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Government of Goa,
Revenue Department,
Secretariat, Porvorim-Goa. 403 521

File No: 1-2(9)/VIII/2020-21 242 **Dated: 24/05/2021**

To,
The Director,
Animal Husbandry & Veterinary Services,
Pashusamvardhan Bhavan,
Patto,
PANAJI – GOA.

Directorate of A. H. & V. S., Patto
Date 27/5/21 Entry No. 3338

Sub: Draft Departmental Disaster Management Plan of Animal Husbandry & Services (AH&VS),

Sir,

I am directed to refer to your proposal dated 22-01-2021 on the subject cited above and to convey approval of the Secretary (Revenue) for Disaster Management Plan – 2020 dated 08-09-2020 of Directorate of Animal Husbandry & Veterinary Services .

It is therefore, requested to upload the same on your website. The file is returned herewith for your necessary action.

Yours faithfully,

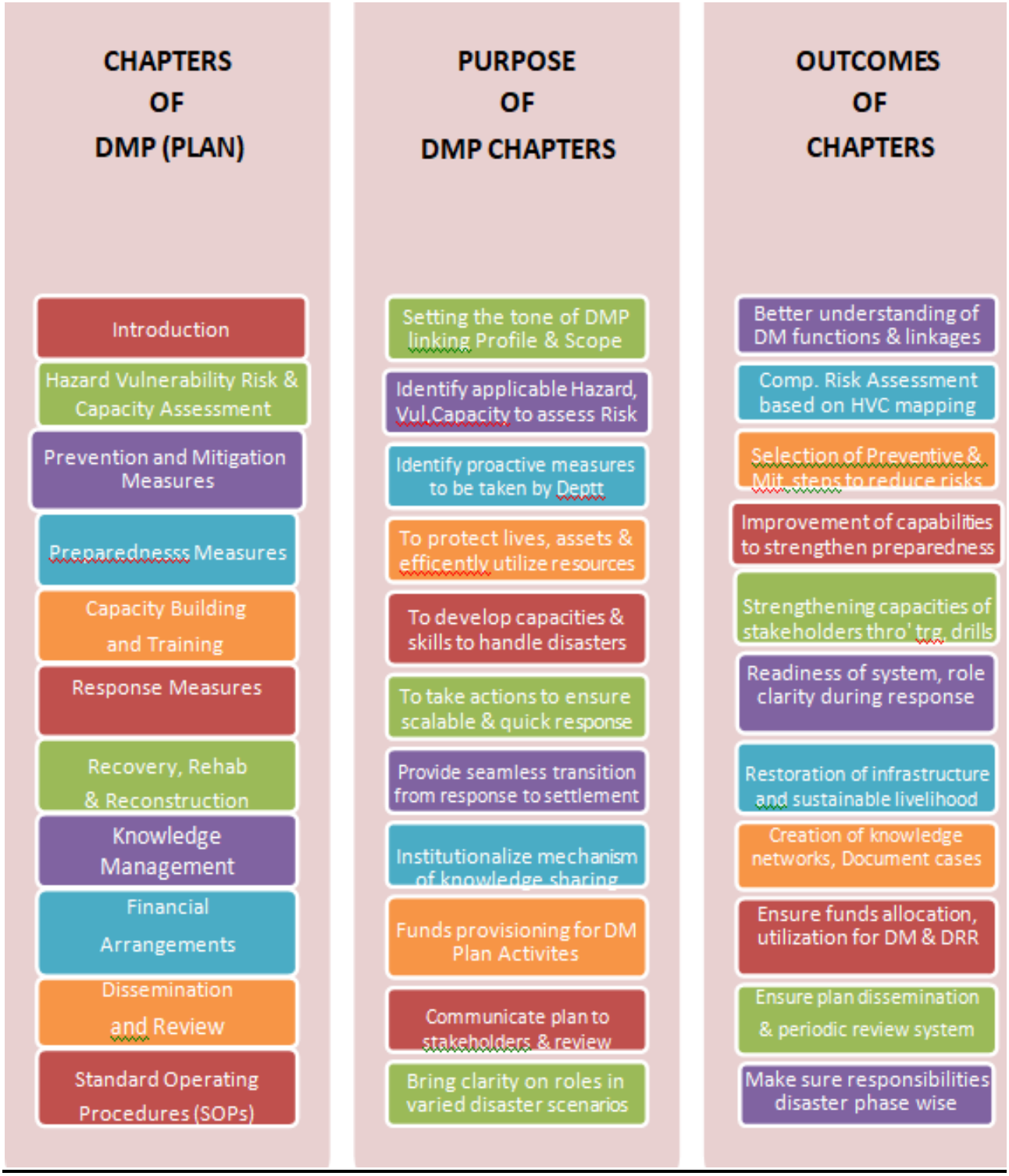
(Isha M. Sawant)
Under Secretary (Rev-II)

Encl: F.No. 1-2(0)/VIII/2020-21

Ph.No. 0832 – 2419876

DISASTER MANAGEMENT PLAN-2020 OF THE DIRECTORATE OF ANIMAL HUSBANDRY & VETERINARY SERVICES, GOVERNMENT OF GOA

Overview of Disaster Management Plan of Animal Husbandry Department, Goa



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1. Definitions :

For the sake of easy understanding, a few of the terms commonly used in dealing with natural disasters are defined here below :-

Hazard : a threatening event, or the probability of occurrence of a potentially damaging phenomenon (e.g. an earthquake, a cyclonic storm or a large flood) within a given time period and area.

Disaster : means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or 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 areas.

Disaster Management : means a continuous and integrated process of planning, organizing, coordinating and implementing measures which are necessary or expedient for:

- prevention of danger or threat of any disaster;
- mitigation or reduction of risk of any disaster or its severity or consequences;
- capacity building;
- preparedness to deal with any disaster;
- prompt response to any threatening disaster situation or disaster;
- assessing the severity or magnitude of effects of any disaster;
- evacuation, rescue and relief;
- rehabilitation and reconstruction.

Risk : "Risk" is defined as the expectation value of losses (deaths, injuries, property, etc.) that would be caused by a hazard. Disaster risk can be seen as a function of the hazard, exposure and vulnerability as follows;

Vulnerability : Vulnerability is the degree to which a population, individual or organization is unable to anticipate, cope with, resist and recover from the impacts of disasters. Vulnerability is a function of susceptibility (the factors that allow a hazard to cause a disaster) and resilience (the ability to withstand the damage caused by emergencies and disasters and then to recover)

Mitigation : measures taken in advance of a disaster aimed at decreasing or eliminating its impact on society and on environment

Preparedness : means the state of readiness to deal with a threatening disaster situation or disaster and the effects thereof.

Prevention : encompasses activities designed to provide permanent protection from disasters. It includes engineering and other physical protective measures, and also legislative measures controlling land use and urban planning.

2. List of Abbreviations & Acronyms :

AI – Artificial Insemination

CBRN - Chemical, Biological, Radiological & Nuclear

CCA – Climate Change Adaptation

CEO - Chief Executive Officer

CMG - Crisis Management Group

CPMFs – Central Paramilitary Forces

DADF – Department of Animal Husbandry, Dairying and Fisheries

DHS - Directorate of Health Services District

DM – Disaster Management

DOP – Directorate of Panchayat

DRM - Disaster Risk Management

DRR - Disaster Risk Reduction

IMD - Indian Meteorological Department

MAITRIS – Multi-purpose AI Technician in Rural India

MHA - Ministry of Home Affairs

NADMP – National Animal Disaster Plan

NCC - National Cadet Corps

NDMA - National Disaster Management Authority

NDRF - National Disaster Response Force

NIDM – National Institute of Disaster Management

NGO - Non-Governmental Organization

NPBBDD – National Programme for Bovine Breeding & Development

PRI – Panchayati Raj Institutions

PWD - Public Works Department

RKVY – Rashtriya Krishi Vikas Yojana

RVC – Remount and Veterinary Corps

QRT - Quick Response Team

SDM - Sub-Divisional Magistrate

SDRF – State Disaster Response Force

SEC - State Executive Committee

SEOC - State Emergency Operation Centre

SOP - Standard Operating Procedure

3. Introduction :

Goa State Profile

Goa is a tiny emerald land in western India with coastlines stretching along the Arabian Sea with a significant rise in land elevation from sea to 1022 m. It is the 25th state of the Union states of India since 1987. Goa has an elected legislative assembly and an executive council of ministers headed by a Chief Minister. It is one of the smallest states in the country and has a coast length of about 104km. It has very high biodiversity both on land and in the marine system. Tourism is one of the most important sectors of the Goa economy. Other important sectors are mining, fishing, and agriculture.

Goa covers an area of 3702 square kilometers and comprises two revenue districts – North Goa and South Goa. It is bordered by Maharashtra and Karnataka across the Western Ghats of India, and the Arabian Sea on the east. According to the 2011 census, the human population of the State of Goa is 1.82 Million.

62% of Goa's population lives in cities. About 80% of the state population lives in four coastal talukas of Bardez, Tiswadi, Mormugao, and Salcete.

Location, geography and size

The State of Goa, located between 140 53' 57''N and 150 47' 59'' N Latitudes and 730 40' 54''and 74053'11'' E Longitudes. It covers an area of 3702 sq. km. and accounts for about one percent of the total geographical area of the country. Goa was elevated to the status of the 25th State of India Union on 30th May 1987. The boundaries of the State are well defined in the north by Terekhol River which separates it from the state of Maharashtra. In the east and south Goa is bordered with the state of Karnataka and in the west, it is surrounded by the Arabian Sea.

The State consists of 2 administrative districts i.e. North Goa and South Goa, which are further divided into 12 talukas viz. Pernem, Bardez, Bicholim, Sattari, Tiswadi, Ponda, Murmugao, Salcete, Sanguem, Dharbandora, Quepem, and Canacona.

After attaining statehood the number of towns in the state increased from 15 to 70 and the number of villages has decreased from 407 to 334. The state has 14 municipalities, 320 inhabited villages. The above is indicative of increasing urbanization in Goa and decreasing rural population. Generally speaking, the rural areas of Goa exhibit semi-urban characteristic.

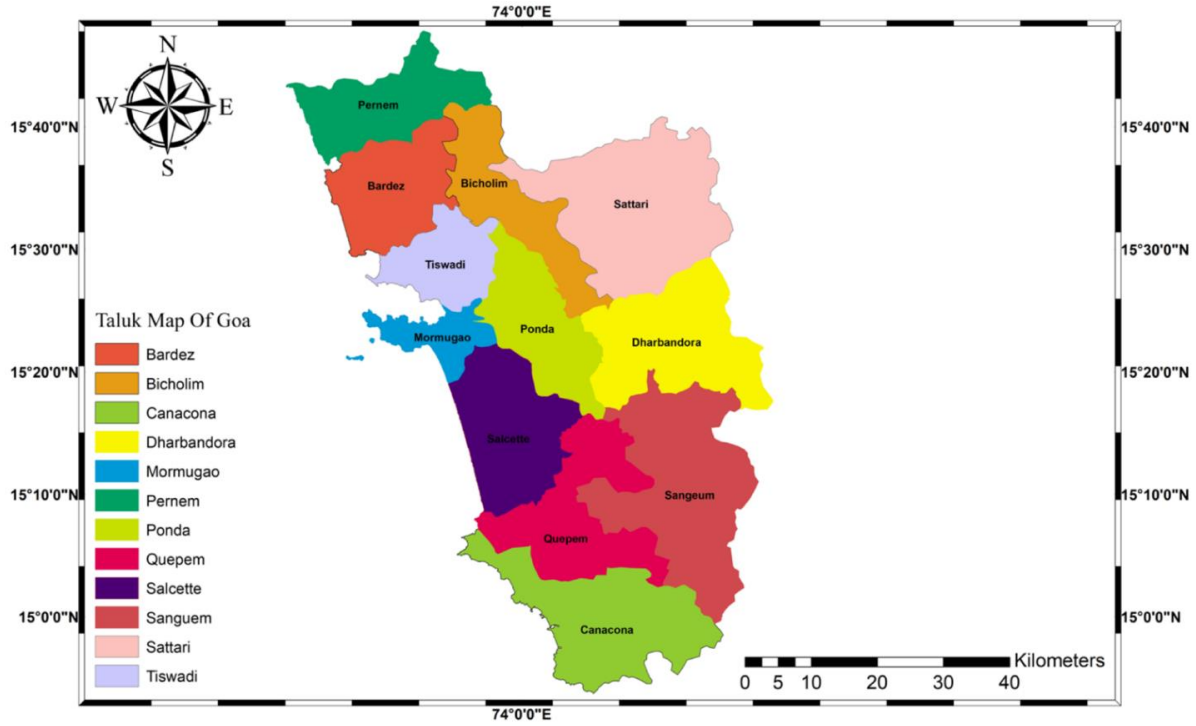

Figure 1: Map of Goa

Socio-Demographic profile

The State of Goa supports a human population of 14.59 Lakhs (Census 2011) which is about 0.12% of India's population. The average population density has increased in the last 20 years from 272 persons per sq. km to 394 persons per sq. km. The population density of Goa is higher than the national population density of 382 persons per sq. km. While the population density of Goa has increased the decennial population growth rate has reduced significantly from 26% in 1987-88 to 8.23% as per the Census 2011. The decadal growth rate of the population of the State for the decade 1991-2001 was 15.21%. Thus, indicating the overall population pressure will decrease further in the coming decades.

More than 62% of the population resides in urban areas and about 38% in rural areas. The sex ratio stands at 973 females per thousand males as against the National sex ratio of 943. As per the 2011 Census, 11,65,487 persons in the State are reported to be literate which constitutes 88.70 % of the total population. The State's workforce is about 577548, which constitutes 39.58% of the total population in the State.

Geophysical profile

The State of Goa has a hilly terrain especially on its eastern side, where lies the southern end of the Sahyadri ranges. These mountains, after skirting a considerable portion of the north-eastern and south-eastern boundaries, branch off westward across the State with many spurs and ridges. The terrain is interspersed by several rivers flowing westwards,

which provide a network of internal waterways. The important rivers are Mandovi, Zuari, Terekhol, Chapora, Sal, Betul and Kushavati. The rivers are navigable for a total length of 256 Kms. The coast is full of creeks and estuaries formed by these rivers which provide a good shelter for fishing crafts. The 105 km long coastal line of Goa is endowed with some of the loveliest beaches in the world which have earned the frame of bearing idyllic beauty spots.

The land elevation ranges from sea level to 1022 meters. The highest point is the Wagheri hills in Sattari taluka. The natural vegetation of Goa consists of dense forest and dry deciduous to moist deciduous type. Moderately sloping lands with laterite outcrops are covered by grass and shrubs. The habitat of the flora is of semi-evergreen type. Evergreen forests are seen only on high hills. The vegetation consists of trees, shrubs, herbs climbers, sedges and grasses. The coastal tracts are namely covered by palms and mangroves. Goa receives rains from the southwest monsoons. The average annual rainfall of the State, as recorded is 2776.9 mm. The rainy season is spread over four months from June to September. Occasional thundershowers are experienced in May and October. Goa experiences a warm and humid tropical climate. The summer temperature ranges from 24°C to 36°C. In winter, the mercury hovers between 21°C to 30°C. Due to the Global Warming effect, the picture seems to be slightly changing.

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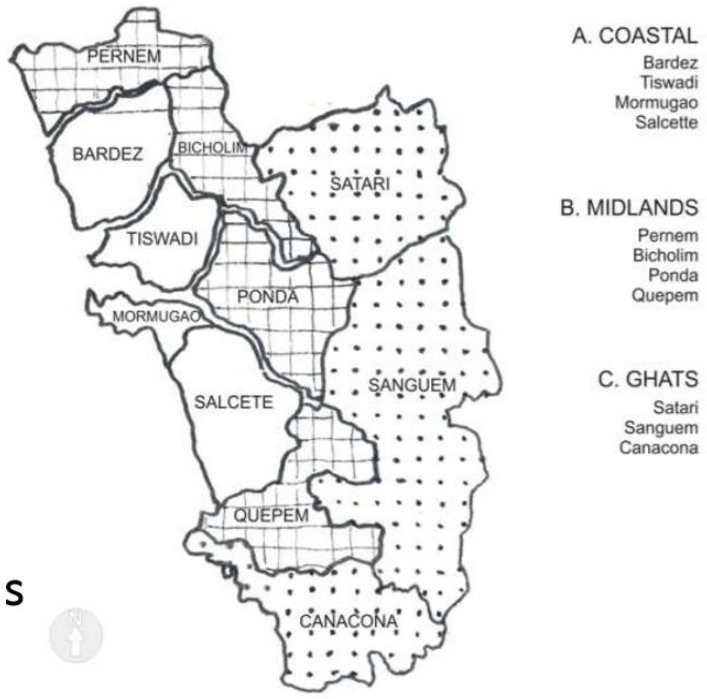


Figure 2 : Geographical zones of Goa

Climate change scenario

Goa's mean annual temperature has increased by over 1°C since the beginning of the 20th century till date (1901-2018), much of it during 1990-2018 period. The mean annual rainfall in Goa has increased by 68% over the period 1901-2015. With increasing rainfall the inter-annual rainfall variability in the state has also increased especially since 1970s. While mean annual rainfall in the state has increased, moderate to light rainfall days (IMD category I) in Goa have declined over 1901-2015 period, whereas very heavy and exceptionally heavy rainfall events (IMD category III) in the state have increased by a dramatic more than 100%.

Mean annual temperatures (model ensemble) in Goa may increase by around 2°C in 2030s compared to 1901-1950 period, and further to by around 4°C by 2080s under high emission scenarios. Goa will start experiencing heat waves (>40C) beyond the 2040s, as maximum temperature increases by about 5°C towards the century end under high emission scenarios. Minimum temperatures are expected to rise even more by up to 8°C by the century end under the high emission scenarios. The mean annual rainfall in Goa is projected to slightly decline under high emission scenarios, which under low emission scenarios is projected to slightly increase.

The flood vulnerability analysis from the state reveals that 14.73% of the land is under 15 meter elevation, much of it in the coastal zones, and are severely vulnerable to flooding both from extreme rainfall events and sea-level rise. In terms of vulnerability from floods and sea-level rise, the Talukas of Salcete, Tiswadi, and Bardez are most vulnerable.

Forest and biodiversity

Goa is the smallest state with just 3702 sq. km. of geographical area is having a good forest cover with 1,225.12 sq. km of recorded Government Forest which is over 33% of the total geographical area of the State. Out of this 62% is designated as 7 Protected Areas, 6 biodiversity-rich and ecologically sensitive Western Ghats and one in Mangrove forest at Chorao island.

Vulnerability to Climate Change: In the context of Goa, communities living in low lying areas, informal settlements like slum population, people with disabilities and those whose livelihood dependents mainly on khazan lands are in particular the immediate and most vulnerable groups. Also, four coastal taluks of Bardez, Tiswadi, Mormugao, and Salcete, house about 80% of the population and are hubs of economic activity.

It is the moderate and light rainfall events that nourish life-forms and ecosystems, whereas very heavy and exceptionally heavy rainfall events create devastation and chaos to life-forms and ecosystems. Increasing frequency of very heavy and exceptionally heavy rainfall events in Goa is one of the key impacts of climate change witnessed in the state.

Temperature Profile in Goa:

Below shows the mean annual temperature map of Goa over the long-term period of 1951-2014. Methodology and data source for this figure is described in Venkateswaran and Chaturvedi (in Preparation). Mean temperature in Goa is found to be 26.70C, which is higher than the national average annual temperature is about 23.3C (Chaturvedi et al 2012). While spatial temperature variability is not high in goa, hilly areas in the eastern parts of the state are generally cooler than the coastal areas in the west.

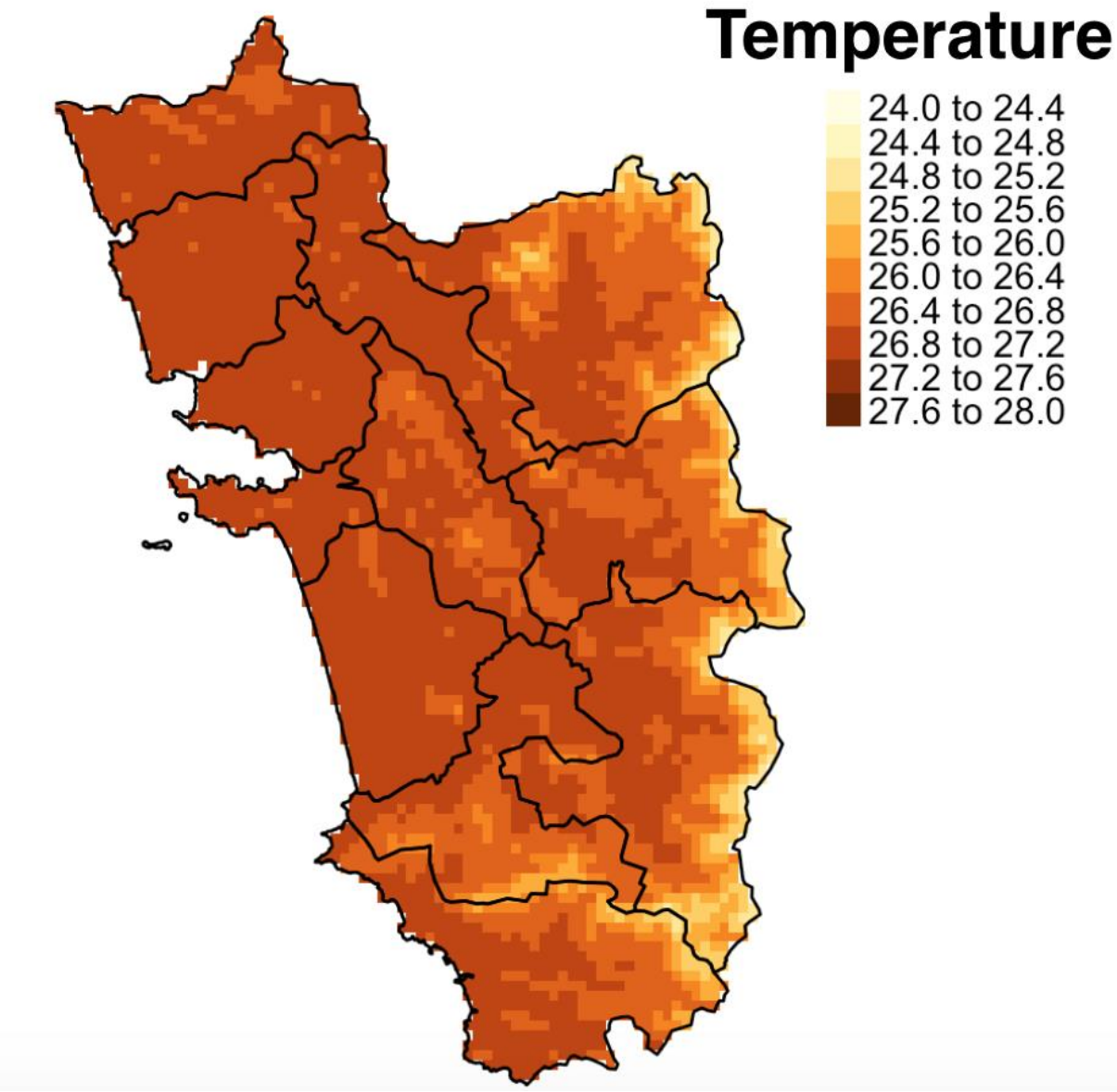


Figure 3: Long period average (1951-2014) spatial distribution of mean temperature (deg C) in Goa

Goa experiences a hot summer (April- June) followed by pleasant monsoon (June-September) season, temperatures temporarily rise again in the month of October, following pleasant winter months (November to March). Figure 11 shows the seasonal and monthly mean monthly temperature profile in the Goa based on the long-period mean temperature average over the period 1951-2014.

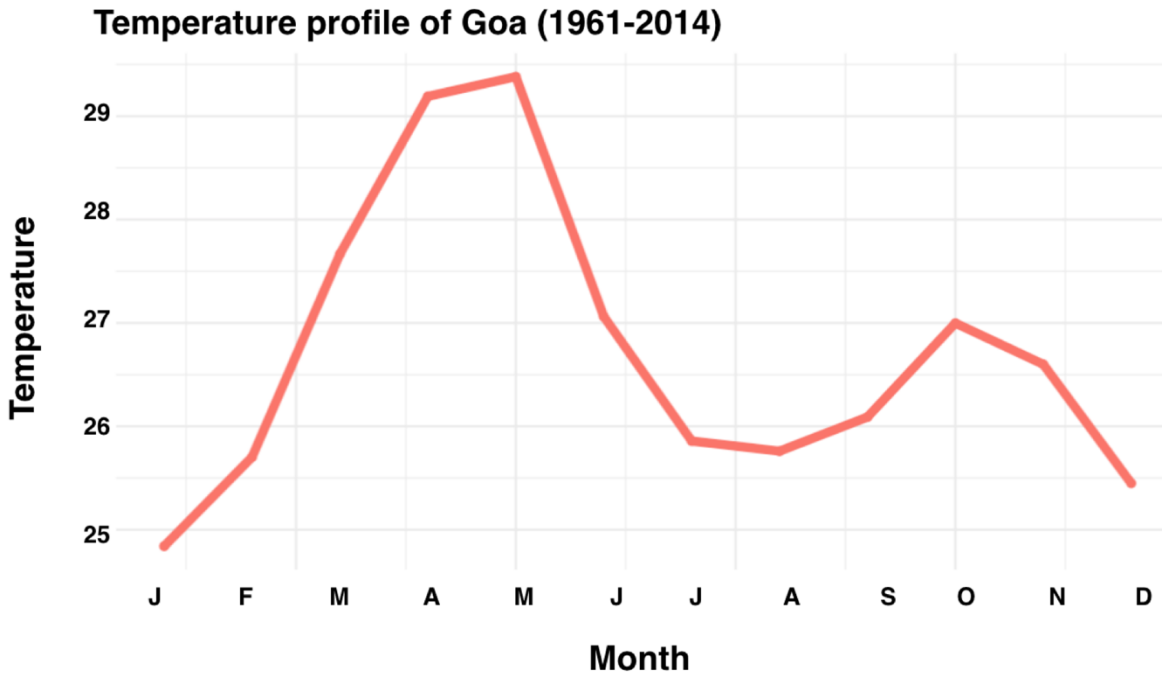


Figure 4: Long-period average (1951-2014) annual temperature profile in Goa

Rainfall Profile in Goa:

Average annual rainfall in Goa is about 3000 mm, which is about three times higher than the national average. Figure 12 shows the spatial distribution of annual rainfall in Goa. Analysis in Figure 13 is based on long-period (1951-2014) gridded precipitation data from the Indian Meteorological Department (Pai et al. 2014).

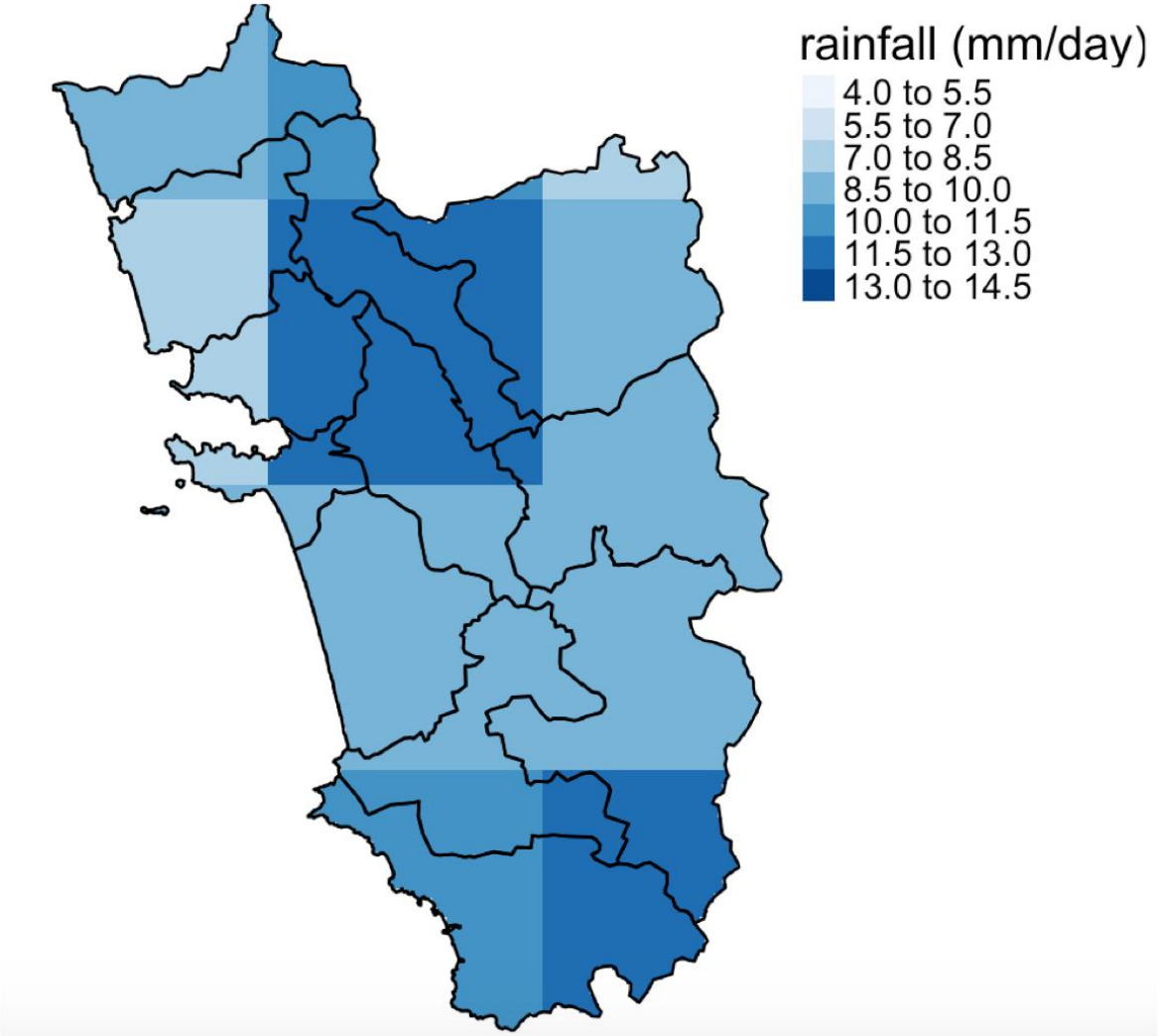


Figure 5: Long period average (1951-2014) spatial distribution of annual rainfall in Goa

Figure 5 shows the mean monthly rainfall profile in the state in monsoon, pre-monsoon and post monsoon months. Figure 13 shows that much of the rainfall in Goa takes place in the monsoon months, whereas winters are usually dry.

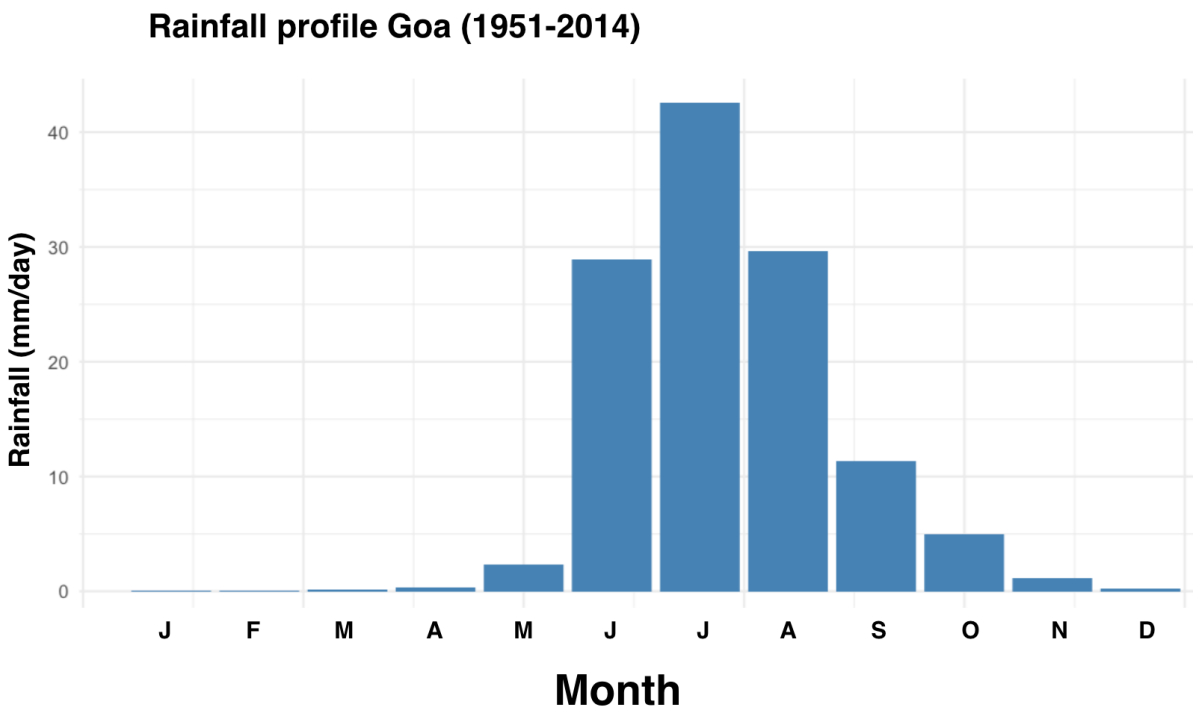


Figure 6: Long-period average (1951-2014) annual Rainfall profile in Goa

Geographical Features that influence climate in Goa

Goa has a peculiar geographic orientation with the Arabian Sea on the West and the Western Ghats (with increased height) on its eastern boundary. This makes the weather pattern very unique for Goa.

Classification of rainfall events based on daily rainfall

IMD Classification		IMD Classes Regrouped as Bhatla et al 2019, and used for analysis in this report	
Rainfall Categories	Daily Rainfall (mm)	Rainfall Categories	Daily Rainfall (mm)
No Rain	0	No rainfall	0-2.4
Very light rain	0.1-2.4		
Light rain	2.5-7.5	Category 1	2.5-64.4
Moderate rain	7.6-35.5		
Rather heavy rain	35.6-64.4		
Heavy Rain	64.5-124.4	Category 2	64.5-124.4
Very Heavy rain	124.5-244.5	Category 3	>124.5
Exceptionally heavy rain	≥244.6		

The frequency of light and moderate rainfall events is declining over the last century, whereas the frequency of extreme rainfall events in increasing in Goa over the last century. No. of rainy days experiencing Category 1, rainfall has declined over the period 1901-2015. Whereas, no. of rainy days experiencing heavy rainfall i.e. category 2, rainfall has increased by about 60%. On the other hand, Category 3 rain fall days, which denotes rainy days with extreme rainfalls (very heavy and exceptionally heavy) have increased by an alarming more than 100%. It is interesting to note that it is the category 1 and 2, rainfall events (moderate to light heavy rainfall) that nourish life-forms and ecosystems, whereas category 3 rainfall events (very heavy and exceptionally heavy) create devastation and chaos to life-forms and ecosystems. Increasing frequency of very heavy and exceptionally heavy rainfall events in Goa is one of the key impacts of climate change witnessed in the state. **Goa state is already vulnerable to flooding, increasing heavy rainfall trend makes the state even more vulnerable to this hazard.**

Analysis of flood vulnerability in Goa

Flood vulnerability in Goa under current climate as well as under future climate is spatially mapped using the high-resolution digital representation of orography based on SRTM Digital Elevation Model (DEM), published by the CGIAR-Consortium for Spatial Information (http:// srtm.csi.cgiar.org), with a cell size (spatial resolution) of 90 m, is used (Farr et al.2007, Reuter et al. 2007). On the basis of elevation, Goa is categorized in multiple elevation zones, elevation zone of 0-5 meter is considered to be most vulnerable to flooding from multiple hazards including sea level rise, and extreme precipitation events. The talukas of Salcete, Tiswadi, and Bardez most vulnerable to flooding related hazards.

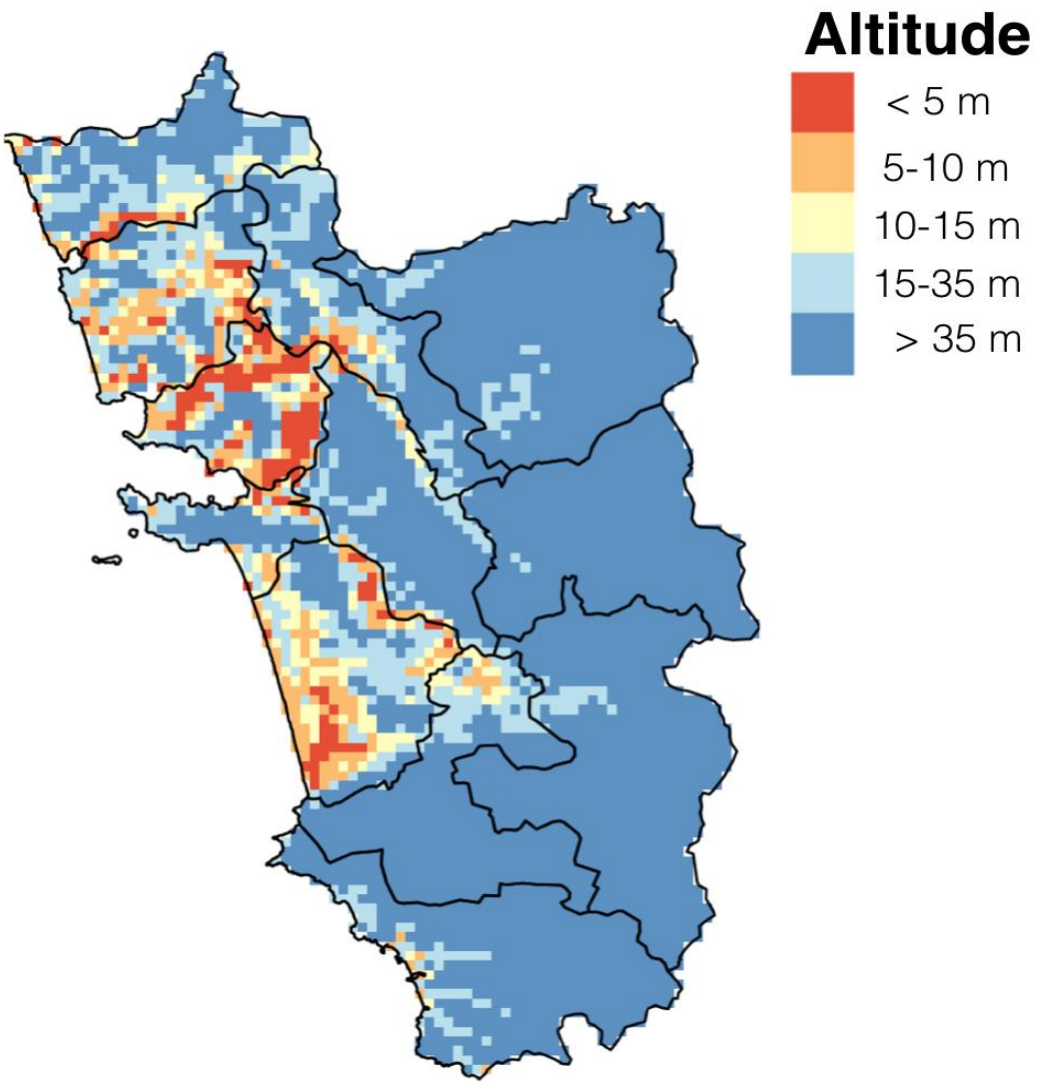


Figure 7: ***Flood vulnerability map of Goa***

Vulnerability assessment

The Intergovernmental Panel on Climate Change (IPCC) defines vulnerability as "the propensity or predisposition to be adversely affected" [1], which encompasses the basic components of exposure, sensitivity, and adaptive capacity. Key sector-specific indicators have been utilized to assess the sensitivity and adaptive capacity of the sector.

The coastal areas of the country, face grave risks due to climate change. There is the risk of cyclones and tsunamis, the intensity of which is predicted to rise. Rising sea levels, which could flood land (including agricultural land) and cause damage to coastal infrastructure and other property, pose another threat.

Coastal Vulnerability: UNDP predicts, Goa stands to lose a large percentage of its land area, including many of its famous beaches and tourist infrastructure, which are very significant to states' socio-economic status. A one-metre rise in sea level, it is estimated, will affect 7 percent of Goa's population and cause damage to the tune of Rs 8,100 crore.[1] Because of this, it becomes essential to understand the vulnerability to different parts of the 100km vast coastline of Goa.

The multi-hazard vulnerability assessment of the coastline of Goa carried out by NIO in 2014 provides a reasonable assessment of coastal flooding and inundation for Talukas along the coast. This is accomplished by using seven physical and geologic risk variables characterizing the vulnerability of the coast, including historical shoreline change, rate of relative sea-level change, coastal regional elevation, coastal slope, mean tidal range, significant wave height, and geomorphology using conventional and remotely sensed data, in addition to two socio-economic parameters: population and tourist density data. The results of this composite vulnerability index-based study suggest that [2] the 30 km of the coastline of the talukas of Salcete, Bardez, and Tiswadi has a coastal regional elevation of fewer than 35 m and is at the highest risk due to sea-level rise and flooding. Bardez and Salcete talukas have both experienced erosion rates of more than 0.6 m/year while the erosion rate for Tiswadi was found to be above 0.3 m/year. These are also the most populated talukas and most prominent tourist spots, further increasing the risk of erosion in these talukas.

Other Physical Vulnerability

The riverine water system of Goa and the creeks and backwaters are vulnerable to high-intensity precipitation scenarios predicted for the state. The brackish water areas have very rich ecosystems and exist along creeks and rivers. Some of them are protected by sluice and gate systems whereas others are at the risk of ingress of saline water due to climate change. Groundwater extraction is not well regulated and intrusion of groundwater is likely to increase Saltwater intrusion into the groundwater system. As the sea level rises this problem will be further exasperated. The high groundwater levels in certain areas pose the challenge of water percolation capacity of the soil. Thus, increasing the vulnerability of these areas like Panaji.

Agriculture and allied sectors

Agriculture is an important sector in the state. Out of the total state area of 361113 ha. about 131587 ha. is under cultivation.

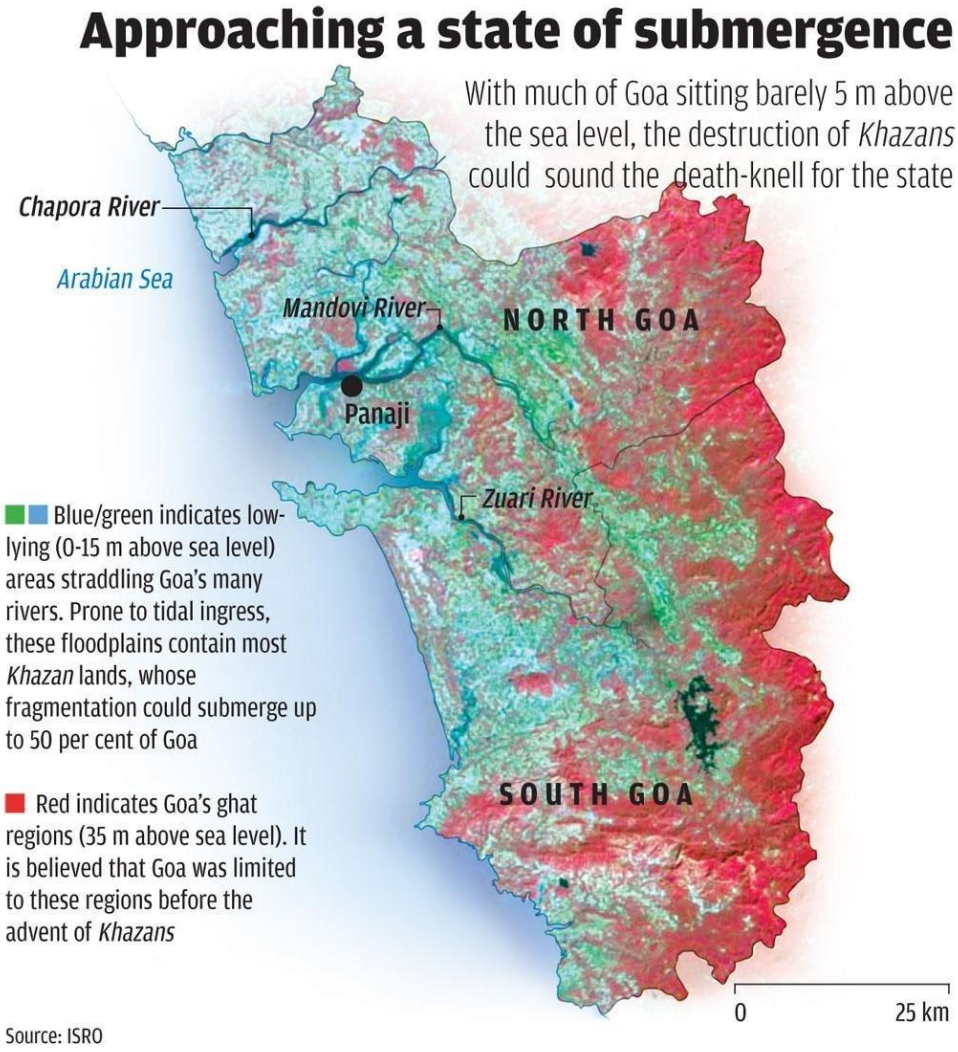
On an average landholding in Goa are small and the average landholding is around 0.84 ha. Like most other coastal States, the people of Goa practice integrated systems of farming, forestry, horticulture, livestock, and off-farm activities.

Goa has only one agro-climatic zone i.e. West Coast Plains & Ghat Region and the state primarily depends on rain-fed agriculture. Paddy, sugarcane, arecanut, coconut are the

major crops grown under irrigation. Besides, pulses are taken in rotation. Goa has a very distinct pattern of land use. The sloppy hills are cultivated with cashew interspersed with Kokum; the lower slopes are cultivated with Coconut. Areas with perennial irrigation have multi-storied cropping including Coconut, Arecanut, Black Pepper, Nutmeg, Jackfruit, Pineapple, Breadfruit, etc. The valley along the Nullah & River is cultivated with Paddy in Rabi season. The sandy soil in Coastal areas is planted with Paddy in Rabi season and with legumes and vegetables in the summer season. Khazan lands that are reclaimed by constructing bunds along the tidal rivers and controlling tidal water through an intricate arrangement of sluice gates cover about 18000 ha. These areas are cultivated with paddy only during the rainy season with salt-tolerant varieties and left fallow due to high salinity in dry months.

The soils of the State are largely acidic in nature having laterite in plains/midlands and in hilly areas while sandy to sandy loam in coastal areas. Brackish water salt pans also exist in the low-lying areas of the coastal regions. About 30 percent of the area of the Goa has shallow soils, 5 percent has moderately deep soils, 46 percent has deep soil and about 7 percent has shallow to very shallow soils.

In the upper reaches of the topography, the soils are coarse and gradually become dense towards the valley regions. The percolation is better up to pediplain areas from hills and gradually decreases in the valley regions. Particularly in the lower areas, i.e. the soil along the river banks and major streams, heavy textured soils are encountered. In some cases, sub soils are affected by acidity. The surface layer of the soil up to a depth of 25 cm. is normally used by the crop plant. About 38 percent has silty clay and gravelly silty clay surfaces soil texture, 26 percent has gravelly clay sand clay texture, and 20 percent sandy loam and loamy sand, 6 percent gravelly sandy clay loam and gravelly clay loam and 5 percent loam and sandy clay loam surface soil texture. Topographically, 13.4% of the area has less than 3% slopes and 5.5% of the area records between 5-25% slopes. Most of the area, which is under rain-fed agriculture, possess 3-5% slope grade.



Goa is endowed with vast resources of livestock including poultry. Livestock sector plays an important role in national economy and socio-economic development of the State. However, different part of the State are vulnerable to a large number of natural disasters, out of which, floods and cyclone are common. In the context of vulnerability to disasters, small and marginal farmers and economically weaker sections are affected more intensely. Most of the cattle owners keep livestock for subsistence income as an insurance against disasters like flood, etc. when agriculture crop failure occurs. Therefore management of livestock during disaster is very important to protect animal owners specially small and marginal farmers from economic losses and spread of diseases.

4. Background :

20th Livestock Census, 2019 Data of Goa

Species	Cattle	Buffalo	Sheep	Goat	Pig	Poultry	Dogs
Livestock Population	60,247	27,207	08	9,446	35,480	3,49,543	86,976

In view of above table, the Department of A.H. & V.S. will have to plan their disaster management accordingly.

Disaster Management Plan :

This plan will be known as Disaster Management Plan – 2020 of the Directorate of Animal Husbandry & Veterinary Services, Government of Goa and will be applicable in Goa.

Disaster Management Act 2005 defines "disaster" as "Disaster means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or manmade 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."

Developing countries suffer the greatest costs when a disaster hits – more than 95 percent of all deaths caused by disasters occur in developing countries, and losses due to natural disasters are 20 times greater. In other words a disaster can be defined as any tragic event that may involve at least one victim of circumstance, such as an accident, fire, terrorist attack, or explosion. Disasters threaten sustainable economic development worldwide. In the past twenty years, earthquakes, floods, tropical storms, droughts and other calamities have killed around three million people, inflicted injury, disease, homelessness, and misery on one billion others, and caused damage worth millions of rupees. Disasters destroy decades of human effort and investments, thereby placing new demands on society for reconstruction and rehabilitation.

Under the Section 39 and 40 of National Disaster Management Act 2005, it is mandatory on the part of Department of the State Government, to adopt a continuous and integrated process of planning, organizing, coordinating and implementing measures which are necessary and expedient for prevention as well as mitigation of disasters.

DMP draws its legal and statutory power from various acts, rules and policies of Government of India. Some of these are as under:

1. **The Disaster Management Act 2005** Section 37 seeks to make it mandatory for every ministry or department of the Government of India to prepare a disaster management plan. It also provides for annual review and updating of the plan and enjoins upon the Ministry or Department concerned to make provision for financing of the activities specified the plan.

2. **The National Disaster Management Policy (2009**) Animals both domestic and 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.

3. **The National Livestock Policy (2013):** Contingency Plan 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 of fodder blocks.

4. **The NDMA Guidelines on Biological Disaster Management :** Livestock disaster Management illustrates a suggestive framework for livestock disease management. It also prescribes a set of mitigation measures and activities mandated by executed through respective nodal ministries.

5. **The Indian Veterinary Council Act, 1984**

6. **The Prevention and Control of Infectious and Contagious diseases in animals Act, 2009**

4.1 **Goal and purpose of the Plan** :

- To make Goa a Disaster Resilient State so as to minimize livestock, property and environmental losses.

- To respond promptly in a coordinated manner in a disaster like situation, it is mandatory to mitigate the potential impact of disasters in order to save lives of Livestock and poultry in the State of Goa.

4.2 **Theme :**

It comprises risk and vulnerability assessment of disasters in the State. It provides planning for prevention and mitigation, mainstreaming disaster in development plans/ programmes/ projects, Capacity building and preparedness measures, the role and responsibilities of each government departments and other stakeholders, risk transfer mechanism and effective programme management for future disasters. It also provides for reviewing and updating plan annually.

4.3 **Objectives of the Plan :** Following are the objectives for preparation of the Departmental Disaster Management Plan:

- To identify the various hazards and hazard prone areas in the State
- To conduct risk and vulnerability assessment and to identify vulnerable locations
- To analyze capacities of the stakeholders in DM .
- To evolve strategies for preparedness and mitigation so that risk involved in vulnerable areas can be reduced
- To evolve Emergency response and recovery mechanism and financial arrangements.
- To promote a culture of prevention and mitigation through curriculum revision, IEC awareness campaign, DM plans at all level, mock drills, communicating hazards, risks and vulnerability at community level and streamlined and institutional techno-legal framework.
- Promote a culture of prevention and preparedness by ensuring that DM receives the highest priority at all levels.
- Ensure that community is the most important stakeholder in the DM process.
- Encourage and promote mitigation measures based on state-of-the-art technology and environmental sustainability.
- Promote a productive partnership with the media for creating awareness and capacity development.
- Ensure efficient response and relief with a caring approach towards the needs of the vulnerable sections of the society.
- Undertaking recovery to bring back the dairy farming community and their livestock to a better and safer level than the pre-disaster stage.
- To provide clarity on roles and responsibilities for all stakeholders concerned with disaster management

Disaster management plan of department is intended to provide guidance to all the agencies within the department, with a general concept of potential emergency assignments before, during and following emergency situations.

4.4 **Methodology :**

The Disaster Management Plan for the state is proposed to be developed as an integrated plan encompassing all disasters in the multi-response fashion keeping with the international trend. Albeit, a common planning and operational framework is proposed for all the disasters which would ensure a systematic assessment, communication and management of risk, appropriate for a disaster and identification of response.

4.5 **Levels of Disasters :**

Based on severity of the disaster, degree of material and physical losses and assistance requirements different levels of disasters are being identified. The activation of the plan will be dependent on the declared level of disaster.

- Level 0 (L0) – This is a level during peace and normal times; time will be utilized for monitoring, prevention and preparatory activities. Capacity building of key departments, mock rescue, rehearsals, testing evacuation plans is rehearsed during this level. Similarly, response and recovery mechanisms are reviewed at state, district, level.

- Level I (LI) – At this level, district machinery can manage the disaster; state and central governments will monitor the progress and remain alert to activate other mechanisms if needed. General inundation, crop losses, livestock losses, minor property losses and disrupted normal life due to disaster/incident.

- Level II (LII) – At this level, active participation of state departments, mobilizing resources at the state level and close monitoring in coordination with district machinery is warranted. Mobilizing rescue and recovery teams consisting of paramilitary forces may be required at this level. In addition to losses identified in LI, human and livestock losses and substantial property losses such as damaged homes, damaged infrastructure and isolation of an area due to the severity of the disaster are part of Level II.

- Level III (LIII) – This is critical and highest level. State and district machinery would need active assistance from the union government. Mobilizing rescue and recovery teams consisting of paramilitary forces may be required at this level. Early warning mechanisms both at state and central government play significant role in identifying situations that may be declared as Level III disasters. Similar levels of losses are identified in LI and LII at higher proportions.

Activation of the plan would vary depending on the level of disasters and intensity as identified; however, at all levels, certain activities especially preparedness, prevention and capacity building are round the year functions. Based on the information received from competent agencies like IMD, district administration and the degree of intensity, the State Executive Committee (SEC) in consultation with Revenue (Disaster Management) Department will identify the level of disaster and notify the impacted districts.

4.6 **Scope and Limitations :**

The scope of the present document will be extended to an analysis of the generic reasons for the risks due to hazards in the State, and an attempt at identifying the vulnerable areas in the state specific to each hazard. The DMP – 2020 of the Directorate of Animal Husbandry & Veterinary Services, Government of Goa provides a consistent, state-wide framework to enable State, local, governments, Central government and the private sector to work together to mitigate, prepare for, respond to and recover from the effects of emergencies regardless of cause, size, location, or complexity. In accordance with the NDMA guidelines, this plan shall be in effect at all times and shall apply at all levels of State government. The scope is applicable to the whole Geographical Jurisdiction of Goa State. The Plan is applicable to all the stakeholders through equal participation and cooperation by way of sharing of risks and effective and efficient collaborative strategies.

The Disaster Management Plan of Animal Husbandry Department shall lay down the following details:

i) Types of disasters to which different parts of the State are hazard prone and vulnerable, *and provide measures for preventing the loss of livestock resources,*

ii) Assess the existing capacities and comprehensiveness of the Department, in terms of multi hazard risk management, operational efficiency and appropriateness in the aftermath of disaster.

iii) Integration of strategies for prevention and mitigation of disasters, its interlinking with development plans and programmes by the department,

iv) Roles & responsibilities of Department in the event of any disaster or threatening situation and the emergency support functions in response,

v) Capacity building and preparedness measures proposed to be put into effect for disaster risk reduction, its financial provisioning, implementation & periodic review.

4.7 **Plan Activation** : The plan will be so activated and operated upon as to make it responsive for disaster preparedness, quick response to the warning signal/information regarding any impending disaster and finally capable of swift recovery and rehabilitation in the long run. The Collector of District shall be the in-charge of activating all the linked response departments and Centres of the respective district. The Collector of District will also declare the end of Emergency once the normalcy is restored in the city. The Chief Secretary will activate all departments for emergency response including the State EOC, and District EOC. Also, they will issue instructions to include the following details: → Exact quantum of resources (in terms of manpower, equipments and essential items from key departments/stakeholders) that is required. → The type of assistance to be provided → The time limit within which assistance is needed → Details of other Task/Response Forces through which coordination should take place The State EOC and other control rooms at the State level as well as district control rooms should be activated with full strength. Once the situation is totally controlled and normalcy is restored, the Chief Secretary declares End of Emergency Response and issues instructions to withdraw the staff deployed in emergency duties.

5. Brief Profile of Department

The Department of Animal Husbandry has major role to play in providing the veterinary health care and improving the genetic production potentialities of livestock and poultry reared in the State.

Livestock sector is emerging as one of the potential and income-generating source to the rural community and providing full time employment in rural as well as semi-urban areas. Livestock wealth is the backbone of the rural economy.

Agriculture farming taken up in smaller land holdings is becoming unproductive in recent years, due to lack of assured market/ fluctuation of prices for produce and other adverse seasonal conditions. Thus, the farmers are shifting from agriculture to Livestock farming i.e. **Animal Husbandry Sector**. Availability of technology and inputs are also contributing to the shift.

5.1 Key Functions of Animal Husbandry:

- Provide preventive and curative health care to livestock by keeping a check on disease outbreaks, rendering preventive vaccinations, de-worming and treatment of ailing animals
- Augment fodder production to meet the nutritional requirements of livestock
- Implement cross breeding programme effectively to improve the production potential of cattle & Buffaloes
- Provide relief measures to livestock during natural calamities
- Build awareness among farmers on profitable livestock production

- Coordinate with the Health Department in controlling Diseases of Zoonotic importance
- Organize co-operatives of milk producers at village and district levels
- Develop infrastructure for processing of milk and manufacture of dairy products
- Help in the marketing of milk and milk products.

6. Hazard, Vulnerability and Risk Assessment :

A disaster is an event triggered by natural or man-made causes that lead to sudden disturbance of normalcy of life within society, causing widespread damage to life and property. Disturbance can be caused due to occurrence of frequent hazards like earthquakes, fires, cyclones, terrorism, biological wars and chemical explosions. When hazards connect with risk and vulnerabilities leads to the massive destruction. Level of risk (high/medium/low) depends upon the various hazards for which any specific area is prone to and/or also on the various physical, social-economic and institutional parameters. The chapter has been covered into two parts. First part is covering hazard assessment and second part is covering vulnerability and risk assessment on the basis of hazard assessment.

A combination and geographical factors like climate, geomorphology, drainage pattern, proximity to the open sea etc. render Goa State prone to a variety of natural disasters like floods, cyclones, earthquakes, Tsunamis etc. As per the all India seismic categorization, Goa falls in seismic zone IV that indicates that Goa has high probability for occurrence of earthquakes. A number of large and small river systems drain the districts and the gradient and topography of the region combined with heavy monsoons and high tide conditions cause flooding and water logging in quite a few places in the State. The occurrence of cyclones / floods, however, is restricted to the monsoons only. The impact of cyclonic winds is felt towards the onset of the monsoons in April end and May and again towards the fag end around September/October.

Disaster Risk = Hazard + Vulnerability

Disaster Risk = function (Hazard, Exposure, Vulnerability) To reduce disaster risk, it is important to reduce the level of vulnerability and to keep exposure as far away from hazards as possible by relocating populations and property. Growing exposure and delays in reducing vulnerabilities result in an increased number of natural disasters and greater levels of loss. (Asian Disaster Reduction Centre)

6.1 Hazard Assessment : In order to focus limited resources on to those areas of the state at risk, it is necessary to understand the pattern of hazard activity precisely and put a quantitative probability to the likelihood of occurrence of hazards. Information is available through newspaper clippings and records maintained with the various government departments of the hazard prone areas in the State with respect to various hazards has been documented for assessing the types of hazards probably occurring in Goa.

1. **Earthquake Hazard**: An earthquake is a sudden shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface and followed by a series of vibrations. Earthquakes can cause buildings and bridges to collapse, telephone and power lines to fall, and result in fires, explosions and landslides.

Goa falls in seismic zone IV that indicates that Goa has high probability for occurrence of earthquakes. Goa forms part of the moderate seismic zone in the country, namely, Zone IV of seismic zoning map of India. Though Goa has not directly witnessed any earthquake it was affected by tremors from devastating earthquakes from neighbouring state.

History of Occurrence:

Type of Disaster	Year of Occur-ence	Damage Caused
The tremors of the devastating earthquakes with magnitude 5.0 or more that hit "Koyana" Maharashtra, that affected life of people in Goa	1967	Residential as well as public structures, infrastructures were damaged severely, although no casualties were taken place
The tremors of the devastating earthquakes with magnitude 5.0 or more that "Latur" in Maharashtra, that affected life of people in Goa	1993	Residential as well as public structures, infrastructures were damaged severely, although no casualties were taken place

2. **Flood Hazard** Areas along coastline and interior regions can be affected by gusty winds which can cause damage to property, damage to crops, collapse of trees and in turn threatening lives of people including fishermen, livestock, ships and barges, boats, ships, fishing trawlers at ports.

If cyclonic winds are accompanied by heavy rainfall then there is possibility of flooding in low lying areas, in Goa. Floods in Goa are not natures wrong doing, it is invariably the irresponsibility of the authorities and those who are totally insensitive of human life blinded by the economics of haves and have nots. This is very clear from the recurring phenomenon of floods in the mighty rivers and flash floods caused by rains due to choked drains of Goa. Also, due to cyclonic winds there maybe felling of trees, electricity poles leading to death of livestock due to electrocution after coming in contact with live wires.

3. **Fire Hazard** : Fire hazards, for the purpose of this study, include fires due to chemicals, LPG, explosives as well as short circuit of electrical systems. However, while assessing the resource needs of the state fire services, it must be considered that these services are also used in rescue operations during building collapses. Additionally, the fire department's services are also required in rescue and relief operations in fires caused by accidents involving hazardous inflammable substances.
4. **Cold Wave & Heat Wave** : Goa being in temperate climatic zone, the average temperatures round the year would be between 20 C to 40 C. Therefore the State is not prone to cold and heat wave hazard.

5. **Cloud Burst** : Though it is not a regular hazard affecting Goa , it did occur in last decade affecting some parts of Canacona taluka.

6. **Thunder Storm & Squall** : The summer season lasts from mid-March to the end of June, with average maximum and minimum temperatures of 32 C to 40 C; it is characterized by frequent thunderstorms and squalls, which are most frequent in April and May.

7. **Epidemics Hazard** : In Goa, preventive, and curative livestock and poultry health is being looked after by the department of A.H. & V.S.. There are Hospitals, Dispensaries, sub centers supplementing the task. With the view of detecting epidemics at the earliest, an Disease Investigation Unit has been established under the Directorate of A.H. & V.S. Therefore, the incidence of epidemics is negligible over last 15 years.

8. **Road & Rail Accidents** : Road accidents, for the purpose of the Disaster Management Action Plan include all forms of motor vehicle accidents involving two / three/ four wheeler passenger vehicles, vehicles carrying goods including hazardous substances. There is also the involvement of animals coming under the train on the rail tracks. These accidents may lead to injuries and fatalities to livestock.

9. **Industrial Hazards** : Industrial accidents may occur as a result of natural phenomena, such as earthquakes, forest fires etc., however, most accidents occur as a result of human activity leading to accidental or deliberate harm. Although there are a number of different definitions of these accidents, the most practical appears to be as follows: any incident connected with an uncontrolled development (such as leak, fire and / or explosion) of an industrial activity involving a serious immediate or delayed hazard to man and / or the environment.

10. **CBRN Disaster** : Goa being a tourist State is also under the threat of any form of conventional and contemporary warfare. CBRN threats could be one of the major potential hazards in Goa. Radiation from the nuclear site at Karwar could also happen. There is high threat of biological disaster caused due to bioterrorism. The threat of chemical attack and chemical disasters caused by hazardous units may not be very high.

11. **Terrorist attacks and bomb blasts** : Goa being a peaceful and touristic place is also under the threat of any form of conventional and contemporary warfare. History perceives that generally terrorist attacks takes place in important government building, air ports, cantonment areas, historical monuments, populous places and important public gathering etc. Many events of bomb-blasts and terrorist attacks across India give an insight towards the importance of this issue.

Around 30 odd types of disasters have been identified and they are grouped into 5 broad categories:

- Water and climate related disasters – drought, flood, cyclone, heavy rains, cloudburst, gale wind, whirlwind, tornado, hailstorm, lightening, Tsunami, heat wave etc.
- Geologically related disasters – earthquakes, volcanoes, landslide etc.
- Chemical, Industrial and Nuclear related disasters.
- Accident related disasters like air crash, rail collision etc.
- Biologically related disasters.

The following table illustrates the number of potential threats and the elements at risk during the disaster expected in the State:

HAZARD	WHAT IS AT RISK
Floods	Everything located in flood plans. Crops, livestock, machinery, equipments, infrastructure, weak buildings, their contents, people, local economy.
Earthquakes	Weak buildings, their occupants and contents, machinery, equipments, infrastructure, human lives, dairy and poultry infrastructure and livestock.
Landslides	Anything located on or at the base of steep slopes or cliff tops, roads, infrastructure, buildings on shallow foundation, human lives, crops, vegetation, dairy and poultry infrastructure and livestock.
Cyclones	Damage to the buildings, infrastructures, crops, vegetation, telecommunication / power lines, roads, dairy and poultry infrastructure and livestock. etc.
Tsunami	Everything located in the coastal areas upto 500 mts -1 km belt.

6.2 **Hazards Profile:**

Generally Goa is prone to natural hazards such as flood, oil spills and cyclone. Considering the hazard potential and existing vulnerabilities in the State, it has become very crucial to enhance the preparedness level, especially at the Departmental level. The frequent disasters lead to erosion of developmental gains and restricted options for the disaster victims. Physical safety, especially of the vulnerable groups, is routinely threatened by natural hazards. Cyclones in recent years in the State, have very clearly illustrated the need for multi-hazard prevention, response and recovery plans for natural hazards so that threat to human life and property is minimized. The State is primarily responsible for the management of natural and human-caused disasters at the state level and has a shared responsibility with the Government of India for preparedness and for identified catastrophic disasters.

a) Hazard Risk Assessment and Vulnerability mapping for Livestock

Risk Analysis : Risk as defined by the United Nations is a measure of the expected losses due to a hazard event of a particular magnitude occurring in a given area over a specific time period. The level of risk depends upon the nature of the hazard, the vulnerability of the elements which it affects and the economic value of those elements. As communities grow larger, more established and more complex, experience has shown that the level of risk which they face increases. Risk Analysis means the identification of undesired events that lead to the materialization of a hazard, the analysis of the mechanisms by which these undesired events could occur and, usually, the estimation of the extent, magnitude, and likelihood of any harmful effects.

Vulnerability Analysis : The vulnerability of a particular element of society is defined as the degree of loss which is would suffer as a result of a specific hazard event. The nature of vulnerability and its assessment vary according to whether the element involved represents people and social structures, physical structures, or economic assets and activities. The vulnerability of an area is determined by the capacity of its social, physical and economic structures to withstand and respond to hazard events. Certain groups of people, types of physical assets and economic activities can be particularly vulnerable or susceptible to damage. The concept of vulnerability implies a measure of risk combined with the level of social and economic ability to cope with the resulting event in order to resist major disruption or loss. Vulnerability is thus the liability of a community to suffer stress, or the consequence of the failure of any protective devices and may be defined as the degree to which a system or part of a system, may react adversely to the occurrence of a hazardous event.

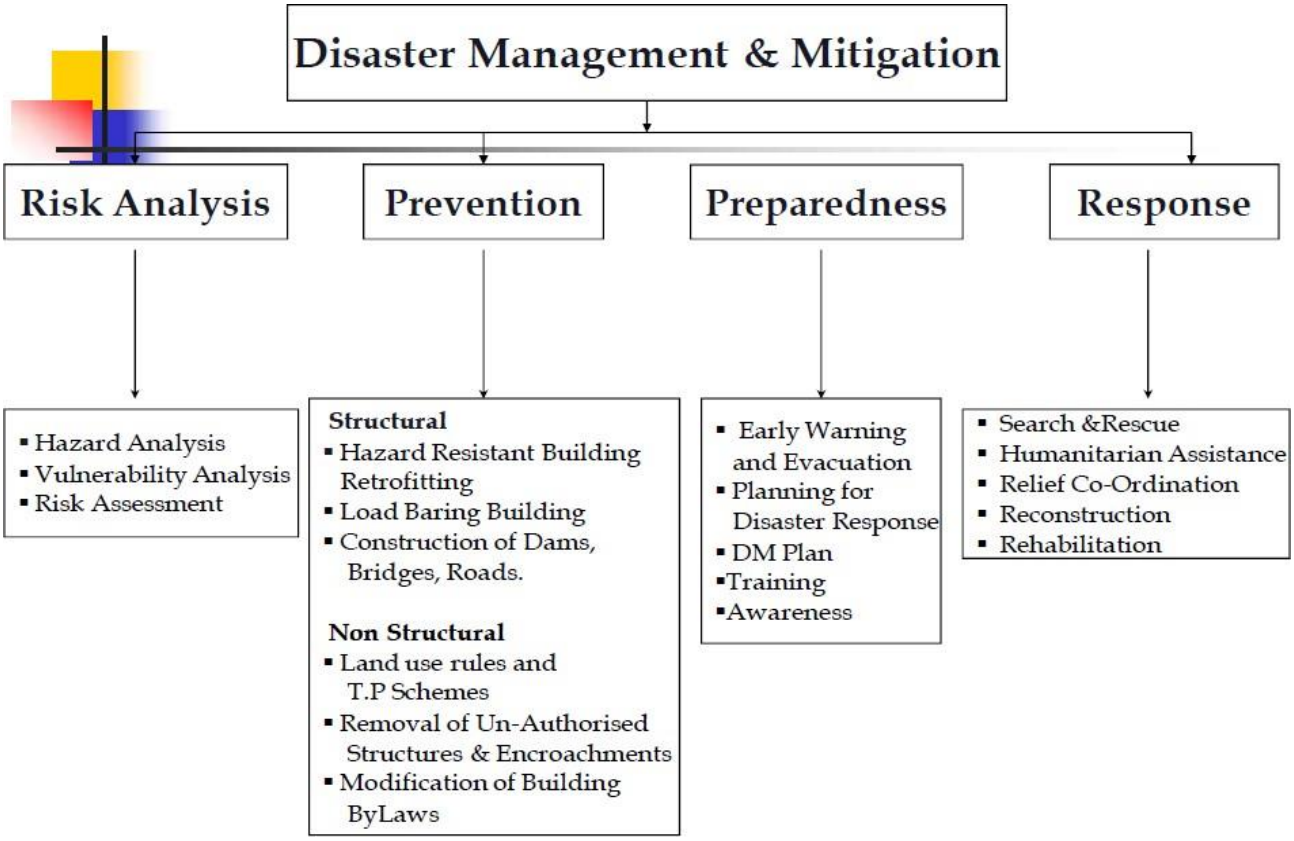
Taluka	Cyclone	Flood	Landslides & Mining	Earth-quake	Chemical	Soil erosion	Nuclear & Radiol-ogical	Drought	Disease incidences	Fodder poisoning
Pernem	**H**	**H**	**L**		**L**			**L**	**L**	**L**
Bardez	**H**	**H**	**M**		**L**			**L**	**L**	**L**
Tiswadi	**H**	**L**	**L**		**L**			**L**	**L**	**NIL**
Bicholim	**L**	**H**	**H**	**L**	**L**	**L**	**L**	**L**	**L**	**L**
Sattari	**L**	**L**	**H**		**L**			**L**	**L**	**NIL**
Ponda	**L**	**L**	**L**		**H**			**L**	**L**	**NIL**
Dharbandora	**L**	**L**	**L**		**L**			**L**	**L**	**NIL**
Murmugao	**H**	**L**	**L**		**H**			**L**	**L**	**NIL**
Salcete	**H**	**L**	**M**		**L**			**L**	**L**	**NIL**
Quepem	**L**	**L**	**H**		**L**			**L**	**L**	**NIL**
Sanguem	**L**	**L**	**H**		**L**			**L**	**L**	**NIL**
Canacona	**H**	**H**	**M**		**L**			**L**	**L**	**NIL**

b) Multi Hazard Risk Assessment

In Goa however transport accidents are quite frequent, though no statistics were available with the Government of Goa to validate these claims. However there have been rare casualties that have occurred due to the accidents of the Hazchem vehicles, for instance an accident that occurred in 1992-93 wherein a Hazchem tanker carrying Chlorine met with an accident leading to a leakage of the toxic gas and affecting some residents who were around the place of the accident including the fire fighting personnel who had to be hospitalized. There has also been an instance where in a tanker fell into a field that was being cultivated and as a result of the leakage of the Chemical which was corrosive in nature the land became infertile for cultivation.

Due to strict implementation of Industrial Policy and pollution control norms, the multiple hazard risk in Goa is very low. So far there are no incidences reported which have affected the livestock population in the State.

Besides rising temperatures and sea levels, climate change is increasingly leading to extreme rainfall, floods and cyclone to occur a t the same time in the country. For this, synergy of all the departments should come together towards mitigation and risk reduction.



6.3 **Vulnerability Profile**

Animal Husbandry is one of the rapidly expanding sectors playing significant role in rural economy. However considering the existing vulnerabilities in State there is high possibility of epidemic. An epidemic refers to the outbreak and rapid spread of a disease in a community affecting a significant number of people or animals in a relatively short period of time.

Many diseases that are generally considered animal diseases can be transmitted to humans. Diseases, which can cause epidemics in animals, can gain a foothold in the State in a number of ways. A disease may be something exotic brought in with animals imported, either legally or illegally, from some other part of the country or state. Other disease vectors include infected animals wandering across the border from neighbouring states. For example, Avian diseases can be brought in by birds on their annual migration. Similarly there are possibilities of spreading diseases, depending upon the vulnerability of the State of Goa.

History of vulnerability

The major disaster seen in the livestock of the State since 2011 till date, was outbreak of Foot and Mouth Disease (FMD) in spite of vaccination. The outbreak was seen mainly due to virus mutation. Migrating population from neighbouring states and the population of wild boar in the forest also acted as a source of infection. Though the outbreaks happened in all seasons, they were more prominent during summer. In most of the cases, virus was not recovered, but in few cases the reports have come positive from WRDDL, Pune and PDFMD, Mukteshwar. In the year 2014-15 and 2016-17, no outbreaks of FMD were seen.

In the past some incidence of fodder poisoning happened in Pernem, Bardez and Bicholim with very low mortality. Also, KFD outbreak was seen in the taluka of Sattari, Bicholim and Ponda in Humans and monkey population.

In recent years, flooding in the low lying areas of talukas like Pernem, Bardez, and Bicholim is witnessed. This occurs mainly when the dam waters are released to control the water levels during heavy rains.

No major casualties were reported in livestock except damage to the dairy equipments and spoilage of feed and fodder.

Goa is exposed to several climate risks like loss of land due to erosion, loss of life, livelihood, the outbreak of disease, damage to buildings, drainage, and other infrastructure. It is also exposed to sea-level rise, storms, high-speed wind, altered runoff, changed wave pattern and sea temperature in addition to the other threats like rainfall and temperature profile changes. The characteristic of states other natural and geographical features like rivers, khazan lands, soil type, and moisture and flora and fauna will result in unique or varied results in different climate scenarios.

The Canacona flash flood is one such event experienced by the state of Goa on 2nd of October, 2009. It was found that these flash floods were directly related to about 271 mm of rain that fell in a short span of 7 hours, resulting in flooding of Talpona and Galjibag Rivers. Due to continuous rainfall in the monsoon season, the soil on slopes was saturated. As a result, on steep slopes with altitude above 300 m, the cascading water led to mudslides. At altitudes of about 50 m or more, agricultural and horticultural areas were submerged and cattle were washed away. At lower altitudes (about 50 m or less), where the topography is flatter, accumulation of water submerged buildings, and as the water made its way towards the sea, the flow destroyed houses and commercial establishments, particularly those that were weak (mud houses, for example). There are no records to suggest the precedence of such a rainfall scenario in the past.

It is interesting to note that the flooding on 2 October 2009 was unprecedented in recorded history, but the total daily precipitation on that day is not. Hence, it implies that similar rainfall can have different risk profiles depending upon the month in which it occurs.

Following are some of the hazard specific vulnerabilities of the State, which are also linked with Animal Husbandry sector:

a) Animal health vulnerability

Animal epidemics may break out in aftermath of a natural calamity. Disaster causes negative impact on overall health of community besides interfering in its sustainable development. Direct health implications of disaster are death and injury. There may be a case of outbreak due to:

- Disruption/ damage to sanitation and sewage facilities create enabling environment favourable for occurrence of vector borne and water borne diseases.

- The affected animals living in temporary shelters/ resettlements have limited or no access to safe drinking water, food etc. In addition, prevailing unhygienic sanitary conditions also make it conducive for spread of food and water-borne diseases.

- Overcrowding or failure to isolate infected animals in temporary shelters results in spread of communicable diseases.

- Animals also suffer from stress due to disasters, which affects their health and productivity.

- Among all the adverse health impacts, the impact of communicable diseases is often delayed for weeks or months after the acute event, but water and food-borne disease transmission potential increases immediately and within a week after the disaster.

- Vector borne diseases may appear after four weeks or more, due to disruption of vector control efforts, washing away of residual insecticides, increased number of vector breeding sites and more man-vector contact. Nutritional problems appear after months.

Emphasis on post-disaster veterinary public health measures is necessitated by the following additional factors:

- Destruction of veterinary healthcare infrastructure.
- Interference in public health services specially for :
  - Safe drinking water
  - Sanitation measures
  - Immunization
  - Rodent / mosquito control
  - Ecological changes and effects in vector populations
  - Displacement to inhospitable areas due to disasters
  - High population density due to displacement.

Following are the other vulnerabilities which can directly or indirectly affect the animal husbandry sector:

(i) Cyclone vulnerability

Only coastal belt of Goa is vulnerable to Cyclones. When cyclones and resulting floods occur, the loss of infrastructure, life of livestock, fodder crops and irrigation infrastructure for the same, due to severe inundation and cyclonic damages is significant in the coastal belt of Goa. It also affects the animals directly and indirectly. Probability of electrocution due to snapping of overhead electrical conductor wires is very high.

Provision of primary health care of animals including the control of epidemics and evacuation of affected animals should be available in advance in cyclone prone areas. This vulnerability has been addressed in detail in the later part of this plan document.

(ii) Flood vulnerability

Floods in Goa have caused loss to the human lives, livestock, damaged homes and caused crop destruction over the decades. Infrastructure damage due floods is well recorded. The Valvanti, Chapora, Kushawati and Talpona rivers have well-defined stable courses; their natural and manmade banks are capable of carrying flood discharges except when the water is let out from the overflowing dams of Tillari and Anjunem. Because of lackluster attitude of the community, unplanned growth, lack of maintenance of natural tanks and improper upkeep of drainage systems, floods have been construed as natural although in reality they are human-caused. Traditionally, flood problem in Goa had been confined to the spilling of smaller rivers and the submersion of marginal areas in Pernem, Bicholim, Sattari, Bardez, Canacona, Quepem and Sanguem. However, the drainage problem in the municipal areas of the State has deteriorated in the last couple of decades, thereby multiplying the destructive potential of increasing flood hazards.

Flood vulnerability can directly affect the health of animals therefore the required precautionary measures to be taken by the Department in advance (explained later) in flood prone areas.

(iii)Drought vulnerability

While drought is an insidious hazard of nature, it originates from a deficiency of the precipitation that persists long enough to produce a serious hydrologic imbalance. Drought should be considered relative to some long-term average condition of balance between precipitation and evapo-transpiration (i.e., evaporation and transpiration) in a particular area. Fortunately, the State of Goa has average rainfall of around 125 inches per annum thereby safeguarding the State from possibility of drought situation in near future.

(iv)Heat waves vulnerability

A heat wave is a climatological extremity involving abnormally higher temperature relative to the normal during months of April-May. The highest temperature recorded in Goa in summer is around 40 degrees centigrade. Till date no casualty is recorded in Goa due to Heat wave. However, the rise in average temperatures during summer is seen in last decade. Heat wave advisory is seen at annexure **XII.**

Animal Husbandry sector is required to address such vulnerabilities which has a direct impact on the production of the animals and the indirect impact on the associated dependent community.

Type of disaster	Jan	Feb	March	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Cyclone				←	→			←	→			
Flood					←	→						
Earthquakes	←	→										
Man made / Industrial / disasters /	←	→										
Landslide	←	→										

7. Prevention and Mitigation Measures :

The prevention and mitigation measures consist of those actions or specific activities which reduce the risk from natural/manmade disasters or induced effects and minimize the impact of animal epidemics related disasters. To address these high potential risks, Animal Husbandry Department of Govt. of Goa will come out with strategic planning, supplemented by the specific interventions.

In the face of increasing menace of hazards, mitigation would remain the key and the most effective strategy to reduce the risks of these hazards. State has to decide its own mitigation strategy according to its own risks, resources and capabilities. Broadly such strategies would be twofold: structural and non-structural. Structural mitigation measures generally refer to capital investment on physical constructions or other development works, which include engineering measures and construction of hazard resistant and protective structures and other protective infrastructure. Non-structural measures refer to awareness and education, policies techno-legal systems and practices, training, capacity development etc.

Manmade Disaster: Manmade disasters are unpredictable and can spread across geographical boundaries. Some disasters in this class are entirely manmade while other may occur because of natural disasters, equipment failures, or workers having inadequate training or fatigue and make errors. Manmade disasters include a broad range of incidents. Routes of exposure through water and food, airborne releases, fires and explosions, and hazardous materials or waste (e.g., chemical, biological, or radiological) released into the environment from a fixed facility or during transport. Fires, explosions, building or bridge collapses, transportation crashes, dam or levee failures, nuclear reactor accidents, and breaks in water, gas, or sewer lines, chemical,

biological, radiological and nuclear disaster, (CBRN) are other examples of technological manmade disasters. The hierarchy of concepts in reducing the risks of chemical disasters is given below:

1. Eliminate use of toxics and replace them with a less or non-toxic alternative at each source.
2. Reduce use of toxics through minimizing use and/or storage volumes.
3. Implement risk management programs designed to minimize opportunities for releases to occur, and mitigate any release that does occur at the source.
4. Implement land-use restrictions to provide minimum safe distances from sources to public and sensitive receptors. This is especially critical for a zone where even a rapid and qualified response may not be able to save lives.
5. Plan for both or a combination of sheltering in place and evacuation programs where they are complimentary. A "key-hole" sheltering concept is ideal and is such that the population within a plume shelter and adjacent populations are evacuated. Both concepts require public warning systems that initiate the community action immediately and are either automatic or initiated by the releasing facility through a formal system.
6. Maintain basic emergency capability to respond to everyday emergencies such as fire and medical. A strong emergency response (fire, police, medical) is essential building block to build chemical emergency response capability. Maintain a rapid (timely) and qualified (well trained and equipped) chemical emergency response capacity to control and reduce the quantity of hazardous chemical leaked and duration of such leak. This requires an extremely effective trigger mechanism for an immediate response.
7. Establish plans, develop public warning systems, and conduct public outreach and training on evacuation and shelter in place. The public needs to be trained on what actions are expected of them based on the warning systems. Without training the public, neither sheltering-in-place nor evacuations will be effective.

Natural Disasters : The State approach for disaster prevention and mitigation will be multi-hazard as it is vulnerable to all-major natural hazards such as Fire, Epidemics, Flood, Earthquake, etc. due to its geo-climatic, geological and physical features as described in detail in previous chapter. There are several prevention/mitigation activities which will be common for natural hazards. Hazard specific measures are mentioned in the chapter 6.

Earthquake: In most earthquakes, the collapse of structures like houses, schools, hospitals and public buildings results in the widespread loss of lives and damage. Past earthquakes show that over 95 per cent of the lives lost were due to the collapse of buildings that were not earthquake-resistant. In such situation, the losses can be reduced if all structures in earthquake-prone areas built in accordance with earthquake-resistant construction techniques.

Flood: Floods being the most common natural disaster, people have, out of experience, devised many ways of coping with them. However, encroachments into the flood plains over the years have aggravated the flood problem and a need to take effective and sustained mitigation measures.

Drought: It is very difficult to prevent droughts, usually because it is caused by lack of rainfall, which is beyond our control. However, by taking effective mitigation measures effect of drought can be minimized.

Recognition of best efforts: Individuals and communities are stimulated when good actions are incentivized and actions that reduce risk and best practices in disaster mitigation are recognized. Awarding cash and other incentives in recognition of best practices and efforts will be promoted to encourage active participation. Similar efforts will also be instituted to recognize non-government agencies and community based organizations that devote programmes in educating and training communities to better prepare in disaster management.

7.1 Key Prevention & Mitigation activities of A.H. department

A prevention & mitigation plan will help to ensure that the disaster management efforts are not affected due to non-availability of resources. The steps required for mitigation are as under:

(A) Preparedness Planning :

Disaster Preparedness: Preparedness focuses on plans to respond to a disaster threat or occurrence. It takes into account an estimation of emergency needs and identifies the resources to meet these needs. It also involves preparation of well-designed plans to structure the entire post-disaster response, and familiarizing the stakeholders, particularly the communities (livestock and poultry farmers) through training and simulation exercises. Preparedness has to be supported by the necessary legislation means, a readiness to cope with disasters or similar emergencies which cannot be avoided. The first objective of preparedness is to reduce the disaster impact through appropriate actions and improve the capacity of those who are likely to be affected most (that is, marginalised, poor and handicapped) to get maximum benefit out of relief. The second is to ensure that ongoing development continues to improve the capacities and the capabilities of the system to strengthen preparedness efforts at community level. The third is disaster risk reduction in development programmes and plans of the Government. Finally, it guides reconstruction so as to ensure reduction in vulnerability. The best examples of preparedness activities are the development of local warning and community evacuation plans through community education, evolving local response structures such as Community based Disaster Management Teams (DMT) and administrative preparedness by way of stockpiling of supplies; developing emergency plans for

rescue and relief. It shall be the duty of every citizen to assist the State Relief Commissioner, the District Magistrate or such other person entrusted with or engaged in disaster management whenever his aid is demanded generally for the disaster management. Since disasters affect economic and social processes, preparedness and mitigation must emphasize the socioeconomic rather than just the physical aspects.

Disaster can occur anywhere and anytime. It strikes with suddenness and fury. And to deal with sudden influx of large number of casualties the quantitative up-gradation of hospitals has to be preplanned. Such a plan for up-gradation of the infrastructure and enhancement of work force in the dept. of A.H. & V.S. is proposed in details in the Action Plan 2020-25.

Disaster preparedness planning measures will primarily focus on the preparedness of Animal Husbandry Department of Govt. of Goa, in order to safeguard lives of animals and users, by protecting assets and efficient utilization of resources by taking appropriate actions to face any disaster.

- At present State does not have any Fodder Bank. However, the requirement of such an arrangement including infrastructure is examined by Director (AH & VS) & needful activity is proposed in the Action Plan 2020-21.

- Provision of vitamin and mineral supplements are available and in case of need, it will be distributed. But to meet the need in case of any disaster the provision need to be enhanced.

<u>Conservation of monsoon grasses and green fodder production :</u>

- Farmers are sensitized for conservation of monsoon grass. Asst. Director, Farmers Training Centre, Ponda and Dy. Director (Farms) at Head Office are entrusted with the responsibility. The existing incentive scheme for green fodder cultivation for perennial and seasonal fodder development should be made more popular. Also, farmers may be encouraged for Silage production and hydroponic green fodder production.

<u>Routine and Emergency vaccination of animals</u>

- Routine vaccination is carried out as per schedule given in Annexure VII and directives from DIU based on the guidelines of the central agencies. In case of outbreak of any disease ring vaccination is administered under the guidance of respective Asst. Director and Veterinary officers.

Compensation arrangement for the loss of livestock due to disaster

- The farmers are permitted to approach the DM of the taluka to avail any compensation under disaster management.

- The Dept. of AH & VS has proposed a Disaster Management Scheme to compensate the Farmers in case of any eventualities. However, it is expected that the farmers avail the compensation vide centrally sponsored schemes initially and followed by topping up with departmental disaster management scheme.

Disposal of Dead Animals during Disasters

- This should be done as per the Standard Operating procedure for disposal of dead animals during disasters as detailed in Annexure **IV a and b** and in accordance with the directives of GSPCB.

(B) Standard Operating Procedure (Animal Husbandry Department)

1. Normal time activities

- Addresses of members with telephone numbers.
- Details of veterinary centers, artificial insemination centers, veterinary dispensary, veterinary colleges' buildings, vehicles, mobile dispensaries and equipments and also the details of vehicles and equipments used often by out sourcing.
- Maps showing the details of animal breeding laboratories, animal vaccination centers, animal husbandry training school with statistical data.
- Details of essential facilities to be provided at sensitive place such as important animal husbandry centers, veterinary college campus, training center etc;
- Arrangement of repairs/alternative arrangements in case the facilities related to animal husbandry and veterinary services are disrupted.
- To make arrangements to necessary medicines, vaccines and other material, for treatment of animals.
- To collect the details of cattle in each village of the taluka, details of safe places for the treatment of animal, milk dairies, other private veterinary doctors and facilities related to it.
- To appoint an employee not below the rank of Assistant Director to coordinate the District Control Room during emergency.
- To maintain the equipments available such as stands to keep animals, sharp instruments, insecticides, diesel generators, dumpers, generator, cutters, tree cutters, ladders, ropes, flood lights, shovels, axes, hammers, RCC cutters, cable wires, fire equipments, de-dusting equipments etc; which can be used during emergency and will also ensure that they are in working condition.

- To see that essential services related to animal husbandry and Veterinary services are not disrupted at the time of emergencies.
- To prepare a list of public properties related to animal husbandry with the help of NGO's, Volunteers and Animal rescuers, which are in damage prone areas and will make advance planning to lessen the damage.
- A mechanism for surveillance will be set up involving the state, district and village level veterinary institutions for early detection of outbreaks. Assistant Director at district level will report to control room in animal husbandry department at state level, on a regular basis.
- Nodal officers will be identified at the state, district and taluka level for coordination of activities.
- Required medicines, equipment, feed and dry fodder will be stocked in advance prior to the flood season/cyclone or any other hazard event.
- Each veterinary hospital/dispensary will have a preparedness plan for handling the inflow of infected animals in co-ordination with the Animal welfare activists, NGO's, local volunteers in their respective area.
- Infrastructure to be set up for digitalization of records, so that the data is not lost during the disaster

2. <u>On receiving the Warning</u>

1. To immediately contact the District Control Room and will assist in the work.
2. To ensure that the staff is on duty at the headquarters
3. To assign the work to be done to the subordinate officers and staff with active participation of NGO's, Rescuers, Animal Welfare activists, local volunteers, etc. This involvement of the NGO's, Rescuers and Animal Welfare activists will facilitate relocation/rehabilitation of the animal in distress with the consent of the owner, first aid and timely attention. It will also help in publicity and extension activity.
4. To receive instructions from the district liaison officer and do theneedful.
5. To ensure the availability of resources included in the DDMP and will make necessary arrangements to obtain those during emergency.
6. To consult the Liaison Officer to prevent the probable epidemic among the cattle with the involvement and support of animal welfare organizations & NGO's.
7. To make groups having vehicles for emergency work and will assign the areas to them.
8. To set up a temporary control room for the exchange of information for emergency work and will appoint a nodal officer.
9. Animal Husbandry department will coordinate with revenue department/ PWD for provision of temporary shelters for animals on identified shelter sites/private properties involving local community and NGO's to provide proper water and feed for animals.

10. Provision of vehicles will be made for the immediate transportation of infected animals to veterinary hospitals/dispensaries by the staff of AH department, ably supported by local AWA's, NGO's and local rescuers.
11. Infected animals should be isolated and treated by the nearest hospital/dispensary as early as possible. In case of floods, animals should be quickly evacuated from affected area to the previously identified cattle camps to prevent spread of diseases with active involvement of the local community.
12. In flood prone areas care should be taken to ensure that the animals are shifted in advance to higher altitudes at a safe place with the help of local volunteers. See that water sources for animals are not contaminated.
13. Initial assessment: should include rapid collection and analysis of data including mortality, morbidity, vaccine coverage, mapping of area.
14. Source of infection should be isolated. In case the infection is spreading through Water, then alternate arrangements should be made.

3. <u>Post Disaster Activities</u>

- To follow the instruction of the District Liaison Officer.
- To carry out the duty assigned to him for search and rescue work.
- To deploy the available resources and manpower including those from AWA's, NGO's, Animal rescuers,etc. besides the department officials, to manage the disaster.
- To review the matters to restart the milk collection activity where it has been closed for security measures.
- To send DMTs with necessary equipments in case of cattle death are there in the affected areas for the disposal of carcass with a view to restoration of public life and result oriented work. To arrange to treat the injured cattle.
- To contact the State Director of A.H. if additional equipments vehicles, manpower, technical personnel etc; are required for restoration of the cattle related activities.
- Animal health checkup camps should be set up in villages to reduce probability of outbreaks involving the participation of local community.

(C) Pre- disaster preparedness

i. 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, the State will take preparatory steps to ensure availability of feed, fodder, drinking water, medicine and vaccination for livestock. DADF will also alert the State for

taking appropriate measures as per the Disaster Management Plan.

ii. Identification of Vulnerability amongst Livestock

State Animal Husbandry Department will assess and review the impact of different disasters on livestock and develop surveillance and control strategies using epidemiological information and tools and risk assessment and risk mapping methodology

(a) Disease Surveillance

Disease surveillance will be an integral and key component of all government veterinary services. This is important for early warning of diseases, planning and monitoring of disease control programmes, provision of sound animal health advice to farmers, certification and export livestock and livestock products and international reporting and proof of freedom from diseases. Comprehensive system of disease surveillance shall include passive disease surveillance and active disease surveillance.

(i) Passive disease surveillance

Passive disease surveillance is the routine gathering of information on disease incidents from sources such as requests for assistance from farmers, reports from field veterinary officers and veterinary assistants, submission of diagnostic specimens to laboratories and the results of laboratory investigations. Routine disease reports may also come from other sources such as milk union/ICAR.

It is important that passive surveillance systems are strengthened and that the disease information they yield be effectively captured and analysed. However, it should be recognized that complete reliance on passive surveillance usually leads to significant underreporting of diseases. It is essential that passive surveillance be supplemented by a strong system of active disease surveillance, particularly for emergency animal diseases.

(ii) Active disease surveillance

Active disease surveillance requires purposeful and comprehensive searching for evidence of disease in animal populations or for verification that such populations are free of specific diseases. Active disease surveillance programmes may be of a catchall nature to detect any significant disease occurrences, targeted against specific high-threat diseases or designed to monitor the progress of individual disease control or eradication campaigns.

The components of successful active disease surveillance programmes are:

- Close integration between the activities of field and laboratory vety. services;
- Regular visits to farming communities for farmer interviews about diseases, provision of animal health advice, clinical examination of livestock and, when appropriate, postmortem examinations and collection of diagnostic specimens including serum samples. Emphasis will be given to critical areas identified by disease risk analyses and other epidemiological assessments;
- Participatory rural appraisal programmes for epidemiological evaluation of specific diseases;
- Utilization of disease information from all potential sources in the public and private sector, including veterinary inspections at abattoirs, milk unions, private veterinary practitioners and veterinarians in commercial livestock industry positions;
- Gathering of ancillary information to support prioritization and decision-making on animal health programmes, e.g. livestock production

For identification of resources for rescue and treatment of animals during disasters following measures will be taken :

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 Equipments (PPEs) life saving equipments etc
iv) Ensure the logistics requirements such as fuels, lighting equipments, 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 diseases
vii) Assessment of existing animal handling search and rescue capacity, equipments infrastructure facilities and related resources available at State and District levels

ii.Cattle Camps :

a) Identification of sites for cattle camps and sheds with basic facilities like feed, fodder, water and medicines etc
b) Promotion of herd health care such as nutrition, pregnant animal care , care of new born and young animals etc
c) Arrangement for rehabilitation of animals to recover from any trauma or fear with active involvement of the local community.

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 animals preferably within the jurisdiction of each Village Panchayat/ within radius of 8 Kms.

Standards of cattle camps (for protection of animals such cows, goats, etc from disasters)

The minimum number of cattle in the camp should be about 100 and maximum 500
• The cattle camps should be located at suitable sites bearing in mind, that adequate supply of water and shade are most essential for the well being of the cattle.
• Cattle sheds constructed should not be less than 24 sq. feet per animal.
• Suitable arrangements *for water trough and Supervisor(s) should be made*.
• The feeding centres for cattle should be located in such a manner that. :
a) There is adequate supply of drinking water.
b) There is sufficient shade for cattle to rest during the afternoon.
c) They are located in the areas where there is good network of road connectivity.
d) They are conveniently located, not beyond a radius of 8 Km from the affected villages.
• The cattle will require 4-5 Kg per cattle head per day of dry fodder, green fodder 10-15 kgs and 1.5 to 2 kg. per cattle head per day, of concentrate.
• Each cattle camp will have a minimum of one camp manager of the rank of Veterinary Assistant and 4 MTS. Day to day management practices in such cattle camps should be done by the staff at the camps.

iv. Pre – flood vaccination in flood prone areas

a) Mass vaccination and deworming of animals for economically important animals disease prior to monsoon and as per schedule of vaccination against specific diseases.
b) The animals should be identified/ marked by proper documentation to avoid duplication after vaccination programme

v. Feed and Fodder Supply

a) Will prepare Contingency Plan for adequate supply of fodder and fodder seeds for 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
b) Will ensure for safe stocking of the feed and fodder for emergency supply

Further the State Department will come out with specific guidelines as mitigation measures pertaining to the Fodder Management in case of disaster. Feeding technologies to be used during disaster are enumerated at **Annexure XIII**

The mitigation and preparedness planning measures will certainly help Department to reduce direct losses in terms of livestock, and indirect losses occurred due to damage of infrastructure such as cattle camps etc. Apart from the emergency animal shelters, the livestock insurance will be promoted to minimize/ transfer the risks and losses.

vi. Availability of Drinking water

Ensure adequate drinking water supply for animals

vii. Supply of Milk and milk products in disaster prone areas

a) State Milk Federations will 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 and supply routes to be developed to provide access for milk and milk products movement during disaster situation.

viii. Poultry Management

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 minimise smoke inhalation, cool the air and reduce the chances of burn injuries.
c) Poultry sheds should be of permanent structure made of steel pillars/pipes with strong overhead roofing to withstand cyclone.
d) farms should have enough carriers to evacuate all birds during emergencies
e) 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
f) Birds should be checked for injury and chemical exposure and a veterinarian should consulted if necessary. Any bird showing signs of lethargy loss of appetite, depression injury should be examined by a veterinarian
g) In case birds are moved to a new surroundings they should not be removed from cages immediately as they may be frightened and may fly away keeping the birds it can reduce stress. So if electricity is available, heating should be provided, if not blanket placed over the cages will have a similar effect.

ix. Disposal of carcass

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

(D) Schemes for Disaster Risk Reduction and Climate Change Adaptation (DRR-CCA) Animal Husbandry Schemes

Sr. No	Name of Scheme	Key Components	Key Aspects for Mainstreaming DRR-CCA
1	HOSPITALS & DISPENSA-RIES	To strengthen hospitals and dispensaries through data base and networking of all the veterinary institutions through outsourcing of the work/software development, training of farmers/field staff to improve capacity building and engaging consultants and experts for scientific preparation of project reports.	• Strengthening database for better monitoring • Inclusion of climate parameters in data base
2	NATIONAL PLAN FOR DAIRY DEVELOPME NT	Implementation of various activities such as establishment of breeders associations/ societies, human resource development, National Programme for Bovine Breeding and Dairy Development (NPBBDD) will be taken up	• Appropriate measures for minimizing disaster and climate change risk
3	ASSISTANCE TO STATES FOR CONTROL OF ANIMAL DISEASES (ASCAD)	The main objective of the scheme is to upgrade and strengthen the vaccine production facilities and also for purchase of vaccines to protect Livestock against economically important diseases. Apart from this, training of field staff is also covered under this programme.	• Prevention of disease and take appropriate measures to prevent animal epidemics
4	FOOT AND MOUTH DISEASE CONTROL PROGRAMME (FMDCP)	It is meant to protect the livestock against foot and mouth disease. It is being taken up in the state with two rounds of free vaccination in a year so as to make these districts as disease free zones. This will enable us to improve our livestock exports to other countries as per WTO guidelines.	• Prevention of disease and take appropriate measures to prevent animal epidemics
5	NATIONAL CONTROL PROGRAMM E ON BRUCELLOS IS (NCPB)	Brucellosis is an economically important disease of livestock, which is also zoonotic in nature. The disease is of zoonotic importance and mainly an occupational hazard i.e. Animal Husbandry staff, farmers, shepherds, milk and meat handlers but common public are also affected due to consumption of un-pasteurized infected milk and milk products.	• Prevention of disease

6	NATIONAL LIVESTOCK MANAGEMENT PROGRAMME	To achieve quantitative and qualitative improvement in livestock production systems and capacity building of all stake holders. Various Sub- missions and interventions viz., national livestock management, livestock census, fodder & feed development, rural backyard poultry and integrated sample survey.	• Close monitoring of disaster and climate risk parameters • Appropriate measures to minimize its impact of animals

(E) State Government schemes

SR.NO.	NAMES OF THE SCHEMES
1	*Kamdhenu Scheme (Sudharit) Amended & its Infrastructure Components*
2	*Revised Scheme for Incentives to Milk Producers.*
3	*Pashupalan Scheme (Amended) Modified.*
4	*Scheme for incentive to Green Fodder Cultivation for Perennial and Seasonal Fodder Development in the State (Amended) 2017-18.*
5	*Dairy Equipment Scheme (Amended) Modified.*
6	*Financial Assistance for Rearing Broilers, Layers & Low Input Technology Poultry Birds (2018).*
7	Dairy Kits Scheme (Scheme for SC/ST Families)
8	*Financial Assistance for Infrastructure of Poultry Farm (2018).*
9	Revised Modern dairy Scheme and Purchase of dairy Farm Equipments.
10	Goatery Scheme
11	*Subsidy for Transportation of Ready Poultry Feed from Outside Goa*
12	*Varah Palan Scheme.*
13	Interest Subsidy on Loans for Agriculture & Allied Activities
14	*Establishments of Backyard Poultry Unit (For SC/ST).*
15	*Community Dairy Farming Scheme (Amended 2019).*
16	Purchase of Milch Animals under WGDS
17	Renovation of Cattle Shed under WGDS
18	*Gopal Ratna Award Scheme*
19	*Gramshakti – Supply of Low Input Technology Poultry Birds to Rural Farmers (2018).*
20	*The Goa Stray Cattle Management Scheme 2013 (Modified)*
21	*The Goa Small Animal Rescue Management Scheme 2014*
22	*Goa Dog vaccination, surveillance and Community Education under 'Short Scheme for Mission Rabies'*

(F) Centrally Sponsored schemes

Sr. No.	Name of Scheme
1	**Rashtriya Gokul Mission -Nationwide Artificial Insemination100%**
2	**Livestock Health and Disease Control (LH&DC)**
(i)	Assistance to States for Control of Animal Diseases (ASCAD) 60:40
(ii)	National Project on Rinderpest Surveillance and Monitoring (NPRSM)100%
(iii)	National Animal Disease Reporting System (NADRS)100%
(iv)	Peste des petits Ruminants Control Programme (PPR-CP)60:40
(v)	Establishment and Strengthening of existing Veterinary Hospitals and Dispensaries (ESVHD)60:40
(vi)	Professional Efficiency Development (PED) 50:50
3	**National Animal Disease Control Programme (NADCP**) 100%
(i)	Foot & Mouth Disease Control Programme (FMD-CP)
(ii)	Brucellosis Control Programme (Brucellosis-CP)
4.	Livestock Census 100%
5.	Integrated Sample Survey (ISS) 50:50
6.	National Rabies Control Programme (NRCP) 100%
7.	Extension of Kisan Credit card facilities to Animal Husbandry & dairy Farmers

(G)Provision of funds for disaster mitigation and related interventions:

Animal Husbandry Department of Goa will take lead in the associated disaster related preparedness, mitigation and relief measures at the State level. The Department has made budgetary provisions for disaster mitigation and related interventions, through the integration with the ongoing or proposed development/ support programs associated with animal husbandry sector.

(H)Coordination with Department and Agencies

The preparedness plan of the Department will further ensure that the all concerned departments and agencies are able to respond to potential damage zones in a prompt & coordinated manner. In most disaster situations the loss of life could be significantly reduced through appropriate preparedness measures.

It is very important for the Animal Husbandry department to get connected with Health, Revenue, PWD, Fire & Emergency and Transport Departments, for the required support and manpower during disaster. Departmental coordination leads to efficient planning, and it also helps in avoiding overlaps. A foolproof system needs to be institutionalized for seamless communication during disaster.

It will be necessary that with respect to every disaster, the concerned agencies will be designated to issue warnings. As part of preparedness plan, it will be ensured by

Department that pre-disaster warning & alerts, preparedness before response and dissemination of warning, and evacuation activities will be carried out in coordination with all concerned departments.

Inter-departmental support

A disaster cannot be managed properly only by one single department. For effective management to mitigate impact on the animal husbandry sector, necessary help should be sought after, from appropriate authorities. The below table presents the responsibility and the trigger mechanism for contacting various departments.

Sl. No	Department	Role	Responsibility to contact	Trigger
1	Revenue department	Administrative directives	Dy. Director (EPID)	In case of disease outbreak.
2	Police/Security forces	Monitoring at the Border Check Post	Dy. Director (Epid)	Outbreak of disease in neighboring states
3	Public works department	Infrastructure Development and providing water facility	Executive Engineer	Shortage of Water and disruption of transportation system.
4	Directorate of Health Services	Preventive health measures for public in case of zoonotic diseases	State Epidemiologist	In case of disease outbreak like avian influenza, KFD, etc.
5	Emergency & Fire services	Burrying of carcasses and large scale disinfection.	Director	In case of large scale fatalities in livestock.

(I) Early Warning System (EWS) for Natural Disasters and Diseases

Each jurisdiction within the state is responsible for preparing for a disaster including establishing methods for alerting and warning the public, mobilizing resources and initiating protective actions. At the state level, State Disaster Management Authority (SDMA) operates the State Alert & Warning Center (SWC), which is staffed 24 x 7, 365 days a year to serve as the official state level point of contact for emergency notifications. From this center, Warning Center personnel will intimate the district Warning centres, taluka centres, central agencies and the IMD.

On the receipt of warning or alert from any such agency which is competent to issue such a warning, or on the basis of reports from District Collector of the occurrence of a disaster, the response structure of the State Government will be put into operation. The Chief Secretary/Relief Commissioner will assume the role of the Chief of Operations during the emergency situation. The details of agencies competent enough for issuing warning or alert pertaining to various types of disasters are given below :

Disaster	Agency (ies)
Earthquake	Indian Metrology Department (IMD), Institute of Seismological Research (ISR)
Cyclone	IMD, ICAR-CCARI
Flood	IMD, WRD
Tsunami	IMD, ISR, Indian national Centre for Ocean Information Services (INCOS), NIO
Drought	IMD, Agricultural Department
Fire, Industrial & Chemical Accidents	Fire & Emergency Services
Epidemics	Health and Family Welfare Department

(J) Efforts for community participation and mass mobilization of resources

a) Dept to ensure ensuring better and close co-ordination between various departments involved in DM and programme implementation Agency for different central and State livestock development schemes in disaster prone areas.
b) Participation of local people and PRI in assessment design and implementation of State DM plan
c) Participation of N.G.Os media Goshalas animal welfare organisation and SHGs in disaster management
d) Incase of drought- prone areas the plan for drought preparedness and response should form part of ongoing livestock development schemes with assumption that periodic drought will occur during the project cycle
e) Streaming/simplification of the procedure for release of assistance in case of emergency

8. Capacity Building and Training :

Capacity Development: Management of Livestock:

Area	Activity	Responsibility	Remark
Immediate relief	Immediate relief in terms of treatment, fodder etc. wherever required	Veterinary Officers, Assistant Directors of Veterinary Dispensaries and Hospitals. ICAR & KVKs to be involved.	Rapid response teams to be formed for disaster management Immediate therapeutic measures to be taken. Emphasis is to be given on training officials & farmers under Central sponsored Schemes.

			Provision of making, fodder banks (Kadbakutti) needs to be explored in view of effect of climate change. There is a shortage of Paravets.
Infrastructure for disposal of dead animals	Farmers burry the Bovine carcass in their own land and there is no specific area demarcated for the purpose. In case of infectious diseases – deep burial method with lime is followed. Farmers need to be given refresher training.	Dy. Director (Epid), Assistant Director (AH), Assistant Director (Extension)	Special training to be provided in case of outbreak of diseases in the State by farmers cum stockmen training centre at Curti, Ponda in adherence to the guidelines issued by the State pollution control board. Suitable Community Land to be earmarked in case of epidemics. Publicity to be done by means of Posters/leaflets of the species wise diseases likely to be spread.
Infrastructure for containment of epidemics	Ring vaccination methods is followed during outbreak of any disease. Periodic vaccinations are carried out in planned manner against various disease in different species regularly.	Local Veterinary Officer/Assistant Director with the help of paravets.	State has adequate facility for maintaining cold chain, with generator backup for storing & transporting of vaccines. Vaccination is carried out as per SOP – Vaccination Programme Schedule
Forecasting of epidemic/disease	Building infrastructure for disease forecasting	Local VO/AD, DD (Epid)	a) State gets information from central nodal

			agency for disease forecasting to the State DIU b) Emphasis to be given on active and passive surveillance, area wise and season wise. c) Routine clinical samples from various parts of the State to be analyzed at State DIU. d) State DIU to be strengthened with the latest equipments to carry out surveillance area wise.
	Training of farmers on mitigation of disaster losses	Local Veterinary Officer/ Assistant Director and Assistant Director – Farmers and Training Centre in association with ICAR & KVKs.	a. Stipend and refreshment facilities for Farmers as farmers lose a day's wage during a day training. b. Farmers need to be trained in latest management skill in connection with Emerging diseases and the measures need to be taken and also on Disaster Management training for various disasters like earthquakes, cyclone, flood and fire by strengthening of Extension wing.

			c. The Farmers cum Stockmen training centre conducts special trainings whenever outbreak of disease takes place in any part of the country as per the instruction of GOI. Annexure V gives the list of regular programmes conducted by training centre.
	Awareness programme for Veterinary and Administrative officials in livestock emergency management with help of expert organizations like KVKs	Dy. Director(EPID)	Necessary materials, demonstrations and refreshment facilities. Arrangement of organized awareness programmes for containment of Biological disaster for veterinary professionals and other administrative officials for emergency management & KVK could take up the same.
	Enhancement of the capabilities of emergency field and laboratory veterinary services	Director (AH) & Dy. Director (EPID)	a) Practical training in the field is required. The present disease investigation laboratory is at BSL II level, needs to be upgraded BSL III by providing additional infrastructural

			facilities & with trained pathologists & Lab. Technicians. Network of labs to be established for conducting sero surveillance area wise. **Special grants may be provided to DIU** b) Enhance capabilities of emergency field and Laboratory Veterinary services in relation to specific priority disease in livestock, both in north and south district taluka wise. This would enable for accurate and timely analysis for tracking and limiting the disease and organized rehabilitation: Collection of blood/other samples. Latest kits to be used for diagnosis.

8.1 **Capacity Development Plan of Department**

First of all it is very important to prepare and follow the capacity development plan of Department. The plan should be reviewed and revised every year. According to the training needs assessment the training calendar will be prepared and followed.

8.2 Training for Early Recognition of Epidemic Diseases and Treatment

A number of training possibilities will be explored & selected, including sending key field or laboratory staff and district Nodal Officers to another state to gain first-hand experience when there is a major disaster. While this is the best type of training, it is unpredictable and expensive. Staff would be able to observe the disaster, after effects of disaster and the remedial procedures in a similar environment and they would also provide additional human resources for the recipient state responding to the emergency. Similar but simpler training workshops will be organized for auxiliary veterinary staff and taluka nodal officers.

Field diagnostic manuals are most useful which are to be prepared in a simple, practical and graphic format whereby they can always be carried in a vehicle and can be available for quick reference at the site of a disease outbreak.

There are prominent training institutes like MANAGE, Hyderabad imparting training to the officials on various aspects related to animal husbandry sector and crises management.

8.3 Awareness Generation

Professional communicators and extension experts will be enlisted to help design and carry out awareness and publicity campaigns. Ideally, personal visits and discussions with farming communities and livestock traders, etc. are preferable, but newspapers, radio, television and social media can reach a large target audience quickly.

The State is conducting various awareness programmes to educate farmers, and other key stakeholders to prepare themselves to effectively deal with any disaster or emergency situation. The programmes will be helpful for them to not only survive but also to contribute in earning livelihood, especially related to the animal husbandry sector.

Radio programmes have proved to be a very effective method for spreading the message. These will broadcast at times of the day when most farmers could be expected to listen to the radio, which may be either early in the morning or at night. For example, to educate farmers for management and feeding of livestock during drought, necessary literature in shape of pamphlets or booklets printed in Konkanni/Marathi should be distributed free of cost and also get approved by the District Collectors.

TRANING NEEDS COMMON TO DEPARTMENTS

S. No.	Training Need	To Whom	Suggested duration
1	Implementation of Disaster Management Act 2005 – Department's Role & Responsibilities	Senior Middle / Middle / Support/ grassroots level functionaries	3 days
2	Incident Response System (IRS); Basic & Intermediate	Senior Middle / Middle / Support/ grassroots level functionaries	3 days
3	Community Based Disaster Preparedness	Senior Middle / Middle / Support/ grassroots level functionaries/Elected Representatives of ULBs/PRIs	3 days
4	Preparation and Implementation of State/ District Disaster Management Plans	Senior / Middle / support level functionaries	2 days
5	Basics of integrating DRR into departmental activities/ programs (DRR implementation Strategies)	Senior / Middle / support level functionaries	2 days
6	National Missions under Climate Change: Activities and Targets	Senior / Middle/support level functionaries	3 days
7	Mainstreaming DRR & CCA into development planning Approaches/Strategies	Senior/Middle/support level functionaries	3 days
8	National/State Action Plan on Climate Change – Status and strategies for implementation	Senior/Middle/support level functionaries	2 days
9	Hazard Risk and Vulnerability Assessment	Senior/Middle/support level functionaries	2 days
10	Mainstreaming Disability into DRR	Senior/Middle/support level functionaries	One-day
11	Carcass disposal and environmental pollution.	Senior/Middle/support level functionaries	2 days

ANIMAL HUSBANDRY

S. No.	Training Need	To Whom	Suggested duration
1	Conservation and preservation of Fodder	Astt. Director (AD's) /Veterinary Officers (VO's) /Para-Veterinarians (VA's)	2-days
2	New Technologies in Feed Manufacturing	AD's/VO's/Para Vets	2-days
3	Carcass Disposal and Environmental Pollution	AD's/VO's /traditional Butchers	2 days
4	Slaughter House Management	AD's/VO's	2-day
5	Regulation of Adulteration of Milk, Meat and Eggs	AD's/VO's	2-day
6	Scientific Management of Animals and Waste disposal in light of Climate Change	AD's/VO's /Para Vets	2-days
7	Modern Technology practices for adaptation in Livestock	AD's/VO's	2-days
8	Technologies to be adapted to reduce methane production (Rumen manipulation)	AD's/VO's	2-day

8.4 Status/ Inventory of trained professionals

The status/ inventory of trained disaster management professionals will be properly maintained and documented by the Animal Husbandry Department.

In this DM plan document, the Trained Manpower of Department will be enlisted after the officials are imparted training, during timely revision of the Disaster management Plan.

8.5 Simulation/Table Top and Mock Exercises

To encourage participation in a coordinated manner simulation exercises on various disasters are very important. These exercises help in institutional building at various levels. Mock exercises help in improving response time and also test reliability. Therefore mock-drills are organized involving all the required agencies on regular basis. These drills also help in updating the response plans.

To measure the training effectiveness, and to check the actual disaster preparedness, the mock exercises and simulation drills will be chalked out at regular intervals, by the Animal Husbandry department.

The mock exercise observations will be discussed and documented for the future actions and record purpose with the Department, and if required, it will be shared with other agencies as well.

9. Disaster Response Plan

9.1 **State Emergency Operations Centre (SEOC)/Control Room:** State Emergency Operations Centre becomes a nodal point for overall coordination of planning and response. Ensure that EOC facility has required communication (connecting all stakeholders vertically and horizontally), Decision support system, alert and warning system in working conditions.

The EOC will be the hub of activity in a disaster situation. This is however, not to underestimate its normal time activities. The EOC, the key organizational structure, is flexible to expand when demand increases, and contracts when the situation comes to normal.

9.2 Departmental Disaster Management Core Committee

Sr. No.	Name & Designation	Description	Ph. No.
1	Dr. Santosh V. Desai, Director, Head Office,Panaji-Goa	Chairman	0832-2437244(O); 9822488911 (mobile)
2	Dr. Marwin Lopes, Dy. Director (AWB), Head Office, Panaji-Goa	State Nodal Officer, Head Office	0832-2437245(O); 9822686658 (Mobile)
3	Dr. Veena Kumar, DIU Tonca-Caranzalem	Disease Investigation & Central Stores	2462919(O); 9860226570 (Mobile)

9.3 Disaster Management - District Nodal Officers

Sr. No.	Name & Designation	Description	Ph. No.
1	Dr. Veena Kumar; Asst. Director; Vety. Hosp. Tonca	North Goa District Nodal Officer	0832-2462423(O) 9860226570(Mobile)
2	Dr. Atanazia Fernandes, VO I/c of Vety. Hospital, Sonsodo	South Goa District; Nodal Officer	0832-2759392 (O); 9850452939(Mobile) 9607918114

9.4 **Disaster Management -Taluka Level Committee**

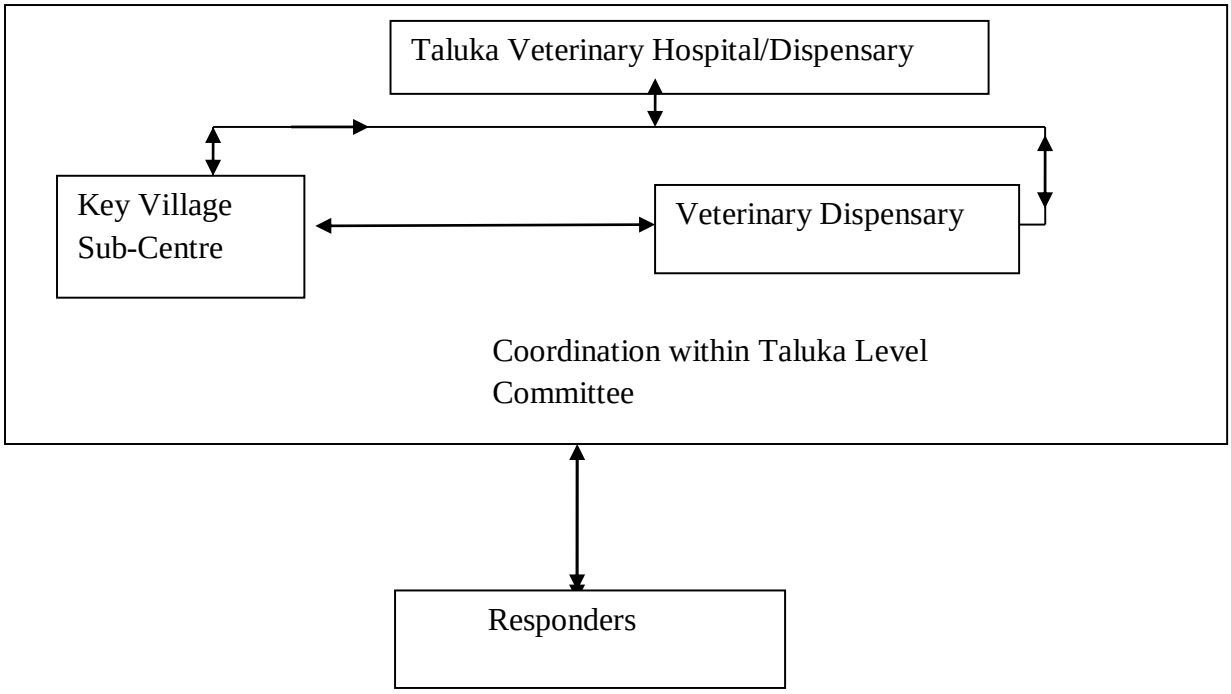
DISASTER MANAGEMENT (NORTH GOA)

Sr. No.	Name & Designation of the Officers/Officials	Residential Address	Office land line No.	Mobile No.	Email ID
1	2	3	4	5	7
1.	Dr. Marvin Lopes, Deputy Director, Head Office, Panaji-Goa (State Level Nodal Officer)	H.No.6A, Models paradise, Tonca, Miramar	2437245/ FAX (0832) 2437244	9822686658	marwinlopes@gmail.com
2.	Dr. Veena Kumar Assistant Director, Veterinary Hospital, Tonca (North Goa District & Tiswadi Taluka Level Nodal Officer)	Infinity Complex, Nagalli Hills, Nr. Krishna Temple, Taligao	2462423	9607918115 9860226570	drveenakumar@gmail.com
3.	Dr. Prakash Korgaonkar, Assistant Director, Veterinary Hospital,Mapusa (Bardez taluka Level Nodal Officer)	H. No. 430, Canca Bandh, Post parra, Bardez-Goa	2257237	9607918113 9422393302	drprakashkor@rediffmail.com
4.	Dr. Rajesh Kenny, Assistant Director, Veterinary Dispensary, Bicholim.(Bicholim Taluka Level Nodal Officer)	H. No. 522/A, Mandrekar wada, Bordem, Bicholim	2362090	9422056987	rajeshkeni@gmail.com
5.	Dr. Harsh Bathini, Veterinary Officer, Veterinary Dispensary, Valpoi (Sattari Taluka Level Nodal Officer)	H. No. 111-E/3, Govind nagar, Karaswada, Mapusa-Goa	2374682	9607918131 9834239116 7083252893	vetharsh@gmail.com
6.	Dr. Gayatridas Gauthankar, Veterinary Officer, Veterinary Dispensary, Pernem.(Pernem Taluka Level Nodal Officer)	H. No. 580, Gaonkarwa da, Mulgao, Bicholim, North-Goa	2201832	9607918127 9049249506	gdas1987@gmail.com

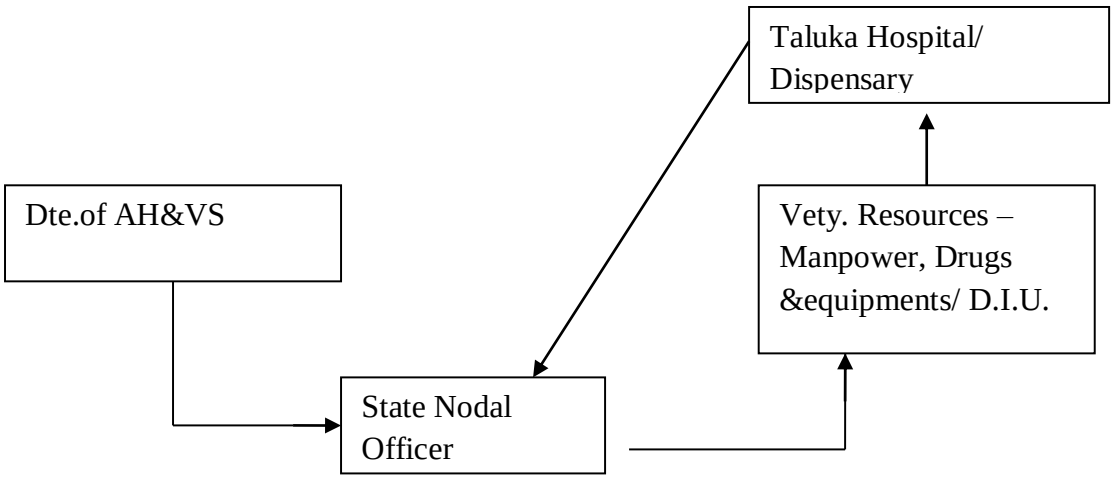
DISASTER MANAGEMENT (SOUTH GOA)

Sr. No.	Name of the Officer	Level	Office No.	Residence/ Mobile	Email ID
1	2	3	4	5	6
1.	Dr. Marvin Lopes, Deputy Director, Head Office, Panaji-Goa (State Level Nodal Officer)	State Level Nodal Officer	2437245	9822686658	marwinlopes@gmail.com
2.	Dr. Atanazia Fernandes, Veterinary Officer, Veterinary Hospital, Sonsodo.	South Goa District/Salcete Taluka Level Nodal Officer	2759392	9607918141 9850452939	atanazia@rediffmail.com
3.	Dr. Mohan Umarye, Assistant Director, Veterinary Hospital, Curti-Ponda	Ponda Taluka Level Nodal Officer	2313027	9607918123 9423062348	umaryemohan@live.com
4.	Dr. Anisha Carol Pinheiro, Veterinary Officer, Veterinary Dispensary, Quepem-Goa	Quepem Taluka Level Nodal Officer	2662243	9607918162 9822118972	drapinheiro@gmail.com
5.	Dr. Manik Patil, Veterinary Officer, Veterinary Dispensary, Netravalim	Sanguem Taluka Level Nodal Officer	2604852	9607918140 9921461384	md_patil@hotmail.com
6.	Dr. Prakash Rane, Veterinary Officer, Veterinary Dispensary, Dharbandora-Goa	Dharbandora Taluka Level Nodal Officer	2614030	9607918142 9011722362	pmrgsvc42@gmail.com
7	Dr. Samaya Veluskar, Veterinary Officer, Veterinary Dispensary, Vasco-Goa	Mormugao Taluka Level Nodal Officer	2501484	9607918144 8459720969	samaya.veluskar23@gmail.com
8.	Dr.Rachel salema, Veterinary Officer, Veterinary Dispensary, Canacona-Goa	Canacona Taluka Level Nodal Officer	2643336	9607918143 7092390454	

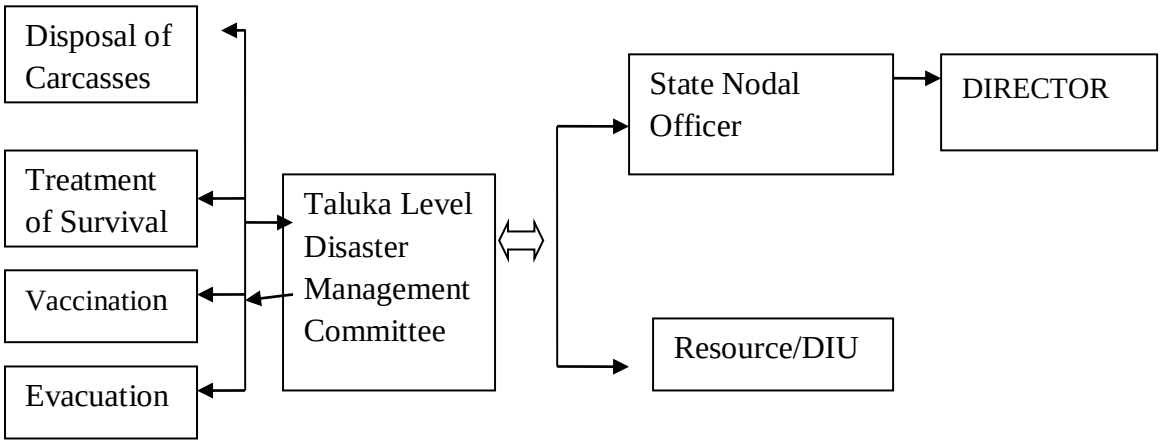
Taluka Level Committee :



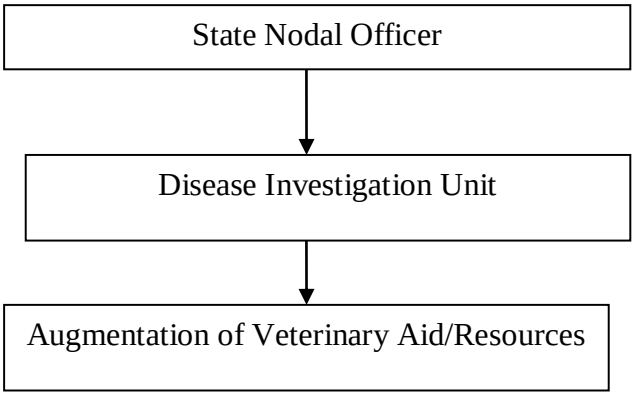
Veterinary Services Communication Core Group



Mass casualty/Disaster Management Plan for Taluka Veterinary Hospital/ Dispensary



Veterinary Services Action at site of Disaster



9.5 Role and Responsibility of Department

Preparedness for Livestock Disaster

While the general Prevention, Mitigation and Preparedness for natural hazards are covered in the State Disaster management Manuals, specific steps for livestock disaster management are addressed here.

Area	Activity	Responsibility	Remarks
Public awareness	Awareness to be created about diseases that may cause livestock disaster among the farmers	Director (AH & VS) and Dist. Collector	The farmers cum stockmen training centre conducts training for allied department personnel's during the outbreak of diseases.
Provision for warning and forecasting	To establish well networked surveillance mechanism for proactively monitoring	Central Nodal Agency / IVRI / Mandated Agencies	The findings of the surveillance to be conveyed to State DIU who in turn will

of diseases	emerging infections and epidemics		disseminate this information to the taluka level officer for implementation.
Policies, procedures and legislations	Periodic review of existing legal provisions to meet changing realities	Director (AH & VS) and Dy. Director(EPID)	As per the provisions of the various Central and State Acts and Rules.
Mobilization of necessary resources	Co-ordination of inventory items such as machinery/ equipments /water tankers/ etc. at the site of disaster	Dy. Director (Planning).	Special financial grants to be allocated to the taluka level officer to meet the emergency expenditure.
Commissioning of risk assessments	Identify high-priority disease threats whose outbreak will cause state level emergency and send early warning signals to all concerned.	Central Nodal Agency / IVRI / Mandated Agencies	DIU to co-ordinate for necessary immunization through taluka level officers.
Active disease surveillance	Development of active disease surveillance and epidemiological analysis capabilities and emergency reporting system	Asst. Director (Disease investigation Unit) and Dy. Director (EPID)	Facilities need to be upgraded
Movement of animals	Restrict uncontrolled movement of animals resulting in mixing of the susceptible and infected population	Dy. Director (EPID) and District Collector	Quarantine facilities to be established for infected animals at the cattle camps.
Vaccination status	Periodic checking of status of vaccination of all livestock	Respective Veterinary Officers / Asst. Director at Taluka / Block level	Ring vaccination to be conducted in case of outbreak.
Immunisation of persons	Ensure immunization of all persons who are likely to handle infected diseased animals	Concerned Veterinary Officers, Asst. Directors and Paravets who handle pets/ diseased bovine/Caprine, etc. get themselves immunized periodically.	Personnel interacting to be immunized against zoonotic diseases and tetanus.
Infrastructure development	Farmers should be encouraged to avail the State/centrally sponsored schemes for renovation/repair of cattle shed.	Dir of A.H. & V.S. and Farmers cum stockmen training centre.	STC to conduct regular training and awareness programmes highlighting various departmental schemes.

Department Of Animal Husbandry and Veterinary Services
Pre-disaster
Designate a focal point for disaster management.
With help from the 192 Panchayats 1 corporation and 12 municipalities, select and earmark highlands for use as shelter for livestock.
Programme for vaccination for protection of livestock against contagious diseases.
Prepare schemes for supplementary arrangements for rehabilitation of livestock and recouping their loss.
Storage of concentrate and dry fodder to be done at government owned farms in addition to their normal requirements when alert for disaster is given by IMD/concerned department. Take up schemes for distribution of such stored animal feed on emergency basis in the affected areas.
Establish fodder bank schemes as security against fodder shortage for livestock due to disasters.
During Disaster
Assist the local governing bodies for operations relating to the rescue and shifting of standard livestock and poultry.
Arrange for the quick vaccination and treatment of livestock and poultry at shelter places.
Arrange to handle day to day operations of livestock population.
Post Disaster
Arrange a rapid survey to assess the loss with the help of latest technology e.g. drones
Form and dispatch Veterinary Teams with appropriate equipment and medicines to aid affected livestock.
Arrange for disposal of dead bodies of animals in collaboration with PWD, Fire and Emergency services and GSPCB personnel.
Implement all schemes for rehabilitation of livestock.

The success of disaster response depends upon coordination amongst all concerned departments and stakeholders. During disaster time, the Department is primarily required to assist the State Administration.

Effective and prompt response

a) The animal husbandry Departments 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 may be trained by NDRF
b) Community being the first responder the State level veterinary emergency response along with SDRF and NDRF will conduct community capacity building and generation programme in the vulnerable areas.
b) Assistance of Civil Defence, NGOs, SDRF, NDRF, veterinary wing of CPMFs (Central para Military Forces) and Remount & Veterinary Corps.
c) State will organise cattle shed/ shelter for livestock to save them from adverse conditions depending on the nature of disaster like earthquakes, cyclone and tsunami

d) Fluid therapy and treatment of sick/ injured animals along with availability of a vaccine against prevailing animal diseases and due to impacts of earthquakes tsunami and drought etc

Rescue of Animals

a) SDRF, NDRF, veterinary wing of CPMFs, RVC and other specialised agencies organizations/ institutions, NGO's, AWA's, local community shall assist State AHDs in livestock rescue and mangement during different disasters
b) State AHD will constitute Animal Rescue Teams involving local community and animal welfare organisations and provide requisite training to members.
c) 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
d) Arrangements for provision of life saving equipments and rescue of animals with the consent of owners, transportation of feed, fodder medicine and vaccine.
e) 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
f) 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

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.

Treatment of injured/ sick animals

a) Arrangement for treatment injured / sick animals and including adlib fluid therapy, preventive vaccination in healthy animals against prevailing diseases.
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 dewormed with suitable broad spectrum anthelmintic to enable animals to regain proper health

Livestock/ Poultry Feed and Fodder Supply

a) During drought cyclone flood and hailstorm, the department will 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 and technical knowhow on fodder. Department will take initiate to make it available to the farmers from these stations.

c) Department supports fodder cultivation and post harvest technologies under 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. The department will act as a catalyst to make it available to the farmers.
d) To deal with 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 talukas of the State.
e) Department of Animal Husbandry will identify fodder surplus States and facilitate agreement between such States and fodder deficit talukas for purchase of fodder.
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 droug/flood affected areas
g) Enrichment of straws using urea-molasses treatment to meet protein and energy requirements of animals by the department.
h) State will regulate the use of distillery brew so that large quantities of brew is available for feeding animals in affected areas. State will establish fodder bank 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 fodder preservation for emergency supplies to be adopted (Refer Annexure- I)

Maintenance of Sanitation

a) Disinfection of premises of temporary sheds with bleaching powder, phenol carbolic etc
b) Carcass should not come in contact with healthy animals

Measures against epidemics and diseases during Disaster

a) The most common diseases during drought/flood periods are Foot and Mouth disease Hemorrhagic Septicaemia. Black Quarter, Anthrax, Enterotoxaemia, Colibacillosis, Trypanosomiasis, Babesiosios, Anaplasmosis. Pox disease, mastitis, Brucellosis Ringworm. Ascariasis, Fascioliasis, Microfilariasis. Tick infestation and mange etc . To prevent these diseases following measures are to be adopted :
    1. Vaccination – In disaster conditions animals become more susceptible to diseases due to stress and thus all vaccinations schedules should be followed

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

    3. Disinfection of animals 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 formaldehyde etc. For control of ticks, fleas , mosquitoes, lice etc insecticides like methrin, melathion, Fenvalarate, Arnitraz etc may be used

Supply of Milk and Milk products in disaster affected areas

DADF will co-ordinate the efforts of State to ensure supply of milk powder, baby food, extra shelf life milk, etc. to the affected areas through State Milk Federations and Semi-government organizations.

Removal of infected and potentially infected animals

This is often referred to as an eradication policy. Susceptible species on infected farms or in designated infected areas will be immediately quarantined and required treatment will be given. In case of death of such animals, deep burial as per the guidelines of GSPCB will be done. It is often combined with cleaning and disinfection procedures for the infected premises.

Summarized Standing Operating Procedures (SOPs) of Animal Husbandry

The Department will be a major support department in case of disaster caused by Earthquake, Flood, Drought, Fire & Cyclonic Storm. The roles and responsibilities of the department shall be :

Disaster Phase wise - 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.

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.
- Mobilize expert swimmers to the cyclone / flood hit areas. Alerting the teams for post disaster activities.
– Arrangements for removal of dead cattle after identification.

Post Disaster

-Asses the loss / damages to the Livestock and poultry, sheds, storage godowns, dairy equipments, feeds and fodder .
- Consolidation of the assessed losses/ damages and reporting.
– Thorough checking of the 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 concerned District Administration.

Normal Time Activities

• Demographic profile of families engaged in farming, poultry, dairy, pig rearing units will be mapped, updated and shared till village level.
• Maintain contact addresses of key resource members with telephone/ mobile numbers such as Director, Deputy Director, Assistant Director, Veterinary Officer, Officers of Line Department, Nodal officers, para vets and MTS, etc.
• Details of veterinary centers, artificial insemination centers, veterinary dispensary, vehicles, mobile dispensaries and equipments and also the details of vehicles and equipments used often by outsource agencies dealing with animal husbandry.
• Maps showing the details of animal laboratories, animal vaccination centers, animal husbandry training school with statistical data.
• Details of essential facilities to be provided at sensitive place such as important animal husbandry centers, training center etc;
• Arrangement of repairs/alternative arrangements in case the facilities related to animal husbandry services are disrupted.
• To make arrangements to necessary medicines, vaccines and other material, for treatment of animals.
• To collect the details of cattle in each village of the taluka, details of safe places for the treatment of animal, milk dairies, other private veterinary doctors, facilities related to it.
• To appoint an employee not below the rank of Assistant Director to coordinate the District Control Room during emergency.
• To maintain the equipments available such as stands to keep animals, sharp instruments, flood lights, shovels, axes, hammers, RCC cutters, cable wires, fire equipments, de-dusting equipments, diesel generators, dumpers, cutters, tree cutters, ladders, ropes, boats, etc; which can be used during emergency and to also ensure that they are in working condition.
• To see that essential services related to animal husbandry services are not disrupted at the time of emergencies.
• List of NGOs involved animal husbandry & allied interventions.

- To prepare a list of public properties related to animal husbandry which are damage prone areas and will make advance planning to lessen the damage.
- Encourage the farmers to insure their Poultry and Livestock to compensate their monetary losses in case of disaster. A policy covering losses during natural disasters to be taken up even by paying additional premium, if need be.

9.6 Quick Response Teams / Rapid Response Teams

Deployment of search and rescue teams will help in reducing the numbers of deaths of animals. A quick response to urgent needs must never be delayed for the reason that a comprehensive assessment has yet to be completed. Deployment of a rapid response team will help to reduce mortality of animals. Rescue operations will be launched for animals trapped in debris or in vulnerable areas.

First aid will be administered to injured animals. The department should be equipped with suitable vehicles for timely deployment of rapid response teams.

The Department at State Level, is responsible for the livestock management, during emergency response.

10. Post Disaster Plan :

10.1 Rapid Assessment Teams :

The Rapid Assessment Teams will be multi-disciplinary teams comprising four or five members. They will mainly comprise senior level specialized officers from the field of health-veterinary sciences, engineering, search and rescue, communication and one who have knowledge of disaster affected area, physical characteristic of the region, language etc. These officials will share a common interest and commitment. There will be a clear allocation of responsibilities among team members.

To make a first / preliminary assessment of damage, the assessment report will contain the following basic elements or activities:

- Animal health and material damage
- Resource availability and local response capacity
- Options for relief assistance and recovery

The Animal Husbandry Department will take the lead in identifying disaster loss & damage, pertaining to animals, allied interventions.

According to the current situation and the loss occurred, the Secretary – Animal Husbandry, will take a final call on the kind of support required from other Departments, such as Revenue, PWD, Fire & Emergency services, NDRF, SDRF & allied agencies.

10.2 **Disease Surveillance**

a) Visit of Disease Surveillance Teams to disaster affected areas to make active surveillance about any disease occurrence in livestock.
b) Collection, testing and confirmation of samples and taking necessary steps for prevention and spread of infection.
c) Use the already compiled epidemiological and statistical information collected before, during and after disaster and to take preventive actions and to monitor preparedness constantly.

10.3 **Disposal of Carcass**

Arrangements for safe disposal of carcass by following zoo sanitary measures to be made. State Animal Husbandry department will constitute Animal Carcass Retrieval Teams and provide requisite training to team members. Detailed procedure for disposal of Dead animals and Poultry birds is at annexure IV a & b respectively

10.4 **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.

10.5 **Restocking of Livestock/Animals**

a) Induction of high genetic merit animals : Sourcing from other States, bull mother farms, central cattle breeding farms.
b) Induction of bulls for natural service ; Indigenous, crossbred and high genetic merit
c) Organizing fertility camps in disaster-affected areas to overcome reproductive inefficiency in milch animals so that the calving is not delayed.
d) Induction of small ruminants – sheep, goats and pigs
e) Induction of ram, buck and boar for natural service.
f) Repopulation of backyard poultry sourcing from central poultry development organizations and State Poultry farms.

10.6 Role of Animal Husbandry Department

All the activities pertaining to health, welfare, disease, control and surveillance, breeding, management and nutrition will be looked after by the department of Animal Husbandry.

10.7 Assistance for Renovation and maintenance of Milk Processing plants

a) Milk Unions in the State may avail financial assistance for establishment/modification and strengthening of their dairy plants, chilling centres, marketing infrastructure, organization of new dairy cooperative under NPBBDD scheme of DADF.

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

10.8 Reconstruction of social infrastructure

Animal Husbandry Department will take lead role in coordination with concerned depts. and agencies for reconstruction of damage infrastructure of animal sheds, feed storage godowns, dairy equipments, etc.

Reconstruction of the damaged animal sheds and their health centers will be addressed and supported through the advance tools like Insurance, Short-term Loans, and by any other important means, which are affordable.

10.9 Restoration to Normalcy

Restoration of all existing facilities to normalcy will be major challenge in front of the Department, in post disaster situation. The concerted coordinated efforts will be required to overcome from the same with assistance from other departments, allied agencies and concerned stakeholders.

The State Govt. will come out with special welfare schemes pertaining to animal husbandry sector, which include relief to the beneficiaries, erection of damaged cattle sheds, restoration of damaged dairy equipments, etc.

11. Knowledge Management :

Creating network of knowledge institutions

The Animal Husbandry Department will identify competent knowledge institutions (region wise) in the State to institutionalize the mechanism of knowledge sharing. Then a network of knowledge institutions will be created.

12. Documentation of lessons learnt & practices

Under the knowledge management initiative, the key lessons learnt of past disasters so far and also the best disaster management practices pertaining to animal husbandry sector will be documented. The same will also be uploaded on the departmental website.

13. Financial Arrangements :

Annual budget for Department's DM plan implementation

As per the National DM Act 2005, Section 40, sub-section (2) concerned State Department shall make (annual) provisions for financing the activities specified in the disaster management plan of Department and its smooth implementation. Funds for relief will be provisioned separately.

Provisioning of funds for specific DRR interventions

Animal Husbandry Department will coordinate with other concerned Departments for provisioning of funds, specific to animal husbandry related DRR interventions. This will include funds for prevention, mitigation and disaster risk insurance. The other financing options will also be explored here.

Provisioning of funds for Disaster Response and Direct Relief

As per DM Act Section 48, State Disaster Response Fund & District Disaster Response Fund will be established by State Govt. Further, there is a provision for release of National Disaster Response Fund (NDRF) amount as per the specified items and norms of assistance of MHA. This will also cover any type of support required to the farmers/ users for animal husbandry, post disaster. According to the type, the assistance will be provided as per norms of State Disaster Response Fund (SDRF).

Also, the State Animal Husbandry department has a Disaster Management Scheme which has provision for providing relief to the dairy farmers in case of disasters. Accessing the actual loss of the dairy farmers in a particular disaster, extra relief, over and above provided by all above relief schemes mentioned in previous para, can be provided through the departmental DM scheme.

14. Dissemination, Review and Updating of DM Plan

Dissemination of DM plan to stakeholders

Disaster Mgmt Plan of Animal Husbandry Department will be communicated and disseminated to all concerned stakeholders for clarity of roles, pertaining to animal husbandry aspects, in case of disasters and specific responsibilities point of view.

Periodic review of plan, annual updating

As per the DM Act 2005, Section 40(2) the Departmental DM plan will be reviewed and updated annually. Especially the contact list of nodal persons and resources will be checked, verified and updated on the website in case there is a change in concerned Nodal Officers.

15. Annexure

I	Guidelines for fodder production and fodder management under drought relief measures 2010
II	Guidelines / precautions in cyclones
III	List of items and norms of Assistance from State Disaster Response funds (SDRF) and National Disaster Response Fund (NDRF)
IV a	Standard Operating Procedure : Disposal of Animal Carcasses
b	Standard Operating Procedure : Disposal of Poultry Carcasses
V	Type of training programmes
VI	Disaster Management Scheme of the Department of A.H. & V.S.
VII	Vaccination schedule for livestock and poultry
VIII	Various Establishments of the Department
IX	List of Staff and their placements
X	List of Vehicles
XI	List of Drugs and Instruments
XII	Heat Wave advisory for animal health and welfare
XIII	Feeding technologies to be used during disaster
XIV	Do's and Don'ts for various disasters o Earthquake

	○ Flood ○ Fire ○ Chemical Disasters ○ Nuclear & Radiological Disasters ○ Biological disasters
XV	Functional steps for response system from Animal Husbandry Department
XVI	How to Document a Disaster
	Disasters in Goa 1. Earthquake 2. Floods/Heavy rain 3. Cyclone 4. Landslides 5. Tsunami 6. Industrial; & Chemical Disasters 7. Oil spill in sea/land

Annexure I

GUIDELINES FOR DROUGHT RELIEF MEASURES

Drinking Water to Livestock:

- Identify Villages with drinking water scarcity for Livestock and organize drinking water facilities with the help of local Sarpanch and District Revenue Administration
- Assess the constructions of new water troughs in the critical villages for provision of drinking water to bovines and also for small ruminants
- WRD to ensure regular potable water supply to the livestock through the above arrangement.

- **Monitoring Distress Sale of Livestock:**
- Issue necessary instructions to all the Departmental Officers to visit all the affected farmers and convince them not to dispose the animals in distress.
- Necessary instructions may be communicated to Panchayat Raj bodies/Marketing department through the district collectors to monitor the movement of livestock in the drought affected areas to avoid distress sale.
- Monitor movement of livestock every day to other states / places at all check posts (Marketing, Agriculture/Forest/Commercial tax/Transport) by issue of necessary instructions to the above departments by the district collectors concerned.
- **ORGANISATION OF CATTLE CAMPS:**
- To meet eventualities in case of prolonged severe drought, places should be identified where water and shelter facilities are available for organization of cattle camps.
- Keep the list ready where water and shelter facilities are available for organization of cattle camps.
- Assess the livestock population to be covered. Fodder required, period of camps, and other logistics.

Assessment of Fodder availability:

- Shall take immediate steps for immediate assessment of fodder availability in surplus areas of the districts.
- If the assessment on requirement of fodder organization of cattle camps is high, shall identify the surplus fodder areas/places in the neighboring talukas. They shall be in close liaison with the Assistant Director/Veterinary Officer of Animal Husbandry of Surplus taluka .
- The Assistant Directors/Veterinary Officers of surplus talukas shall coordinate this activities on identification of surplus places, quantities and fixation of price through I/c of fodder bank. They shall coordinate with the needy talukas or as required.

- District level committee may be formed under the chairmanship of the District Collector involving the officials of Revenue. Transport, Police, Panchayat Raj, Agriculture etc. for fixation of price for procurement of fodder, transport of fodder and organization of cattle camps .
- Similar committees may be formed at taluka level and village level for proper coordination and implementation of drought relief measures.
- Fodder transportation Plan by road / rail may be kept ready by fixation of transport price of fodder per Kilo Meter in consultation with RTA, on assessment of fodder availability with in the State or from out side the State as the case may be.
- Though the advance action has already been taken for production of fodder under various resources with the funds made available so far. As per the action plans submitted, still there is urgent need to bring more area under fodder production to bridge the gap and to make available fodder locally. For this a State level committee headed by Director Agriculture was formed. This committee has already submitted proposed action plan to make the State self sufficient in green fodder required by the livestock in the State. Further, in recently submitted Policy document for the department of Animal Husbandry, it is proposed to establish fodder banks at district level to co-ordinate the supply of green fodder to the dairy farmers. This will enable the regular supply of green fodder to the livestock regularly and in case of any eventualities.

Health Coverage:

Necessary Vaccine requirements should also assessed for the next 3 months. Open vaccine Depots at the strategic points in the affected talukas to keep vaccine in stock to meet emergency of out break. The emergency medicines may also be kept ready.

VI. Publicity:

- To educate farmers for management and feeding of livestock during drought, necessary literature in shape of pamphlets or booklets printed in Konkanni/Marathi should be distributed free of cost and also got approved by the District Collectors. The expenditure shall be met from the drought funds provided.
- All the Assistant Directors can also convey the message on drought situation on Radio or T.V. and can also utilize the services of Agriculture Training Management Agency (ATMA) to spread messages of fodder cultivation in all villages.
- They shall attend to adverse press reports on the ongoing drought related activities and shall take immediate necessary action for issue of rejoinder and the same may be intimated to Head Office by Fax/social media.

VII. Monitoring:

- Emergency drought monitoring cells are to be established immediately in all Assistant Directors (AH) Office with a technical personal in-charge and communicate the name and phone number of the individual to drought cell in Head Office .
- They are requested to utilize the funds for the purpose for which it is sanctioned and send weekly report on Drought Relief Measures under taken in respective District on financial and physical achievements to the Head Office by every Saturday evening without fail and kept in mail address **dir-ahvs.goa@nic.in**
- Departmental Officers are informed that the Director of Animal Husbandry, Assistant Directors in-charge of concerned Districts may make surprise visit to the Institution to check up drought relief measures. They shall monitor all the inputs promptly.
- The amounts released shall be utilized for the purpose for which it is released without any deviations.
- Contingencies like handling, local transportation charges, other logistics if any, to be met from drought funds with the approval of Collector concerned.
- Fodder Seed, sowing of fodder plots, should be verified by the concerned officers Village- wise in their respective jurisdiction.
- The Assistant Directors and Veterinary Officers\other nominated Officials should inspect stock registers, Fodder Plots and give wide publicity about Fodder production.
- They shall conduct regular review meetings with field functionaries on preparedness and keep them alert on preparedness and implementation of all drought related activities in their talukas for the benefit of farmers.
- For correspondence on drought related matters, the following are the contact numbers of the officers in the Directorate of Animal Husbandry, Government of Goa :

1	Director	9822488911
2	Deputy Director (Disaster Management)	9607918110
3	Deputy Director (Farms)	9607918103

Annexure II

GUIDELINES / PRECAUTIONS IN CYCLONES

PRE-CYCLONE PREPAREDNESS:

1. The Director (AH) I/c State administration on receipt of the forecast information on the occurrence of cyclone or floods in a particular area of the State will alert the field functionaries to take steps

- to inform the livestock owners/farmers to evacuate their livestock to uplands
- to let loose the animals to protect them in order to minimize the livestock losses.
- The Director (AH) I/c State administration shall arrange to obtain and keep sufficient quantity of vaccines as a forecast requirement with the knowledge of previous demand.
- The Director (AH) I/c State administration shall take steps to procure sufficient quantities of medicines and stock at strategic places.
- The Director (AH) I/c State administration shall constitute Veterinary Teams consisting of (1) one Assistant Director/Veterinary Officer/ (1) One Para Staff and (1 or 2) One or Two MTS or as the case may be.
- First aid kits shall be made available for each team with emergency medicines to take care of affected Livestock.
- The Director (AH) I/c State administration shall take steps to identify the availability of dry and green fodder in the nearby villages so as to make arrangements to procure and supply to the affected areas in exigencies.
- The local Animal Husbandry Officers shall take necessary action to tackle the eventuality with Co-ordination of local Gram Panchayat/ Municipality/ Social Organizations/Non Governmental Organizations etc.
- Out of the total budget allocated towards medicines 25% is earmarked for meeting the exigencies.

DURING CYCLONE:

1. The Director (AH) I/c State administration shall keep in touch with Weather bulletins broadcasted through all media
2. The Director (AH) I/c State administration shall alert all the field functionaries to be available at the respective Head Quarters and shall recall the staff who are on leave by canceling the leave.
3. The Director (AH) I/c State administration shall watch the cyclone movement in order to alert the field functionaries.
4. The field staff shall be available at the Head Quarters and immediately after the cyclone hits, and visit all the affected villages and provide treatment to all the ailing and affected animals
5. The field staff shall obtain the information on Livestock losses, building losses and Fodder losses and report to their Assistant Directors/Veterinary Officers

immediately without delay. They should also be in close liaison with the Revenue Officials.

6. The Assistant Directors/VO's shall keep in close touch with the field staff and Revenue Department and take their help wherever needed including Vaccines and Medicines.
7. The field staff shall report daily on damage to infrastructure related to the department, livestock losses, veterinary relief operations taken up and loss of fodder crops etc., to the concerned Assistant Directors/Veterinary Officers who in turn shall submit consolidated report to their respective District Collectors immediately and to the Director of Animal Husbandry.
8. To monitor the relief operations and to guide the field functionaries and to record and report, Monitoring Cells shall be constituted at State, district and taluka level.

POST CYCLONE:

1. Once Cyclone recedes, the field staff/veterinary teams formed shall visit all the approachable villages and take up treatment of injured and ailing animals.
2. The veterinary teams shall conduct preventive vaccinations against contagious diseases in the area.
3. The veterinary teams shall advise the local administration i.e. Panchayat Raj bodies and revenue officials to take up prompt disposal of carcasses with the help of other line departments, to prevent epidemics.
4. The Director (AH) I/c State administration shall assess the availability of fodder stocks in the affected area and plan for procuring green/dry fodder from the neighboring areas/States so as to supply to the affected areas. Organization of cattle camps, if necessary may be thought of.
5. The field staff shall assess the value of damaged infrastructure related to the department, livestock losses and fodder crops etc., and report to the Assistant Director (AH) /District administration as per the proforma communicated by head office.
6. The field staff shall advise the farmers on management of livestock especially on the spread of diseases in such eventualities through possible media.
7. The Director (AH) I/C State administration shall prepare consolidated report on the value of damaged infrastructure related to the department, livestock losses and fodder crops etc., and also the relief operations taken up and report to the Secretary of Animal Husbandry by FAX, e-mail or by telephone/social media daily.
8. Preparation of contingency action plan covering immediate/permanent relief to the affected shall be taken up by the district administration.
9. Advise the district Agriculture Department to propose fodder yielding /fodder crops in their alternate contingency plans.
10. Advise the PR Bodies to provide safe drinking water to the livestock of affected areas by way of constructing water troughs

Annexure – III

Revised List of items and norms of Assistance from State Disaster Response funds (SDRF) and National Disaster Response Fund (NDRF)

(Period 2015-2020, MHA Letter No. 32-7/2014-NDM-1 dated 08th April 2015)

ANIMAL HUSBANDRY - ASSISTANCE TO SMALL AND MARGINAL FARMERS	
i) Replacement of milch animals, draught animals or animals used for haulage.	***Milch animals*** **-** **Rs. 30,000**/- Buffalo/cow/camel/yak etc. **Rs. 3,000**/- Sheep/goat/Pig. ***Draught animal*** **-** **Rs. 25,000**/- 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 drought animals per household irrespective of whether a household has lost a large number of animals. (The loss is to be certified by the Competent Authority designed by the State Government). ***Poultry:-*** Poultry at **Rs. 50**/- per bird subject to a ceiling of assistance of **Rs. 5,000**/- per beneficiary household. The death of the poultry birds should be on account of 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.
(ii) Provision of fodder/ feed concentrate including 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 exceed25% of SDRF allocation for the year. Based on assessment of need by SEC and recommendation of Central Team, (in case of NDRF) consistent with estimates cattle as per Livestock Census and subject to the certificate by competent authority about the requirement of medicine vaccine being calamity related.
iii) Transport of fodder to cattle outside cattle camps	As per the actual cost of transport, based on assessment of need by SEC and recommendation of the Central team (in case of NDRF) consistent with estimated of cattle as per Livestock Census.

Annexure – IV a

Standard Operating Procedure: Disposal of Animal Carcasses

Guidelines for Burial

- Burial shall be performed in the most remote area possible.
- Burial areas shall be located a minimum of 300 feet down gradient from wells, springs and other water sources.
- Burial shall not be made within 300 feet of streams or ponds, or in soils identified in the country soil survey as being frequently flooded.
- The bottom of the pit or trench should be minimum 4 to 6 feet above the water table.
- Pits or trenches shall approximately be 4 to 6 feet deep.
- They should have stable slopes not steeper than 1 foot vertical to 1 foot horizontal.
- Animal Carcasses shall be uniformly placed in the pit or trench so that they do not exceed a maximum thickness of 2 feet. The cover over and surrounding shall be a minimum of 3 feet. The cover shall be shaped so as to drain the runoff away from the pit or trench.
- The bottom of trenches left open shall be sloped to drain and shall have an outlet. All surface runoff shall be diverted from entering the trench.
- Burial areas shall be inspected regularly and any subsidence or cavities filled.

If death was caused by highly infectious disease

- Clean and disinfect the area after the carcass is removed.
- Wear protective clothing when handling dead stock and thoroughly disinfect or dispose off the clothing before handling live animals.
- Properly dispose off contaminated bedding, milk, manure or feed.
- Check with Disease Investigation Unit about disposal options. Burial may not be legal. Special methods of incineration or burial may be used in case of highly infectious disease.
- Limit the excess of dead stock collector and his vehicle to the areas well away from other animals, their feed and water supply, grazing areas or walkways.

COMPOSTING DEAD STOCK

If you compost your dead stock, follow the steps listed below :

A) Decide what method you will use. Burial methods included static piles, turned windows, turned bins and contained systems. Information on the first 3 methods is available on several websites listed under “resources on dead stock disposal”
    - Static piles with minimum dimension of 4 feet long by 4 feet wide by 4 feet deep are by far the simplest to use.

- Turned windows may be option for farmers already composting manure in windows.
- Turned bin system are more common for handling swine and poultry mortalities.
- The eco pod is a contained system developed by Ag-bag which has been used to compost swine and poultry mortalities.

B) Select an appropriate site.

- Well drained with all season accessibility
- At least 3 feet above season high groundwater level.
- At least 100 (preferably 200) feet from surface water ways, sinkholes, seasonal seeps or ponds.
- At least 150 feet from roads or property lines - Think about which way the wind flows.
- Outside any class I ground water, wetland or buffer or source protection area contact – NRCS for ventilation.

C) Select and use of effective carbon source.

- Use materials such as wood chips, wood shavings, course saw dust, chopped straw or dry heavily bedded horse or heifer manure as bedding material. Co compost materials for the base and cover must allow air to enter the pile.
- If bulking material are not very absorbent, cover them with 6 inch layer of sawdust to prevent fluids from leaching from the pile.
- Cover the carcass 2 feet deep with high carbon material such as old silage, dry bedding (other than paper) saw dust or compost from old pile.
- Plan on 12 feet x basis for an adult dairy animal. The base should be at least 2 feet deep and should allow 2 feet on all sides around the carcass. When composting smaller carcasses, place them in layers separated by 2 feet of material.

D) Prepare the carcass

- After placing the carcass on the base, lance the rumen of the adult cattle. Explosive release of gases may uncover the pile releasing odours and attracting scavengers.

E) Protect the site from scavengers.

- ✓ Adequate depth of material on top of carcass should minimize odours and risk of scavengers disturbing the pile.
- ✓ Scavengers may be deterred by the temperatures within the pile, but, if not, an inexpensive fence of upside down hog wire may be adequate to avoid problems,

F) Monitor the process

- ❖ Keep the log of temperatures, carcass weight and co compost material when each pile is started. Weather and starting materials will affect the process.
- ❖ Measure the pile temperature with compost thermometer 6 to 8 inches from the top of the pile and deep within to check for proper heating. Check daily for the first week or two. Pile temperature should reach 65 degree centigrade for 3 consecutive days to eliminate common pathogens.
- ❖ Record events or problems such as scavengers, odours or liquid leaking from the pile wall. Most large carcasses will be fully degraded within 4-6 months Small carcasses take less time. Turning the pile after 3 months can accelerate the process.

Note: Taken from the National Disaster Management Guidelines – Management of biological disasters, 2008 (ISBN 978-81-906483-6-3). For ready reference it has been reproduced here

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Annexure – IV b

Standard Operating Procedure: Disposal of Poultry Carcasses

Most appropriate is to burn or incinerate the dead/ sacrificed birds. Approximately 5 quintals of fuel wood would be required to burn 100 kg of dead birds. However the most common practice in recent outbreaks has been to bury in deep pits, cover with calcium hydroxide followed by at least 40 cm layer of soil. More layers of lime and soil can be applied to level the pit. A pit of 2 x 2 x 2 meters accommodates around 1800 birds (fowls) and about 450 turkeys. Pits must be deep enough to pre access to rodents or dogs etc. The burial ground is suitably marked and is not opened for at least year. Top it up with earth and lime if it sinks over time. A certificate of disposal of birds must be obtained from the designated officer. The burial site should be away from the habitat and water logged area ponds/ rivers etc.

Sites for disposal of birds and its management

a) For proper management, pits should be dug on a common land within the infected zone in limited numbers.
b) All the pits should be well covered with multiple layers of time and soil
c) Adequate amount of lime should be spread over the pits
d) The pit sites should be fenced with kanta/bushes
e) Permanent warning sign board should be fixed in all the pit sites
f) The pits should be monitored at regular intervals to check any sinking, water accumulation etc and if necessary steps be taken as mentioned above.
g) The pits should be located on the farm, premises and in case of backyard a village common land/ forest land preferably be at a higher level to avoid accumulation of water during rainy season. Pits should be located away from water body and residential areas. No crop should be grown further for at least one year on the pit site. During digging of the pits, it should be ensured that no water is oozing out of the pit.
h) All the pits should be dug one day in advance of the culling
i) To minimize risks to the environment and human health by way of leaching etc. environmental impacts of the construction methods of pits should be carefully adopted

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Annexure - V

TYPE OF TRAINING PROGRAMMES

A. DAIRY DEVELOPMENT FOR UNEMPLOYED YOUTH

1. Scientific Housing for Cattle rearing
2. Introduction of cross bred cow and its breeds.
3. Care and management of new born calf
4. Heat detection and artificial insemination in cross bred cows and in local cows.
5. Diseases and vaccination in cattle and buffaloes.
6. Schemes of the department
7. Insurance of cattle and buffaloes.

B. POULTRY PRODUCTION TRAINING

1. Introduction to poultry production in Goa
2. Scientific Housing to rear poultry birds
3. System of rearing and brooding of chicks
4. Feeds and feeding practices.
5. Common parasitic and nutritional deficiency diseases
6. Common bacterial and viral diseases.
7. Vaccines and vaccination in broilers and layers.
8. Management practices like de-worming, de-beaking, lightening patterns
9. Post mortem findings and laboratory findings
10. Preservation and marketing of poultry products
11. Economics of poultry broilers and layers and departmental schemes.
12. Field visit to government poultry farm.

C. PIGGERY DEVELOPMENT TRAINING

1. Introduction to Piggery development and breeds of pigs.
2. Management of breeding stock
3. Nutrition and feeding
4. Site selection, construction of shed and housing of pigs.
5. Diseases of pigs, their control, preventive measures and treatment.
6. Economics and marketing of Pork.
7. Field visit to government piggery farm.

D. GOATERY DEVELOPMENT TRAINING

1. Introduction to Goatery development and breeds of goats.
2. Management of breeding stock
3. Nutrition and feeding
4. Site selection, construction of shed and housing of goats.
5. Diseases of goats, their control, preventive measures and treatment.
6. Economics and marketing of mutton.
7. Field visit to goater farm.

Annexure VI

Government of Goa
Department of Animal Husbandry & Veterinary Services
Pashusamvardhan Bhavan, Patto,
Panaji, Goa – 403 001, India.

Phone Nos.: +91 (0832) 2437245 *Fax No.: +91(0832) 2437244*
Website : *www.ahvs.goa.gov.in* *E-mail: dir-ahvs.goa@nic.in*

DISASTER MANAGEMENT SCHEME (DMS)

The Disaster Management Act 2005 uses the following definition for disaster:

"Disaster" means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or manmade 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."

Aims and Objectives

DMS of the Directorate of Animal Husbandry & Veterinary Services (A.H. & V.S.) is a dedicated fund for calamity relief whose primary purpose is to supplement the State Disaster Response Fund (SDRF) which is a primary fund available with States for disaster response and is constituted under Section 48 of the Disaster Management Act, 2005 (DM Act).

The financial assistance from DMS is for providing immediate relief/assistance for loss or Permanent Total Disability to livestock and Poultry/ Provision of fodder, feed, concentrates including water in cattle camps and also at individual affected farmers sheds/Relief towards the cultivated but damaged green fodder crop plots/ Provision for repairs of damaged Dairy machinery such as the Generator set, Chaff cutter, Animal shed washer and the milking machine and towards assistance for damaged cattle shed. In other words, DMS amount can be spent only towards meeting the expenses for emergency response, relief and rehabilitation to the victims of cyclone, drought, earthquake, fire, flood, tsunami, hailstorm, landslide, avalanche, cloud burst, pest attack, and frost and cold wave.

Eligibility

In the wake of natural calamities, a state Government is empowered to undertake necessary relief measures. All dairy farmers who satisfy the criteria as laid down in the definition of "Disaster" can avail of the scheme.

Procedure

The affected farmer should apply on a plain paper, in triplicate and submit it through the local Veterinary Officer/Assistant Director along with all proof as deemed fit.

The concerned Officer shall scrutinize the application and personally verify and put his remarks and recommend the case to the jurisdiction Deputy Collector and also forward a copy to the Directorate of Animal Husbandry & Veterinary Services, Patto – Panaji for information within 03 days of its receipt.

On receiving the documents completed in all respects the jurisdiction Deputy Collector will initiate the process of re-verification through the State Executive Committee constituted by the State Government under Section 20 of the DM Act, 2005 and will be responsible for ensuring that DMS expenditures are as per specifications and as per the approved pattern of assistance. On the recommendation of the Deputy Collector, the required funds from under the scheme of the Directorate of A.H. & V.S. will be placed at his disposal for effecting relief.

The concerned Area Assistant Director/Veterinary Officer shall maintain all relevant details under the scheme.

Pattern of Assistance

Sr. No.	Items	Norms of Assistance
1	**Search & Rescue Operations**	
	a) Cost of search and rescue measures/ evacuation of Livestock and poultry affected/ likely to be affected	As per actual cost incurred, assessed by SEC and recommended by the Central Team (in case of NDRF). - By the time the Central Team visits the affected area, these activities are already over. Therefore, the State Level Committee and the Central Team can recommend actual / near-actual costs.
	b) Hiring of boats for carrying immediate relief and saving animal lives.	As per actual cost incurred, assessed by SEC and recommended by the Central Team (in case of NDRF). The quantum of assistance will be limited to the actual expenditure incurred on hiring boats and essential equipment required for rescuing stranded Livestock and thereby saving animal lives during a notified natural calamity.

2	**Relief Measures** Provision for temporary shelters at a higher altitude for livestock affected/evacuated and sheltered in cattle camps/animal shelter, feed and fodder, veterinary health care, etc. for livestock/poultry affected/ evacuated and sheltered in relief camps.	As per assessment of need by SEC and recommendation of the Central Team (in case of NDRF), for a period up to 30 days. The SEC would need to specify the number of camps, their duration and the number of livestock in camps. In case of continuation of a calamity like drought, or widespread devastation caused by earthquake or flood etc., this period may be extended to 60 days, and upto 90 days in cases of severe drought. Depending on the ground situation, the State Executive Committee can extend the time period beyond the prescribed limit subject to that expenditure on this account should not exceed 25% of the actual allocation of departmental Disaster relief fund. Veterinary care may be provided by the Animal Husbandry department
3	**Clearance of Affected areas** a) Clearance of debris in public areas.	As per actual cost within 30 days from the date of start of the work based on assessment of need by SEC for the assistance to be provided under SDRF and as per assessment of the Central team for assistance to be provided under NDRF.
	b) Disposal of dead bodies/ Carcases	As per actual, based on assessment of need by SEC and recommendation of the Central Team (in case of NDRF).
4	Provision for hiring of essential search, rescue and evacuation equipments including public address systems, etc. for response to disaster.	Expenditure is to be incurred as assessed by the State Executive Committee (SEC). - The total expenditure on this item should not exceed 10 % of the actual allocation of departmental Disaster relief fund
5	Capacity Building	The total expenditure should not exceed 5% of the actual allocation of the departmental disaster relief fund
6	Provision for Emergency Medicines/Vaccines/Surgical Equipments	The total expenditure should not exceed 20 % of the actual allocation of departmental Disaster relief fund.
7	Assistance for the loss of milch animals, draught animals or animals used for haulage	**Milch animals** Rs. 40,000/- (Rupees Forty thousand only) for Adult Buffalo / CBC / Indigenous cows (Gir, Sahiwal & Red Sindhi) breeds. Rs. 20,000/- (Rupees Twenty thousand only) for Buff / CBC calves upto 27 months of age

		Rs. 25,000/- (Rupees Twenty five thousand only) for Indigenous calves upto 40 months of age For home reared Non Descript local female animals of age upto 1 year – Rs. 4,000/- (Rupees Four thousand only). Between 1 year to 4 years – Rs. 6,000/- (Rupees Six thousand only) and above 4 years - Rs.10,000/- (Rupees Ten thousand only) Rs. 5,000/- (Rupees Five thousand only) for **Adult (one year and above)** Sheep/ Goat/Pig Rs. 1,000/- (Rupees One thousand only) for below one year Sheep/ Goat/Pig **Draught Animals** Rs. 25,000/- (Rupees Twenty Five thousand only) for Horse/ Bullock/etc Rs.16,000/- (Rupees Sixteen thousand only) for donkey/ pony/mule and bulls of indigenous breeds. *The assistance will be subject to a ceiling of 03 large milch animals or 30 small milch animals or 03 large draught animals or 06 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 Area Officer/Competent Authority designated by the Department)* Losses incurred on the infrastructure damage, feed and fodder at Goshalas will be compensated duly as per the norms of the DMS of the department.

		Also, the expenditure incurred on rescue of the animals housed at Goshala will be reimbursed as assessed by the local area officer. However, no compensation shall be paid on account of loss of lives of impounded stray cattle. **Poultry** Poultry @ Rs. 100/- (Rupees One hundred only) per bird subject to a ceiling of assistance of Rs. 10,000/- (Rupees Ten thousand only) 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.*
8	Provision of Fodder/ Feed concentrate including water supply and medicines in cattle camps/animal shelters.	**Large animals** : Rs. 150/- (Rupees one hundred fifty only) per day **Small animals** : Rs. 50/- (Rupees fifty only) per day *Period for providing relief will be as per the assessment of the Departmental committee. 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 upto 90 days. Depending on the ground situation, the Departmental Committee can extend the time period beyond the prescribed limit.* ***Every Government Veterinary field establishment shall identify a safe place in consultation with the respective village Panchayat/Municipality at a higher level for evacuation of animals in case of floods. Only the animals brought to these identified safe places (known as cattle camps) will be eligible for the above said assistance.***

9	Provision of Fodder/ Feed concentrate including water supply and medicines to the affected animals at their respective sheds	A lump sum of Rs. 3,000/- (Rupees Three thousand only) per large animal head shall be provided as feed cost assistance (i.e. Concentrates, Hay, Kadba Kutti, etc) damaged due to Natural Disaster, subject to verification by the Area Officer, and an upper limit of Rs. 25,000/- (Rupees Twenty five thousand only) per beneficiary or at actual, whichever is less, irrespective of number of animals. For small animals, the assistance shall be half the above with an upper limit of Rs. 12,500/- (Rupees Twelve thousand five hundred only) per beneficiary or at actual, whichever is less, irrespective of number of animals. **This amount is calculated as on average for 30 days.** *Period for providing relief will be as per the assessment of the Departmental committee. 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 upto 90 days. Depending on the ground situation, the Departmental Committee can extend the time period beyond the prescribed limit.*
10	Assistance for cultivated damaged green fodder plots.	Rs. 7,500/- (Rupees Seven thousand five hundred only) per Ha. (amount proportionate to actual cultivated area) assistance shall be paid to the green fodder damaged in cultivated plot due to natural calamity
11	Assistance for stored dry fodder	50 % of the actual damage as assessed by the local area Officer.
12	Transport of fodder to cattle outside cattle camps.	As per actual cost of transport, based on assessment of need by the Departmental Committee consistent with estimates of cattle as per Livestock Census.
13	Provision for repairs of Dairy equipment damaged (Machinery only)	Assistance @ Rs. 2,000/- (Rupees Two thousand only) per dairy equipment (Machinery only i.e. Generator set, Chaff cutter, Milking machine & Shed washer) shall be paid towards repairs of such above said individual items.
14	Assistance for damaged Cattle shed.	Rs. 10,000/- (Rupees Ten thousand only) or the actual cost whichever is less, per cattle shed when the damage is at least 15 %.
15	Assistance for loss of milk on account of natural disasters.	Rs. 10,000/- (Rupees Ten thousand only) shall be

		paid towards Permanent Total Disability in case of injury/disability inclusive of loss of milk due to mastitis/metritis caused due to natural calamity on verification from the local Area Officer.

Government may add and or relax any of the clauses as felt deemed fit necessary from time to time.

The expenditure towards the scheme shall be debited to the following Budget Head of account : **Demand No.65**

2403 – Animal Husbandry
00 –
800 – Other Expenditure
11 – Disaster Management Scheme under Act 2005 (Plan)
50 – Other charges

The Disaster Management Scheme corpus fund shall be created by means of an initial allotment of funds amounting Rupees twenty lakhs, by way of budgetary provisions made for this purpose and such additional grants on annual basis.

There will be additional annual allotments to the funds as per requirements. The required amount will be decided by the Department.

Interpretation

If any question arises regarding interpretation of any clause, word, expression of the scheme, the decision shall lie with Government, which shall be final and binding on all concerned.

Annexure VII

VACCINATION SCHEDULE FOR LIVESTOCK AND POULTRY

Disease	Vaccine	Periodicity	Responsibility	Records	Animal
Swine Fever	Swine fever vaccine	Annually	Veterinary Officers, Asst. Directors of respective jurisdiction	Records are maintained on daily basis at the respective establishments.	Pigs
H.S. & BQ	HS & BQ Vaccine	Annually - Prior to Monsoon			Cattle, Buffaloes and Goats
Enterotoxaemia	Enterotoxaemia vaccine	Annually - Prior to Monsoon			Cattle, Buffaloes and Goats
Mareks	Mareks vaccine	Day one at hatchery, neck prick			Poultry chicks
Raniket	Lassota strain	On 7th day intra ocular /intra nasal Vaccine. In case layers birds repeated orally in 5th week and once in 10 weeks during lay			Poultry Birds
	Freeze dried Raniket Vaccine (R2B)	Once in life time before12th week			
Fowl Pox	F. Dried Fowl Pox Vaccine	Once in life time before 8th week			Poultry Birds
F.M.D	F.M.D Vaccine (Poly valent)	Every six months			Cattle, Buffaloes, Goats and pigs

Annexure VIII

RESOURCES/EQUIPMENT AVAILABLE FOR DEPARTEMENT AT DISTRICT AND FIELD LEVEL

LIST OF ESTABLISHMENTS

MAIN OFFICE: - Directorate of Animal Husbandry & Veterinary Service, Pashusamvardhan Bhavan, Patto – Panaji - Goa.

NORTH GOA DISTRICT

1. Veterinary Hospital Tonca

a. KVSC Ela, Old Goa

b. KVSC Chorao

c. KVSC Goa Velha

d. KVSC Cumbarjua

2. Veterinary Hospital Acoi – Mapusa

a. KVSC Aldona

b. KVSC Salvador do mundo

3. Veterinary Hospital Honda

a. KVSC Paryem

b. KVSC Ravona

c. KVSC Keri

4. Veterinary Hospital Ponda

a. KVSC Kavale

b. KVSC Nirankal

c. KVSC Priol

d. KVSC Kundai

e. KVSC Bethora

f. KVSC Keri

5. Veterinary Dispensary Pernem

KVSC – Warkhand

6. Veterinary Dispensary Mandrem

KVSC Agarwada

7. Veterinary Dispensary Bicholim

a. KVSC Navelim

b. KVSC Sanquelim

8. Veterinary Dispensary Valpoi

a. KVSC Advoi

b. KVSC Thana

c. KVSC Nagargao

d. KVSC Surla (Sattari)

9. Veterinary Dispensary Gawane

a. KVSC Khotodem

10. Veterinary Dispensary Shiroda

a. KVSC Borim

11. Veterinary Dispensary Usgao

a. KVSC Guleli

b. KVSC Surla (Bicholim)

c. KVSC – Kasailem (GosevaAsharam)

12. Veterinary Dispensary Pirna

13. Veterinary Dispensary Siolim

14. Veterinary Dispensary Calangute

15. Veterinary Dispensary Savoi verem

16. Veterinary Dispensary Chandel

17. Veterinary Dispensary Sal

SOUTH GOA DISTRICT

1. Veterinary Hospital Sonsodo – Raia

a. KVSC Curtorim

b. KVSC Benaulim

c. KVSC Loutoulim

2. Veterinary Dispensary Navelim

3. Veterinary Dispensary Majorda

4. Veterinary Dispensary Cuncolim

a. KVSC Fatorpa

5. Veterinary Dispensary Quepem

a. KVSC Cotombi

b. KVSC Pirla

c. KVSC Malkarnem

d. KVSC Caurem

6. Veterinary Dispensary Sanguem

a. KVSC Kalay

b. KVSC Rivona

c. KVSC Bhatti

7. Veterinary Dispensary Mollem

a. KVSC Sacordem

b. KVSC Collem

8. Veterinary Dispensary Dharbandora

a. KVSC Dabal

9. Veterinary Dispensary Netravali

a. KVSC Verlem

10. Veterinary Dispensary Canacona

a. KVSC Agonda

b. KVSC Gaondongrim

11. Veterinary Dispensary Poinguinim

a. KVSC Loliem

12. Veterinary Dispensary Vasco

a. KVSC – Velsao

13. Veterinary Dispensary Varca

Other Establishment of the Department

1. Disease Investigation Unit Tonca – Caranzalem
2. Key Village Scheme, Curti – Ponda
3. Farmers Training Centre, Curti – Ponda
4. Government Livestock Farm, Dhat – Mollem
5. Cattle Breeding Farm, Copardem – Sattari
6. Fodder Seed Production Farm – Kalay- Sanguem
7. Government of Piggery Farm, Curti – Ponda
8. Government of Poultry Farm, Ela- Old Goa.

Annexure - IX

List of Veterinary Hospitals/ Dispensaries with number of Veterinary Doctors, Extension Officers, Veterinary Assistants and Multi Tasking Staff

Name of the Veterinary Hospital/ Dispensary	No. of Veterinary Doctors		Ext. Officer	No. of Veterinary Assistant	No. of MTS
	AD	VO			
Veterinary Hosp. Tonca	-	3	2	3	11
Veterinary Hosp. Mapusa	1	1	1	3	5
Veterinary Hosp. Ponda	1	-	1	9	11
Veterinary Hosp. Honda	-	1	-	2	5
Veterinary Hosp. Sonsodo	-	3	1	4	15
Vety. Disp. Pernem	-	1	1	2	3
Vety. Disp. Mandrem	-	1	-	1	3
Vety. Disp. Pirna	-	1	-	1	2
Vety. Disp. Bicholim	1	-	1	5	7
Vety. Disp. Valpoi	-	1	1	4	7
Vety. Disp. Gawane	-	1	-	2	3
Vety. Disp. Mollem	-	1	-	3	6
Vety. Disp. Dharbandora	-	1	-	3	4
Vety. Disp. Usgao	-	1	1	4	6
Vety. Disp. Sanguem	-	1	1	4	6
Vety. Disp. Sal	-	1	-	1	2
Vety. Disp. Chandel	-	1	1	-	2
Vety. Disp. Savoi-Verem	-	1	-	1	2
Vety. Disp. Netravali	-	1	-	3	4
Vety. Disp. Cuncolim	-	1	-	1	7
Vety. Disp. Poiguinim	-	1	-	1	3
Vety. Disp. Canacona	-	1	1	3	4
Vety. Disp. Quepem	-	1	3	2	6
Vety. Disp. Calangute	-	1	-	1	2
Vety. Disp. Siolim	-	1	-	1	1
Vety. Disp. Shiroda	-	1	-	1	5
Vety. Disp. Navelim	-	1	-	1	2
Vety. Disp. Majorda	-	1	-	1	2
Vety. Disp. Vasco	-	1	1	2	4
Vety. Disp. Varca	-	1	1	-	1
Cattle Breeding Farm	1	1	-	2	41
Govt. livestock Farm	1	-	-	2	25
Govt. Poultry Farm	1	-	-	2	20
Govt. Piggery Farm	-	1	-	1	15
Fodder Seed Production Farm, Kalay	-	-	-	-	08

Annexure - X

LIST OF VEHICLES (Four wheelers)

Sr. No	Registration	Model	Make	Station
1.	GDE 8246	1988	Maruti Gypsy	GLF, Dhat farm
2.	GA-01-G-1703	1994	Tata Sumo	Veterinary Hospital - Tonca
3.	GA01-G-1583	2005	Tata Indigo	Head Office
4.	GA-01-G-0920	1999	Tata mini Bus	STC, Curti, Ponda
5.	GA-01-G-1326	2002	Mahindra Jeep	Veterinary Disp – Sanguem
6.	GA-01-G-1325	2002	Mahindra Jeep	Veterinary Hospital – Vasco
7.	GA-01-G-1603	2005	Tata Sumo	Veterinary Dispensary – Valpoi
8.	GA-01-G-1604	2005	Tata Sumo	Veterinary Dispensary - Usgao
9.	GA-01-G-1605	2005	Tata Sumo	Veterinary Hospital – Mapusa
10.	GA-01-G-1568	2005	Tata Sumo	Veterinary Dispensary- Canacona
11.	GA-01-G-1565	2005	Tata Sumo	Cattle Breeding Farm, Coperdem
12.	GA-01-G-1566	2005	Tata Sumo	Veterinary Dispensary – Quepem
13.	GA-01-G-2010	2007	Pickup	Head Office – Panaji
14.	GA-01-G-1808	2008	Tata Sumo	Veterinary Hospital – Netravali
15.	GA-01-G-1809	2008	Tata Sumo	Head Office
16.	GA-01-G-0093	2009	Tata Sumo	Veterinary Hospital – Sonsodo
17.	GA-01-G-0094	2009	Tata Sumo	KVSC – Curti- Ponda
18.	GA-01-S-1077	2000	Maruti Esteem	Head Office
19	GA-01-G-1756	2007	Tata Sumo	Veterinary Dispensary - Pernem
20	GA-01-G-8052	On road	Tata Tanker	KVS, Curti, Ponda
21	GA-07-G-1324	2016	Tata Sumo	Veterinary Dispensary – Bicholim
22	GA-07-G-1325	2016	Tata Sumo	Veterinary Hospital – Ponda
23	GA-07-G-1326	2016	Tata Sumo	Head Office
24	GA-07-G-0956	2013	Tata Winger	Veterinary Dispensary – Cuncolim
25	GA-07-G-0957	2013	Tata Winger	Veterinary Hospital – Honda
26	GA-07-G-0969	2013	Mahindra Verito	Head Office

LIST OF VEHICLES (Two wheelers)

Sr. No.	Motorcycle/Scooter Type & Registration No.	Motorcycle/Scooter allottment
1	Hero Honda Splendor Plus, GA-07 -G- 0708	V. D. Netravali
2	Hero Honda Splendor Plus, GA-07 -G- 0709	K.V.S.C, Verle.
3	Hero Honda Splendor Plus, GA- 07- G-0710	K.V.S.C, Kalay.
4	Hero Honda Splendor Plus, GA- 07- G-0711	K.V.S.C, Bhati.
5	Hero Honda Splendor Plus, GA- 07- G-0713	K.V.S.C, Caurem
6	Hero Honda Splendor Plus, GA- 07- G -0714	K.V.S.C, Pirla
7	Hero Honda Splendor Plus, GA- 07- G -0715	K.V.S.C, Malcorne.
8	Hero Honda Splendor Plus, GA- 07- G -0716	K.V.S.C, Gaondongri.
9	Hero Honda Splendor Plus, GA- 07- G -0717	V. D. Poinguinim
10	Hero Honda Splendor Plus, GA- 07- G -0718	K.V.S.C, Kasarpal.
11	Hero Honda Splendor Plus, GA- 07- G -0719	K.V.S.C, Sankhali.
12	Hero Honda Splendor Plus, GA- 07- G -0720	V.D. Valpoi

13	Honda Activa Scooter, GA- 07- G -0692	K.V.S.C ,Thana
14	Hero Honda Splendor Plus, GA- 07- G -0721	K.V.S.C, Nagargao
15	Hero Honda Splendor Plus, GA- 07- G -0722	V.D., Gawane.
16	Hero Honda Splendor Plus, GA- 07- G -0723	V.H., Honda.
17	Hero Honda Splendor Plus, GA- 07- G -0724	V.D. Mollem.
18	Hero Honda Splendor Plus, GA- 07- G -0725	K.V.S.C, Sancorda.
19	Hero Honda Splendor Plus, GA- 07- G -0726	K.V.S.C, Varca.
20	Hero Honda Splendor Plus, GA- 07- G -0727	K.V.S.C, Curtorim
21	Hero Honda Splendor Plus, GA- 07- G -0728	K.V.S.C, Varkhand.
22	Hero Honda Splendor Plus, GA- 07- G -0729	K.V.S.C, Chandel.
23	Honda Activa Scooter, GA- 07- G -0693	V. D. Mandrem.
24	Hero Honda Splendor Plus, GA- 07- G -0730	V. D. Pirna.
25	Honda Activa Scooter, GA- 07- G -0695	V. D., Majorda.
26	Hero Honda Splendor Plus, GA- 07- G -0731	V.D. Navelim.
27	Honda Activa Scooter, GA- 07- G -0696	V. D., Shiroda.
28	Honda Activa Scooter, GA- 07- G -0697	V. D. Calangute.
29	Hero Honda Splendor Plus, GA- 07- G -0732	K.V.S.C, Kasaile.
30	Hero Honda Splendor Plus, GA -07- G -0733	K.V.S.C, Goa-Velha.
31	Hero Honda Splendor Plus, GA -07- G -0734	K.V.S.C, Chorao.
32	Honda Activa Scooter, GA- 07- G -0698	K.V.S.C, Savoi- Verem.
33	Honda Activa Scooter, GA- 07- G -0701	K.V.S.C, Priol.
34	Hero Honda Splendor Plus, GA- 07- G -0735	K.V.S.C, Bethora.
35	Hero Honda Splendor Plus, GA- 07- G -0736	K.V.S.C, Kavlem.
36	Hero Honda Splendor Plus, GA- 07-G -0737	V.H. Curti, Ponda.
37	Hero Honda Splendor Plus, GA- 07- G -0738	K.V.S.C, Dabal.
38	Honda Activa Scooter, GA- 07- G -0700	Head Office, Panaji.
39	Honda Activa Scooter, GA-07-G-0982	V. D. Cuncolim.
40	Honda Activa Scooter, GA-07-G-0983	V.D., Dharbandora.
41	Honda Activa Scoote, GA-07-G-0984	K.V.S.C, Aldona.
42	Honda Activa Scooter, GA-07-G-0985	K.V.S.C, Cottambi.
43	Honda Activa Scooter, GA-07-G-0986	K.V.S.C, Gaondongri.
44	Honda Activa Scooter, GA-07-G-0987	K.V.S.C, Agonda.
45	Honda Activa Scooter, GA-07-G-0988	K.V.S.C, Velsao.
46	Honda Activa Scooter, GA-07-G-0989	K.V.S.C, Agarwada.
47	Honda Activa Scooter, GA-07-G-0990	V. D., Bicholim.
48	Honda Activa Scooter, GA-07-G-0991	K.V.S.C, Collem.
49	Honda Activa Scooter, GA-07-G-0694	V.D., Siolim.
50	Honda Activa Scooter, GA- 07- G -0691	KVSC Rivona.
51	Yamaha Crux , GA-01-G-1624	K.V.S.C, Benaulim.

Annexure - XI

Checklist of Manpower, Drug and Instruments

Manpower

For managing the disaster, following categories of additional staff may be required:

1. Veterinary Doctors
2. Veterinary Assistants
3. MTS
4. General duty personnel – Drivers , NGOs and Administrative officer
5. Secretarial personnel – clerks, accountants, storekeepers.

List of Medicines

1. Inj. Hydrocortisone
2. Inj. Dexamethasone
3. Inj. Adrenaline
4. Inj. Antihistamine
5. Inj. Xylocaine
6. Disposable I.V Sets
7. Disposable syringes 10ml / 5ml / 2ml
8. Disposable needle No. 18, 19, 21 and 22
9. I.V Fluids
   a. Dextrose 5 % & 20 %
   b. Dextrose saline
   c. Normal saline
   d. Calcium borogluconate
   e. Ringers Lactate
10. Cetrimide/Cholrhexidine
11. Tincture Benzoin
12. Xylocaine Skin Ointment
13. Himax Skin Ointment
14. Tincture Iodine
15. Black Phenyl
16. Sodium Hypochlorite
17. Broad spectrum Antibiotics
18. Anthelmentics
19. Anti-inflammatory drugs
20. Anti protozoals
21. Anti snake venom
22. Supportive medicines like mineral mixtures and multi vitamin supplements,
23. Any other life saving medicine.

List of Instrument / Equipments

1. Airway with tongue clip.
2. Oxygen cylinder with face mask, pressure gauge and flow meter.
3. Artery forceps/scissors
4. Suturing needles.
5. Tourniquets.
6. Splints.
7. Cotton.
8. Bandages.
9. Suction Machine (foot operated).
10. B.P surgical handles & Blades.
11. Stethoscope, torch and hammer.
12. Foley's and rubber catheter.
13. Kidney tray
14. Crepe and elastic bandages.
15. Scissors with sticking plaster.
16. Saws.
17. Post mortem sets.
18. Post mortem gloves.
19. Gum Boots.
20. Apron.
21. Shaving Blades.
22. Soaps.
23. Disposable gloves

Annexure – XII

HEAT WAVE ADVISORY FOR ANIMAL HEALTH AND WELFARE DO'S AND DON'T'S

1) Pets and animals should be kept indoors between 11.00 AM to 4.00 PM.
2) Keeping pets and animals in parked vehicle should never be done.
3) Public is requested to place water bowls for birds, dogs, cats and animals in open space.
4) Animals and birds may be transported only during cooler weather hours of the day.
5) Water bowls to be kept at the entrance for pets and animals visiting the Veterinary Hospital, Dispensary and Clinics.
6) Vaccinations of pets and animals may be done before 10.00 AM to avoid any stress.
7) Avoid surgery that is not urgent after 11.00 AM.
8) Dairy farmers are advised to sprinkle water on the body of animals every half hourly between 11.00 AM to 3.00 PM.
9) Delivery of milk to societies to be done before 8.00 AM and after 5.00 PM.
10) Farmers are advised to cover their roofs of shed with coconut leaves, betal leaves and sprinkle water on the roof.
11) Farmers are advised to give plenty of cool water to animals to drink and also provide green fodder at adlib wherever possible.
12) Poultry farmers are advised to give plenty of water and electrolyte to birds.
13) Gaushalas are instructed not to leave animals for grazing between 11.00 AM to 3.30 PM.
14) The Panchayats and Municipalities are advised to place large cement bowls or stray cattle, stray dogs and other animals. Water to be provided by tankers twice daily through Municipality /PWD/Local bodies.
15) All animals and birds may be provided adequate feed regularly.

Annexure – XIII

Feeding Technologies to be used during Disaster

Different feeding technologies to be adopted to meet the challenge of fodder scarcity during disaster.

a) Straw to be supplemented with concentrate mixture and other local feed resources

Supplements such as minerals or proteins can be used to enhance rumen fermentation leading to increased intake and digestibility

b) Urea treatment of straws:

Urea –treated straw saves on concentrate feeding, increases milk yield, offers better economic returns to the farmers and help in reducing land area required for green fodder production.

c) Urea molasses liquid diet (UMLD)

Molasses can be used as a potential drought/scarcity feed after supplementing deficient nutrients viz protein, minerals and vitamins.

d) Urea molasses mineral block (UMMB)

UMMB blocks can be stored, transported and distributed as against the common bulky diets during disaster.

e) Compressed complete feed block (CCFB)

Complete feed is a system of feeding concentrates and roughages together in blended form. Minimizing feed cost and labour cost and maximizing production is the need of time and can be achieved by complete feed system. This system is economical and efficient as it allows inclusion of low cost agro industrial by- products and low quality crop residues with their efficient utilization.

f) Silage technology for scarcity during various disaster:

i) Ensiling paddy straw, fruit factory waste and poultry dropping these by products which cause a great disposal problem can be ensiled with paddy straw and poultry droppings

ii) Ensiling paddy straw and poultry droppings: paddy straw, poultry dropping green grass and molasses on dry matter basis form very food silage an highly relished by animals.

g) Use of sugarcane crop residue as animal feed

By product of sugarcane i.e. sugarcane tops, sugarcane bagasse, molasses can be used to feed cattle and buffaloes during scarcity period. Urea when used for treatment of bagasse

enhances its nutritional quality. However, its digestibility can be increased by Steam treatment.

h) Tree Leaves and vegetable leaves

Leaves of neem, mango, banyan, papal, subabul, mahuva etc. can be used as green fodder which are good source of protein, calcium and vitamin A. Vegetable leaves and creepers like cabbage, cauliflower and potato are rich source of crude protein an soluble sugars which can be use as animal feed during scarcity.

i) Crop residues:

Treated crop residues can form a good maintenance diet for livestock

i) Best Crops techniques to be adopted so that crop-weed competition for water gets reduced

ii) Identification of more than one supply chain for feed and fodder so that failure of single supply source does not disrupt the rescue/ relief operations

iii) Proper sanitary storage of feed and fodder is required to stop the ingress of crop/ animal diseases in the disaster affected areas.

iv) Feeds not to be fed exclusively during such calamities

At the end of scarcity period, animals usually develop craving for food and eat uncontrolled access to herbage. Thus, it is desired to be careful in feeding the farm animals after the flood water had receded. Newly grown grasses which contain high concentration of nitrite and nitrate should be avoided as far as possible or may be fed in small quantity mixed with dry roughages like paddy straw and wheat straw.

ANNEXURE XIV

The following disasters have a very little impact on the livestock and poultry. However, the common aspects pertaining to prevention and mitigation included in them may be adopted by the department in its disaster management plan.

Do's and Don'ts for Various Disasters

EARTHQUAKE: **What to Do Before an Earthquake**

- ♣ Repair deep plaster cracks in ceilings and foundations. Get expert advice if there are signs of structural defects.
- ♣ Anchor overhead lighting fixtures to the ceiling.
- ♣ Follow BIS codes relevant to your area for building standards
- ♣ Fasten shelves securely to walls.
- ♣ Place large or heavy objects on lower shelves.
- ♣ Store breakable items such as bottled foods, glass, and china in low, closed cabinets with latches.
- ♣ Hang heavy items such as pictures and mirrors away from beds, settees, and anywhere that people sit.
- ♣ Brace overhead light and fan fixtures.
- ♣ Repair defective electrical wiring and leaky gas connections. These are potential fire risks.
- ♣ Secure water heaters, LPG cylinders etc., by strapping them to the walls or bolting to the floor.
- ♣ Store weed killers, pesticides, and flammable products securely in closed cabinets with latches and on bottom shelves.
- ♣ Identify safe places indoors and outdoors. Under strong dining table, bed. Against an inside wall. Away from where glass could shatter around windows, mirrors, pictures, or where heavy bookcases or other heavy furniture could fall over. In the open, away from buildings, trees, telephone and electrical lines, flyovers and bridges
- ♣ Directory with emergency telephone numbers to be kept ready (such as those of doctors, hospitals, the police, etc)
- ♣ Educate yourself and family members to have a disaster emergency and first aid kit ready
- ♣ Battery operated torch with extra batteries
- ♣ Battery operated radio
- ♣ Emergency food (dry items) and water (packed and sealed) to be kept ready
- ♣ Household items such as cell phone with charger, knives, Can opener, candles, matches (in a waterproof container) to be kept ready
- ♣ Chlorine tablets or powdered water purifiers

- ♣ Cash and credit cards
- ♣ Thick ropes and cords
- ♣ Sturdy shoes

Develop an emergency communication plan

- ♣ In case family members are separated from one another during an earthquake (a real possibility during the day when adults are at work and children are at school), develop a plan for reuniting after the disaster.
- ♣ Ask an out-of-state relative or friend to serve as the 'family contact' after the disaster; it is often easier to call long distance. Make sure everyone in the family knows the name, address, and phone number of the contact person. Help your community get ready.
- ♣ Publish a special section in your local newspaper with emergency information on earthquakes. Localize the information by printing the phone numbers of local emergency services offices and hospitals.
- ♣ Conduct week-long series on locating hazards in the home.
- ♣ Work with local emergency services and officials to prepare special reports for people with mobility impairment on what to do during an earthquake.
- ♣ Provide tips on conducting earthquake drills in the home.
- ♣ Interview representatives of the gas, electric, and water companies about shutting off utilities.
- ♣ Work together in your community to apply your knowledge to building codes, retrofitting programmes, hazard hunts in neighbourhood and family emergency plans.

What to Do During an Earthquake:

Stay as safe as possible during an earthquake. Be aware that some earthquakes are actually foreshocks and a larger earthquake might occur. Minimize your movements to a few steps that reach a nearby safe place and stay indoors until the shaking has stopped and you are sure exiting is safe.

If Indoors:

- ♣ DROP to the ground; take COVER by getting under a sturdy table or other piece of furniture; and HOLD ON until the shaking stops. If there is no a table or desk near you, cover your face and head with your arms and crouch in an inside corner of the building.

- ♣ Protect yourself by staying under the lintel of an inner door, in the corner of a room, under a table or even under a bed.

- ♣ Stay away from glass, windows, outside doors and walls, and anything that could fall, (such as lighting fixtures or furniture).

- ♣ Stay in bed if you are there when the earthquake strikes. Hold on and protect your head with a pillow, unless you are under a heavy light fixture that could fall. In that case, move to the nearest safe place.

- ♣ Use a doorway for shelter only if it is in close proximity to you and if you know it is a strongly supported, load bearing doorway.

- ♣ Stay inside until the shaking stops and it is safe to go outside. Research has shown that most injuries occur when people inside buildings attempt to move to a different location inside the building or try to leave.

- ♣ Be aware that the electricity may go out or the sprinkler systems or fire alarms may turn on.

If Outdoors:

- ♣ Do not move from where you are. However, move away from buildings, trees, streetlights, and utility wires.

- ♣ If you are in open space, stay there until the shaking stops. The greatest danger exists directly outside buildings; at exits; and alongside exterior walls. Most earthquake-related casualties result from collapsing walls, flying glass, and falling objects.

If in a moving vehicle:

- ♣ Stop as quickly as safety permits and stay in the vehicle. Avoid stopping near or under buildings, trees, overpasses and utility wires.

- ♣ Proceed cautiously once the earthquake has stopped. Avoid roads, bridges, or ramps that might have been damaged by the earthquake.

If trapped under debris:

- ♣ Do not light a match.

- ♣ Do not move about or kick up dust.

- ♣ Cover your mouth with a handkerchief or clothing.

- ♣ Tap on a pipe or wall so that rescuers can locate you. Use a whistle if one is available. Shout only as a last resort. Shouting can cause you to inhale dangerous amounts of dust.

FLOOD

What to do before a flood - To prepare for a flood, you should :

♣ Avoid building in flood prone areas unless you elevate and reinforce your home.

♣ Elevate the furnace, water heater, and electric panel if susceptible to flooding.

♣ Install "Check Valves" in sewer traps to prevent floodwater from backing up into the drains of your home.

♣ Contact community officials to find out if they are planning to construct barriers (levees, beams and floodwalls) to stop floodwater from entering the homes in your area.

♣ Seal the walls in your basement with waterproofing compounds to avoid seepage. If a flood is likely to hit your area, you should listen to the radio or television for information.

♣ Be aware that flash flooding can occur. If there is any possibility of a flash flood, move immediately to higher ground. Do not wait for instructions to move.

♣ Be aware of streams, drainage channels, canyons, and other areas known to flood suddenly. Flash floods can occur in these areas with or without such typical warnings as rain clouds or heavy rain. If you must prepare to evacuate, you should secure your home. If you have time, bring in outdoor furniture. Move essential items to an upper floor.

♣ Turn off utilities at the main switches or valves if instructed to do so. Disconnect electrical appliances. Do not touch electrical equipment if you are wet or standing in water.

If you have to leave your home, remember these evacuation tips:

- Do not walk through moving water. Six inches of moving water can make you fall. If you have to walk in water, walk where the water is not moving. Use a stick to check the firmness of the ground in front of you.
- Do not drive into flooded areas. If floodwaters rise around your car, abandon the car and move to higher ground, if you can do so safely. You and the vehicle can be quickly swept away.

URBAN FLOOD : Before floods

♣ Do not litter waste, plastic bags, plastic bottles in drains

♣ Try to be at home if high tide and heavy rains occur simultaneously

♣ Listen to weather forecast at All India Radio, Doordarshan. Also, messages by Municipal bodies from time to time and act accordingly.

♣ Evacuate low line areas and shift to safer places.

♣ Make sure that each person has lantern, torch, some edibles, drinking water, dry clothes and necessary documents while evacuating or shifting.

♣ Make sure that each family member has identity card.

♣ Put all valuables at a higher place in the house.

In the Flood Situation :

♣ Obey orders by government and shift to a safer place.

♣ Be at safe place and they try to collect correct information.

♣ Switch off electrical supply and don't touch open wires.

♣ Don't get carried away by rumors and do not spread rumors.

DO's

♣ Switch off electrical and gas appliances, and turn off services 'off' at the mains.

♣ Carry your emergency kit and let your friends and family know where you are going.

♣ Avoid contact with flood water it may be contaminated with sewage, oil, chemicals or other substances.

♣ If you have to walk in standing water, use a pole or stick to ensure that you do not step into deep water, open manholes or ditches.

♣ Stay away from power lines, electrical current can travel through water. Report power lines that are down to the power company.

♣ Look before you step-after a flood, the ground and floors are covered with debris, which may include broken bottles, sharp objects, nails etc. Floors and stairs covered with mud and debris can be slippery.

♣ Listen to the radio or television for updates and information.

♣ If the ceiling is wet shut off electricity. Place a bucket underneath the spot and poke a small hole into the ceiling to relieve the pressure.

♣ Use buckets, clean towels and mops to remove as much of the water from the afflicted rooms as possible.

♣ Place sheets of aluminum foil between furniture wet carpets.

Don'ts

♣ Don't walk through flowing water - currents can be deceptive, and shallow, fast moving water can knock you off your feet.

♣ Don't swim through fast flowing water - you may get swept away or stuck by an object in the water.

♣ Don't drive through a flooded area - You may not be able to see abrupt drop - offs and only half a meter of flood water can carry a car away. Driving through flood water can also cause additional damage to nearby property.

♣ Don't eat any food that has come into contact with flood water.

♣ Don't reconnect your power supply until a qualified engineer has checked it. Be alert for gas leaks - do not smoke or use candles, lanterns, or open flames.

♣ Don't scrub or brush mud and other deposits from materials. This may cause further damage.

♣ Never turn on ceiling fixtures if ceiling is wet. Stay away from ceilings those are sagging.

♣ Never use TVs, VCRS, computer terminals or other electrical equipment while standing on wet floors, especially concrete.

♣ Don't attempt to remove standing water using your vacuum cleaner.

♣ Don't remove standing water in a basement too fast. If the pressure is relieved too quickly it may put undue stress on the walls.

FIRE

What to do Before a Fire : The following are things you can do to protect yourself, your family, and your property in the event of a fire :

Smoke Alarms • Install smoke alarms. Properly working smoke alarms decrease your chances of dying in a fire by 50%.

• Place smoke alarms on every level of your residence. Place them outside bedrooms on the ceiling or high on the wall (4 to 12 inches from ceiling), at the top of open stairways, or at the bottom of enclosed stairs and near (but not in) the kitchen.

• Test and clean smoke alarms once a month and replace batteries at least once a year. Replace smoke alarms once every 10 years.

Escaping the Fire:

- Review escapes routes with your family. Practice escaping from each room.
- Make sure windows are not nailed or painted shut. Make sure security gratings on windows have a fire safety-opening feature so they can be easily opened from the inside.
- Consider escape ladders if your residence has more than one level, and ensure that burglar bars and other antitheft mechanisms that block outside window entry are easily opened from the inside.
- Teach family members to stay low to the floor (where the air is safer in a fire) when escaping from a fire.
- Clean out storage areas. Do not let trash, such as old newspapers and magazines, accumulate.

Flammable Items:

- Never use gasoline, benzene, naphtha, or similar flammable liquids indoors.
- Store flammable liquids in approved containers in well-ventilated storage areas.
- Never smoke near flammable liquids.
- Discard all rags or materials that have been soaked in flammable liquids after you have used them. Safely discard them outdoors in a metal container.
- Insulate chimneys and place spark arresters on top. The chimney should be at least three feet higher than the roof. Remove branches hanging above and around the chimney.

Heating Sources:

- Be careful when using alternative heating sources.
- Check with your local fire department on the legality of using kerosene heaters in your community. Be sure to fill kerosene heaters outside, and be sure they have cooled.
- Place heaters at least three feet away from flammable materials. Make sure the floor and nearby walls are properly insulated.
- Use only the type of fuel designated for your unit and follow manufacturer's instructions.
- Store ashes in a metal container outside and away from your residence.
- Keep open flames away from walls, furniture, drapery, and flammable items.
- Keep a screen in front of the fireplace.
- Have heating units inspected and cleaned annually by a certified specialist.

Matches and Smoking:

- Keep matches and lighters up high, away from children, and, if possible, in a locked cabinet.

- Never smoke in bed or when drowsy or medicated. Provide smokers with deep, sturdy ashtrays. Douse cigarette and cigar butts with water before disposal.

Electrical Wiring

1. Have the electrical wiring in your residence checked by an electrician.
2. Inspect extension cords for frayed or exposed wires or loose plugs.
3. Make sure outlets have cover plates and no exposed wiring.
4. Make sure wiring does not run under rugs, over nails, or across high-traffic areas.
5. Do not overload extension cords or outlets. If you need to plug in two or three appliances, get a UL-approved unit with built-in circuit breakers to prevent sparks and short circuits.
6. Make sure insulation does not touch bare electrical wiring.
7. Use proper fuse wire in the fuses

What to do During a Fire :

1. Do not sleep with your door closed.
2. Install A-B-C-type fire extinguishers in your residence and teach family members how to use them.
3. Consider installing an automatic fire sprinkler system in your residence.
4. Ask your local fire department to inspect your residence for fire safety and prevention.

If your clothes catch on fire, you should stop, drop, and roll - until the fire is extinguished. Running only makes the fire burn faster.

To escape a fire, you should:

- ❖ Check closed doors for heat before you open them. If you are escaping through a closed door, use the back of your hand to feel the top of the door, the doorknob, and the crack between the door and door frame before you open it. Never use the palm of your hand or fingers to test for heat - burning those areas could impair your ability to escape a fire (i.e., ladders and crawling). Hot Door Cool Door Do not open. Escape through a window. If you cannot escape, hang a white or light-colored sheet outside the window, alerting fire fighters of your presence. Open slowly and ensure fire and/or smoke is not blocking your escape route. If your escape route is blocked, shut the door immediately and use an alternate escape route, such as a window. If clear, leave immediately through the door and close it behind you. Be prepared to crawl as smoke and heat rise and the air is clearer and cooler near the floor. Also, heavy smoke and poisonous gases collect first along the ceiling.
- ❖ Close doors behind you as you escape to delay the spread of the fire.
- ❖ Stay out once you are safely out. Do not reenter. Call 101 for any assistance.

What to do After a Fire: The following are guidelines for different circumstances in the period following a fire:

- If you are with burn victims, or are a burn victim yourself, cool and cover burns to reduce chance of further injury or infection.
- If you detect heat or smoke when entering a damaged building, evacuate immediately.
- If you are a tenant, contact the landlord.
- If you have a safe or strong box, do not try to open it. It can hold intense heat for several hours. If the door is opened before the box has cooled, the contents could burst into flames.
- If you must leave your home because a building inspector says the building is unsafe, ask someone you trust to watch the property during your absence.

CHEMICAL DISASTER

Precautions to be taken during and after the Chemical (Industrial) Accidents

♣ Do not panic, evacuate calmly and quickly perpendicular to wind direction through the designated escape route

♣ Keep a wet handkerchief or piece of cloth/ sari on face during evacuation

♣ Keep the sick, elderly, weak, handicapped and other people who are unable to evacuate inside house and close all the doors and windows tightly.

♣ Do not consume the uncovered food/ water etc open to the air, drink only from bottle

♣ Change into fresh clothing after reaching safe place/ shelter, and wish hands properly

♣ Inform Fire & Emergency Services, Police and medical services from safe location by calling 101, 100 and 108 respectively.

♣ Listen to PA (Public Address) System of the plant/ factory, local radio/ TV channels for advice from district administration/fire/health/police and other concerned authorities

♣ Provide correct and accurate information to government official.

♣ Inform others on occurrence of event at public gathering places (like school, shopping centre, theatre etc.).

♣ Don't pay attention to the rumours and don't spread rumours.

General Precautions During Normal Time

♣ Do not smoke, light fire or spark in the identified hazardous area

♣ Sensitize the community living near the industrial units and they should be more vigilant about the nature of industrial units and associated risks.

♣ Keep the contact numbers of nearest hazardous industry, fire station, police station, control room, health services and district control room, for emergency use.

- ♣ Avoid housing near the industries producing or processing the hazardous chemicals, if possible.
- ♣ Participate in all the capacity building programmes organized by the government/ voluntary organizations / industrial units.
- ♣ Take part in preparing disaster management plan for the community and identify safe shelter along with safe and easy access routes.
- ♣ Prepare a family disaster management plan and explain it to all the family members.
- ♣ Make the family/ neighbours aware of the basic characteristics of various poisonous/ hazardous chemicals and the first aid required to treat them.
- ♣ Adequate number of personal protective equipments needs to be made available, to deal with emergency situation.
- ♣ Prepare an emergency kit of items and essentials in the house, including medicines, documents and valuables.

NUCLEAR & RADIOLOGICAL DISASTER

DO's

- ♣ Go indoors. Stay inside.
- ♣ Switch on the radio/television and look out for public announcements from your local authority.
- ♣ Close doors/windows.
- ♣ Cover all food, water and consume only such covered items.
- ♣ If in the open, cover your face and body with a wet handkerchief, towel, dhoti or sari. Return home, change/remove clothes. Have a complete wash and use fresh clothing.
- ♣ Extend full cooperation to local authorities and obey their instructions completely in regards to taking medication, evacuation, etc.
- ♣ You must be aware of nuclear radiation hazard. Discuss on Nuclear radiation safety among children and family members, to reduce their fear of radiation.

Don’ts

- ♣ Do not panic.
- ♣ Do not believe in rumours passed on by word of mouth from one person to another.
- ♣ Do not stay outside/or go outside.
- ♣ As far as possible, AVOID water from open wells/ponds; exposed crops and vegetables; food, water or milk from outside.
- ♣ Do not disobey any instruction of the district or civil defence authorities who would be doing their best to ensure the safety of you, your family and your property.

BIOLOGICAL DISASTER

BEFORE THE DISASTER

Preparation by ensuring Prevention measures :-

(a) Personal cleanliness - daily bath, don't grow long nails and wear clean clothes.

(b) Hand Hygiene (Wash hands with soap and water before preparing food or eating, after passing stools, coughing or sneezing).

The steps of hand washing are :-

Step 1 : Wash palms and fingers
Step 2 : Wash back of hands.
Step 3 : Wash fingers and nuckles
Step 4 : Wash thumbs
Step 5 : Wash fingertips
Step 6 : Wash wrists

(c) Eat nutritious and balanced food.

(d) Immunization state should be up to date.

(e) Prevent overcrowding.

(f) Good ventilation.

(g) Protect from hot and cold weather.

(h) Health Education.

(i) Surveillance.

Annexure XV

Functional steps for response system from Animal Husbandry Department

• There will be a Control Room at state level headed by the Director, Animal Husbandry. It will be the responsibility of the Director to issue alert in case of an epidemic on information from the field level. The State nodal Officer will initiate action thereafter.
• District Control Room (DCR) is looked after by the district nodal officer. Rapid Response Teams will also get assembled within the department as and when required.
• At taluka level, the taluka level Disaster team will be headed by taluka level nodal Officer. This Officer, is in-charge of carrying out response and relief functions in case of an outbreak and has to report to the district and state control room.
• During disasters animals will be evacuated to relief camps and arrangement for food and water is made at the relief camps. In hazardous areas work is done on priority.
• The District Administration gives space for relief camp. The shelters will be provided in such relief camps for the animals affected by the disaster.
• The animal husbandry department will give services related to animals.
• Information of disaster will be given by revenue department or district administration.
• During disasters, animal husbandry department will take care of life saving work of sick and wounded animals and feeding of animals.
• Rescue of animals during disasters will be handled by Fire and Emergency services, Police/ Para Military/ NDRF/ SDRF.
• After disaster, monitoring for diseases will be done.
• In case of infections, infected animals will be segregated. They will be kept in a location away from the wind direction. They will not be allowed to share food and water with other animals.
• Rapid response teams will be assembled when information of disaster/ disease outbreak is received. The team generally consists of :
➢ Assistant Director
➢ Veterinary Officer
➢ Veterinary Assistants and MTS
• As the department may have the limitation of vehicles in the field, hired vehicles can be used for transporting animals.
• After taking stock of situation at the ground level, services of other line departments required will be roped in.

• In disaster times supply of animal feed will be problem. Anticipating the shortage of feed and fodder, the storage will be ensured as soon as the intimation of disaster is received from the concerned agencies.
• For better animal care during disasters, improved awareness will be needed.
• Village disaster management teams (DMT) will be needed.
• In case of loss/damage to dairy equipments, feed, fodder and animals, disaster relief will be provided as per the guidelines of the Disaster management scheme of the department.
• For burying dead animals generally a 4 ft. deep pit will be required. For cows and buffaloes 6 ft. x 10ft. ditch will be required. For other animals pits will be made as per size. Big animals will be moved using JCB. Sarpanch of the village panchayat will give the space for burying of animals. All the norms fixed by GSPCB will be adhered to.

Annexure XVI

How To Document a Disaster:

Proper documentation of the disaster and the entire administrative response to handle the disaster is the crucial foundation on which the up-gradation of the DDMP and future success of the administration in disaster management is dependent on. In the event of any natural disaster, like floods, cyclone etc, records can be maintained date wise from the first receipt of early warning till the final rehabilitation.

History of the Event

- Cycle of the event.
- Nature.
- Intensity.
- Past data on the damages caused.

Causes of disaster-

- Climate
- Geological
- Environmental Degradation.
- Any other Causes.

Map of the affected area showing areas highly affected, moderately affected and less affected.

Damage Assessment

- Human life
- Livestock.
- Houses.
- Infrastructure.
- Agriculture/Animal Husbandry.
- Horticulture.
- Silviculture.
- Ecology/Environment.
- Others.

Response

(Government Response) :

- ✓ State Government.
- ✓ Central Government (Various sector like Army / Health Services /Civil Defence etc.)

(Non-Government Response) :

- ✓ Local.
- ✓ National.
- ✓ International.

(Community Response) :

Rehabilitation

- ➢ Temporary Shelter.
- ➢ Physical Rehabilitation.
- ➢ Social Rehabilitation.
- ➢ Psychological Rehabilitation.
- ➢ Economic Rehabilitation.

Self-Assessment for improvement of services in future / existing shortcomings.
Community Perception about relief (Independent survey by some professional organization/NGO).
Lesson learned and future strategy.

Annexure XVI

DISASTERS IN GOA

As far as Goa is concerned, two types of disasters are being experienced by this State i.e. 1) Natural Disaster like Earthquake, Floods / Heavy rains, Cyclones, Landslides, Tsunami and 2) Man made Disaster like Oil spill in the Sea / Land, Gas leakage, Explosives, Mine collapse, etc.

1. Natural Disasters

a) Earthquake

Introduction.

It may seem something of a revelation that the plates of the earth's crust are in slow but constant motion and innumerable earthquakes are registered around the world on the seismographs everyday. However the tremors are generally so small that they pass without being noticed. It is only when the magnitude around 5.0 or more on the Richter Scale that it is noticeable. With magnitude around 6.0 or more and hitting densely populated areas, these tremors assume apocalyptic proportions both on account of the suddenness or the shock and their mass destructive potential.

Although Goa has not witnessed earthquakes directly, the tremors of the devastating earthquakes with magnitude 5.0 or more that hit "Koyana" and "Latur" in Maharashtra in the year 1967 and 1993 respectively, affected the routine life of the people in Goa as many of the residential as well as public structures, infrastructures were damaged severely, although no casualties were taken place.

Causes of Earthquake.

The earth's crust is not one piece but consists of portions called plates, of varying sizes. These plates are not stable but move with three distinctive types of movements along the boundaries of the plates.

- **Convergent Boundaries :** Where plates push each other and one plate slides down the other one.
- **Divergent Boundaries :** Where plates pull away from each other.
- **Transformed Boundaries :** Where plates slide past each other.

Due to continuous movement of the plates, stress accumulation takes place at the boundaries of these plates. When the stress accumulation reaches a point of maximum supportive strain, a rupture takes place generating an earthquake. The earthquakes generated this way are most damaging. Approximately 95 % of the earthquake activities occur at the plate boundaries. Some earthquakes, however, do occur in the middle of the plates, possibly indicating where earlier plate boundaries might have been. The point of rupture is called the focus.

The intensity of shaking at any place is related to the amount of energy released, the focal depth, distance of the place from the focus and the structural properties of the rock or soil on the surface. Some earthquakes are associated with volcanic activities as well.

Measures for Earthquake Risk Reduction.

Various measures can be classified in terms of preparedness, mitigation and prevention in the pre-earthquake phase. These are immediate rescue and relief measures including temporary sheltering from just after an earthquake event to about 3 months; and reconstruction measures in the next six months to a three year period following an earthquake occurrence.

Earthquakes are hazards that strike without warning and cause widespread damage to various man-made structures and systems. These can neither be prevented nor predicted in terms of their magnitude, place and time of occurrence. Therefore, the most effective measures of risk reduction are pre-disaster mitigation, preparedness and preventive measures for reducing the vulnerability of the built environment and expeditious effective rescue and relief actions immediately after the occurrence of the earthquake. The measures can also be divided into long term, medium term and short term. The long term measures requires five to fifteen years, the medium term one to five years and the short term to be taken up immediately in high risk areas. It may be stated at this juncture that earthquakes don't kill people, buildings do. Therefore, most importantly, reduction of vulnerability of buildings and structure will be the key to earthquake risk reduction. Also, pre-disaster preparedness through a 'post-earthquake response plan' including training of the concerned personnel in various tasks is considered essential for immediate and effective response after an earthquake occurrence. The major action points are highlighted in the following paragraphs.

Pre Disaster Preventive Measures :

Long term measures :- Various activities taken up as long term measures for earthquake disaster mitigation may include :

- Re-framing the building codes, guidelines, manuals and bye-laws and their proper implementation. Stricter legislation for highly seismic areas, in this regard is imperative.
- In high-risk areas, all buildings should incorporate earthquake resistant features.
- Public utilities like water supply system, communication network, electricity lines etc. Must be earthquake proof to reduce damage to the infrastructure facilities, alternative arrangement for the same must be developed.
- Community buildings and buildings used for gathering of large number of persons, like school, dharamshalas, hospitals, prayer halls, etc. must be made earthquake resistant in seismic zones of moderate to higher intensities.
- Supporting R&D in various aspects of disaster mitigation, preparedness and prevention and post-disaster management.
- Improving educational curricula in architecture and engineering institutions and technical training in polytechnics and schools to include disaster related topics.

Medium term measures :- The medium term measures for earthquake disaster mitigation may be listed as follows :

- Retrofitting of the weak structures in the highly seismic zones.
- Preparation of literature in local languages with do's and don'ts for the building constructions.
- Getting community involved in the process of disaster mitigation by providing them proper education and awareness.
- Supporting local technical institutions / colleges / school to conduct research and to organise research and to organise exhibitions etc. for public awareness.
- Networking of local NGOs working in the area of disaster management.

Post Disaster Preventive Measures :

Short term measures :- The urgent measures to be undertaken in the aftermath of a damaging earthquake will include the following :

- Maintenance of law and order, prevention of trespassing, looting etc.
- Evacuation of people and livestock.
- Recovery of dead bodies/carcasses and their disposal.

- Medical/veterinary care for injured.
- Supply of food/feed and fodder and drinking water.
- Temporary shelters like tents, metal sheds, cattle camps, etc.
- Restoring lines of communication and information.
- Restoring transport routes.
- Quick assessment of damage and demarcation of damaged areas according to grade of damage.
- Condoning off severely damaged structures that are liable to collapse during aftershocks.

Co-ordination between various agencies involved in rescue and relief work is extremely important for success in avoiding gaps and duplication. Pre-disaster preparedness needs to be based on preparing likely damage scenario in probable earthquake occurrences and the estimate of extent of efforts required. The following preparedness actions will be useful :

- Community should be trained in search, rescue and relief at the time of disaster in high-risk areas.
- An extensive programme of mass drills may be very helpful in high risk areas for earthquake damage reduction.
- Local NGOs should be trained and their capacity and capabilities should be strengthened.
- Introducing earthquake disaster safety do's and don'ts and drills in schools.
- To organise training of field personnel of the states in the science and art of carrying out post disaster damage surveys, (a) for urgent relief purposes, (b) for repair, reconstruction and retrofitting purposes.

Consolidation and reconstruction

An effort needs to be made in the emergency phase, to involve the affected people to the maximum extent so as to create a feeling of self-reliance. They need to be started as quickly as possible so that the period of relief is minimised.

- Detailed survey of building/animal sheds for assessment of damage and decision regarding repair, reconstruction and strengthening or demolition.
- Repair, reconstruction and seismic strengthening or demolition.
- Selection of sites for new settlements, if required.
- Execution of the reconstruction programme.

- Review of the existing seismic zoning maps and risk maps.
- Review of seismic codes and norms of construction.
- Training of personnel, engineers, architects, builders and masons.
- Statistical studies regarding the earthquake.

b) Floods / Heavy rains

Introduction.

Of the annual rainfall, 75 % is received during four months of monsoon (June – September) and as a result, almost all the rivers carry heavy discharge during this period. The Flood hazard is compounded by the problems of sediment deposition, drainage congestion and synchronisation of river floods with see tides in the Coastal Plains.

As far as North Goa District is concerned, there are 3 main rivers viz. Terekhol, Chapora and Mandovi, besides one minor river Baga. The river Mandovi has 10 tributaries viz. Madei, Surla, Kotrachi, Ragda, Khandepar, Kudnem, Valvanti, Bicholim, Assonora and Sinker. This District had not experienced by major floods in past few years, except in 2000 at Bicholim; 2005 at Mala, Panaji and Bicholim and in 2007, 2019 and 2020 also in Bicholim and parts of Pernem taluka due to overflowing of rivulet, causing no major casualties but causing heavy damages to the properties.

In South Goa, Talpona, Kushavati and Zuari are the 3 main rivers. Selaulim dam is the main reservoir in the Sanguem taluka which became operational in late 80's and early 90's. Due to the deposition of silt over 2 decades, the holding capacity of the water in the reservoir is reduced to a greater extent. During heavy rains, as the dams get overflooded, part of Sanguem, Quepem experience floods. In 2009, Canacona taluka experienced cloud burst leading to floods damaging the property on a larger scale.

Causes of Floods

<u>Flooding conditions may occur due to</u> :

- Rivers in spate,
- Storm surges
- Short intense storms causing flash floods

<u>Flooding in rivers is mainly caused by</u> :

- Inadequate capacity within the banks of the river to contain high flows.
- River bank erosion and silting of riverbeds.

- Landslides leading to obstruction of flow and change in the river course.
- Synchronisation of flood in the main and tributary rivers.
- Flow retardation due to tidal and backwater effects.
- Poor natural drainage.
- Cyclone and heavy rainfall.

Types of Floods

Storm Surge

Floods in coastal areas and in river estuaries are usually due to storm surges, which result from sea being driven onto the land by meteorological forces. Here two physical phases act together. A storm with intense low pressure causes the level of sea to rise because of barometric efforts and strong winds associated with this storm, if directed on shore, dry the sea on the land. Storm surges are thus commonly associated with the tropical cyclones. The storm that produces the surge can also give rise to heavy rainfall in land so that the estuary region can be subject simultaneously to river flooding and storm surge. This is more often seen when it is in synergy with high tide timings.

Flash Floods

Flash floods are defined as floods of short duration with a relatively high peak discharge. They rise from local precipitation of extremely high intensity, typical or thunderstorms. The high concentration of rainfall on a small area can have devastating effects as the river flow can rise to several hundred times the normal flow in the space of a few hours. Flash floods are common in arid and semi-arid areas. In these areas, what little rainfall there is usually occurs in short, intense storms. The intensity of the storms and the poor absorptive capacity of arid zone soils lead to much of the annual runoff occurring as Flash Floods.

Flood Disaster Management

The various measures adopted for flood mitigation may be categorised into two groups :

(i) Structural

(ii) Non-Structural

The general approach was aimed at preventing floodwaters from reaching the potential damage centres, as a result of which a large number of embankments came up along the various flood prone rivers. The main thrust of the flood protection programme needs to be undertaken in the Districts, so far in the form of structural measures may be grouped into the following :

- Dams and Reservoirs
- Embankments, flood walls, sea wall
- Natural detention basin
- Channel improvement
- Drainage improvement
- Diversion of flood waters.

For effective functioning of all the physical measures taken, it is necessary that pre – and post–monsoon checks must be made and special repairs must be carried out prior to flood period.

The non – structural measures, on the other hand, aim at modifying the susceptibility to flood damage as well as modifying the loss burden. The various non – structural measures needs to be implemented in the Districts are :

(i) Modifying the susceptibility to flood damages through :

- Flood plain management
- Flood proofing including disaster preparedness, and response planning and
- Flood forecasting and Warning

(ii) Modifying the flood loss burden through :

- Disaster Relief
- Flood fighting including Public Health Measures

Setting up of flood forecasting and warning services is one of the most cost effective non – structural measures available.

Flood and Drainage Management

EMERGENCY SUPPORT FUNCTION	REQUIREMENTS	DEPARTMENT RESPONSIBLE
Communication. ➢ Warn people against areas that are likely to get flooded. ➢ Assess damage to communication facilities.	VSATs, battery	1) Water Resources Department 2) Police Deptt. 3) Fire & Emergency services 4) SDRF

Public Health and Sanitation ➢ Assess the advent of infectious diseases ➢ Warn people of special measures against epidemics ➢ Special care for waterborne disease and epidemic outbreaks ➢ Distribute chlorine tablets ➢ Ensure purity of drinking water, free from contamination ➢ Provide drugs and medications for water borne diseases.	Specialized medical to handle epidemics, cases of drowning , and water borne diseases.	i) Director of Health Services. ii) PWD iii)Directorate of Fire & Emergency services. iv)State Epidemiologist
Power ➢ Damage to electric poles and stations etc., due to flooding ➢ Short circuiting measures ➢ Restore facilities at local and State level	Inventory of power installations of the area	Electricity Deptt. And PWD
Transport ➢ Provide boats as a means of transport	Inventory of transport water way facilities in the area	Dte. of Panchayat, DMA, CCP, River & Navigation dept, Fire & Emer. ser
Donation ➢ Compile information on specific needs of the people. ➢ Distribute donations by means of air dropping and boats to marooned victims.	Socio-economic needs Cultural needs	Mamlatdar / Deputy Collector / B.D.O. Coast guards
Search and Rescue ➢ Aerial survey for marooned victims	Deep sea divers S & R boats Equipments cache	Police Department / Fire & Emergency / Corporation of City of Panaji /DMA/ DOP.
Public Works and Engineering ➢ Clear areas for relief camps Clear roads for easy access ➢ Seal areas and buildings that are likely to cause further damage Build temporary bridges for ease of access.	• Specialised equipments for functioning in flood prone areas • Specialised equipments for bridges and other temporary structures	C.C.P. / P.W.D. / W.R.D. / Fire & Emergency.

Food ➢ Provide food packs that contain dry and non-perishable food items	Inventory of non- perishable food items	Directorate of Civil Supplies and Deputy Collector
Information and Planning ➢ Release flood related information to all ESF ➢ Provide access to resource inventories and document all situations-reports and procedures.	Disk net All Inventories	Directorate of Information and Publicity.
Relief Supplies ➢ Provide basic logistic materials required for local administration ➢ Provide relief materials such as batteries, flash lights to victims / rescue workers.	Inventory of relief supplies.	P.W.D. / W.R.D. / Directorate of Civil Supplies.
Drinking water ➢ Provide clean drinking water ➢ Place shelters in a safe area ➢ Shelters should adhere to the climatic conditions of the area.	Inventory of water sources of the area.	P.W.D. Civil Supplies dept
Shelter/Cattle camps ➢ Provide weather resistant shelter ➢ Place shelters close to relief camps in a safe area. ➢ Shelters should adhere to the climatic conditions of the area	Inventory of specific type of shelter for cyclones and floods	Mamlatdar / Deputy Collectors / B.D.O.s
Media ➢ Information on current status	Regular updates of calamity	Directorate of Inf. & Publicity.
Helplines ➢ Provide information on marooned victims and hospitals	Inventory of emergency phone numbers	District Control Room Police Control Room
➢ Receive messages for victims and forward them to relatives outside disaster area	Publish emergency helpline numbers	Directorate of Inf. & Publicity

Contingency Plan Action Points : Floods

Pre – Flood Arrangements :

- Convening a Meeting of the District Level Committee on Natural Calamities;
- Functioning of the Control rooms;
- Closure of past breaches in river and canal embankments and guarding of weak points;
- Rain – recording and submission of rainfall reports;
- Communication of gauge – readings and preparation of maps and charts;
- Dissemination of weather reports and flood bulletins issued by the meteorological Centres, Central Water Commission, Flood Forecasting Organisation;
- Deployment of boats at strategic points;
- Use of power boats;
- Installation of temporary Police Wireless Station and temporary telephones in flood – prone areas;
- Arrangement for keeping telephone and telegraph lines in order;
- Storage of food in interior, vulnerable strategic and key areas;
- Arrangements of dry food stuff and other necessities of life;
- Arrangements for keeping the drainage system desilted and properly maintained;
- Health measures;
- Veterinary measures;
- Selection of flood shelters;
- Advance arrangements for army assistance;
- Training in flood relief work;
- Organisation of relief parties;
- Other precautionary measures; and
- Alternative drinking water supply arrangements.

Arrangements During And After Floods :

Organising rescue operations.

- Organising shelter/cattle camps for the livestock in distress and assist in the efforts of the civil authorities. Army assistance could be requisitioned.
- Relief measures by non-official and voluntary organisations may be enlisted as far as possible.
- Organise relief camps.
- Provision of basic amenities like drinking water, sanitation and veterinary health care and arrangements of feed and fodder in the relief cattle camps.

- Organising enough relief parties to the rescue of the marooned livestock within a reasonable time limit.
- Establish alternate communication links to have effective communication with marooned areas.
- Grant of emergency economic relief to all the owners of affected livestock.
- Submission of daily reports and disseminate correct information through mass media to avoid rumours.
- Commencement of agricultural activities / resowing of green fodder.
- Repairs and reconstruction of infrastructure facilities such as cattle sheds, resettlement of flood prone areas.
- Veterinary health measures.

c) Cyclone

Introduction :

Cyclones are the most destructive of the seasonally recurring rapid onset natural hazards. Between 80 to 100 cyclones occur around the world each year. Cyclones are the progeny of ocean and atmosphere, powered by the heat from the sea, driven by the easterly trades and temperate westerly, the high planetary winds and their own fierce energy. As a combined result the ocean develops devastating surge, inundating vast coastal areas. Devastation in violent winds, torrential rainfall and accompanying phenomenon including storm surges and floods can lead to massive community disruption.

Characteristics of Cyclone :

Cyclones are characterised by destructive winds, storm surges and exceptional levels of rainfall which may cause flooding :

i) Destructive winds : The strong winds that blow counter-clockwise, whilst spiralling inwards and increasing towards the cyclone centre is highly destructive. Winds speeds progressively increase towards the core. As the eye arrives, winds decrease to become almost calm bur rise again just as quickly as the eye passes and are replaced by Hurricane force winds from a direction nearly the rivers reverse of those previously blowing.

ii) Storm Surges : The Storm surge defined as the rise in sea levels above the normally predicted astronomical tide, is frequently a key or overriding factor in a tropical disaster. The major factors

include.

- A fall in the atmospheric pressure over the sea surface.
- The effect of the sea bed
- A funneling effect
- The angle and speed at which the storm approaches the coast
- The tides.

iii) Exceptional rainfall occurrence : The very high specific humidity condenses into exceptionally large raindrops and giant cumulus clouds, resulting in high precipitation rates. When a cyclone makes landfall, the rain rapidly saturates the catchment areas and the rapid runoff may extensively flood the usual water sources or create new ones.

Causes of cyclone :

i) Formation and initial development : Four atmospheric and oceanic conditions are necessary for development of a cyclonic storm :

- **A warm sea temperature** in excess of 26^{o} C to a depth of 60 m, which provides abundant water vapour in the air by evaporation.
- **High Relative Humidity** of the atmosphere to a height of above 7000 m facilitates condensation of water vapour into water droplets and clouds, releases heat energy thereby inducing a drop in pressure.
- **Atmospheric instability** encourages formation of massive vertical cumulus cloud convection with condensation of rising air over ocean.
- **A location of atleast 4 – 5 Lat. Degree from the Equator allows** the influence of the forces due to the earth's rotation to take effect in reducing cyclonic wind circulation around low pressure centres.

ii) Mature Cyclones : As viewed by weather satellites and radar imagery the main physical feature of a mature cyclone is a spiral pattern of highly turbulent giant cumulus thunder cloud bands. These bands spiral inwards and form a dense highly active central cloud core which wraps around a relatively calm and cloud free 'eye'. The eye has a diameter of from 20 – 60 Km of light winds and looks like a black hole or dot surrounded by white clouds. In contrast to the light wind conditions in the eye, the turbulent cloud formation extending outwards from the eye accompany

winds of up to 250 kph, sufficient to destroy or severely damage most non-engineered structures in the affected communities.

iii) Modification of decay : A cyclone begins to weaken in terms of its central low pressure, internal warm core and extremely high winds as soon as its source of warm most air begins to ebb or are abruptly cut off. The weakening of a cyclone does not mean the danger to life and property is over. When the cyclone hits land, especially over mountainous or hilly terrain, riverine and flash flooding may last for weeks.

Early Warning System :

Cyclone Disaster Warning System has been installed in the Police Headquarters which plays an important role in alerting the people / State authorities for taking preventive measures at the time cyclone warning issued by India Meteorology Department (IMD).

As and when cyclone is likely to affect Goa, the Area Cyclone Warning Centre, Mumbai gives first message called Cyclone alert 48 hrs. before, followed by another message in 24 hrs. or more frequently till the de-warning message is sent.

d) Landslides

Introduction:

Landslides are simply defined as the mass movement of rock, debris or earth down a slope and have come to include a broad range of motions whereby falling, sliding and flowing under the influence of gravity dislodges earth material. Landslides along with other sudden and short lived phenomena such as earthquakes, volcanic eruptions, flood and hurricanes can be grouped into catastrophic or disaster phenomena.

These are one of the exogene processes that produce extra ordinary terrain changes during the time they last.

When landslides endanger humans/livestock and their installation, they are known as hazards; when they cause property damage and loss of life, they are disasters.

Landslides are ubiquitous and occur in all climates on most hilly terrains, and in lakes and oceans. Some rocks are more landslides resistant than others, but regolith is likely to be landslide prone.

Various authors in many ways have defined the term landslide. But in general, a landslide may be defined as a process involving downward and outward movement of a part of slope forming material along a definite plane i.e. plane of failure. It is caused due to shear failure along this plane.

Landslide Zonation Mapping is a modern method to identify landslide prone areas and has been in use in India since 1980s.

The major parameters that call for evaluation are as follows :

- Slope – Magnitude, Length and Direction
- Soil thickness
- Relative relief
- Landuse
- Drainage – pattern and density
- Landslide affected population

Causes of Landslides :

Landslides can be caused by poor ground conditions, geomorphic phenomena, natural physical forces and quite often due to heavy spells of rainfall coupled with impeded drainage.

A checklist of causes of Landslides

1	Ground Causes 1. Weak, sensitivity or weathered materials 2. Adverse ground structure (joints, fissures, etc.) 3. Physical property variation (permeability, plasticity, etc.)
2	Morphological Causes 1. Ground uplift (Volcanic, tectonic, etc.) 2. Erosion (wind, water) 3. Scour 4. Deposition loading in the slope crest 5. Vegetation removal (by forest fire, drought, etc.)

3	Physical Causes 1. Prolonged precipitation 2. Rapid draw – down 3. Earthquake 4. Volcanic eruption 5. Thawing 6. Shrink and swell 7. Artesian pressure
4	Man – made Causes 1. Excavation (particularly at the toe of slope) 2. Loading of slope crest 3. Draw – down (of reservoir) 4. Deforestation 5. Irrigation 6. Mining 7. Artificial vibrations 8. Water impoundment and leakage from utilities.

e) Tsunami

As far as Goa is concerned, the coastal belt has not recorded any Tsunami in the past. However, the Tsunami of 26th December, 2004 in the Bay of Bengal had caused after effects such as monster waves about 15 to 20 feet high in the sea. No loss of lives or damages to the properties were reported, except some vessels in the sea were reported to have been damaged.

B. Man made Disasters

a. Industrial and Chemical disasters:

The Industrial Hazards do not have clear definition. The disasters are the result of:

- Accident
- Failure
- Mishap/Misuse of technology
- Leakages
- Spills
- Radiation fallout
- Explosions and fire
- Structural failure
- Transportation mishaps (Road, Air, Rail, Shipping and Pipelines)

Major chemical hazards in Goa:

- ❖ Hazards at port terminals
- ❖ Hazards due to leakage or pilferage and sabotage to conveying pipe
- ❖ On-site emergencies at the process units
- ❖ Hazards posed by improper transportation and accidents involving carriers
- ❖ Accidents involving aircraft and ships
- ❖ Accidents involving goods trains transporting hazardous material

Major accident hazard units:

1. Goa Glass Fibre – Colvale (Other chemicals)
2. Filpack Pvt. Ltd., Pilerne (LPG)
3. Hindustan Petroleum, Kundaim (LPG)
4. Esteem Industries, Pissurlem (Other chemicals)
5. Syngenta, Corlim (Chlorine)
6. Finolex Essex, Usgaon (Other chemicals)
7. Venus Ethoxyethers Pvt. Ltd., Bicholim (Other chemicals)

Action contemplated to reduce hazards:

- ➢ It is proposed to involve Civil Society Organizations in the dissemination of knowledge, precautions and coping up with disasters.
- ➢ Need for safety audit by introducing a single inspection system.
- ➢ Continuous professional development of all regulating agencies in bi-annual cycles.
- ➢ Acquisition of PPE & HAZMAT appliance and other supporting equipments.

b. Oil Spill in the Sea / Land :

No major incidents of oil spillage were reported in Goa, except in the year 2005, such incident had taken place on 23/03/2005 due to spillage of oil from M/V. Maritime Wisdom anchored at Panaji Port and as a result the beaches at Vagator, Anjuna, Baga, Calangute, Candolim and Sinquerim were polluted, thereby posing danger to the Marine life beach goers. However, preventive measures were taken by the Captain of Ports with the assistance of Coast Guards. One mammoth oil tanker with a dead weight of 1.14 lakhs tones was drifted off shore from Marmagoa port limits and was grounded in Candolim on 6/6/2000 due to cyclone. Here also, concerned agencies acted swiftly to avoid any disaster.

Summary of Disaster Management Plan

Department of Animal Husbandry to identify suitable sites for Animal Rehabilitation based on Disaster prone areas which will be initially identified. These rehabilitation sites will be easily accessible, raised plateaus of land having provisions for electricity, potable water, storage of emergency medicines, food, feed, fodder, cattle sheds, and basic accommodation for cattle owners.

The names and contacts numbers of all agencies involved in rescue and rehabilitation of animals to be kept handy. Capacity Building exercise involving Departmental and other agencies will be taken up.

Constitution of Rapid Response Teams (RRT's) of the Department of Animal Husbandry who have been suitably trained (to respond and obtain necessary help from NGOs, AWOs and volunteers) will be constituted. These RRT's will be provided the list of contact numbers of agencies involved in rescue and rehabilitation.

On receipt of the alert from India Meteorological Department (IMD) and/or Central/State authorities of impending disaster, the RRTs will be kept on standby. Latest technology like use of Drones, etc to assess the gravity of the situation and its likely after effects, will be deployed.

Emergency stock of food, feed, fodder, medicines, vaccines potable water etc will be arranged at the designated rehabilitation sites.

Once disaster strikes, the RRTs will be mobilised and co-ordinated by the Director and Dy. Directors of Animal Husbandry Department.

These designated sites of Animal rehabilitation housing the rescued animals and their owners will then have to be sustained for further supply of food, water, feed, fodder, medicines, vaccines etc until the Disaster subsides. During this period the animal owners will be responsible for their respective animal and the Department of AH & VS will only be responsible for veterinary aid and prophylaxis. NGOs and AWOs will intern assist in managing the stray animals rehabilitated at the camps under the guidance of Animal Husbandry Officers.

The RRT and concerned authorities will assess the losses to life and property and submit the report within 48 hours to the Directorate. The duly constituted Committee at Head Office will then visit the disaster site within 72 hours and submit a report of financial assistance to be disbursed to the affected farmers which will be credited via DBT through the departmental Disaster Management Scheme.

After the disaster ends and normalcy sets in the Director will roll back the RRTs and other authorities.

Disaster Management Plan drafting Committee :

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5	Shri. Pandurang Talgaonkar	Deputy Director (Admn.), HO	Member
5	Dr. Mahendra Bale	Assistant Manager (AH/PEN)	Member
6	Dr. Rajesh Kenny	Assistant Director	Member
7	Shri. Dilip Parvatkar	Asstt. Accounts Officer, HO	Member

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