जल की व्यवस्था

विभिन्न शरण स्थलों जहां बाढ़ पीड़ित स्वयं शरण लेते हैं उन शरण स्थलों तथा राहत षिविरों में पीने के पानी तथा अस्थायी शौचालय तथा मोबाईल मेडिकल टीमों की व्यवस्था की जाएगी। बाढ़ प्रभावित क्षेत्रों में यदि पीने के पानी का संकट हो तो वहाँ भी पीने के पानी की व्यवस्था की जाएगी। इस कार्य का उत्तरदायित्व लोक स्वास्थ्य अभियंत्रण विभाग का होगा।

क्रम	कार्रवाईयाँ	नोडल विभाग / एजेन्सी	लाईन विभाग / एजेन्सी	समय सीमा
	तालाब, पोखर, आहर, पाईन आदि को रिचार्ज करने हेतु आवश्यक कदम उठाना।			
7.	**खाद्यान्न की उपलब्धता** ✓ राज्य खाद्य निगम के कार्यालयों / गोदामों में खाद्यान्न उपलब्धता का आकलन तथा आवश्यकतानुसार भंडारण सुनिश्चित करना।	खाद्य आपूर्ति एवं उपभेक्ता संरक्षण विभाग	जिला पदाधिकारी / खाद्य आपूर्ति एवं उपभेक्ता संरक्षण विभाग के जिला स्तरीय पदाधिकारी / जिला टास्क फोर्स	15 जून तक।
8.	**भुखमरी से बचाव** ✓ शताब्दी अन्न कलश योजना अन्तर्गत प्रत्येक पंचायतों में दो–दो क्वींटल खाद्यान्न चक्रीय स्टॉक (Revolving Stock) के रूप में रखना सुनिश्चित करना। **(शताब्दी अन्न कलश योजना को आपदा प्रबंधन विभाग के वेबसाईट** http://www.disastermgmt.bih.nic.in **पर देखा जा सकता है)**	आपदा प्रबंधन विभाग	जिला पदाधिकारी / जिला के अपर जिला दण्डाधिकारी (आपदा प्रबंधन) / जिला टास्क फोर्स	सतत् निगरानी।
9.	**मानव स्वास्थ्य की देखभाल** ✓ सुखाड़ की स्थिति में संभावित बिमारियाँ की रोकथाम हेतु की जानेवाली कार्रवाईयों के संबंध में संधारित अनुदेश सभी सिविल सर्जन / प्रमंडलीय आयुक्त / जिला पदाधिकारी को निर्गत करेगा। उक्त अनुदेश में वर्णित निर्देशों के अनुरूप तैयारियाँ की जाएगी। स्वास्थ्य विभाग के पत्रांक 603 (11) दिनांक–14.07.2015 द्वारा निर्गत अनुदेश की प्रति **अनुलग्नक – 3**	स्वास्थ्य विभाग	जिला पदाधिकारी / स्वास्थ्य विभाग के जिला स्तरीय पदाधिकारी / जिला टास्क फोर्स	15 मई तक
10.	**पशु संसाधन की देखभाल** पशु एवं मत्स्य संसाधन विभाग द्वारा आकस्मिक योजना तैयार करना, जिसके अन्तर्गत निम्न गतिविधियाँ भी	पशु एवं मत्स्य संसाधन विभाग /	जिला पदाधिकारी / पशु	15 जून तक

क्रम	कार्रवाईयाँ	नोडल विभाग / एजेन्सी	लाईन विभाग / एजेन्सी	समय सीमा
	शामिल होंगी :– ✓ पशुओं के लिए पानी एवं चारे की व्यवस्था करना। ✓ जलस्रोतों की पहचान एवं जल के संग्रहण के लिए लघु जल संसाधन विभाग से समन्वय स्थापित करना ✓ पशु राहत शिविर का स्थल चिन्हित करना। पशु शिविर यथा संभव राजकीय ट्यूबवेलों अथवा अन्य जल स्रोतों के आस–पास स्थापित किए जाएं ✓ पशुचारा का संग्रहण एवं आपूर्त्ति। ✓ सुखाड के समय पशुओं के लिए चारा की व्यवस्था पूर्व से ही करना। कम नमी में जमने वाली घास बरसिम, शू बबूल एवं अन्य दूसरे पशु आहार की व्यवस्था या उपलब्धता के लिए पड़ोसी राज्यों से भी लाईजन रखना होगा। ✓ सुखाड़ के दौरान पशुओं में उत्पन्न होने वाली विभिन्न बिमारियों के लिए पशु चिकित्सालयों में आवश्यक दवाइयों / टीका इत्यादि का प्रबंध करना। ✓ इस योजना को प्रत्येक वर्ष अद्यतन करना। ✓ मृत पशु / पक्षियों के मृत शरीर को जलाने अथवा दफनाने का स्थान चिन्हित करना।	लघु जल संसाधन विभाग	एवं मत्स्य संसाधन विभाग / लघु जल संसाधन विभाग के जिला स्तरीय पदाधिकारी / जिला टास्क फोर्स	
11.	<u>रोजगार की उपलब्धता</u> ✓ रोजगार की वैकल्पिक व्यवस्था करने के लिए एक आकस्मिक योजना तैयार करना जिसमें ग्रामीण क्षेत्रों में आवश्यकतानुसार किये जानेवाले विभिन्न कार्यों की पहचान की जाएगी। ✓ मनरेगा योजना के अन्तर्गत जिला, प्रखंड एवं पंचायत स्तर पर Shelf of Project or Bank of Sanctions पूर्व से ही तैयार रखना।	ग्रामीण विकास विभाग	जिला पदाधिकारी / ग्रामीण विकास विभाग के जिला स्तरीय पदाधिकारी / जिला टास्क फोर्स	30 मई तक।
12.	<u>सामाजिक सुरक्षा</u> ✓ वृद्धावस्था पेंशन का वितरण सुनिश्चित करना। ✓ छात्रवृति का वितरण ससमय कराना ताकि गरीब बच्चों की पढ़ाई नहीं छूटे।	समाज कल्याण विभाग / शिक्षा विभाग	जिला पदाधिकारी / समाज कल्याण विभाग /	30 मई तक।

क्रम	कार्रवाईयाँ	नोडल विभाग / एजेन्सी	लाईन विभाग / एजेन्सी	समय सीमा
	शामिल होंगी :– ✓ पशुओं के लिए पानी एवं चारे की व्यवस्था करना। ✓ जलस्रोतों की पहचान एवं जल के संग्रहण के लिए लघु जल संसाधन विभाग से समन्वय स्थापित करना ✓ पशु राहत शिविर का स्थल चिन्हित करना। पशु शिविर यथा संभव राजकीय ट्यूबवेलों अथवा अन्य जल स्रोतों के आस–पास स्थापित किए जाएं ✓ पशुचारा का संग्रहण एवं आपूर्त्ति। ✓ सुखाड़ के समय पशुओं के लिए चारा की व्यवस्था पूर्व से ही करना। कम नमी में जमने वाली घास बरसिम, शू बबूल एवं अन्य दूसरे पशु आहार की व्यवस्था या उपलब्धता के लिए पड़ोसी राज्यों से भी लाईजन रखना होगा। ✓ सुखाड़ के दौरान पशुओं में उत्पन्न होने वाली विभिन्न बिमारियों के लिए पशु चिकित्सालयों में आवश्यक दवाइयों / टीका इत्यादि का प्रबंध करना। ✓ इस योजना को प्रत्येक वर्ष अद्यतन करना। ✓ मृत पशु / पक्षियों के मृत शरीर को जलाने अथवा दफनाने का स्थान चिन्हित करना।	लघु जल संसाधन विभाग	एवं मत्स्य संसाधन विभाग / लघु जल संसाधन विभाग के जिला स्तरीय पदाधिकारी / जिला टास्क फोर्स	
11.	<u>रोजगार की उपलब्धता</u> ✓ रोजगार की वैकल्पिक व्यवस्था करने के लिए एक आकस्मिक योजना तैयार करना जिसमें ग्रामीण क्षेत्रों में आवश्यकतानुसार किये जानेवाले विभिन्न कार्यों की पहचान की जाएगी। ✓ मनरेगा योजना के अन्तर्गत जिला, प्रखंड एवं पंचायत स्तर पर Shelf of Project or Bank of Sanctions पूर्व से ही तैयार रखना।	ग्रामीण विकास विभाग	जिला पदाधिकारी / ग्रामीण विकास विभाग के जिला स्तरीय पदाधिकारी / जिला टास्क फोर्स	30 मई तक।
12.	<u>सामाजिक सुरक्षा</u> ✓ वृद्धावस्था पेंशन का वितरण सुनिश्चित करना। ✓ छात्रवृति का वितरण ससमय कराना ताकि गरीब बच्चों की पढ़ाई नहीं छूटे।	समाज कल्याण विभाग / शिक्षा विभाग	जिला पदाधिकारी / समाज कल्याण विभाग /	30 मई तक।

पत्रांक –1 / प्रा0आ0–01 / 2017 / 1487 / आ0प्र0

बिहार सरकार

आपदा प्रबंधन विभाग

प्रेषक

प्रत्यय अमृत, भा0प्र0से0
प्रधान सचिव।

सेवा में

जिला पदाधिकारी,
मधेपुरा / सहरसा / सुपौल / खगड़िया / बेगूसराय / कटिहार / भोजपुर / वैशाली / पटना / भागलपुर

पटना–15,, दि0– 30/5/17

विषय : **संभावित बाढ़ 2017 के दौरान पशुओं के निष्क्रमण हेतु बड़े आकार के नावों के निर्माण के संबंध में ।**

महाशय,

उपर्युक्त विषय के संबंध में कहना है कि बाड़ आने की स्थिति में मानव आबादी के साथ–साथ बडी संख्या में पशुओं को भी बाढ़ग्रस्त क्षेत्र से सुरक्षित बाहर निकाला जाता है। इस कार्य हेतु बडे आकार के नाव की आवश्यकता होती है, परन्तु जिलों में बडे आकार की नावों की पर्याप्त उपलब्धता नहीं होने के कारण बाढ़ग्रस्त क्षेत्रों से पशुओ / जानवरों को सुरक्षित बाहर निकालने मे काफी कठिनाई का सामना करना पड़ता है।

अतः उपर्युक्त के आलोक में अनुरोध है कि संभावित बाढ़ के मद्देनजर पशुओ / जानवरों को बाढ़ग्रस्त क्षेत्रों से सुगमतापूर्वक सुरक्षित बाहर निकालने के उद्देश्य से अपने जिले में 3–3 बडे आकार के नावो को नियमानुसार निर्माण कराने की कृपा की जाय ।

विश्वासभाजन,

(प्रत्यय अमृत)
प्रधान सचिव

ज्ञापांक – 1487 / आ0प्र0 दिनांक – 30/5/17

प्रतिलिपि सभी प्रमडलीय आयुक्त, बिहार को सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित ।

प्रधान सचिव

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2.3 अन्य संबंधित विभागों द्वारा पूर्व तैयारियॉ

2.3.1 **<u>लघु जल संसाधन विभाग:</u>** यह विभाग पेय जल संकट की सूचना प्राप्त होते ही अपने राज्य एवं जिला स्तरीय पदाधिकारियों को सक्रिय करेगा। साथ ही भूजल रिचार्ज की विभागीय योजनाओं के कार्यान्वयन एवं नलकूपों की स्थिति की सघन एवं नियमित समीक्षा प्रारंभ करेगा। विभाग का दायित्व होगा कि वह अधिकाधिक नलकूपों को कार्यरत बनाए रखने के लिए उचित कदम उठाए।

2.3.2 **<u>पशु एवं मत्स्य संसाधन विभाग:</u>** यह विभाग पशुओं के समक्ष उत्पन्न होने वाले पेय जल एवं चारा संकट की सतत निगरानी करेगा। पेय जल एवं चारा संकट की सूचना मिलते ही यह अपने राज्य एवं जिला स्तरीय पदाधिकारियों को सक्रिय करेगा। साथ ही पशु षिविरों हेतु आकस्मिक योजना सूत्रण एवं कार्यान्वयन हेतु यह विभाग राज्य स्तर पर नोडल विभाग होगा। आकस्मिक योजना में निम्नांकित बिन्दु अवष्य शामिल किए जाऐंगे:

- पशु षिविरों हेतु स्थल चयन(स्थल ऐसी जगह होने चाहिए जहाँ जल की पर्याप्त व्यवस्था असानी से हो सके। जैसे– लघु जल संसाधन विभाग के चालू नलकूप के समीप का स्थल।
- पशुओं को पशु षिविरों में पहचाने की व्यवस्था।
- पशु षिविर के अन्तर्गत अस्थायी शेड का निर्माण।
- पीने का पानी एवं नाद की व्यवस्था।
- पशु चारा की व्यवस्था।
- बीमार पशु के इलाज के लिए दवा की व्यवस्था।
- पशुपालकों एवं विभागीय कर्मचारियों को प्रषिक्षण की व्यवस्था।
- मृत पशुओं के निस्तारण की व्यवस्था।

1973

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बिहार सरकार

आपदा प्रबंधन विभाग

प्रेषक,

व्यास जी,
प्रधान सचिव।

सेवा में,

सभी विभागीय प्रधान सचिव / सचिव,
सभी प्रमंडलीय आयुक्त,
सभी जिला पदाधिकारी।

पटना–15, दिनांक– 26/5/15

विषयः **वर्ष 2015–2020 तक के लिए दिनांक 01.04.2015 से प्रभावी भारत सरकार द्वारा अधिसूचित प्राकृतिक आपदाओं एवं राज्य सरकार द्वारा अधिसूचित स्थानीय आपदाओं (Local Disasters) से प्रभावित व्यक्तियों / परिवारों को भारत सरकार द्वारा अधिसूचित (एस0डी0आर0एफ0 एंव एन0डी0आर0एफ0) द्वारा निर्धारित साहाय्य मानदर के अनुरूप साहाय्य मुहैय्या कराने के संबंध में।**

महाशय,

निदेशानुसार उपर्युक्त विषय के संबध में कहना है कि भारत सरकार, गृह मंत्रालय (आपदा प्रबधन डिविजन), जयसिंह रोड, नई दिल्ली के पत्रांक 32–7 / 2014–एन0डी0एम0–1 दिनांक–08.04.2015 के द्वारा राज्य आपदा रिस्पौंस कोष (एस0डी0आर0एफ0) तथा नेशनल डिजास्टर रिस्पौंस फंड (एस0डी0आर0एफ0) से वर्ष 2015–2020 तक अधिसूचित प्राकृतिक आपदाओं तथा राज्य सरकार के अधिसूचना संख्या 1418 दिनांक–17.04.15 द्वारा अधिसूचित स्थानीय आपदाओं (Local Disasters) से प्रभावित परिवारों के बीच साहाय्य वितरण हेतु मदों की सूची तथा मानदर निर्धारित किया गया है। इसमें माह फरवरी एवं मार्च 2015 में ओलावृष्टि से फसल क्षति को भी सम्मिलित करते हुए नये मानदर के अनुसार अनुमान्य भुगतान करने की स्वीकृति दी गई है।

2. उपर्युक्त संशोधित मानदर पर राज्य कार्यकारिणी समिति की अनुशंसा के आलोक में राज्य सरकार द्वारा पूर्ण विचारोपरान्त भारत सरकार, गृह मंत्रालय के पत्र संख्या 32–7 / 2014–एन0डी0एम0–1 दिनांक–08.04.2015 द्वारा निर्धारित निम्नांकित सहाय्य मानदर को दिनांक 01.04.2015 से राज्य में लागू करने का निर्णय लिया गया है। ***यह मानदर दिनांक 01.04.2015 तथा उसके उपरान्त घटित प्राकृतिक आपदाओं तथा माह फरवरी एवं मार्च 2015 में ओलावृष्टि से फसल क्षति के लिए लागू होगा।***

	b) Perennial crops	**Rs. 18,000/-** ha. for all types of perennial crops subject to areas being sown and subject to minimum assistance not less than Rs 2000/- and restricted to sown areas
	(ख) शाश्वत फसल (Perennial crops) के लिए	₹ 18,000/– प्रति हेक्टेयर, सभी प्रकार के पेरिनियल (शाश्वत) फसल के लिए। बुआई वाले क्षेत्र के लिए साहाय्य राशि 2000/–रू0 से कम नहीं दी जाएगी । बुआई वाले क्षेत्र तक सीमित।
	c) Sericulture	**Rs. 4,800/-** per ha. for Eri, Mulberry, Tussar **Rs. 6,000/-** per ha. for Muga.
	(ग) सेरीकल्चर (रेशम) के लिए	₹ 4,800/– प्रति हेक्टेयर "इरी" "मलवेरी" एवं "तसर" के लिए ₹ 6,000/– प्रति हेक्टेयर मूंगा के लिए
(ii)	**Input subsidy to farmers having more than 2 ha of landholding.**	**Rs.6,800/-** per hectare in rainfed areas and restricted to sown areas. **Rs.13,500/-** per hectare for areas under assured irrigation and restricted to sown areas **Rs. 18000/-** per hectare for all types of perennial crops and restricted to sown areas - Assistance may be provided where crop loss is 33% and above, subject to a ceiling of 2 ha. per farmer.
(ii)	कृषकों को कृषि इनपुट सब्सिडी जिनके पास 2 हेक्टेयर से अधिक भूमि उपलब्ध हो।	₹ 6,800/– प्रति हेक्टेयर वर्षा आधारित फसल क्षेत्र के लिए। ₹ 13,500/– प्रति हेक्टेयर, सुनिश्चित सिंचाई आधारित फसल क्षेत्र के लिए। ₹ 18,000/– प्रति हेक्टेयर, सभी प्रकार के पेरिनियल (शाश्वत) फसल के लिए। 33 % एवं अधिक फसल क्षति होने पर 2 हेक्टेयर प्रति कृषक।
6	**ANIMAL HUSBANDRY - ASSISTANCE TO SMALL AND MARGINAL FARMERS/ पशुपालन – लघु एवं सीमान्त कृषकों को सहायता**	
	i) Replacement of milch animals, draught animals or animals used for haulage.	***Milch animals*** **-** **Rs.30,000/-** Buffalo/ cow/ camel/ yak/Mithun etc. **Rs.3,000/-** Sheep/ Goat/Pig

		Rs.25000/- Camel/ horse/ Bullock, etc. **Rs.16,000/-** Calf/ Donkey/ Pony/ Mule - The assistance may be restricted for the actual loss of economically productive animals and will be subject to a ceiling of 3 large milch animal or 30 small milch animals or 3 large draught animal or 6 small draught animals per household irrespective of whether a household has lost a larger number of animals. (The loss is to be certified by the Competent Authority designated by the State Government). ***Poultry:-*** Poultry **@ 50/- per bird** subject to a ceiling of assistance of **Rs 5000/-** per beneficiary household. The death of the poultry birds should be on account of a natural calamity. *Note:* - Relief under these norms is not eligible if the assistance is available from any other Government Scheme, e.g. loss of birds due to Avian Influenza or any other diseases for which the Department of Animal Husbandry has a separate scheme for compensating the poultry owners.
	i) अदुग्धकारी/ दुग्धकारी या ढुलाई के कार्यों में उपयोग में आने वाले पशुओं का प्रतिस्थापन।	दूध देने वाला जानवर गैस/गाय/ऊँट/याक/मिथुन इत्यादि ₹ 30,000/- की दर से भेंड़/बकरी ₹ 3,000/- की दर से अदुग्धकारी जानवर ऊँट/घोड़ा/बैल इत्यादि ₹ 25,000 की दर से बछड़ा/गदहा और टट्टू ₹ 16,000 की दर से सहाय्य आर्थिक रूप से उत्पादक जानवरों की वास्तविक क्षति के अनुसार सीमित होगी और यह 3 बड़े अदुग्धकारी जानवर या 30 छोटे अदुग्धकारी जानवर या 3 बड़े अदुग्धकारी जानवर या 6 छोटे अदुग्धकारी जानवर प्रति परिवार तक सीलिंग के अंतर्गत होगी। चाहे जानवरों की क्षति की संख्या बड़ी क्यों न हो (क्षति राज्य सरकार द्वारा विनिर्दिष्ट सक्षम पदाधिकारी द्वारा प्रमाणित की जाएगी) पॉल्ट्री ₹ 50/– प्रति चिड़ियॉ की दर से यह सहायता प्रत्येक लाभुक परिवारों को 5000/– रू0 की अधिकतम सीमा

		के अंतर्गत। पॉल्ट्री चिड़ियों की मृत्यु प्राकृतिक आपदा के कारण होने पर अनुदान देय होगा। टिप्पणीः– इन मानदरों के अंतर्गत सहाय्य अनुमान्य नहीं होगा यदि किसी अन्य सरकारी योजना यथा चिड़ियों की क्षति पक्षी इन्फ्लुएंजा के कारण या किसी अन्य बीमारियों के कारण हुई हो जिसके लिए पशुपालन विभाग द्वारा पॉल्ट्री मालिको को क्षति पूर्ति करने हेतु कोई अलग योजना हो।
	ii) Provision of fodder / feed concentrate water Supply and medicines in cattle camps.	Large animals- **Rs. 70/-** per day Small animals- **Rs. 35/-** per day, Period for providing relief will be as per assessment of the State Executive Committee (SEC) and the Central Team (in case of NDRF). The default period for assistance will be upto 30 days, which may be extended upto 60 days in the first instance and in case of severe drought up to 90 days. Depending on the ground situation, the State Executive Committee can extend the time period beyond the prescribed limit, subject to the stipulation that expenditure on this account should not exceed 25% of SDRF allocation for the year. Based on assessment of need by SEC and recommendation of The Central Team, (in case of NDRF) consistent wih estimates of cattle as per Livestock Census and subject to the certificate by the competent authority about the requirement of medicine and vaccine being calamity related.
	ii) पशु शिविरों में पशुचारा / feed concentrate सहित जलापूर्ति एवं औषधि हेतु।	बड़ा पशु ₹ 70/– प्रतिदिन की दर से । छोटा पशु ₹ 35/– प्रतिदिन की दर से । साहाय्य प्रदान करने हेतु समय सीमा राज्य कार्यकारिणी समिति द्वारा एवं केन्द्रीय दल द्वारा (एन0डी0आर0एफ0 से सहायता हेतु) आंकलन किया जाएगा। सहायता के लिए सामान्य अवधि 30 दिनों की होगी जिससे पहली बार में 60 दिनो तक एवं गभीर सूखे की स्थिति में 90 दिनों तक विस्तारित किया जा सकता है। जमीनी स्थिति के आधार पर राज्य कार्यकारिणी समिति समय सीमा का अवधि विस्तार कर सकती है। कुल व्यय की राशि एस0डी0आर0एफ0 के वार्षिक विनियोजन के 25% से अधिक नहीं होनी चाहिए। राज्य कार्यकारिणी समिति द्वारा जरूरत के आकलन एवं केन्द्रीय दल की सिफारिश (एन0डी0आर0एफ0 के मामले

	ii) Input subsidy for fish seed farm	**Rs. 8,200 per hectare.** (This assistance will not be provided if the beneficiary is eligible or has availed of any subsidy/ assistance, for the instant calamity, under any other Government Scheme, except the one time subsidy provided under the Scheme of Department of Animal; Husbandry, Dairying and Fisheries, Ministry of Agriculture.)
	(ii) मछली जीरा फार्म के लिये इनपुट सब्सिडी	₹ 8,200/- प्रति हेक्टर (यदि लाभुक सरकार के किसी अन्य योजना के तहत अनुदान/सहायता प्राप्त कर लिए है तो उन्हें यह सहायता नही दिया जायेगा। अपवाद –यदि किसी ने एक बार पशुपालन, डेयरी और मत्स्य पालन विभाग, कृषि मंत्रालय के योजना के तहत एक बार अनुदान प्राप्त किया है।)
8	**HANDICRAFTS/HANDLOOM – ASSISTANCE TO ARTISANS/** हस्तशिल्प/ हस्तकरघा– कारीगरों के लिए सहायता	
	i) For replacement of damaged tools/ equipment	**Rs. 4,100** per artisan for equipments. - Subject to certification by the competent authority designated by the Government about damage and its replacement.
	(i) क्षतिग्रस्त उपकरणों के प्रतिस्थापन के लिए	₹ 4,100/– प्रति शिल्पी बशर्ते यह क्षति/ प्रतिस्थापन राज्य सरकार द्वारा विनिर्दिष्ट सक्षम प्राधिकार द्वारा प्रमाणित हो।
	ii) For loss of raw material/ goods in process/ finished goods	**Rs. 4,100** per artisan for raw material. - Subject to certification by Competent Authority designated by the State Government about loss and its replacement.
	(ii) कच्चे माल/ प्रकियाधीन माल/ तैयार माल के क्षति के लिए	₹ 4,100/– प्रति शिल्पी कच्चे माल के लिए बशर्ते यह क्षति/ प्रतिस्थापन राज्य सरकार द्वारा विनिर्दिष्ट सक्षम प्राधिकार द्वारा प्रमाणित हो।
9	**HOUSING/ अवास/ मकान**	
	a) **Fully damaged/ destroyed houses**	
	i) Pucca house ii) Kutcha House	**Rs. 95,100/-** per house, in plain areas. **Rs. 95,100/- प्रति मकान, मैदानी क्षेत्रों के लिए**
	(क) पूर्णतया क्षतिग्रस्त मकान	**Rs.1,01,900/-** per house, in hilly areas

		मे) पशुधन की गणना के अनुसार एवं सक्षम प्राधिकारी द्वारा प्रमाण पत्र के अनुसार आवश्यक दवा एवं टीकाकरण संबंधित आपदा के अनुरूप दिया जायेगा।
	iii) Transport of fodder to cattle outside cattle camps	As per actual cost of transport, based on assessment of need by SEC and recommendation of the Central Team (in case of NDRF) consistent with estimates of cattle as per Livestock Census.
	iii) पशु शिविर के बाहर पशुचारे का परिवहन	वास्तविक परिवहन लागत के अनुरूप, राज्य कार्यकारिणी समिति द्वारा आंकलन किया जाएगा और एन0डी0आर0एपफ0 से सहायता प्रदान करने हेतु केन्द्रीय दल द्वारा अनुशंसा किया जाएगा । यह अनुदान पशु गणना के आकलन पर आधरित होगा।
7	**FISHERY/ मत्स्य पालन**	
	i) Assistance to Fisherman for repair / replacement of boats, nets – damaged or lost -- Boat -- Dugout-Canoe -- Catamaran -- net (This assistance will not be provided if the beneficiary is eligible or has availed of any subsidy/ assistance, for the instant calamity, under any other Government Scheme.)	**Rs. 4,100/-** for repair of partially damaged boats only **Rs.2,100/-** for repair of partially damaged net **Rs.9,600/-** for replacement of fully damaged boats **Rs.2,600/-** for replacement of fully damaged net
	(i) मछुआरों के लिए नाव, जाल, आदि का मरम्मती/पुर्नस्थापन– क्षतिग्रस्त या खो जाने पर – • नाव • डोगी • कटमरैन • जाल (यदि लाभुक सरकार के किसी अन्य योजना के तहत अच्छादित है तो उन्हें यह सहायता नहीं दिया जायेगा।)	₹ 4,100/- आंशिक रूप से क्षतिग्रस्त नाव के लिए ₹ 2,100/- आंशिक रूप से क्षतिग्रस्त जाल के लिए ₹ 9,600/- पूर्णतः क्षतिग्रस्त नाव के प्रतिस्थापन के लिए ₹ 2,600/- पूर्णतः क्षतिग्रस्त जाल के प्रतिस्थापन के लिए


बिहार सरकार
पशु एवं मत्स्य संसाधन विभाग
(पशुपालन)
पशुपालन सूचना एवं प्रसार कार्यालय, बिहार
ऑफ पोलो रोड, पटना–01
गर्मी के मौसम में पशुओं की देखभाल हेतु आवश्यक सुझाव
• पशुओं को धूप एवं लू से बचाव हेतु पशुओं को हवादार पशुगृह अथवा छायादार वृक्ष के नीचे रखें।
• पशुगृह को ठंढ़ा रखने हेतु दीवारों के उपर जूट की टाट लटका कर उसपर थोड़ी–थोड़ी देर पर पानी का छिड़काव करना चाहिए।
• पंखे अथवा कूलर का यथासंभव उपयोग करें।
• शरीर में जल एवं लवण की कमी को ध्यान में रखकर दिन में कम से कम चार बार स्वच्छ जल उपलब्ध कराना चाहिये। साथ ही संतुलित आहार के साथ–साथ उचित मात्रा में खनिज मिश्रण देना चाहिये।
• मौनसून आने से पूर्व पशुओं को गलाघोंटू एवं ब्लैक क्वार्टर (एच0एस0 एवं बी0क्यू0) रोग से बचाव हेतु टीकाकरण अवश्य करा लेना चाहिए।
• पशुओं खासकर भैंस को दिन में दो–तीन बार नहाना चाहिए।
• आहार में संतुलन हेतु एजोला घास का उपयोग किया जा सकता है। साथ ही आहार में गेहूँ का चोकर एवं जौ की मात्रा बढ़ा देनी चाहिए।
• गर्मी में अगलगी की घटना प्रायः आम बात है, इससे बचने हेतु विशेष सावधानी बरतनी चाहिए।
• विषम परिस्थिति में नजदीकी पशु चिकित्सालय से सम्पर्क स्थापित करना चाहिये।
(डा0 दिवाकर प्रसाद)
सहायक निदेशक


बिहार सरकार
पशु एवं मत्स्य संसाधन विभाग
(पशुपालन प्रभाग)
सर्दी के मौसम में पशुओं की देखभाल हेतु आवश्यक सुझाव
• सर्दी के मौसम में पशुओं को ठंढ, ओस एवं कोहरे से बचाने के उपाय करने चाहिए। इसके लिए पशुओं को गर्म स्थान पर जैसे छत के नीचे या घास–फूस की छप्पर के नीचे रखना चाहिए। रात में पशुओं को कभी भी खुले में नहीं बांधना चाहिए। फर्श गीले व ठंढे नहीं रहनी चाहिए। ठंढ से बचाव हेतु फर्श पर पुआल बिछा कर रखना चाहिए।
• धूप निकलने के स्थिति में पशुओं को खुले धूप में बांधें क्योंकि सूर्य की किरणों में जीवाणु एवं विषाणु को नष्ट करने की बहुत क्षमता होती है तथा विटामिन डी की प्राप्ति होती है।
• अधिक ठंढ होने पर पशु के शरीर को गर्म रखने के लिए शरीर पर कपड़ा या जूट की बोरी बांध दें। पशुगृह को गर्म रखने के लिये अलाव/घुआं इत्यादि का प्रयोग अत्यंत सावधानी से करना चाहिए ताकि आगजनी की समस्या न हो।
• पशुओं को नियमित व्यायाम कराये। रोगी, कमजोर, गाभिन और अपाहिज पशुओं को टहलाकर तथा स्वस्थ एवं वयस्क पशुओं को हल्का या तेज दौड़ाकर व्यायाम कराना चाहिए। इससे पशुओं के सभी अंगों में रक्त संचार सुधरती है।
• उन्हें स्वच्छ एवं ताजा पानी, जो अत्यधिक ठंढा न हो, पीने को दें।
• ब्याने वाले पशुओं का विशेष ध्यान रखें। उनका शरीर गर्म रखा जाए तथा उचित मात्रा में प्रोटीन, कार्बोहाइड्रेट, मिनरल्स, विटामिन से भरपूर संतुलित भोजन दिया जाय।
• खुरहा–मुहपका रोग, गलाघोंटू, लंगडी, पी0पी0आर0, बकरी/भेड़ चेचक आदि रोगों से बचाव हेतु टीके, यदि अभी तक नही लगवाएं हो तो, कृपया समय रहते अवश्य लगवा लें ।
• अन्तः एवं बाह्य परजीवी से बचाव हेतु उचित कृमिनाशक दवाओं का उपयोग करना चाहिए।
• इस मौसम में कफ, निमोनिया (बच्छडों में) और खांसी से संबंधित रोग होने की स्थिति में पशु चिकित्सक से यथाशीघ्र परामर्श लेकर उचित औषधि पशुओं को देना चाहिए।
• दुधारू पशुओं को थनैला रोग से बचाने के लिए दूध पूरा व मुट्ठी बांध कर निकालें और दूध दूहने के बाद थनों को कीटाणुनाशक (फिटकिरी, लाल पोटाश) घोल से धो लेना चाहिए।
• पशुओं को नमक एवं खनिज लवण मिश्रण निर्धारित मात्रा में दाने या चारे में मिलाकर दें।
• सर्दियों के मौसम में दलहनी किस्म का हरा चारा जैसे बरसीम, ल्यूसर्न, जई आदि रसदार चारा प्रचुर मात्रा में उपलब्ध रहता है। इसलिए इन्हें पशुओं को पर्याप्त मात्रा में देना चाहिए। शुष्क पदार्थ का एक तिहाई भाग हरा चारा होना चाहिए। महंगे दाने मिश्रण की मात्रा को दलहनी किस्म के हरे चारे के प्रयोग से कम किया जा सकता है। हरे चारे की मात्रा एक निश्चित अनुपात में ही बढ़ाना चाहिए। अत्यधिक मात्रा में हरा चारा देने से पशुओं में दस्त, अफारा इत्यादि की समस्या हो सकती है।
• पशुओं को खिलाने के पश्चात् अतिरिक्त हरा चारा अगर बचा हुआ हो तो उसे छाया में सुखाकर सूखी घास 'हे' के रूप में संरक्षित कर लें। यह हरे चारे की अनुपलब्धता में इस्तेमाल किया जा सकता है।
• पशुओं को संतुलित आहार देना चाहिए। दानों में अनाज, खल तथा भूसी की समान मात्रा मिलाएं। खल में मूंगफली की खल का प्रयोग करना चाहिए। दानें में 10 प्रतिशत शीरा का प्रयोग करना चाहिए।
• सर्दी में अक्सर अधिकतर भैंसे गर्म हो जाती हैं, इसे उचित समय पर गर्भाधान करवाएं।
पशुपालन सूचना एवं प्रसार कार्यालय, बिहार, पटना द्वारा जनहित में प्रचारित।

बिहार सरकार

पशु एवं मत्स्य संसाधन विभाग
(पशुपालन)

बाढ़ की स्थिति में पशु प्रबंधन

- बाढ़ आने की स्थिति में पशु को रखने की व्यवस्था ऊँचे स्थान पर करना चाहिए जहाँ जल निकास की उचित व्यवस्था हो ताकि पशु परिसर साफ एवं सूखा रहे तथा गर्मी एवं नमी जनित रोगों से पशुओं को बचाया जा सकें।
- पशुशाला को साफ एवं स्वच्छ रखने के लिये समय-समय पर विसंक्रामक का उपयोग करना चाहिए।
- पशु गृह को अत्यधिक नमी से बचाने के लिए पशुशाला में चूने का छिड़काव करना चाहिए।
- पशुओं को संतुलित आहार तथा साफ एवं ताजा पानी उपलब्ध कराना चाहिए।
- अतःपरजीवी एवं बाह्य परजीवी का प्रकोप इस समय काफी होता है। अतः इनसे बचाव हेतु सभी पशुओं में कृमिनाशक दवा का प्रयोग अवश्य करें।
- खुरहा-मुँहपका (एफ0एम0डी0) रोग, गलाघोंटू (हिमोरेजिक सेप्टीसिमिया), लंगड़ा बुखार (कृष्णजंघा), इन्टेरोटौक्सिमिया रोग के टीके यदि नहीं लगाए गये हों, तो अभी अवश्य लगवा दें।
- बीमार एवं घायल पशुओं को स्वस्थ पशुओं से अलग रखना चाहिए एवं उपचार हेतु पशु चिकित्सक से सम्पर्क स्थापित करना चाहिए।
- आवारा एवं वन्य पशुओं से अपने पशु को सुरक्षित रखें।
- बाढ़ के समय मृत पशुओं से कई प्रकार की बीमारियाँ फैलने की संभावना अधिक होती है, अतः मृत पशुओं का निस्तारण सावधानीपूर्वक करें।

गर्मी से पशुओं के बचाव हेतु सुझाव

- पशुओं को पशु शेड में रखना चाहिए।
- पशुओं को किसी एकल ऊँचे वृक्ष के नीचे न बाँधकर पेड़ों के समूह के नीचे बाँधना चाहिए।
- ऊँचें स्थान खासकर पहाड़ों पर पशु के खाने एवं पानी के लिये धातु निर्मित नाद का उपयोग नहीं करना चाहिए।
- उर्जा चालित यंत्रों से पशु को दूर रखना चाहिए।

बिहार सरकार

पशु एवं मत्स्य संसाधन विभाग
(पशुपालन)

पशुओं में भीषण गर्मी एवं लू लगने के लक्षण एवं उससे बचाव

गर्मी के मौसम में जब बाहरी वातावरण का तापमान अधिक हो जाता है तो वैसी स्थिति में पशु को उच्च तापमान पर ज्यादा देर तक रखने से या गर्म हवा के झोंकों के संपर्क में आने पर लू लगने का डर अधिक होता है जिसे हिट स्ट्रोक अथवा सन स्ट्रोक कहते हैं।

पशुओं में लू लगने के लक्षण

- तीव्र ज्वर की स्थिति
- मुंह खोलकर जोर जोर से सांस लेना अर्थात हांफना।
- मुंह से लार गिरना।
- क्रियाशीलता कम हो जाना एवं बेचैनी की स्थिति।
- भूख में कमी एवं पानी अधिक पीना।
- पेशाब कम होना अथवा बंद हो जाना।
- धड़कन तेज होना।
- कभी कभी अफरा की शिकायत होना आदि।

पशुओं में लू से बचाव के उपाय

- पशुओं को धूप एवं लू से बचाव हेतु पशुओं को हवादार पशुगृह अथवा छायादार वृक्ष के नीचे रखें जहां सूर्य की सीधी किरणें पशुओं पर न पड़े।
- पशुगृह को ठंढा रखने हेतु दीवारों के उपर जूट की टाट लटका कर उसपर थोड़ी-थोड़ी देर पर पानी का छिड़काव करना चाहिए ताकि बाहर से आने वाली हवा में ठंढक बनी रहे।
- पंखे अथवा कूलर का यथासंभव उपयोग करें।
- पशुओं में पानी एवं लवण की कमी हो जाती है। साथ ही भोजन में अरूची हो जाती है। इन्हें ध्यान में रखकर दिन में कम से कम चार बार साफ, स्वच्छ एवं ठंढा जल उपलब्ध कराना चाहिये। साथ ही संतुलित आहार के साथ-साथ उचित मात्रा में खनिज मिश्रण देना चाहिये।
- पशुओं खासकर भैंस को दिन में दो-तीन बार नहाना चाहिए।
- आहार में संतुलन हेतु एजोला घास का उपयोग किया जा सकता है। साथ ही आहार में गेहूँ का चोकर एवं जौ की मात्रा बढ़ा देनी चाहिए।
- पशुओं को चराई के लिए सुबह जल्दी एवं शाम में देर से भेजना चाहिए।

पशुओं में लू लगने के उपचार

- सर्वप्रथम शरीर के तापमान को नियंत्रित करने के लिए पशु को ठंढे स्थान पर रखना चाहिए।
- पशु को पानी से भरे गड्ढे में रखना चाहिए अथवा पूरे शरीर पर ठंढे पानी का छिड़काव करना चाहिए। सम्भव हो तो बर्फ या अल्कोहल पशुओं के शरीर पर रगड़ना चाहिए।
- ठंढे पानी में तैयार किया हुआ घी-नी, भुने हुए जौ का आटा व थोड़ा नमक का घोल बराबर पिलाते रहना चाहिए।
- पशु को पुदीना व प्याज का अर्क बनाकर देना चाहिए।
- शरीर के तापमान को कम करने वाली औषधी का प्रयोग करना चाहिए।
- शरीर में पानी एवं लवणों की कमी को पूरा करने के लिए इलेक्ट्रोलाइट थेरेपी करना चाहिए।
- विषम परिस्थिति में नजदीकी पशु चिकित्सालय से संपर्क करना चाहिए।

बिहार सरकार

बिहार राज्य आपदा प्रबंधन प्राधिकरण

BIHAR STATE DISASTER MANAGEMENT AUTHORITY

(आपदा प्रबंधन विभाग, बिहार सरकार)

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