I. BACKGROUND

Climate change is a burning issue in the world. Climate change posing a serious threat to attain the Millennium Development Goal. Minor changes in global worming as well as minor changes in Climate are a continuous phenomenon in the nature. But the change which has been started very rapidly since 1979 has created a great concern for mankind. Earlier the government of Bangladesh confined its disaster related activities only on post disaster response. Later on govt. has realized that the post disaster response on disaster management is not a real approach only. However, govt. acknowledges the need and importance of pre-disaster activities and steps are equally important to save the life of human, animals and security of other resources. Thus, priority has been accorded to focus on community level preparedness, response, recovery and rehabilitation. Programs to train people living in disaster-prone areas, improving their capability to cope with natural disaster are highlighted. The action plan on Disaster Risk Reduction and Climate Change Adaptation in Livestock sector has emphasized a group of broad-based strategies:

1. Disaster management in livestock sector arising from the need of both risks and consequences of disasters that include prevention emergency response and post-disaster recovery.
2. Community involvement for preparedness programs for protecting lives of animals and Properties would be a major focus. Involvement of local government bodies would be and essential part of the strategy. Self-reliance should be the key for preparedness, response and recovery.
3. Non-structural mitigation measures such as community Disaster Preparedness, Training, Advocacy and Public awareness must be given a high priority; this would require an integration of structural mitigation with non-structural measures.
4. Structural measures for disaster management emphasized for safe animal shed and shelter (Killa).
5. Long term mitigation of disaster in livestock sector through adaptation.

DISASTER MANAGEMENT VISION OF BANGLADESH GOVT.

The Disaster Management Vision of the Government of Bangladesh is to reduce the risk of people, especially the poor and the disadvantaged, from the effects of natural, environmental and human induced hazards, to a manageable and acceptable humanitarian level, and to have in place an efficient emergency response system capable of handling large scale disasters.

DISASTER MANAGEMENT VISION OF LIVESTOCK SECTOR

The Disaster Management Vision of the Department of Livestock Services (DLS) is to reduce the risk of Livestock from the effects of natural, environmental and human induced hazards to a manageable and acceptable level through the strengthening of capacity building of DLS Officials, other associated aspects of disaster management for efficient emergency response system capable of handling any large scale disaster .

II. INTRODUCTION

Bangladesh has made a substantial achievement since independence in Agriculture, livestock, Fisheries, Textile and garments production and other small and medium Enterprises etc. Population growth declined from 2.9% to 1.4%. The country has become self sufficient in food production by this time. Household Income & Expenditure Survey (HIES, 2010) from the BBS reflects that the rate of poverty reduction in Bangladesh is making excellent progress. This can be compared with many other countries that the trend of poverty reduction in Bangladesh has indeed been impressive. The most recent report suggest that since 2005 (the last HIES) the incidence of extreme poverty in the country has decreased from 25.1% to 17.6%. The GDP growth of the country has a rising trend in each year which was 6.3% in the fiscal year 2010/2011. In the fiscal year 2011/2012, livestock production has increased almost two fold then the fiscal year 2003/2004. In the 2003/2004 fiscal the milk, meat and egg production was 1.99 Million Metric Tons, .9 MMT and 4780 million no of eggs respectively where as in the fiscal year 2011/2012 the production of milk 3.46 MMT, meat 2.33 MMT and egg 7303.89 million no respectively. As on Economic review of Bangladesh 2010/2011 fiscal year contribution of livestock in national economy is 2.58%(2010/2011), Direct employment 20%, Partly employment 50%, foreign exchange only from hides & skin 4.31% and fuel supply from livestock around 25% specially in the rural areas (Source: Economic review of Bangladesh). From ancient era to modern period it has been proved, high quality animal protein in the form of milk, meat and eggs is extremely important for the proper physical and mental growth of human being. In Bangladesh, around 9% of total protein for human consumption comes from livestock. In the urban areas the consumption of animal protein is high which is many times higher than the national average consumption of animal protein. Hides and skin of cattle, buffaloes, goats and sheep are valuable export items, ranked third in earnings after RMG and shrimp.

Surprisingly, Bangladesh has one of the highest cattle densities: 145large ruminants/km^2 compared with 90 for India, 30 for Ethiopia, and 20 for Brazil. But most of them trace their origin to a poor genetic base. The average weight of local cattle ranges from 125 to 150 kg for cows and from 200 to 250 kg for bulls that falls 25-35% short of the average weight of all-purpose cattle in India. Milk yields are extremely low: 200-250 liter during a 10-month lactation period in contrast to 800 liter in Pakistan, 500 liter in India, and 700 liter for all Asia. Despite highest cattle densities in Bangladesh, the current production of milk, meat and eggs are inadequate to meet the current requirement. Before 1990 basically no private hatchery for producing day old chicks in Bangladesh. But there are 137 hatcheries in Bangladesh and more than 20000 people are directly working there.

Though production of animal protein has maintained an upward trend, per capita availability of animal protein presently stands at around 43 gm meat/day, 64 ml milk/day and 49 eggs/year, but the recommended intake of 120 gm meat/day, 250 ml milk/day and 104 eggs/year (Source: DLS). Shortage of quality inputs, inadequate services and physical infrastructure, institutional weaknesses in terms of weak regulatory framework and enforcement, limited skilled manpower and resources, inadequate research and technological advancement are all continuing to act as constraints to livestock development.

Regardless of the success there is shortage of milk, meat and egg production in Bangladesh. 17.6 million People live in below poverty line that means those who have no ability to purchase sufficient food to fulfill the daily requirement of 2100 calorie. The government of Bangladesh

pledge bound to achieve the MDG to reduce the poverty. The Govt. has a vision 2021 to establish a country free from hunger and poverty at the time of Golden Jubilee of our independence. Due to the rapid industrialization, the purchasing capacity of a huge number of people has increased substantially. As we know the demand of the livestock product basically increases following the fulfillment of the demand of grain and also increase in income.

Livestock sector is the worst affected sector due to climate change. Bangladesh has proved its capacity and innovativeness in disaster risk reduction through effective Disaster Management specially for the reduction of the loss of human life. The loss of human life has been drastically reduced due to pre and posts disaster management activities On the contrary the death/loss of livestock remains in a dangerous level although the livelihood of poor, vulnerable and marginal farmers is highly depending on the livestock. As mentioned earlier that the GDP growth, protein supply, income generating activities are closely related to the proper and targeted growth of the livestock sector. In the days ahead it is envisaged that the frequency and severity of floods, Tidal Surge, cyclone, storm surges, earth quake will increase the loss of livestock and poultry unless entire existing disaster management system is well structured. Bangladesh govt. sets their priority for Disaster Risk Reduction and Climate Change adaptation in the livestock sector for country's economic growth. Effective and sustainable Livelihood adaptation in case of small and marginal farmers, landless women, widow is closely related through the sustainable development of Livestock in the country. It is essential that Bangladesh prepares now to face the challenge ahead and to safeguard her future economic wellbeing and the livelihoods of her people.

Bangladesh govt. have been spent a lot of money (more than $10 billion US dollar, source; BCCSAP) since 1972 to make the country more climate resilient and less vulnerable to disasters. The Govt. has built a number of killa's in the coastal areas for safety of animals from the curse of the Storm surges, flood, Aila, cyclone, SIDR etc. In general Govt. has established some other structural measures like Embankments, Cyclone shelters, coastal polders to reduce the risk of disaster. Among the nonstructural measures, most important achievement is the creation and activation of community volunteers those who are the community worker to inform the people as part of the early warning system. Bangladesh Red Crescent Society has also been participated actively for the development of early warning at community level. The Govt. of Bangladesh had a long experience in implementing different types of programs on disaster management since 1972 to till date. Basically after the devastating cyclone occurred in 29th April 1991 learned many things from the management, including which details the responsibilities of Government officials and others at times of disaster, has also been put in place. The Government demonstrated its competence in dealing with disasters in 2007 when the country suffered two serious floods and a severe tropical cyclone (Cyclone Sidr) in the same year.

The COP 18th of the United Nations Framework Convention on Climate Change (UNFCCC) held in Doha, Qatar from 26th November to until 8th December in their draft decision has agreed about the implementation of outcome pursuant to the Bali Action Plan. The COP 18th also recalled the decisions of 1/CP.13,1/CP15,1/CP16 and 2/CP. 17. Basically Doha conference put emphasis on the implementation of the Kyoto Protocol on the basis of the Bali Action Plan. In Doha conference the demand of the Climate affected countries was to reduce the GHG at least 40-45% but the industrialized nations were proposed to reduce only 18%. The delegates mentioned that if 40-45% reduced then the situation will as like as before 1990 level. If the GHG is not possible to reduce at a calculated level on that circumstance the global temperature may rise up to 4 degree Celsius which would be very dangerous for the mankind. It could be mentioned in Bali

COP Bangladesh put emphasis on the specific interventions to ensure that the people have secure access to food, water, energy and livelihoods. The statement given by Bangladesh, at the UN General Assembly in February 2008, on behalf of the Least Developed Countries (LDC's), emphasized the need for immediate international support to build the LDCs resilience to global warming and climate change. The resources currently available for adaptation are grossly inadequate to meet the needs of the LDC's, who will bear the brunt of climate change. Adaptation is the priority for Bangladesh in the short to medium term.

III.CLIMATE HAZARDS IN BANGLADESH

Circumstances:

Bangladesh is a highly disaster prone country in the world. In 13th October 2012 the Development Affairs Alliance and Environment & Human Security affairs of UN disclose the list of disaster prone countries as on the intensity of disaster risk in Brussels Belgium. Out of 173 countries in the world Bangladesh is fifth. In the top of the list the Vanuatu Island is the first country of the Pacific Ocean in the world, 2nd Tonga, 3rd Philippines, 4th Guatemala. The least risk country is Malta and Qatar. But Qatar is less risky than Malta. Two parameters have been taken into consideration for calculating disaster risk: 1. Flood, storm, drought, earthquake proneness and the loss due to that disaster and how much would be the devastation/loss in future. 2. The capacity of the government to combat the disaster in the area of infrastructure, health care, nutrition support, administration and education, bima opportunity for recovery of losses.

The IPCC predicts that the Global temperature will increase between 1.8 C to 4.0 C at the end of the 21st century and as a result the sea level will rise between .18 meter to .79 meter. The sea level rise will inundate new coastal areas which will hamper the livelihood of those areas. IPPC in their 4th report apprehend that in South Asia more erratic rainfall will increase the river flows in Bangladesh from India, Nepal, Bhutan and China. IPCC in their remarks also pointed that the intensity of the drought will increase in the North and western part of Bangladesh.

The climate change effect in livestock sector is posing a serious threat. The increase in global temperature has the direct influence on animal kingdom. The Bio-diversity is becoming narrower than the previous. Some of animal and plant species already is extinct from the nature due to pollution of inland and marine water, deforestation due to excessive population growth. Some of the animal species are in endangering situation. The impact of Climate Change on livestock has already been started such as warmer and more humid climate causing increased prevalence of diseases and diseases vectors to grow. The fluctuation of temperature in the summer season and winter season is increasing. The frequency and intensity of hot spell and cold wave is increasing. The both of the extreme condition is the multiple threat for keeping the hi-breed animals and birds.

These physical causes has created direct and indirect trouble for the proper and sustainable growth of the sector. The direct threat include the massive death of the animals and birds due to heat stoke and cold wave. The indirect threat creating a huge stress condition to the animals and birds as a result productivity and immunity is decreasing rapidly. The loss of productivity resulting the direct economic loss in the sector. The lowering of immunity is indirectly helping the disease vector to attack the birds and animals. Some of the causal agent of the disease is changing their nature through mutation and becoming more and more virulent.

The emerging diseases causing huge economic loss specially the poultry sector. The loss of poultry industry due to Avian Influenza is causing a serious challenge to the industry. In Bangladesh since March 2007 the outbreak of Avian Influenza in livestock sector is facing a critical situation. The sustainability of the sector is becoming fragile. The entrepreneur is losing their confidence to invest more in the sector. The demand of protein is increasing but the production of poultry is in highly fluctuating condition specially the commercial poultry. The livelihood of small and marginal farmers is facing a critical situation. Due the synergistic effect of hot spell, cold wave, emerging and re-emerging diseases the poultry sector has lost its upward trend since 2007 and as a result hundreds of thousands of small and medium commercial farms closed down and a huge number of youth became unemployed. UNDP has identified Bangladesh to be the most vulnerable country in the world to tropical cyclones and the sixth most vulnerable country to floods**.**

In Asia, glacier melt in the Himalayas is projected to increase flooding and avalanches and to affect water resources within two to three decades. Climate change will also decrease freshwater availability in large river basins. This, along with population growth and increasing demand from higher standards of living, could adversely affect more than a billion people by 2050. Coastal areas, especially heavily-populated mega-delta regions, will be at the greatest risks due to increased flooding from the sea and the rivers. Endemic morbidity and mortality due to emerging diseases and diarrhea are projected to rise. Increases in coastal water temperature would exacerbate the abundance and/or toxicity of cholera in South Asia.

Source: IPCC, 2007: Consequences of Climate Change in Asia

Bangladesh is exposed to following natural hazards, such as,

1. Flood
2. Cyclone / Storm surges /Aila / Sidr
3. Tornado
4. Drought
5. Salinity intrusion
6. Earth quake
7. Tsunami
8. Emerging diseases
9. Lands slide
10. Heat wave
11. Cold wave
12. Infrastructure collapse

1.Flood:

Bangladesh is one of the most flood prone country in the world. The total area of Bangladesh is about 147000 Sq. Km with a population of 150 million. It is one of the 10 most densely populated country in the world. Bangladesh is situated in the south East Asia. During the last 55 years at least 6 serious flood have been affected the country with the inundation of 35-70% land area of Bangladesh. Due the huge inundation a substantial loss of human lives, livestock, crops, damage of roads, building, bridges, culverts etc have been occurred. The devastating flood causes immense sufferings of the peoples. Most of Bangladesh lies in the delta of three of the largest rivers in the world – the Brahmaputra, the Ganges and the Meghna. These rivers have a

combined peak discharge in the flood season of 180,000 m3 /sec. (the second highest in the world, after the Amazon) and carry about two billion tones of sediment each year.

The topography of the country is mostly low and flat. Two-thirds of the country is less than 5 meters above sea level and is susceptible to river and rainwater flooding and, in lower lying coastal areas, to tidal flooding during storms.

Types of flood:

a. Flash flood
b. River flood.
c. Rain fed flood
d. Cyclone/tidal flood/sidr flood in the coastal side

a. Flash flood: Flash flood is characterized by sudden rise and fall of water levels. The duration of flash flood is few minutes to few hours. This type of flood affects the most northern, north-central, northeastern and southeastern parts of Bangladesh. In northernmost, north-central and northeastern land of the country are at the foothills catchment of India. If it rains heavily in the parts of India, the runoff quickly accumulates and flows to Bangladesh. To provide early warning to the people is very difficult in case of Flash flood. Flash usually starts from mid April i.e before the southwesterly monsoon. In the northern and southeastern areas, it starts with the onset of southwesterly monsoon.

b. Rain fed flood: This type of flood commonly seen in the southwestern part of the country especially in the Gangetic deltas. This type flood occurs deterioration of the natural drainage systems due to upland inflow in the main river the Ganges. When there are intense rainfall in this area temporary inundation affects many localities.

c. River flood: River flood basically causes the most dangerous flood in Bangladesh. The river flood occurs due to excessive rainfall in the catchments. The nature of the river flood water is long standing(15 days to 45 days) and simultaneously crosses the danger level of all the major rivers of the country. River flood usually observed in mid-July to mid September.

d. Cyclonic flood / Flood due to storm surges: This type of flood occurs in the 800 Km long coastal belt of the country. The continental shelves in part of Bay of Bengal is shallow and extends about 20-25 Km. The coastline in the eastern part is conical and funnel like in shape. Because of these above facts the storm surges are comparatively very strong in other parts of the world. So many super cyclones hit the Bangladesh coastline and causes a huge loss of human lives, livestock, crops and other properties. Among the cyclones in the coastal belt the devastation of the cyclone which occurs in the 10th November 1970 and 29th April 1991 was highly catastrophic. In 1970 the human death was 300,000 and in 1991 was 130,000 respectively. The incidence of such type of flooding occurs from June to September with an increasing trend.

Table:1

The losses of livestock due to flood damage in 1998 is shown in the following table

Sl. no	**Death of animals and birds**	No	Financial loss in million (Tk)
1	a. Cattle and buffalo	5326	33.13
	b. Goat and sheep	9297	
	c. chicken and ducks		
2	**Indirect Loss of affected animals and birds (non farm)**		
	a. Cattle and buffalo	7706238	25813.35
	b. Goat and sheep	4183195	
	c. chicken and ducks	35157584	
3	**Estimated loss of private farms**		
	a. Dairy	16888	2890.47
	b. Poultry	52686	
4	**Loss of housing**		
	a. Cattle and buffalo	782445 sheds	2026.4
	b. Goat and sheep	278879 ,,	
	c. chicken and ducks	1173673 ,,	
	Total loss		**30793.38**

Source: Options for flood Risk and Damage Reduction in Bangladesh.

The department of livestock services (DLS) is responsible for mitigating flood losses in the livestock sector in close collaboration with other govt. and non govt. agencies. Responses from DLS in any types of disaster like flood including counseling of the farmers, information to media during and after flood, during flood to rescue the flood trapped animals, information gathering for calculating the losses, assessment of losses, relief operation, planning for rehabilitation for policy making, planning and mitigation etc. Preparation of rehabilitation plan at local and national levels with the help of Ministry and local govt. agencies. Communications and coordination among the governmental and with other non governmental agencies and stakeholders.

The main problems or immediate impact that are encountered livestock sub-sector during and after flood are identified so far,

- Rescue of flood trapped animals
- Safe transfer of animal's feeds and other valuables.
- Lack of accommodation
- Lack of food and safe water
- Veterinary care of sick animals and birds
- Marketing and preserving products
- Outbreak of diseases.
- Lack necessary counseling to owners
- Insufficient logistic supply and funding scarcity.
- Lack of coordination.
- Lack of transport for carry the animals and birds in safe place

- Lack of enough preparedness.
- Unavailability of fund to meet the emergency requirement by the DLS as because there is no direct provision for keeping fund in district livestock office. But there is a probation of funding from district disaster management fund which are common for all other department and it needs time to release.

The post flood situation sometimes may become very critical due to the following:

i. Scarcity of animal feeds and fodder
ii. Scarcity of cash money for buying inputs by the farmers.
iii. Chance of disease outbreaks like Anthrax, Black quarter, FMD, HS, NCD, Coccidiosis, parasitic diseases, fowl cholera, Duck plaque, etc.
iv. Unavailability of some inputs- like, vaccines, medicines etc. due to excess demand.
v. Lack of shelters
vi. Delayed starting of rehabilitation which aggravates the situation
vii. Insufficient allocation of funds
viii. Unstructured procurement system
ix. Loss of productivity due to over dependency and stress.

Figure: 2

2. Tropical cyclones, Sidr, Aila and storm surges

A severe tropical cyclone hits Bangladesh, on average, every 3 years. These storms generally form in the months just before and after the monsoon and intensify as they move north over the warm waters of the Bay of Bengal. They are accompanied by high winds of over 150 KPH and can result in storm surges up to seven meters high, resulting in extensive damage to houses and high loss of life of humans and livestock in coastal communities. In the context of cyclone, sidr like disaster, the destruction usually becomes catastrophic. The early warning to the livestock farmers in accordance with other people is the most important aspect of saving life and properties. Since 1876 to until 2007, 10 strongest cyclones hit Bangladesh. "SIDR" developed in

the Bay of Bengal in early November 2007and it further intensified into a category 4 storm system (on the Saffir-Simpson Scale) with peak sustained winds of up to 215 km/h (135 mp/h) (peaking at 260 km/hour). The cyclone made landfall in Bangladesh in the November 15, 2007. SIDR and its surge resulted in thousands of deaths and massive destruction of coastal communities.

The tropical cyclones in 1970 and 1991 are estimated to have killed 500,000 and 1430,00 people, respectively. The storm surges are higher in Bangladesh than in any other neighboring countries. Tracks of cyclones over the last 50 years in Bangladesh are so high among the neighboring countries as because the Bay of Bengal narrows towards the north, where Bangladesh is located. In recent years, general cyclonic activity in the Bay of Bengal has become more frequent, causing turbulent the sea that can make it difficult for fishermen and small craft to put to the sea. Bangladesh has a world-renowned community based early warning system and has built cyclone shelters on stilt, so that the storm surge can flow underneath. These shelters typically provide refuge to over 700 people and have separate spaces for women and men. However, people are often reluctant to go to the shelters, leaving their livestock and other assets behind. It is very essential to safe the livestock from the curse of the cyclone, sidr, Aila etc. Now the DLS is establishing killa for animals which until now are not well protected against the cyclone. It is very authentic that the valuables like livestock cannot be given up by the people at the time of calamities. It will be wise to built the Killas nearby or in the same campus of the cyclone shelter from where the owner of the animals can take care or supervise their animals.

Death Toll and Damages Most of the cyclones that have made landfall in Bangladesh in the past have caused thousands of deaths. "SIDR" was no exception. According to official accounts 3,447 people lost their lives in SIDR 2007. It is estimated that more than thousands injured, or missing. Hundreds of thousands of people were displaced and became homeless. The damage in Bangladesh was extensive. About a quarter of the World Heritage Site "Sunderbans" was damaged. The entire cities of Patuakhali, Barguna and the Jhalokati District were hit hard by the cyclone's surge of over 5 meters (16 ft). There was extensive flood damage at Barisal and across the port city, Mongla, as the cyclone's surge rolled in. In the town of Mothbaria, one of the towns in the very center of the devastation, there was hardly anything left standing, except of a few brick and concrete buildings. Houses and schools were demolished. The storm's surge washed away all roads in the region. About 500 fishing boats were unaccountable and over 3,000 fishermen were reported missing.

Much of the capital city of Dhaka was also severely affected due to the winds and the flooding which affected the city's infrastructure. Electricity and water service were cut. The agricultural industry of Bangladesh was devastated by the flooding which covered about1 million hectares of farmable land. In brief, "SIDR" affected about 2 million families comprising about 9 million people. More than 1.5 million homes were destroyed.

Figure:4

Livestock killed in 17 Sidr-hit districts

Name	Killed
Cow	37,391
Buffalo	7,211
Goat	59,804
Sheep	3517
Hen	22,19,328
Duck	3,53,691

Sources: Department of Livestock Services, Dhaka

In order to protect people from severe storms and tidal surges, more than 2,100 cyclone shelters have been built in the coastal districts. Construction of cyclone shelters is one of key mitigating measures along with embankments, a forestation, early warning systems, awareness building and communications. According to a government estimates, around 1.5 million people took refuge in cyclone shelters when Cyclone Sidr hit the coast of Bangladesh in November, 2007. In 2007, cyclone shelters and the very effective early warning system helped to limit the number of human fatalities, to around 3,500. This is still **3,500 too** many but a small fraction of the loss incurred in 1991 when some 143,000 lives were lost due to the less effective early warning system and lack of shelters. The multi-purpose cyclone shelter is a concrete example of indigenous adaptation to extreme climatic events in Bangladesh.

The fatalities of human were less although there was probability to loss much more human life in sidr 2007. It was possible due to preparedness and also the presence of cyclone shelters. The death in Livestock was 44,602 cattle (37391 cow + 7211 Buffalo), 63,321 sheep and goat and 25,73,019 chicken & duck. The huge death of Livestock is indicating the remarkable weakness or negligence of the preparedness of cyclone/sidr for saving the life of animals and birds. After the devastating sidr of 2007 it was found that the livelihood of the affected people has become

very vulnerable due to loss of their livestock and other agricultural means of livelihood. It is generally agreed by the all sections of development expert that livestock is the good savings to escape following any natural calamities for the rural poor people. But the loss of livestock was much higher which was almost as like as other devastating cyclone in this region as because the improvement in this sector was not commensurable to the efforts like to save human life. Basically the sector was somehow ignored. The Killa which was constructed to save the life of animals is not able to provide full safety to the animals. The Killa is open where there is no shed to save the animals from the high speed storm. In 2007 at the time of SIDR the wind speed was 215 km/hour and the surge was 5 meter high(16ft). The animal cannot resist such a high speed with tidal surge and heavy rainfall. So, the effectiveness of such Killa is not proved well. It would be wise to add some of the appendages with the existing design of killa which are mentioned below.

- The location of the Killa by the users should be well connected with communication network.
- The mounds of the killa should be at least 22ft high.
- Soil should be collected at least 300 meter away from the proposed Killa. If soil collected from the near by proposed pond, on those circumstances the edge of the pond may not reach up to 22 ft high to protect saline water during cyclone surge.
- The elevated mounds of the killa should be well slopped.
- The slope of the Killa will be protected by implanting para grass (Brachiaria Mutica) in the initial stage. Para grass has a lot of roots which protect the soil from erosion. Well structured animal shed to be built on the mounds.
- The shed will be one stored building with concrete roof or the roof may be built with corrugated tin sheet on the Iron structure which can resist the wind speed more than 250 km/h. The construction of shelter in the Killa is necessary for the following rationale

  i. During cyclone there are rainfall accompanied with cold weather. ii. Due to high velocity of the wind there is every possibility to displace the animals from the killa if it remain open. So, the protection of the animals from wind, rain and cold is necessary otherwise the animal will be affected by diseases due to stress or may die instantly. iii. In one side of the Killa there must be a provision for staying of the owner as because supervision and security of the animals from owner side is essential. Iv. It will be wise to prepare the Killas with appropriate design with the above mentioned facilities, if not, the keeping of animals in the open air may become insignificant efforts.
- To protect the safety of the animals from thief / dacoits appropriate authority should be there.
- In the Killa there must be a pond with raised mound to protect infiltration of saline water inside the ponds and from where animals can get fresh drinking water even after tidal surge or cyclone or sidr/aila.

- Another option for the construction of killa as like as human cyclone shelter on RCC pillar leaving 22 feet beneath the shelter with a easy slopped steps/ siri and the location of killa should be nearby the Cyclone shelter. The killa should have source of feed and fresh water for animals.
- The management of the killa in the off season should be as like as human cyclone shelter, i.e could be used as school after proper washing or periodic warehouse or may be vacant with care taker.

3. DROUGHT

Droughts in Bangladesh are seasonal and can devastate crops, causing hardship to poor agricultural labor and others who cannot find work. In these areas, monga (unemployment leading to seasonal hunger) is often a problem, especially in the months leading up to the November-December rice harvest. If the crop totally fails because of drought, the situation for poor people and livestock can become critical. Droughts most commonly affect the northwestern region, which generally has lower rainfall than the rest of the country.

Figure:12 Drought in Bangladesh

Drought has long been considered to be a hazard responsible for ups and downs of many civilizations in the world. Drought occurs when rainfall is absent for a prolonged period of time, causing earth to parch, wells to dry, underground water to fall, crops to wither leading to crop failure and scarcity of fodder for livestock. Because of meager supply of water, food and fodder both humans and livestock suffer untold miseries. Drought extends its ominous tentacles slowly but surely. In Bangladesh, drought in the northern districts is very common. The hydrological and climate conditions of Bangladesh are characterized by 'too much water in the wet monsoon season and too little water in the dry months, creating a drought environment. The bad weather of this monsoon may put many farmers in a difficult situation. So, the government should take a long-term mitigation programs in order to alleviate the effects of drought.

4.**Salinity Intrusion**

Saline water intrusion is mostly seasonal in Bangladesh; in winter months the saline front begins to penetrate inland, and the affected areas rise sharply from 10 percent in the monsoon to over 40 percent in the dry season.

Coastal districts such as Satkhira, Khulna, Bagerhat, Barguna, Patuakhali, Barisal are the victims of salinity intrusion. Agricultural production, fisheries, livestock, and mangrove forests are affected by higher salinity in the dry season. It is observed, in the dry season the river flow has a declining trend and become feeble as a result the saline water from sea infiltrating to the inland water resulting contamination both surface and ground water. The salinity affects the indigenous fodder/grasses along the river side and other low laying areas near by the streams and rivers. The grasses become damaged as a result the livestock and other harbivorous animals deprived from fodder. Another direct consequence is that the animals can not drink the saline water and suffers from drinking water scarcity. The predators and deer of mangrove forest fall in a very dangerous situation as because they have no access of drinking water outside the natural sources. The local people has expressed their experience that in the dry season the deer leave the forest and enter into the locality resulting hunting by the local people which disrupting the biodiversity.

Salinity data from Land Reclamation Program (LRP) and Meghna Estuary Study (MES) indicate an enormous seasonal effect due to the influence of huge fresh water discharge from the Lower Meghna River on the horizontal distribution of salinity in the estuary. This distribution is strongly influenced by the fresh water flow in the Lower Meghna River.

High salinity both in monsoon and dry season in the southwest corner and along the Pussur-Sibsa system of the area is associated with the decreasing upstream freshwater flow as well as silting of major channels.

5. Earthquake

Bangladesh and the northeastern Indian states have long been one of the seismically active regions of the world, and have experienced numerous large earthquakes during the past 200 years. The catastrophic earthquakes of 1762 and 1782 are believed to have been partially responsible for the diversion of the main flow of the Old Brahmaputra River from the west to present Jamuna River and main flow of the Arial Kha river to the present Padma channel. Reliable historical data for seismic activity affecting Bangladesh is available only for the last 450 years. Recently developed earthquake catalogue for Bangladesh and surrounding areas shows 1200 earthquakes with a magnitude (Ms) of 4.0 have occurred between 1885 and 1995, within a 200 km radius of Bangladesh. An earthquake is the sudden, rapid shaking f the earth caused by the breaking and shifting f subterranean rock as it releases strain that has accumulated ver a lng time.

Before an Earthquake

The following are things you can do to protect yourself, your family and your property in the event of an earthquake.

- To begin preparing, you should build an emergency kitand make a family communications plan.
- 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.

- Fasten heavy items such as pictures and mirrors securely to walls and away from beds, couches and anywhere people sit.
- Brace overhead light fixtures and top heavy objects.
- Repair defective electrical wiring and leaky gas connections. These are potential fire risks. Get appropriate professional help. Do not work with gas or electrical lines yourself.
- Install flexible pipe fittings to avoid gas or water leaks. Flexible fittings are more resistant to breakage.
- Secure your water heater, refrigerator, furnace and gas appliances by strapping them to the wall studs and bolting to the floor. If recommended by your gas company, have an automatic gas shut-off valve installed that is triggered by strong vibrations.
- Repair any deep cracks in ceilings or foundations. Get expert advice if there are signs of structural defects.
- Be sure the residence is firmly anchored to its foundation.
- Store weed killers, pesticides, and flammable products securely in closed cabinets with latches and on bottom shelves.
- Locate safe spots in each room under a sturdy table or against an inside wall. Reinforce this information by moving to these places during each drill.
- Hold earthquake drills with your family members: Drop, cover and hold on.

Know the Terms

Familiarize yourself with these terms to help identify an earthquake hazard:

Aftershock - An earthquake of similar or lesser intensity that follows the main earthquake.

Earthquake - A sudden slipping or movement of a portion of the earth's crust, accompanied and followed by a series of vibrations.

Epicenter - The place on the earth's surface directly above the point on the fault where the earthquake rupture began. Once fault slippage begins, it expands along the fault during the earthquake and can extend hundreds of miles before stopping.

Fault - The fracture across which displacement has occurred during an earthquake. The slippage may range from less than an inch to more than 10 yards in a severe earthquake.

Magnitude - The amount of energy released during an earthquake, which is computed from the amplitude of the seismic waves. A magnitude of 7.0 on the Richter Scale indicates an extremely strong earthquake. Each whole number on the scale represents an increase of about 30 times more energy released than the previous whole number represents. Therefore, an earthquake measuring 6.0 is about 30 times more powerful than one measuring 5.0.

Seismic Waves - Vibrations that travel outward from the earthquake fault at speeds of several miles per second. Although fault slippage directly under a structure can cause considerable damage, the vibrations of seismic waves cause most of the destruction during earthquakes.

6.Tsunami

Underwater strong earthquakes, volcanic eruption or other submarine landslide usually causes tsunamis. When earthquake occur offshore at subduction zones (places where a tectonic plate that carries an ocean is gradually slipping under a continental plate).

Some tsunamis can be very large. In coastal areas their height can be as great as 30 feet or more (100 feet in extreme cases), and they can move inland several hundred feet.

A tsunami consists of a series of waves. Often the first wave may not be the largest. The danger from a tsunami can last for several hours after the arrival of the first wave. Tsunamis can move faster than a person can run. Tsunamis can occur at any time, day or night.

Although infrequent, tsunamis are among the most terrifying and complex physical phenomena, and have been responsible for great loss of life and extensive destruction to property. Because of their destructiveness, tsunamis have important impacts on the human, social, and economic sectors of societies.
Considering the state of tsunami vulnerability and potential seismic sources, Geological Survey of Bangladesh has divided the Bangladesh coastal belt into three zones;

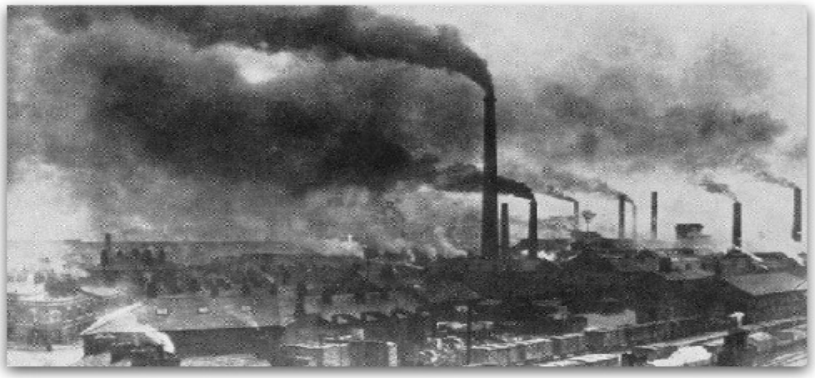
- Tsunami Vulnerable Zone- I (Chittagong-Teknaf coastline) Most vulnerable.
- Tsunami Vulnerable Zone- II (Sundarban-Barisal coastline) Moderately vulnerable.
- Tsunami Vulnerable Zone- III (Barisal-Sandwip estuarine coastline) Low vulnerability.

7.Environmental pollution:

Environmental pollution is great concern for livestock and also for bi-diversity. The world is becoming industrialized very rapidly. Even the LDC's has got momentum for developing industry. The huge amount of different types of industrial wastage is coming to the nature every day and normally pouring into the rivers, streams, oceans, lakes which are polluting the water. Due to the pollution the fresh source of drinking water for scavenging animals and birds are shrinking day by day. The most dangerous chemicals such as the wastage of insecticides, pesticides, lead, Arsenical compounds is mixing with water. In Bangladesh the water pollution is wide spread in water, air and soil.
Environmental pollution is "the **contamination** of the physical and biological components of the earth/ atmosphere system to such an extent that normal **environmental processes** are adversely **affected**".
"Pollution is the introduction of **contaminants** into the environment that cause **harm** or **discomfort** to humans or other living organisms, or that damage the environment" which can come "in the form of chemical substances, or energy such as noise, heat or light". "**Pollutants**

can be naturally occurring substances or energies, but are considered contaminants when **in excess of natural levels**."

Although pollution had been known to exist for a very long time (at least since people started using fire thousands of years ago), it had seen the growth of truly global proportions only since the onset of the *industrial revolution* during the 19th century.



Environmental Pollution

Environmental Pollutants:

Environmental pollutants are constituent parts of the pollution process. They are the actual "*executing agents*" of environmental pollution.

They come in *gaseous*, *solid* or *liquid* form.

It is interesting to note that, as of 1990, there were around 65,000 different chemicals in the marketplace, i.e. potential environmental pollutants that were to be released into air, water and land on a regular basis.

Pollutants don't recognize boundaries, i.e. they are *transboundary*;

- Many of them can't be degraded by living organisms and therefore stay in the ecosphere for many years; and
- They destroy biota and habitat.

These points emphasize that pollutants present a serious long-term *global* problem that affects more or less every country and, therefore, can only be solved by a *coordinated set of actions* and *unwavering commitment* of nations to international environmental agreements.

In order to develop and implement an effective international policy for pollutants' management, it is important, among other factors, to understand their decomposition mechanisms.

We know that decomposition of pollutants can occur either *biologically* or *physicochemically*.

Types of Environmental Pollution

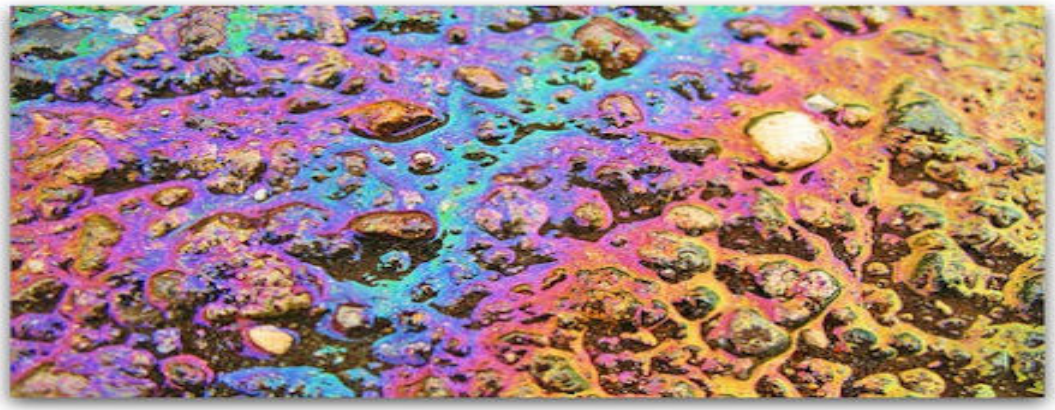
Generally speaking, there are many but the most important ones are:

- Air pollution
- Water pollution
- Soil pollution (contamination)

Some of the most notable air pollutants are sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, volatile organic compounds (VOCs) and airborne particles, with radioactive pollutants probably among the most destructive ones (specifically when produced by nuclear explosions).

Sources of Environmental Pollution

Fossil Fuel Sources of Environmental Pollution



Oil Pollution

In modern industrialized societies, fossil fuels (oil, gas, coal) transcended virtually all imaginable barriers and firmly established themselves in our everyday lives.

Not only do we use fossil fuels for our obvious everyday needs (such as filling a car), as well as in the power-generating industry, they (specifically oil) are also present in such products as all sorts of plastics, solvents, detergents, asphalt, lubricating oils, a wide range of chemicals for industrial use, etc. Combustion of fossil fuels produces extremely high levels of *air pollution* and is widely recognized as one of the most important "target" areas for reduction and control of environmental pollution. Fossil fuels also contribute to *soil contamination* and *water pollution*. For example, when oil is transported from the point of its production to further destinations by pipelines, an oil leak from the pipeline may occur and pollute soil and subsequently groundwater. When oil is transported by tankers by ocean, an oil spill may occur and pollute ocean water.

Power-generating plants and transport are probably the biggest sources of fossil fuel pollution.Common sources of fossil fuel pollution are:

Industry:

- Power-generating plants

- Petroleum refineries
- Petrochemical plants
- Production and distribution of fossil fuels
- Other manufacturing facilities

Transport:

- Road transport (motor vehicles)
- Shipping industry
- Aircraft

For example, it's been recently noted that packaging of products sold in supermarkets and other retail outlets is far too excessive and generates large quantities of solid waste that ends up either in landfills or municipal incinerators leading to *soil contamination* and *air pollution*.

Residential sector is another significant source of pollution generating solid municipal waste that may end up in landfills or incinerators leading to *soil contamination* and *air pollution*.

Environmental Pollution Effects

Environmental pollution effects can be truly damaging.

Some of the effects of air pollution include asthma, reduced energy levels, irritation of eyes, disruption of the immune system, malfunction of the central nervous system, cancer.

Water pollution can cause skin rashes & allergies, all sorts of water-borne infections, vomiting & stomach aches, malfunction of the central nervous system and so on in man and animals.

In the industrial area of Bangladesh specially around 50 km radius of Dhaka there are hundreds of thousands of different types of industries are located. The pollutants from those industries are pouring to the river Buriganga, Sithtalakha, Torag and demaging the biodiversity of the region. The destruction of fish breeding ground is the first impact. The livestock in the region is in high threat as because our small holder farmers used to rear their livestock near by the pasture land of the contaminated area of streams and rivers. The livestock are getting detrimental effect of the pollution in many ways such as intake of contaminated water, the grass grown in the contaminated area, sometimes non digestible materials like plastic materials, iron particle or other metallic substance, synthetic pieces of cloth etc. The excessive drainage of human excreta, industrial, garbage pollutants is also the physical cause of river congestion and promoting rapid siltation of natural water sources in the region. As we know the chemical does harm human animals in many ways such as direct intake in intestine causing toxicity, diarrhea, death etc and direct contact on the body. Due to contact of contaminated water causing itching, allergy, direct injury due corrosive action of some chemicals.

Impacts of environmental pollution in livestock:

1. Causing diseases in animals like allergy, skin irritation, diarrhea, Indigestion, Asthma, Toxicity,
2. Damaging of fodder source.
3. New diseases arising in different unknown form which are sometimes confusing to physicians.
4. Destruction of biodiversity of plants and animals, as result the animals are getting deprivation from beneficial plant.
5. Farming of livestock is facing a critical problem due to lack of pure of water.
6. There are high mortality in animals due to polluted water and pasture land.
7. Decreased productivity of livestock.
8. Human health hazards arising from the consumption of contaminated eggs, meat, milk due to residual affects some chemicals which are deposited in animal body.
9. Indigestion of livestock due intake of polluted water.

8.Emerging diseases

Due to impact of Green House Gas causing higher ambient temperatures, as well as floods and droughts, are likely to adversely affect poultry and livestock. Higher temperatures will limit the feed intake of animals which stunted the growth of chicken, broilers and other birds. It is found that the cows and birds can consume more food until temperature 30 degree Celsius. In case of poultry feed intake drastically falls at 33 degree Celsius and at 35 degree Celsius chicken specially the broiler starts to die and more than 40 degree Celsius mortality become very high. In case of cattle at 42 degree Celsius the feed intake of cattle is zero. However the feed intake reduces with the increase of temperature. Grazing lands may no longer be productive due to rising salinity in coastal areas and droughts. Higher temperatures and humidity may affect animal health through the more rapid breeding of parasites and bacteria. These changes are likely to seriously affect the livelihoods of livestock farmers and the availability of livestock products in Bangladesh. It is necessary to understand these processes, develop appropriate adaptive measures, field test them and make them available to livestock and poultry farmers, many of whom are among the poorest and most vulnerable people in the country.

Among the emerging diseases Bird flu or Avian Influenza is the most pandemic disease in the world. Gumboro disease, Newcastle disease are also a potential threat to poultry industry in Bangladesh which are the reemerging diseases causing huge economic loss in the poultry sector.

In case of large animals Anthrax and Foot and Mouth Disease are the potential threat of livestock and human being. These two disease also have the zoonotic importance.

a. Avian Influenza(A.I)

History and background Avian influenza H5N1 in the world: The H5N1 virus subtype - a highly pathogenic AI virus- first infected humans in 1997 during a poultry outbreak in Hong Kong SAR, China. Since its widespread re-emergence in 2003 and 2004, this avian virus has spread from Asia to Europe and Africa and has become entrenched in poultry in some countries, resulting in millions of poultry infections, several hundred human cases, and many human deaths. Outbreaks in poultry have seriously impacted livelihoods, the economy and international trade in affected countries. Ongoing circulation of H5N1 viruses in poultry, especially when endemic, continues to pose threats to public health, as these viruses have both the potential to cause serious disease in people and may have the potential to change into a form that is more transmissible among humans. Other influenza virus subtypes also circulate in poultry and other animals, and may also pose potential threats to public health. The continuing outbreaks of high pathogenic avian influenza(HPAI) in several southeast ASIAN countries that begun in late 2003 and early 2004 have been disastrous to poultry industry in the region and have raised serious global public health concerns. Over 150 million domestic poultry have either died or been destroyed and over a hundred people contracted the infection, of which case to359 have died since 2003.Indonesia has been the latest country in which human fatalities cases have been documented. Economic losses to the Asian poultry sector are estimated at around $ 10 billion, but despite control measures the diseases continues to spread, causing further economic losses and threatening the livelihood of hundreds of millions of poor livestock farmers, jeopardizing small holder entrepreneurship and commercial poultry production and seriously impeding regional and international trade market opportunities.

With the present situation, the potential of HPAIi virus become transmissible among humans is of serious concern to the global community. If the virus adapts itself to human to human transmission, millions of lives may be threatened. The WHO estimates that millions people could die of HPAI, should a human pandemic occur. Considering potential for scenario, the recent regional meeting in ho chi minn city, Vietnam and the international scientific AI conference in Paris in April 2005 have strongly recommended that a global strategy be developed and implemented to help stem the broad negative impact of the diseases. Since then a regional meeting in Kualalumpur was held organized by FAO/OIE and WHO on Avian Influenza and Human Health.

FAO and OIE, in collaboration with WHO, Have taken the initiative to start a stepwise and a consultative process of developing the global strategy. The approach is seen as an integral part of the FAO/OIE Global Framework for the control of trans-boundary animal diseases(GF-TADs).The first step in this process has been the development of a strategy for Asia, the region of major HPAI crisis. This step has now been completed through a formal consultative meeting of the key stallholders in Asia, held in Bangkok in mid-May 2005.The draft document presented here is an evolving document that describes a strategy for HPAI control in and beyond Asia. The documents provides a long term vision, goal, approach and implementation plans to control HPAI in Asia with a phased diseases control programme.Due to the recent spread of the diseases in other regions, the global strategy is expanded and similar plans for central Asia,Africa,Americas and Europe will be developed.

Vision and goal: The long-term vision of the strategy is to minimize the global threat and risk of HPAI in domestic poultry and humans, through progressive control and eradication of HPAI, particularly that caused by H5N1 virus, from terrestrial domestic poultry in Asia. Achieving this goal will diminish the global threat of human pandemic, stabilize poultry production, enhance a robust regional and international trade in poultry and poultry products, increase human and food safety, and improve the livelihoods of the rural poor.

History of outbreaks in Bangladesh: HPAI was declared by the Government in 22nd March.2007. The disease moved to the South western part quickly within few days and first incidence from backyard flock (native chicken) was detected in April/2007. Within a month disease moved to Northern part of the country. The first wave continued till July 2007 with steady regression of number of cases. Total Number of outbreaks were 55 during the first wave. No disease was reported in August 2007.Second wave of outbreak started in September 2007. The number of outbreaks was climbing steadily and reached at peak in February 2008 with 96 outbreaks. Number of outbreaks during the second wave till 20March/2008 is 187. Outbreak were reported in both backyard poultry and commercial chickens. No outbreak is reported in ducks till to date. Since 2003 there are outbreaks in Bangladesh in each year until 2012. Around 22 outbreaks HPAI has been encountered in Bangladesh IN 2012.

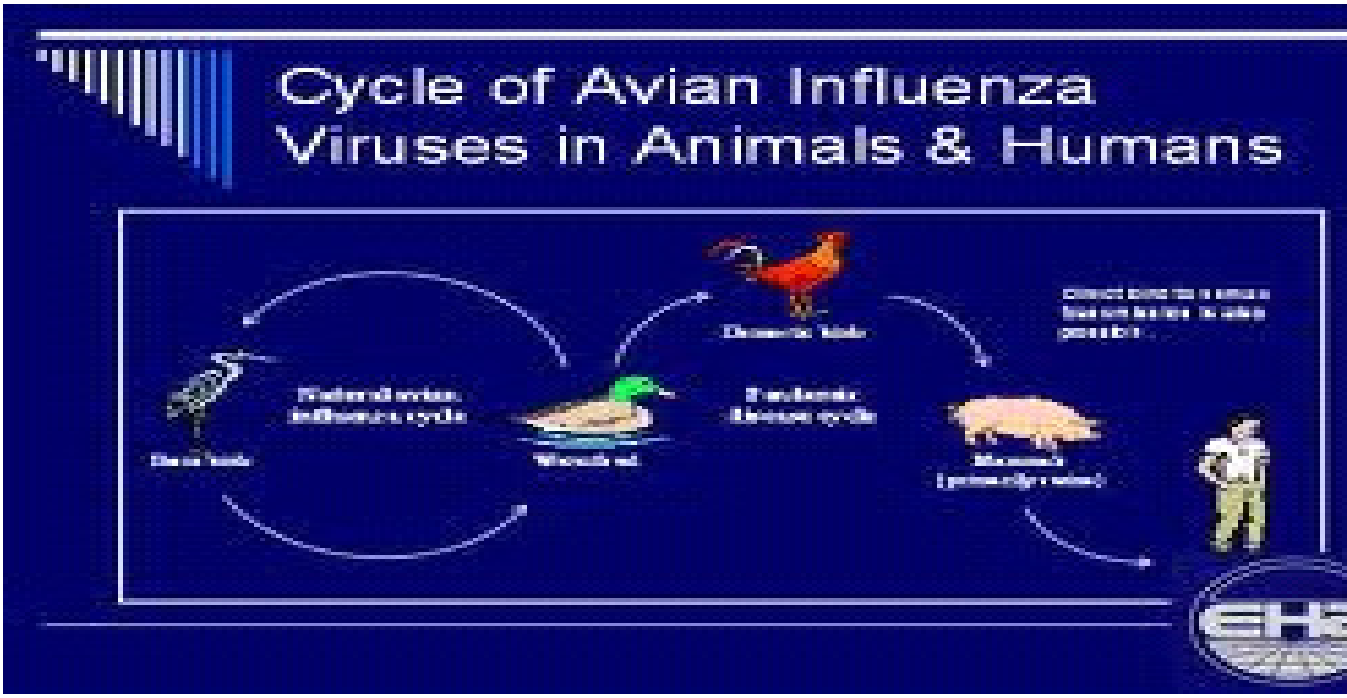
Global Strategy for Prevention and control of HPAI

Key features of the disease

- Avian influenza (AI), commonly called bird flu, is an infectious viral disease of birds.

- Most avian influenza viruses do not infect humans; however some, such as H5N1, have caused serious infections in people.

- Outbreaks of AI in poultry may raise global public health concerns due to their effect on poultry populations, their potential to cause serious disease in people, and their pandemic potential.
- Reports of highly pathogenic AI epidemics in poultry can seriously impact local and global economies and international trade.
- The majority of human cases of H5N1 infection have been associated with direct or indirect contact with infected live or dead poultry. There is no evidence that the disease can be spread to people through properly cooked food.
- Controlling the disease in animals is the first step in decreasing risks to humans.



Avian influenza H5N1 infections and clinical features in humans

- The case fatality rate for H5N1 virus infections in people is much higher compared to that of seasonal influenza infections.

Clinical features

- In many patients, the disease caused by the H5N1 virus follows an unusually aggressive clinical course, with rapid deterioration and high fatality. Like most emerging disease, H5N1 influenza in humans is poorly understood.
- The incubation period for H5N1 avian influenza may be longer than that for normal seasonal influenza, which is around two to three days. Current data for H5N1 infection indicate an incubation period ranging from two to eight days and possibly as long as 17 days. WHO currently recommends that an incubation period of seven days be used for field investigations and the monitoring of patient contacts.
- Initial symptoms include a high fever, usually with a temperature higher than 38oC, and other influenza-like symptoms. Diarrhoea, vomiting, abdominal pain, chest pain, and

bleeding from the nose and gums have also been reported as early symptoms in some patients.

- One feature seen in many patients is the development of lower respiratory tract early in the illness. On present evidence, difficulty in breathing develops around five days following the first symptoms. Respiratory distress, a hoarse voice, and a crackling sound when inhaling are commonly seen. Sputum production is variable and sometimes bloody.

Risk factors for human infection

- The primary risk factor for human infection appears to be direct or indirect exposure to infected live or dead poultry or contaminated environments. Controlling circulation of the H5N1 virus in poultry is essential to reducing the risk of human infection. Given the persistence of the H5N1 virus in some poultry populations, control will require long-term commitments from countries and strong coordination between animal and public health authorities.
- There is no evidence to suggest that the H5N1 virus can be transmitted to humans through properly prepared poultry or eggs. A few human cases have been linked to consumption of dishes made of raw, contaminated poultry blood. However, slaughter, defeathering, handling carcasses of infected poultry, and preparing poultry for consumption, especially in household settings, are likely to be risk factors.

Human pandemic potential

- Influenza pandemics (outbreaks that affect a large proportion of the world) are unpredictable but recurring events that can have health, economic and social consequences worldwide. An influenza pandemic occurs when key factors converge: an influenza virus emerges with the ability to cause sustained transmission from human-to-human, and there is very low, or no, immunity to the virus among most people. In the interconnected world of today, a localized epidemic can transform into a pandemic rapidly, with little time to prepare a public health response to halt the spread of illness.
- The H5N1 AI virus remains one of the influenza viruses with pandemic potential, because it continues to circulate widely in some poultry populations, most humans likely have no immunity to it, and it can cause severe disease and death in humans. In addition to H5N1, other animal influenza virus subtypes reported to have infected people include avian H7 and H9, and swine H1 and H3 viruses. H2 viruses may also pose a pandemic threat. Therefore, pandemic planning should consider risks of emergence of a variety of influenza subtypes from a variety of sources.

WHO response

- Animal health agencies and national veterinary authorities are responsible the control and prevention of animal diseases, including influenza. WHO, World Organisation for Animal Health (OIE), and Food and Agriculture Organization (FAO) collaborate through a variety of mechanisms to track and assess the risk from animal influenza viruses of public health concern, and to address these risks at the human animal interface wherever in the world they might occur.

Capacity building

Inadequate capacity in many countries is the principal limiting factor for effectively and quickly stamping out and controlling infectious diseases. Thus the strategy suggests building a strong and sustainable human and physical resource capacity, especially in countries at immediate risk, to respond in a more effective and timely manner in stamping out, linked to a compensation policy, not only for HPAI outbreaks but also other newly-emerging infectious zoonotic and trans boundary animal diseases (TADs). Capacity building will be wide ranging and include all aspects of disease control as well as policy development and socio-economic impact analysis.

Strategic research

The global strategy recognizes that the dynamics of the current rapid spread and persistence of HPAI remain unclear. Therefore, the strategy will facilitate strategic research to investigate the epidemiology of avian influenza, evaluate the efficacy of vaccines in domestic ducks to reduce virus shedding in domestic duck reservoirs, of HPAI transmission dynamics in migratory birds, and work in close collaboration with regional and international advanced research institutions (ARIs) and wildlife organizations, to promote the development of improved vaccines and rapid diagnostic tests.

Implementation

The global strategy will be implemented at the national, regional and international levels. At the national level, well-defined country specific projects will be formulated.

At the international level, coordination of the national programs and sub regional networks will be under the umbrella of GF-TADs (global framework for the control of trans boundary animal diseases), a joint FAO/OIE initiative. The international coordination will provide technical backstopping to the sub regional networks and national programs, promote international cooperation will provide technical backstopping of the sub regional networks and national programs, promote international cooperation, and mobilize and coordinate resources for HPAI control. The regional coordination will be supported by the GF-TADS regional steering committees and by FAO's Regional Office for Asia and the Pacific (FAORAP, Bangkok) and in Regional/Sub regional FAO Offices in Budapest, Nairobi, Bamako, Tehran, Cairo and corresponding OIE regional offices in Tokyo, Beirut, Buenos Aires, Bamako and Sofia.

The global HPAI control and eradication programs will draw on the experience of other countries, and will be guided by FAO's experience of the Global Rinderpest Eradication Campaign (GREP) in successfully controlling and eradicating Rinderpest in Asia.

Partners: The main partners in implementation of the strategy will be the infected and non-infected at risk countries, the new countries at immediate risk, and the regional organizations (e.g. ASEAN and SAARC, Economic Cooperation Organization (ECO), Arab Maghreb Union (AMU), AU-IBAR (African Union Inter African Bureau for Animal Resources) and Southern Africa Development Community (SADC) , all of which are committed to controlling

transboundary animal and zoonotic diseases (see Appendix 9 for details). Given the zoonotic nature of the HPAI, and the complex interface between farming systems, livestock trade, food safety and public health, a strong international partnership among FAO, OIE and WHO will be continued. This partnership will promote joint epidemiological studies, harmonize contingency plans, and promote public awareness and share virus strains and other technical information. A number of other partners will be involved, important among these would be the private sector, NGOs and regional national agriculture extensions systems (NARES) and selected wildlife organizations.

WHY A GLOBAL STRATEGY?

The rationale for developing and implementing a global strategy for the control of HPAI is multiple Key reasons include: HPAI is a highly infectious and dynamically evolving disease that spreads rapidly and widely across countries and continents.

HPAI is often zoonotic and trans boundary in nature, with the potential to cause a global human pandemic. HPAI has emerged and spread rapidly as a consequence of globalized markets. HPAI may be transported widely and quickly by migratory birds, along flyways and in resting or nesting areas. HPAI impacts on the livelihoods of millions of people, especially the rural poor. HPAI threatens regional and international trade and paces the global poultry industry in the developed and developing worlds at risk.LPAI results from low pathogenic avian influenza (LPAI), which is present in wild birds in many parts of the world. All countries in the world are at risk of being infected unexpectedly. HPAI outbreaks are beyond the scope and resources of a single country or region to control. Protecting global human health and well-being is a responsibility of the international community. The immediate short term objective is to reduce the risk to humans by preventing further spread of HPAI is those countries that are currently infected by H5N1. Of these, the focus has been on Viet Nam, Cambodia and Thailand and is now centered on Indonesia, all of which has had, or is continuing to have human cases of bird flu. The strategy has proposed aggressive control measures for Viet Nam through the deployment of the conventional control methods of culling, bio security and movement control, combined with strategic vaccination of domestic poultry and ducks. To this end, evaluation of the feasibility of vaccinating ducks and the study of the epidemiology of the disease have begun, to develop approaches to duck vaccination in Viet Nam and other countries with large duck populations.

Indonesia, which has experienced widespread H5N1-infection since 2004, is now reporting deaths and illness from human avian influenza. The country has adopted a strategy of wide scale vaccination in the predominantly commercial and backyard poultry sectors with variable success in reducing the incidence of the disease. However, the large scope of the HPDI problem in the vast smallholder poultry sector of this huge country requires a medium to long them strategy to progressively control the disease. Bali, Lombok, South Sulawesi, South Sumatra, Central Kalimantan and all of Java will be targeted by continuing vaccination, deploying OIE approved vaccines with strict post-vaccination monitoring and stricter bio security and stamping out, to progressively confine he disease to defined foci in Java and establishing disease free compartments and zones. In Indonesia, massive emergency intervention is urgently needed to prevent further spread of the disease, especially in densely populated Java where human fatalities and clinical cases have occurred.

Present surveillance: The DLS is conducting regular surveillance to identify any outbreak in the country. The govt. has massive network for surveillance and regular reporting system.

Government Policy for HPAI control in Bangladesh:

- Depopulation of all birds in 1 Km radius of infected premise in case of backyard poultry
- Depopulation of the infected farm only, in case of commercial farm.
- Destruction or decontamination of all contaminated materials of the infected premise.
- Complete disinfection of infected and contaminated premise, transport and vehicle.
- Movement control of poultry and poultry product in the control zone.
- Surveillance program for early detection.
- Post outbreak surveillance in outbreak areas.
- Compensation for 100% of culled birds/eggs.
- Motivation for bio-security in farming practices.
- Supervision and disinfection in wet markets
- Disinfection of vehicles in border entry points and entry points of districts and sub-districts.
- Communication and awareness building.
- Radio, TV and print media publicity.
- Training programs.
- Strengthening of bio-security of poultry farms.

Support form the government for culling and surveillance operation

Sources of funding

- Government Program for HPAI control
- AIPRP support
- USAID (imput support)
- FAO (Expertise and input support)

Capacity building

Inadequate capacity in many countries is the principal limiting factor for effectively and quickly stamping out and controlling infectious diseases. Thus the strategy suggests building a strong and sustainable human and physical resource capacity, especially in countries at immediate risk, to respond in a more effective and timely manner in stamping out, linked to a compensation policy, not only for HPAI outbreaks but also other newly-emerging infectious zoonotic and trans boundary animal diseases (TADs). Capacity building will be wide ranging and include all aspects of disease control as well as policy development and socio-economic impact analysis. The Disaster and climate Risk Management program has taken initiative to trained the DLS officers on Bio-security of poultry farms.

Strategic research: The global strategy recognizes that the dynamics of the current rapid spread and persistence of HPAI remain unclear. Therefore, the strategy will facilitate strategic research to investigate the epidemiology of avian influenza, evaluate the efficacy of vaccines in domestic

ducks to reduce virus shedding in domestic duck reservoirs, of HPAI transmission dynamics in migratory birds, and work in close collaboration with regional and international advanced research institutions (ARIs) and wildlife organizations, to promote the development of improved vaccines and rapid diagnostic tests.

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Disposal pit: Disposal pit for dead birds or dead body is the highest priority and primary need for maintenance of proper bio-security and disease control. It is the observed that the small & medium poultry farms have an acute problem for disposal of dead birds. Due to lake of proper facilities, most of them dispose their birds indiscriminately. They just throw the dead birds to their nearby jungle, free water body, river from where stray dogs, jackal, dirt eating wild birds etc. disseminate most of the diseases which poses a serious threat to other healthy flocks. So, a low cost scientific pit for proper funeral of the dead birds has been developed. Meanwhile govt. is raising awareness of the farmers to dispose the dead birds in a scientifically developed pit.

b. Anthrax:

Anthrax has emerged as a zoonotic disease in Bangladesh during 2009 -2010. The human outbreaks were preceded by animal outbreaks. The animal anthrax known as 'Torka' is believed to be enzootic for long in Bangladesh. The disease caused by the bacterium *Bacillus anthracis* is primarily a disease of herbivores and was one of the main causes of uncontrolled mortality in cattle, sheep, goats, horses and pigs worldwide until the development of an effective vaccine and advent of antibiotics. Although the organism has always been high on the list of potential agents with respect to biological warfare and bioterrorism, humans almost invariably contract the natural disease directly or indirectly from animals or animal products.

Global condition

Through successful national programs, there has been a progressive global reduction in animal anthrax cases over the past three decades. The disease is now absent or only sporadic in the West Europe and the North America. Anthrax is hyper endemic in many countries of Africa with epizootic form in Chad and Ethiopia. In the Middle East, the disease is sporadic. Various levels of endemicity occur in central Asian countries, in western China and some other Southeast Asian countries. Anthrax is a severe problem in southern and eastern India. Humans are moderately resistant to anthrax and the incidence of anthrax in humans is low. Reported human: animal case ratios in a country reflect the economic condition, quality of surveillance, social traditions and dietary behavior. Whereas in northern Europe, there has been one human infection per 10 livestock cases, in Africa and Asia, there can be some 10 human cases per one livestock infection. There are approximately 10-100 thousand human incidences annually throughout the world with significant numbers of cases in Chad, Ethiopia, Zambia, Zimbabwe and India.

Figure: A typical lesion of an Anthrax affected patient

Bangladesh condition

Though there are not many reports, but anthrax in animal locally known as 'Torka' is believed to be enzootic in Bangladesh. Sixty two animal infections were recorded with 69% deaths from Pabna milk shed areas during 1980-84. In another report, there were found to be 333 animal cases during 1989-96 from Bangladesh. A number of outbreaks of animal anthrax were reported during 2009-10 infecting 140cattle and goat in different districts. The country has an estimated 23 million cattle, 1 million buffalo, 21 million goat and 3 million sheep. To prevent anthrax vaccination is practiced in the country since long. In 2009-2010, the total vaccine production was 38.29 million doses. Various reports indicate that the disease is more prevalent in areas-Pabna, Sirajganj and Tangail having greater cattle population. Like that of animal anthrax, reports for

human anthrax are also lacking. So the true picture of anthrax is not available. As the disease is thought to be enzootic and in agricultural setting, humans always get infection from infected animal, so anthrax is also likely to be prevailing in the country in endemic form. Samad and Haque (1986) reported 27 human cases of anthrax during 1980-84 and a research team of Institute of Epidemiology, Disease Control and Research (IEDCR) detected 19 cases out 624 tannery workers of Dhaka city in 1997. In 2009 and 2010, there were twenty nine human anthrax outbreaks with 706 outbreaks in 12 districts.

Table I : Reported findings of anthrax in animal and humans in Bangladesh

Year	Animal case	Human case
1980	6	00
1981	7	00
1982	16	17
1983	21	10
1984	12	-
1989-96	333	-
1997	00	19
October 2009 – June 2010	55	99
August 2010 – October 2010	140	607
Total	450	725

All the human cases were cutaneous anthrax and no inhalation or ingestion anthrax was ever reported from Bangladesh. The skin lesion was characterized by the presence of papule and/or vesicle, ulcer, erythema, surrounding oedema and tenderness. The lesions were mostly distributed on the upper limbs (75%), but were also present on lower limbs, face, chest, back, neck and scalp. Almost all of the cases with cutaneous lesion (97%) had slaughtered sick cattle or goats, or handled raw meat or were present at the slaughtering site.

c. Infectious Bursal Disease

Infectious Bursal Disease virus (IBDV) is an avian pathogen responsible for an acute immunosuppressive disease that causes major losses to the poultry industry. The disease was first discovered in in 1962 in US. Overall prevalence due to the disease was recorded as 12.13%for Bangladesh and mortality rate was 5.25%. Seasonal influence of IBD showed a significantly higher prevalence 13.47% and mortality rate 7.73% in winter season in Bangladesh.

d. Newcastle Disease

Newcastle disease is endemic in Bangladesh with prevalence of viscerotropic velogenic strains. the disease appear every year in epidemic form which causes 40-50% of the total mortality rate of poultry population in Bangladesh. The disease is characterized by sudden appearance and rapid spread within the flock with high morbidity and mortality. It may cause 100% mortality in young chickens and 80-90% in adult chickens.

Pandemic threat of the emerging diseases.

Nearly 75 percent of all new, emerging, or reemerging diseases affecting humans at the beginning of the 21st century have originated in animals. Notable reminders of how vulnerable the increasingly interconnected world is to the global impact of new emergent diseases include HIV/AIDS, severe acute respiratory syndrome (SARS), H5N1 avian influenza, and the pandemic 2009 H1N1 influenza virus. The speed with which these diseases can emerge and spread presents serious public health, economic, and development concerns. It also underscores the need for the development of comprehensive disease detection and response capacities, particularly in those geographic areas where disease threats are likely to emerge.

Role of different international agencies FAO, WHO, OIE and others.

Pathogens circulating in animal populations can threaten both animal and human health, and thus both the animal and human heath sectors have a stake in, and responsibility for, their control. Pathogens – viruses, bacteria or parasites – have evolved and perfected their life cycles in an environment that is more and more favorable to them and ensures their continuity through time by replicating and moving from diseased host to a susceptible new host. While FAO, OIE and WHO have long-standing experience in direct collaboration, the tripartite partners realize that managing and responding to risks related to zoonoses and some high impact diseases is complex and requires multi-sectoral and multi-institutional cooperation. The FAO-OIE-WHO Global Early Warning and Response System for Major Animal Diseases, including zoonoses,(GLEWS), combines the alert and response mechanisms of the three organizations in order to avoid duplication and coordinate verification processes. FAO also has numerous databases for which integration into GLEWS is required. To support the notification of cases of the main animal

diseases, including zoonoses, and the subsequent analyses of these data, the OIE has developed the World Animal Health Information System and Database (WAHIS and WAHID). FAO, OIE and WHO have together developed numerous coordination mechanisms. Annual tripartite meetings are organized alternatively by the three organizations in order to improve coordination. The tripartite organizations also communicate weekly regarding matters of common interest and have liaison officers that function at the global level, which has facilitated the preparation of joint messages and shared publications. Technical experts from the three organizations regularly participate in technical meetings or consultations hosted by partner organizations and, at times, represent the other organizations at high level conferences.

Impact on trade and commerce due to emerging diseases.

Due to Anthrax in USA,2001 there loss US$ 250 million.In Hongkong due to Influenza A ,1997 there loss US$ 22 million due to poultry slaughtering.In Malaysia due to Nipah Virus swine slaughtering US$ 540 million in 1999.

In China 2003 due to SARS there loss US$ 25 billion.
In Peru 1991 Cholera loss US$ 770 million.
In Tanzania 1998 Cholera loss US$ 36 million.
Bovine Spongiform Encepalopathy at United Kingdom loss US$ 9 billion from 1990-98.
In India due to Plauge in 1994 there loss US$ 2 billion.

IV.IMPACTS OF CLIMATE CHANGE:

Impacts in livestock sector:

- High mortality due to direct physical influence of heat and cold. Because the extreme climatic condition disrupt the internal homeostasis of the animals which affects the normal physiology of animals and birds.
- High outbreak of emerging and remerging diseases.
- Direct loss of animals due to natural hazards like flood, cyclone, storm surges, earth quake, Tsunami, Tornado, Aila, Sidr etc.
- Saline intrusion damaging the pasture land.
- Scarcity of pure drinking water following Flood, Cyclone, Saline intrusion, Sidr/Aila
- Loss of production due to high temperature/low temperature.
- Huge mortality of poultry due abrupt fluctuation of temperature.
- Outbreak of emerging diseases.
- Change of the nature of virus, bacteria.
- Excessive growth of some disease vector due to change in environmental temperature such as Protozoa, helminth and external/internal parasites.
- Loss of fertility
- Loss of milk production
- Loss of egg production.
- Drought
- River erosion

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- Destruction of feeds and fodder.
- Damage of animal shelter/shed.

- Spread of disease vector like the bacteria, virus, helminth, protozoa etc.
- Spread of corrosive substance and industrial waste which contaminate water.
- Water become heavily contaminated due decomposition of dead body in water.
- Contamination of water with the mixing of human and animal excreta in water.
- Damage of straw, hay and other Agro- Industrial by product.
- Damage of communal and other indigenous pasture land.
- Accommodation problem of animals birds due to inundation.
- Marketing of animals.
- Loss of productivity.
- Due to shortage of cash money peoples force to sell their animals with very low price for their livelihood.
- Huge loss of productivity due to scarcity of feed.
- Animal get infection due to vegetative growth of different types of spore forming organisms in the newly grown pastures like Anthrax, fowl cholera, food poisoning by clostridium, Fasiolosis, Actinomycosis, Actinobacilosis, Hemorrhagic Septicemia, coccidiosis etc. Which causes high mortality in livestock sector.
- Crisis aggravate due to unavailability of fodder seeds and cuttings for rehabilitation program.

Socio-economic Impact:

- Unemployment due to damage of poultry and dairy farms specially the small, medium and marginal farmers. In rural and in peri-urban areas hundreds of thousands of youth are involved in poultry and dairy farming and it is their only source of employment and means of livelihood.

    - Malnutrition in a major section of the society.
    - Unemployment
    - Increase vulnerability among women, marginal farmers due to loss of animals.
    - Problem is increasing in livelihood of rural and periurban livestock keepers
    - Increasing the price of the product
    - Decrease export.
    - Increase social unrest due to unemployment.
    - Reduced and retardation of growth of the children due to lack of milk, meat and eggs.
    - Price hike of the product affect the low income group.
    - Increased production cost.
    - Impact on poultry feed industry.
    - Impact on maize price.
    - Impact on the people involved in trading of livestock and livestock product.
    - Impact on international trade.
    - Impact on the industry of hides and skin.
    - Increased health hazards for human being due to increase of zoonotic diseases.
    - Increase in animal food borne diseases.
    - Increase in inflation in national economy.
    - Hamper the growth of pharmaceuticals which produces livestock drugs.
    - Increase scarcity of fuel in rural areas.
    - Decrease in money flow from town to the rural areas.

- Decrease selling and buying of other commodities in the rural areas.

V. International and National drivers working on climate change

1.International drivers:

The issue of climate change is the national and international issue. As because the climate in any area or region in the world has the effect in other areas or other countries also. For instance due to release of green house gas from industrialized nation causing the global worming which are affecting all countries. As a result the countries which are not responsible for global worming they are also becoming the victim of the impact of climate change. So, the international community through UN umbrella is trying to launch various types initiatives, guidelines, plan of actions etc. Following the UN guideline the IPCC has been drafted various policy issues, rules regulations, support to the nations those who are victim of climate change etc. So, during the development of any action plan on DRR & CCA it is essential to synchronize the national initiatives with UN initiatives. Among the international initiatives following are important:

a.HYOGO FRAMEWORK FOR ACTION (HFA) 2005-2015

On January 18-22, 2005, the World Conference on Disaster Reduction was held in Kobe, Japan. About4,000 participants from 168 states, 78 observer organizations from the UN and other inter-governmental organizations, 161 NGOs and 154 media organizations attended the conference.
The broad objective of the conference was building the resilience of nations and communities to substantially reduce the losses in lives and social, economic and environmental assets of communities.

The specific objectives were:
• Conclude the review of the Yokohama Strategy and Plan of Action with a view to updating the guiding framework on disaster reduction for the 21st century;
• Identify specific activities aimed at ensuring the implementation of relevant provisions of the Johannesburg Plan of Implementation (JPOI), adopted in 2002 at the World Summit on Sustainable Development (WSSD);
• Share best practices and lessons learned to support and facilitate disaster reduction within the context of attaining sustainable development, and identify gaps and challenges;
• Increase awareness of the importance of disaster reduction policies to facilitate and promote the implementation of those policies; and
• Increase the reliability and availability of appropriate disaster-related information to the public and disaster management agencies in all regions, as set out in the relevant provisions of the JPOI.

b.UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC)

Climate change is rapidly emerging as one of the most serious threats that humanity may ever face. Global warming threatens the development goals for billions of the world's poorest people.

We face genuine danger that recent gains in poverty reduction will be thrown into reverse in coming decades, particularly for the poorest communities. The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The Convention enjoys near universal membership, with 189 countries having ratified. Under the Convention, governments: Gather and share information on greenhouse gas emissions, national policies and best practices. Launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing Countries Cooperate in preparing for adaptation to the impacts of climate change

c. SAARC Framework for Action(SFA) 2006-2015

The Heads of State or Governments in the 13th Dhaka Summit called for elaboration of a Comprehensive Framework on Early Warning and Disaster Management. In view of the December 2004 Asia Tsunami and the 2005 Pakistan Earthquake, the Heads of State or Governments underscored the urgency to put in place a regional response mechanism dedicated to disaster preparedness, emergency relief and rehabilitation to ensure immediate response. They directed the concerned national authorities to coordinate their activities in the areas of disaster management such as early warning, exchange of information, training and sharing of experiences and best practices in emergency relief efforts.

Following the Dhaka Declaration, a SAARC (South Asian Association for Regional Cooperation) Expert Group was formed to formulate a regional comprehensive framework on disaster management for the SAARC region. The expert group met in Dhaka on 7-9 February 2006. As per the mandate of the Meeting and taking into account the deliberations of the Meeting, Bangladesh circulated a draft Comprehensive

Framework on Disaster Management titled- 'Disaster Management in South Asia: A

Comprehensive Regional Framework for Action 2006-2015', for consideration. After detailed discussions and amendments, the Framework was adopted in the Meeting.

Strategic Goals of the framework include the following:

- Professionalizing the disaster management system;
- Mainstreaming disaster risk reduction;
- Strengthening of community institutional mechanisms;
- Empowering community at risk particularly women, the poor and the disadvantaged;
- Expanding risk reduction programming across a broader range of hazards (all hazards approach);
- Strengthening emergency response systems; and
- Developing and strengthening networks of relevant national, regional and international organizations.

The SFA identifies the following as the priority areas for action:

- Develop and implement risk reduction strategies
- Establish Regional and National Response Mechanisms

- Establish a Regional Information Sharing Mechanism and Develop Network of
- Institutions and Organizations
- Develop and implement Disaster Management training, education, research and awareness programs
- Apply the ICT for disaster management.
- Establish an effective monitoring and evaluation mechanism.

2.National:

Polices, Regulatory framework and principal actors in Disaster Management in Bangladesh.

In Bangladesh there was a disaster management activities since the independence of the country but was not systematic. In 1997 Government of Bangladesh has developed the SOD for systematic, well defined institutional responsibilities to guide and to coordinate the whole implementation process of Disaster Management in Bangladesh.

In September 2000 MDG was developed by UN and The Millennium Declaration identified, among others, the following key objectives: Protecting the vulnerable "We will spare no effort to ensure that children and all civilian populations that suffer disproportionately the consequences of natural disasters…are given assistance and protection so that they can resume normal life as soon as possible."Protecting our common environment, resolving to "intensify cooperation to reduce the number and effects of natural and man-made disasters".

Its principal goals include the following:

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development

To enhance the capacity of low income group and of vulnerable World Bank, IMF and Bangladesh GOB in wide spread discussion with stakeholders had been developed PRSP.

The core principle of the Bangladesh PRSP includes the following:

- It is country-driven and promotes national ownership of strategies through broad-based participation of civil society;
- It is result-oriented and focused on outcomes that will benefit the poor;
- It is comprehensive in recognizing the multidimensional nature of poverty;
- It is partnership-oriented and involves coordinated participation of development partners (government, domestic stakeholders, and external donors); and It is based on a long-term perspective for poverty reduction.

Since 2003 the GOB is actively promoting the implementation of the international paradigm shift in DM from conventional response and relief actions towards a more comprehensive risk reduction culture, recognizing food security as a crucial aspects of community resilience. New priorities have been set to further promote community level preparedness, response, recovery and rehabilitation.

In 2008, the Government has presented the drafts of a new National DM Act, Policy and Plan as well as revised SoD. Basically the SOD illustrate the specific responsibility of the MoFL and also the responsibility of the DLS regarding risk reduction such as Focal point, budgetary system, mainstreaming,

research on hazards analysis, preparedness, Bio-security, shelter, inventory, animal feed, vaccine, medicine, emerging diseases etc. The draft revised Standing Orders on Disaster (SoD) of 2008, detail the response and recovery mechanisms and responsibilities of key stakeholder agencies in immediate crisis. The new draft of SoD includes the risk reduction component covering preparedness and prevention aspects, which were not addressed in the previous version. According to the SoD, all ministries, divisions/ departments and agencies will prepare their own Sectored Action Plans for disaster management and for efficient implementation with regard to their specific responsibilities outlined in the SoD. The SoD create the commitment to establish disaster management committees at every leveland also provide ample scope for the Government, NGOs and the private sectors to think and plan locally, involving communities into needs-based program development. In SOD the formation of different interrelated committees, structures has been mentioned to provide the disaster management activities in a formal structural shape.

a. Committees at National Level

- National Disaster Management Council (NDMC), headed by the Hon'ble Prime Minister.
- Inter-Ministerial Disaster Management Coordination Committee (IMDMCC), headed by the Hon'ble Minister in charge of the Ministry of Food & the Ministry of Disaster Management (MoFDM).
- National Disaster Management Advisory Committee (NDMAC) headed by an experienced person to be nominated by the Hon'ble Prime Minister.
- Cyclone Preparedness Program Implementation Board (CPPIB) headed by the Secretary, MoFDM.
- Disaster Management Training and Public Awareness Building Task Force (DAMTATF),
- Focal Point Operation Coordination Group of DM (FPOCG), NGO

Coordination Committee on DM and Committee for Speedy Dissemination of Disaster Related Warning/ Signals (CSDDWS) are the other committees and organizational structures headed by the DG of DMB to ensure smooth functioning of DM System in the country.

- Besides these committees, MoDM works as the co-coordinating Ministry with its two Directorates the DMB and DRRA.

b. Committees at Field Level:

- District Disaster Management Committee (DDMC), headed by the Deputy Commissioner.
- Upazilla Disaster Management Committee (UzDMC), headed by the Upazilla Nirbahi Officer (UNO).
- Union Disaster Management Committee (UDMC), Headed by the Chairman of the Union Parishad.
- City Corporation/*Pourashava* Disaster Management Committee headed by the Mayor/Pourashava Chairman. These field level committees include representatives from NGOs, Social Organizations, Local Government Bodies and other Government Departments.

The draft NDMA 2008 has given a legislative background for implementing the DM activities which include the saving of life and properties of the people. This draft NDMA eventually with some amendment passed from the National Parliament as Disaster Management Act 2012 which is discussed in another paragraph.

The draft National Plan for Disaster Management (NPDM) for 2008-15 is the guideline document which presented how to develop the relevant disaster Management plan for any department addressing the key issues like risk reduction, Climate change adaptation, gender, mainstreaming, capacity building, livelihood, community empowerment and different stages of disaster Management. The plan also contains

main hazard specific management plans and different plan formats for each district, upazilla, union and city corporation. The NPDM makes a reference to the plan of
developing various guidelines for government at all levels to assist Ministries, NGOs, DMC and civil society in implementing disaster risk management programs. It also includes the Disaster Management Action Matrix (2008-2015) for specific goals mentioned in the National Disaster Management Policy, specifying the key targets, expected out comes, action agenda, agencies and departments.

c. Strategic goals of SAARC FRAMEWORK FOR ACTION (SFA) 2006-2015

The Heads of State or Governments in the 13th Dhaka Summit called for elaboration of a Comprehensive Framework on Early Warning and Disaster Management. The SAARC countries agreed to increase cooperation among the member countries in the areas of regional response mechanism dedicated to disaster preparedness, emergency relief and rehabilitation to ensure immediate response.

Following the Dhaka Declaration, a SAARC (South Asian Association for Regional Cooperation) Expert Group was formed to formulate a regional comprehensive framework on disaster management for the SAARC region. The expert group met in Dhaka on 7-9 February 2006. As per the mandate of the Meeting and taking into account the deliberations of the Meeting, Bangladesh circulated a draft Comprehensive Framework on Disaster Management titled "Disaster Management in South Asia: A Comprehensive Regional Framework for Action 2006-2015", for consideration. After detailed discussions and amendments, the Framework was adopted in the meeting. Bangladesh has taken the SAARC goals in it's Draft National Disaster Management Policy 2008. The strategic Goals of the framework include the following:

- Professionalizing the disaster management system;
- Mainstreaming disaster risk reduction
- Strengthening of community institutional mechanisms;
- Empowering community at risk particularly women, the poor and the disadvantaged
- Expanding risk reduction programming across a broader range of hazards (all hazards
- approach);
- Strengthening emergency response systems; and
- Developing and strengthening networks of relevant national, regional and international organizations.

d. Disaster Management Act 2012:

The govt of Bangladesh has passed a bill in the National Parliament on 24th September 2012 which known as Disaster Management Act 20012, for organizing the DM activities in a coordinated, Object oriented, strong and well structured with a view to strengthen DRR to reduce the loss of life and properties in an acceptable level, ensuring humanitarian relief activities to the affected people and development of strong concerted systematic approach of DM among the Govt. and Non govt. organizations. This act basically is the latest complete legislative guide line for comprehensive disaster management in Bangladesh. The Disaster Management Act 2012 provides guideline for DM activities, safety and security of the Govt. and other stakeholder involved DM activities by law. The act describes the detailed responsibility of Govt. officers regarding DM of various department of govt. It also the mentioned the govt. policy how to conduct the DM activities with other stakeholders like the NGO's and private organizations. The formation of different committees for DM activities from National level to field level or last tires

of administrative unit has been specify very clearly. As on the act the following committees will exist for smooth operation of DM activities from national level to field level.

a)National Disaster Management Council-Headed by honorable PM.

b) National Disaster Response Coordination Group- Headed by Honorable Minister Disaster Management and Relief.

c)National Level Disaster Management Committee-To fulfill the objective of the law and there will be

National level committee, Board and Platform such as

National Disaster Management committee,

National Disaster Management Advisory Committee,

Cyclone Preparedness policy committee

Cyclone preparedness Implementation Board.

Earthquake ,, and awareness committee

National platform for Disaster Risk Reduction

Disaster Signal Message Dissemination Committee.

Mechanism Implementation Committee
The act provides the various illustrations on fund utilization mechanism. The act has mentioned there will be a Funding infrastructure in the National level and District level.

- National disaster management Fund
- District Disaster Management Fund

The sources of funding are to:

- Govt. grant
- Grant from foreign govt. or organization or grant from international organization.
- Grant from local authority
- Grant from local elite person
- Fund from any other legal source.
  The will be used as per the govt. rules and regulation following disaster as necessary.

According to the Act, the Ministry of Disaster Management and Relief (MoDM&R) is responsible for the overall coordination of all disaster management efforts at different levels such as various Ministries of the govt. The major role of Disaster Management Buruea is to ensure support to disaster management decision makers, planners and practitioners in different levels. The Department of Disaster Management and Relief is responsible for providing effective and comprehensive disaster risk management services, including post emergency response relief and rehabilitation, and to implement disaster management programs at community level.

The core functions for this task are outlined in the allocation of business for the Ministry in the Government's Rules of Business. The act mentioned that the Disaster Management division will be re-designate/renamed as Department of Disaster Management and Relief. This DDM&R having the authority to coordinate with other department/ division of the govt. as a focal department on DM.
The Disaster Management Act 2012 is generous in implementing DRR & CCA activities through GO and NGO collaboration which has created a plenty of opportunities for govt. officials to work together with NGO,s, Private sector, individual initiatives regarding DM.

e. Comprehensive Disaster Management Program(CDMP):
In order to catalyze and assist putting into practice its new, more comprehensive approach, in 2003 the GoB launched the Comprehensive Disaster Management Programme (CDMP). The CDMP reports to the MoFDM and is mandated to raise the awareness level of institutional members to risk reduction issues and the use of disaster risk reduction (DRR) tools for planning and managing in a more integrated way, both mitigation and response initiatives. The CDMP has adopted a programme approach that encompasses all aspects of risk management and in doing so could facilitate the move from a single agency response and relief system to a broad multisectoral (entire government, NGOs, and development partners) strategy. To drive the risk reduction programme, the CDMP has developed five priority sub-programs: Capacity Building, Partnership Development, Community Empowerment, Research and Information Management and Response Management. The first implementation phase of CDMP ends in 2009. The GOB has decided to extend the project activities for the second phase till 2014. In the context of this POA, the most relevant feature of the CDMP's second phase is the directive of mainstreaming DRR across a group of 12 target ministries and 13 departments, including the Ministry of Livestock and Fisheries. Mainstreaming efforts will target strategic policy or planning units within key ministries and offer a range of technical advice and resource materials to support the up-take of 5 risk reduction approaches. Support will include the development of the tools and resources necessary to inform and guide other ministries, including guidelines and templates for inclusion of DRR in sector policies and planning. Finally, this output area will provide a vertical linkage with the work of CDMP Phase II in rural risk reduction by connecting planning at central and
local levels and flagging the hazard risks identified through the Community Risk Assessment (CRA) and Risk Reduction Action Plan (RRAP) process

VI. National Livestock Development Policy 2007:

a. **Objectives of the National Livestock Development Policy:**

The general objective of the National Livestock Development Policy:
To provide the enabling environment, opening up opportunities, and reducing risks and vulnerability for harnessing the full potential of livestock sub-sector to accelerate economic growth for reduction of rural poverty in which the private sector will remain the main actor, while the public sector will play facilitating and supportive role.

The specific objectives of the National Livestock Development Policy:

1. To promote sustainable improvements in productivity of milk, meat and egg production including processing and value addition;

2. To promote sustained improvements in income, nutrition, and employment for the landless, small and marginal farmers; and

3. To facilitate increased private sector participation and investments in livestock production, livestock services, market development and export of livestock products and by-products.

b. Policy framework for dairy development is:

1. Cooperative dairy development (Milk Vita model) would be expanded in potential areas of the country;
2. Successful pro-poor models for community-based smallholder dairy development including appropriate contact farming schemes would be replicated;
3. Smallholder dairy farming, integrated with crop and fish culture would be promoted;
4. Supply chain based production, processing and marketing of milk and milk products would be promoted;
5. A National Dairy Development Board would be established as a regulatory body to promote dairy development;
6. "National Dairy Research Institute" would be established to carry out research in various aspects of dairying.

c. Policy framework or Poultry Development:

1. Successful pro-poor models would be replicated for semi-scavenging poultry development;
2. Formation of poultry smallholder groups, CBOs, and producers associations would be facilitated;
3. Quality control of poultry feeds and feed ingredients would be ensured through establishment of a legal body and enforcement of regulations;
4. Production and consumption of safe meat, milk and eggs would be ensured;
5. Organic meat, milk and eggs production would be promoted;
6. Criteria and guidelines would be established to ensure supply of quality day-old chicks;
7. Specific guidelines would be developed and enforced for establishing environment-friendly commercial poultry farms. Small commercial farms would be converted into profit oriented large farms following cooperative system;
8. Poultry farms of the DLS would be utilized as breeding and multiplication farms / centers for smallholder training, technology testing and demonstration etc;
9. Smallholder production and marketing of ducks and minor poultry species (e.g.Quail, Goose, Pigeon, Guinea fowl) in selected areas would be promoted;
10. Government has already declared BLRI as National Reference Laboratory for detection of Avian Influenza virus and other emerging diseases . It would be strengthened at International standard;
11. National Avian Flu Preparedness Plan would be implemented;
12. All Commercial Poultry farms will be registered with DLS;
13. Bio safety protocol developed by the MoFL should be followed by the concern stakeholders.

d. Policy framework for Veterinary Services and Animal Health:

1. Soft loans would be provided to accelerate the development of private veterinary services;
2. Community-based veterinary service would be developed through special projects;
3. Mobile veterinary services will be provided by DLS;

4. An autonomous Quality Control Agency would be established to ensure quality of veterinary drugs, vaccines, feeds, feed ingredients and breeding tools and materials;
5. A licensing system for veterinary pharmacists and a quality monitoring system of veterinary services would be introduced;
6. Veterinary research would be strengthened in critical areas, particularly those related to provision of public goods and services;
7. Veterinary public health services would be strengthened and closer linkages with the Department of Health would be established;
8. Capacities of disease investigation network of DLS would be strengthened for disease surveillance, quarantine services and emergency planning to manage major disease outbreaks including Avian Influenza and other emerging diseases;
9. Specific strategy would be developed for controlling economically important trans-boundary animal diseases;
10. Veterinary Council would be strengthened to help ensure quality veterinary services;
11. "National Livestock Health Disaster Committee" would be formed including all trade organizations to combat crises related to animal and human health;
12. A separate "Veterinary Cell" would be established in Department of Drug Administration for facilitating decision making on veterinary drug registration and approval in Bangladesh. Animal Health Companies Association and related trade association would be included in the committee to represent the private sector.
13. Promote and encourage private sector to set-up compliant veterinary diagnostic center, clinics and hospitals to cater the `needs of the farmers and other beneficiaries.

e. **Policy framework for Feeds and Animal Management**:

1. Feed and fodder development strategy would be developed for community- based fodder cultivation along roads and highways, rivers and embankments, in Khas lands, and in combinations with crops;
2. Necessary support would be provided to private sector for promotion of crop residues, Agro-Industrial by product and unconventional feed resources as animal feed.
3. An Animal Feed Act would be approved and implemented to ensure feed quality; and
4. Resources would be provided for training of dairy farmers on improved animal management and husbandry practices.
5. Market driven industries should be developed on feed, feed additive, forage seed and forages;
6. Human resource should be developed for feed and fodder production.

f. Breeds Development

g. Policy framework for Breeds Development:

1. Conservation and utilization program of potential indigenous breeds for subsistence farming would be developed;
2. A comprehensive human resource development program in animal breeding would be developed;
3. Frozen semen production unit would be established/extended for wide scale artificial insemination of Cattle, Buffalo and Goats to face the challenges of service shortage of proven buck throughout the country;

4. 'Breeders Association' would be established for monitoring and coordination of livestock breeding activities in the country.

h. Breeding Policy Recommendations

Rapid improvement in animal productivity for food security and livelihood leading to poverty reduction is needed in Bangladesh. The need for planning to intensify livestock productivity is a crying need of the time. In order to maximize overall profitability, the herd/ flock must have appropriate combination of genetically high potential breeds along with good health care, feeding and management system. Appropriate breeding program is an important part of livestock development strategy. Breeding strategy usually aims at maximizing production per animal / bird. Conventional animal breeding techniques are based on quantitative genetics, essentially a statistical science and this approach has been very successful in temperate part of the globe. However, pre-requisites for breeds and breeding program are (a) accurate recording, (b) large herds / flocks or cooperation between small herds / flocks, (c) efficient artificial insemination and breeding organizations, and (d) a well-trained extension service. Very few developing countries including Bangladesh

VII. DLS ADMINISTRATIVE SET UP AND CURRENT LIVESTOCK EXTENSION SERVICES:

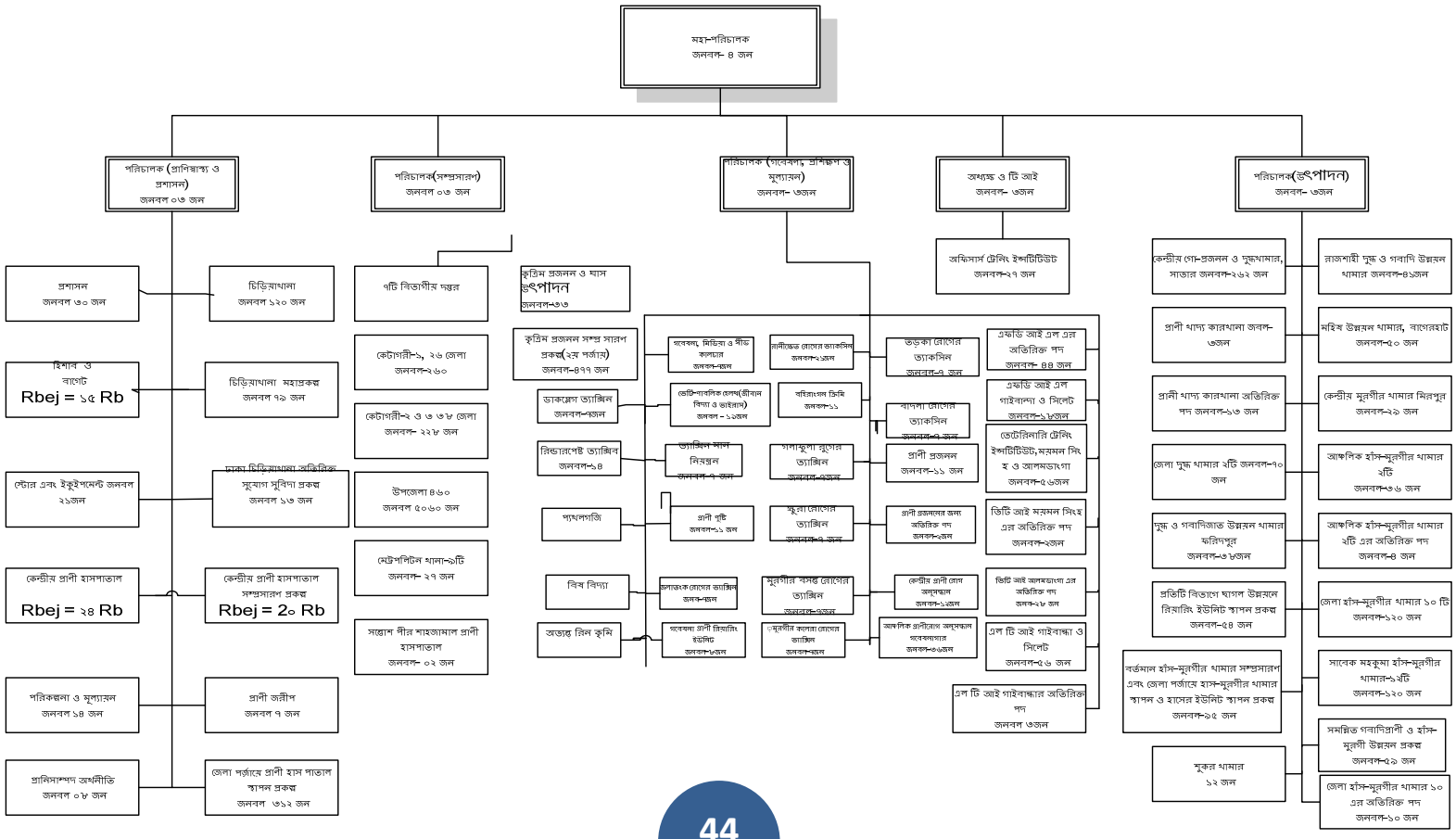
a. **Administrative set up :**For the extension of livestock services The Directorate of Livestock Services was established in 1960 and renamed as the Department of Livestock Services (DLS) in the late 1980s. The mandate and functions of DLS include all activities related to livestock development and control of livestock diseases. This includes provision of veterinary services, conservation and genetic improvement of livestock and poultry breeds, artificial insemination, development of feeds and fodder for improving livestock nutrition, extension of livestock services, vaccine production, procurement and distribution of drugs and equipments, training, analysis and diagnostic services, collection of data and economic assessment of livestock production and the development of zoo animal and survey of wild life. Since 1960, the mandate and functions, structure, organization and management system of DLS have remained almost unchanged.

DLS is organized into five divisions, headed by five Directors. The five divisions are
(i) Animal Health and Administration,
(ii) Research, Training and Evaluation,
(iii) Extension,
(iv) Production and
(v) Officers Training Institute. The divisions are functionally split into sections to deal with different subject matters. It has 6 Divisional Livestock Offices, 64 District Livestock Offices and 476 Upazila Livestock Offices. Divisional Offices coordinate and supervise the activities of the District offices and carry out liaison functions with the sister and other related organizations. DLOs (District Livestock Officer) supervise and coordinate the livestock development activities at the Upazila level and maintain liaison with the concerned departments and the district administration. ULOs (Upazila Livestock Officer) are charged with the following functions;
(i) awareness building, motivation and technology transfer,
(ii) vaccination and prevention of diseases,
(iii) collection and documentation,

(iv) artificial insemination,
(v) reporting,
(vi) farmers training,
(vii) fodder cultivation,
(viii) implementation of special projects,
(ix) distribution of micro credit along with execution of PRSP. VS (Veterinary Surgeon) are charged with animal/poultry health management and disease control activities at the upazila level.

b. Other entities of DLS: include a Livestock Research Institute (LRI), a Central Veterinary Hospital, Dhaka Zoo, Rangpur Zoo, 7 Field Disease Investigation Laboratories (FDIL), District veterinary Hospitals, 22 District Artificial Insemination Centers. Livestock Research Institute includes Veterinary Public Health Section, Central Disease Investigation Laboratory, Toxicology Section, Parasitology section, Pathology Section, Animal Rearing Section, Animal Nutrition Section, Quality Control Section and Vaccine Production Sections. DLS has a number of training institutes such as officers training institute (OTI), Veterinary Training Institute (VTI) and Livestock Training Institute (LTI), but remain grossly underutilized due to lack of funds. DLS also has 35 poultry farms, 4 duck farms, 7 cattle breeding and dairy farms, 1 buffalo breeding farm, 5 goat farms and 1 pig farm. The Director General is the executive head at the top of the line of command, followed by Directors, Deputy Directors, Unit Heads and so on. DLS follows a highly centralized management system.

c. Organogram of DLS



d. Manpower Strength of DLS

- The Department is Headed by Director General.
- Under Director General five Director level officer work.
- 50 Deputy Director work under this Department.
- 197 District level officers are working in this Department.
- 533 Upazila level Officers are working at Upazila/District level.
- 755 entry level officers are working in various field under this Department.
- At Present the Department is operating with

1. 1546 First Class Officers.
2. 8 Second Class Officers.
3. 4612 third class Staffs
4. 2296 fourth class employee

Total 8426 Officers and Staffs under revenue budget are working in this Department. Other than this, there are 24 projects and programs and 1856 Officer`s and staffs are working under Development budget in this Department.

e. The major challenges faced by DLS were identified as.

(i) Inappropriate mandate and functions;
(ii) Structural and Organizational deficiencies;
(iii) Thin and weak frontline services at the upazila; (iv) Weak linkage with research organization including BLRI;
(v) Weak management system and MIS (management information system);
(vi) Lean recruitment and promotion system;
(vii) Shortage of skilled manpower;
(viii) Lack of regular skill development training;
(ix) Limited budget allocation.

In the context of increasing participation by the private sector and NGOs in livestock development, there is an urgent need to redefine the mandate and functions of DLS in a fashion that will allow it to gradually withdraw from private goods services, engage increasingly in delivery of public goods services, viz. enforcement of laws and regulations, quality control of feeds / drugs / vaccines / semen and breeding materials, extension services, disease investigation and surveillance, veterinary public health, conservation and development of native breeds, policy formulation and strategy development.

f. **Policy frame work of livestock extension :**

(1) Private sector, NGOs and CBOs (Community Based Organizations) would be encouraged to provide private goods livestock services viz. veterinary services, vaccination etc.
(2) DLS would be reformed to enhance its role as a provider of public goods services, viz. regulatory measures, quality assurance and control, monitoring function, food safety function, disease surveillance etc.
(3) Front line extension services of DLS would be updated and extended for rapid livestock development and sound service delivery.
(4) Resource allocations to DLS would be increased to make it effective in delivery of public good services.

(5) Autonomous unit/ institute would be established for quality assurance and certification of livestock products, vaccines and biologics, and consumers right protection.
(6) Quality Control of breeding materials would be ensured by extending District AI centre with modern laboratory facilities to all districts.
(7) Long term fodder development programme would be taken throughout the country to minimize the acute shortage of feeds and fodder.
(8) Analytical and diagnostic facility in the district mini-laboratory would be strengthened for full time service with skilled manpower.
(9) DVH would be further extended to UVH (Upazila Veterinary Hospital) to ensure better services.
(10) A special cell in all DVH would ensure round the clock service for emergency purpose.
(11) Retraining program would be developed and implemented to equip DLS staffs with modern knowledge and skills within the frame work of a clearly declined human resource development action plan.
(12) Besides staff training, DLS training institutes would be opened for all eligible candidates from private sector NGOs and CBOs for livestock service extension training.

(13) Extension-research-NGO linkage would be strengthened for field testing and dissemination of livestock technologies.
(14) An MOU has been signed between DLS and BRAC to Provide / extend Artificial Insemination Programme throughout the country .
(15) More Administrative and Financial power has been delegated/ give and to field level Official's to works smoothly.
(16) The Procurement of Veterinary drugs and surgical instruments has been decentralized to District levels.

VIII. Action plan on DRR &CCA for DLS

The Plan of action developed on DRR &CCA will strengthen the role of DLS in Disaster Management. The plan has been developed focusing on priority issues and area of intervention. The plan was developed through interactive consultative processes which include various DRR stakeholders within DLS and the people of disaster prone area at community level. The Action Plan will build the current strength of DLS particularly in the field of DM In livestock sector. During preparation of Action Plan international activities (UNFCC, Hyogo Frame work, and SAARC guideline) and national activities, GOB priorities have been taken into consideration.

1.Process of Plan development: The PADRR&CCA in Livestock sector for DM was developed with extensive consultation with TWG, Action Plan Committee, recommendations of the seminar on action plan, discussion with the farmers of different disaster prone areas, extensive field visit and observation in the disaster prone coastal areas. There was elaborate discussion with higher officials of DLS and share their experiences during the preparation of action plan.

1. VISION, MISSION, RANGE, OBJECTIVES

Vision

The DLS would be functionally efficient to disaster risk management system that substantially reduces disaster risk of its resources, existing service delivery system and beneficiaries from different natural and anthropogenic hazards to an acceptable level by 2021.

Mission

The mission that would be achieved by DLS through proper implementation of the PADRR & CCA with the integration of DRR & CCA in planning and operational system in the ongoing and future activities to reduce the risk and vulnerability for livestock due to enhance resilience to disaster risks.

Scope/Possibility of use of PADRR&CCA

The PADRR&CCA is the main document for DLS which spell out risk, strategy, prioritize specific activities and mechanisms be relevant to the implementation and required institutional arrangement of disaster risk reduction efforts of DLS for its own operations and for ensuring the reduction of risks for livestock in Bangladesh. The responsibility of all the stakeholders has been identified in a participatory process and accommodated the national and international frame work of actions.

Range of the action plan therefore would be to:

a) Analyze the natural and man-made disaster threats including climate change to livestock, livestock related infrastructure, livestock beneficiaries, feeds and fodder with the intention of identifying where and when these threats are likely to occur and in what frequency.

b) Identify by further detailed analysis of livestock resources vulnerability, service delivery and likely consequence in the livestock sector

c) Make out what activities for reducing the risks of disaster in livestock sector and its beneficiaries to be taken by the DLS in different stages of disaster management which include Prevention, preparedness, response, recovery and rehabilitation.
d) Identification of specific responsibility of DLS staffs, NGO's and private sector investors.
e) Should generate a rational and mechanism of use of finance for effective implementation of Disaster Management activities.
f) Specify a operational procedure for proper implementation of the program/projects activities.
g) Develop a Design to ensure an effective system of sustainable livestock development with effective DRR &CCA.
h) Identification of monitoring and evaluation activities to implement the plan conducted by DLS.

Objectives

The objectives and purpose of PADRR & CCA are to:

- The DRR &CCA strategic direction initiatives of DLS break into line of national and international priorities and commitments.
- Articulate the vision and goals for DRR &CCA activities in DLS.
- Outline the strategic direction and priorities to guide the design and implementation of disaster management policies and programs.
- Create an interrelated and well-coordinated programming framework incorporating all types of stakeholders.
- Ensure that DRR &CCA efforts are comprehensive and all-hazards focused.

- To create a better coordination from central level committee to District and upazila level committee.
- To ensure the DRR related services up to farmer's level through CBO's.

The PADRR&CCA is closely linked to the Hyogo Framework for Action (HFA), 2005-2015, which was adopted at the World Conference on Disaster Reduction by 168 countries, including Bangladesh, in 2005 in Kobe, Japan as framework document to address DRR in a proactive manner. The HFA defines 5 priorities areas for action, which were used as reference point to structure and organize the Main Result Areas to be addresses by this sector specific PADRR&CCA for DRR in Livestock sector.

3. The HFA priorities for action are to:

1. Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation,
2. Identify, assess and monitor disaster risks and enhance early warning.
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels,
4. Reduce the underlying risk factors and
5. Strengthen disaster preparedness for effective response at all levels.

Considering implementation of Hyogo Framework of Action in proactive manner as a priority issue, the GoB is committed to achieve the targets set out in the HFA. The *Bangladesh National Progress Report on the implementation of the Hyogo Framework for Action, 2009* reports success in the development of community risk assessment methods and tools. Up-scaling is challenged by the absence of a centralized agency that could act as a repository of technical information and advice on the suitable application of tools across the territory The PADRR&CCA of DLS on DM will help and contribute to the national efforts to implement and follow-up to the strategic goals and priorities for actions set out in the HFA.

4. Expected outcome, strategic goals and priorities set out in Hyogo Frame Work for Action (2005-2015

- The substantial reduction of losses of lives, social, economic and environmental assets of communities and countries.
- Integration of DRR in sustainable development into policies and planning.
- Development and strengthening of institutions, mechanism and build capacities to resilience to disaster.
- The systemic incorporation of risk reduction approaches into the implementation of emergency preparedness, response and recovery.

6. Core Principles of the (DMAP) PADRR&CCA

The PADRR&CCA builds on the disaster management vision of the GOB to reduce the risk of people, especially the poor and the disadvantaged, from the effects of natural, environmental and human induced hazards, to a manageable and acceptable humanitarian level. The Government mission stresses the need to bring a paradigm shift in disaster management from conventional response and relief practice to a more comprehensive risk reduction culture.

The guiding principles of the Plan of Action for DLS are:

- To consider DRR as an fundamental part of sustainable development planning,

- To build on existing experience and capacities and strengthen them in respect of DRR,
- To promote partnerships with other stakeholders, including GOs, NGOs and CBO's.
- To promote the development of high professionalism in DLS on DRR,
- To define livestock rearers, communities as the ultimate beneficiaries of DLS's involvement and contribution to DRR,

7. Major Outcomes Areas and Entry Points Proposed for DLS Interventions in DRR

Five Major Outcome Areas (MOA) have been identified to strengthen LED with respect to DRR. These MOAs correspond largely with the first 4 priority areas of action defined within the HFA.

MOA1
(HFA priority areas 1 and 3)

Institutional Set-up for DRR in DLS and Stakeholder Coordination

Justification: Right now no mandated authority to carry out the responsibility of DRR in livestock sector. According to the Disaster Management Act 2012, a well defined institutional setup and complete guideline is needed in which the DM activities would be implemented through the newly constituted cell.

Goal: Ensure efficient institutional mechanism within DLS covering all aspects of DRR related activities to the Livestock sector and coordinating with other agencies involved in DRR and CCA.

Capacity building of DLS towards institutionalization for Disaster Risk Reduction

Proposed Strategies:

The formal establishment of a Disaster Risk Reduction Cell (DRRC) within the DLS, which is mandated to maintain relentless link with all extension programs and activities of the DLS, to facilitate the action of DLS on DRR at each and every level and to work as a "**focal point**" for DRR..

- The DRRC may be headed by one senior level officer, most appropriately the Director (DRRC) - level, and staffed with 7 professionals. It will work as the implementation unit in DLS for DRR.
- When the DRRC is functioning, a regular monitoring mechanism will be put in place for the review and monitoring of activities.
- DLS will support the technical mandate and empower the Disaster Management Core Group (DMCG) to LED.
- Its members will take up additional new tasks and responsibilities, including provision of technical guidance and advice for the DRR, including translation of received early warning information into impact outlooks and preparing response management plans.
- Definition of roles and responsibilities of other division of DLS with regard to DRR and the technical coordination among them.
- Guide and coordinate among livestock training institutes on the contents and the training methodologies for DRR training courses.
- The LED will arrange special training for DMCG officials at National/ international training institutions with high reputation in the field of DRR.
- The cell will identify some priority area of DRR and CCA in livestock sector and provide responsibility to core staffs of the cell which include cyclone/tidal surge/Aila/sidr, Salinity intrusion, emerging disease, environmental pollution etc.

Involve LED Staff in DM Committees at all Levels

As per the Disaster Management Act 2012 and as on revised SOD (January 2010), there are provisions of different types of committees on DM. The DLS will coordinate with MoDM&R for the active involvement of LED officials within DM committees at national, regional, district, upazilla and union levels, including the DLS's specific responsibilities within the committees.
LED officers will provide their technical knowledge for the design and updating of sectoral local DRR plans.

Collaboration with National and International Livestock Research Organizations on DRR

DLS will enhance collaboration with selected national and international research organizations such as BLRI,LRI,CDIL,FDIL, BARI, BARC, OIE, ICDDRB, ILRI etc. to share results and promote strategic research for developing suitable animal species for CC adaptation, specific technologies for current hazard risk management.

Strengthen Linkages with other key Stakeholders in DRR

- DMB overviews and coordinates all disaster management activities from national to grass root level and also liaison with different stakeholders to ensure maximum coordination. DLS is responsible to develop a strong operational mechanism for regular interaction with the DMB, CDMP and different committees operating under them. DLS's role and contributions in key committees (to be determined jointly) must be specified.
- To ensure mainstreaming of DRR into the livestock sector, DLS will ensure the application of Disaster Impact Risk Assessment (DIRA) in all livestock related programs and projects implemented by DLS.
- DLS will intensify its collaboration with other GOs, CBOs and NGOs, through the introduction of an annual technical working session, organized and hosted by the DM Core Group. These sessions will focus on annually selected technical areas of joint interest; they will have the main purpose of experience and information sharing, elaborating and sharing training material and modules, and sharing knowledge about DRR related technologies.
- **Disaster Risk Reduction Cell (DRRC)** will develop good coordination mechanism at regional and local level through its extension support and information sharing with other departments.

MOA 2
(HFA priority area 1)

Policy Framework for DLS's Role in DRR in Livestock Sector

Justification: The present policy/ planning documents of DLS do not include DRR. Revised key policy documents need to incorporate clear guidance about DLS role and contributions to DRR in the livestock sector.

Goal: Revised policy and planning framework at DLS which should include DRR & CCA

Proposed Strategies:

Incorporate DRR Issues in Existing DLS Policy and Planning Documents

- The existing draft National livestock Extension Policy (NLEP) of DLS's 2012 should include the DRR &CCA. The National Livestock Development Policy (NLDP) 2007 should revise with the inclusion of DRR&CCA issues for sustainable livestock development. A revision committee should be formed with strong recommendations to revise these policies in accordance with the current Risk Reduction and Disaster Management Framework in close collaboration with CDMP.
- The next Strategic Plan for DLS should be prepared with DRR components included. It will define which Division within DLS will be responsible or involved into which of the

new DRR related topics proposed in the PADRR&CCA. Special attention will be given to the tasks for the field service, training and monitoring wings.

Incorporate Livestock Related DRR Issues into the Standing Orders on Disasters (SoD) and other National Programs

- The SoD, developed by DMB, which articulate the role and responsibilities of the government and other stakeholders in DRR, are currently under revision. The draft version contains a separate section on risk reduction. However, there is a need to further elaborate on the roles and responsibilities of MoFL and DLS with regard to prevention, preparedness and mitigation.
- The CDMP's draft second phase document includes a separate section about mainstreaming DRR in seven key ministries, including the Ministry of Agriculture. Drawing from its vast experience, DLS will assist CDMP and DMB in formulating concrete recommendations for other departments and ministries to consider in new programs and policy documents aspects and strategic links between DRR in agriculture and the other sectors' needs and objectives.

MOA3
(HFA priority area 2)

Enhanced Application of Early Warning Systems in Livestock

Justification: For the efficient and timely generation and transfer of information related to early warning it is necessary to enhance the capacity of DLS functionaries at various levels to translate climate and flood forecasts into locally relevant impact outlooks and management plans. DLS to be developed a data base on DRR especially on flood, cyclone, drought, environmental pollution, salinity intrusion and drought. DLS has to prepare a data base on emerging diseases with the help of national and international diseases investigation institutes, OIE, National level disease diagnostic lab, BLRI, ICDDRB, Coordination between Veterinary and Human Public Health Department etc.

Goal: Enhance understanding of early warning systems by DLS activities and coordination between the partner organizations of early warning systems.

Proposed Strategies:

Capacity Building for the Better Use of Early Warning

- The Bangladesh Meteorological Department (BMD) division provide relevant weather and climate forecast on a regular basis. The Flood Forecasting and Warning Centre (FFWC) of BWDB provides a daily flood forecast bulletin with 48-72 hours lead time. However, due to the lack of a well defined system and methodology, this valuable information is not much used by DLS.
- DLS will empower its DRRC through training and basic facilities to receive, process and disseminate early warning information received from different sources.
- The DMCG will assist DRRC in translating the collected information from different sources related to disaster and weather forecasting. The DMCG will help for developing brushier, leaflets, training manuals incorporating the climate issues to develop the DRR & CCA knowledge of DLS extension staffs.
- DRRC will arrange the basic training of selected DLS officials.

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Strengthen Collaboration with Partners Involved in Early Warning System:

- DLS will further strengthen strategic linkages with organizations involved in early warning systems within the country to facilitate mutual sharing of information. From
- DLS side, all weather / climate related information will be regularly shared with the partner organizations and the Disaster Management Information Centre of CDMP.
- DLS extension will maintain communication with Upazila livestock office for getting basic information about natural calamities of the respective area and disease outbreak situation.
- Every upazila district veterinary hospitals, FDIL, CDIL, Veterinary public health department, BLRI, Livestock training institute, Universities should be linked with DRRC unit of DLS for sharing information and collaboration for further prudent decision making and effective action.

Disseminate Livestock Related Early Warning

Product Outputs at Community Level:

Based on early warning forecasts data available and guidance/support from DLS HQ (DRRC), DLS district officers will prepare area specific livestock impact outlooks and management plans for various anticipated flood and climate scenarios. Necessary cooperation may be sought with local NGOs/CBOs for the purpose. DLS will make necessary arrangements to disseminate the product outputs prepared by DLS HQ at grass root level through its extension staff and through NGOs, CBOs and Union Parishads in a more people friendly manner. Different formal and informal communication means like radio, mobile phone, television, news papers, information through volunteers etc. will be used to disseminate the information in a more effective manner.

Develop and standardize a Monitoring System for DRR in Livestock

- Since DRR in the Livestock sector is a new concept, it will need continuous monitoring and evaluation (M&E).
- DLS will follow the standard guideline for monitoring and evaluation and share data with DLS Officials through workshop, seminar, preparation and dissemination of report to the all concern etc.

MOA 4

(HFA priority area 3)

Knowledge Management, Capacity Building and Awareness Creation

Justification: Bangladesh has a lot of experience in disaster management but has no precise collection of those experiences. A comprehensive move towards adaptation and mitigation supported by technology transfer and financial flows requires an up-graded system of knowledge creation, dissemination and training. Adaptation Research and Training program should be established in the country as an international public facility for all to draw upon. While this may be an ultimate goal, a more urgent need is to set up a centre or network of institutions to be (a) a source of all available national information, reports and knowledge, and (b) a virtual technology bank, including on financial mechanisms related to both adaptation and mitigation in livestock sector. It would also track and provide information on the state of climate change negotiations. A dedicated web portal would be established, which would track all national and within country policies, rules and regulations, and news related to climate change debates. The information

managed by the Centre will be available to the public. In essence, it would be a one-stop data and information bank on climate change for all related national activities.

Goal: To increase institutional and human capacity on research and knowledge management related to climate change, and to train sector professionals to build a culture of innovation, safety and resilience, and institutionalize training on DRR in DLS.

Proposed Strategies:

Technology Transfer

DLS will facilitate a need based technology transfer from fisheries, Agriculture, forestry and other research institutions to the respective extension system to strengthen DRR at local level.

Up-date DLS's Operational Field Manuals and Guidelines

- DLS should include the DRR &CCA issues in their extension manual.
- DLS will adopt the Community Risk Assessment guidelines prepared by CDMP to prioritize risk areas and formulate priority projects.
- As part of the above, DLS will prepare and field test operational process guidelines to assist front line agricultural extension workers and farmers in the introduction of DRR related activities at farm level, and to guide them on potential hazard specific DRR interventions.
- The Community Risk Assessment (CRA) approach of CDMP should link with existing DLS extension and training manuals to ensure that technical aspects of livestock are properly addressed.

Enhance Capacities of DLS's Training Institutes & Trainers

- Central, divisional and other training institute of DLS to be equipped with modern training facilities including all logistic support.
- The trainer must have TOT which will improve their training skill and TOT to be imparted in collaboration with CDMP's on going ToT training program on DRR and CCA.
- Preparation of proper training plan.
- Preparation of effective and useful training content.
- Development/ accumulation of resource person
- To ensure all modern facilities.
- Refresher and further sharing with seminar, workshop etc.

Increase Community Awareness on the Importance of DRR in Livestock

- Awareness material (Livestock specific) for farmers, i.e. posters, leaflets, etc
- prepared and widely disseminated among communities. DRR related knowledge should also be disseminated through popular audio- visual aids, TV, radio, documentary films etc.
- DLS will work closely with DMB, CDMP to incorporate Agricultural related disaster
- management issues into CDMP's capacity building programme and into the revised
- school curriculum on DRR. CDMP and DLS may organize a joint field level campaign about DRR at grass root level.
- Necessary support of NGOs (both national and international) will be sought in awareness
- raising programs.
- Provide necessary awareness about the effect of excessive cold/hot weather on poultry production, Dairy animals including the mortality, loss of egg production, milk production, immunity, biosecurity measures in changed situation etc.

Enhance and Maintain DLS's Livestock Specific Data Base and Link it with a CDMP Central Data Base

- The existing database available with DAE is useful not only in the context of Livestock development but also to provide support and help in DRR. This data will be updated with hazard risk specific entries and may be put on the web for free access by other departments; it will be linked with the central data base of CDMP for use in over all DRR planning in the national context.

MOA-5
(HFA priority area 3 and 4)

Technical Options to Reduce the Underlying Risk Factors in Livestock and Fisheries

Justification: A significant amount of technical options to assist livestock producers in increasing their resilience and preparedness against natural hazards are known and available at regional, national and international levels. However, the spectrum of available options is often not known or easily accessible at community level. Local DRR and CC adaptation practices are not systematically documented and shared. To make DRR in the livestock sector more effective, it is significance that available options are systematically assessed, documented, shared and adapted to location specific needs in a participatory way with farmers.

Goal: Increased capacity of DLS to assist farmers with a variety of tested technical interventions, thus increasing local level resilience against natural hazards and climate change risks.

Proposed strategies:

Assess Indigenous Knowledge and Elaborate Available Local Technologies For DRR in livestock

In Bangladesh many indigenous technologies are available within the communities to face the agony of disasters and reduce the loss. However, local knowledge is not well assessed, shared and replicated; DLS will assist through its extension staff in identifying, documenting, sharing and elaborating the knowledge about the most convenient, locally accepted and efficient technologies. In case of animal health issues ethno veterinary medicine sometimes proved effective which developed by community people.

Promote DRR Related Action Research and Technology Exchange at Community Level

The small and marginal farmers has a lot of experience on dairy and poultry production. So research with small and medium farmers within the community could be included for action research to address the issue for further solution.

NGOs and CBOs will be involved in this process. BARC (in charge of developing new varieties and new technologies) will be approached to carry out relevant needs based and more practical research in the field of DRR in the livestock sector. DLS will coordinate with research institutions to promote the inclusion of climate change monitoring and impact analyses into agricultural research, which should result in the formulation and recommendation of long term adaptation options, such as changes in livestock rearing practices (especially the use of thermal/salinity/drought tolerant fodder crops and alternative fodder cultivation, capable of withstanding extremes of weather, long dry spells, flooding, increased salinity and variable

moisture availability). The recently presented "Bangladesh Climate Change Strategy and Action Plan 2008",which at present is under review outlines some programs related to DRR in the livestock sector for which DLS will take a lead role in close coordination with MoEF and research organizations.

Enhance and Apply Risk Mitigation Options in Livestock in Selected Sites With Selected Breed

In consultation with Upazila Livestock office or with relevant stakeholders will analyze (i) livelihoods, farming systems in view of identifying current hazard coping strategies, assess constraints, and identify opportunities for utilizing technological options to reduce risks; and (ii) the existing livestock input supply and emergency response system. After the above location specific analyses, DLS will implement hazard prevention, mitigation and adaptation activities and livelihood diversification strategies, apply and disseminate successful technological options within a capacity building framework in order to address emerging needs. It is anticipated that the following activities will be considered for application and promotion:

a) Animal breeding patterns more resistant to floods and drought;
b) land and water use zoning;
c) Crop diversification with the integration of fodder crops;
d) Introduction and management of new crop species/varieties, fish and animals that are more resistant to floods and/or droughts;
e) Fodder stocking infrastructure, buffering capacities
f) Strengthening community-based early warning systems, including the elaboration of location specific impact outlooks and alternative management options.

8. Financing Action Plan

The DLS currently working on Disaster and Climate Risk Management in Livestock sector with the financial assistance of the Ministry of Disaster Management and Relief(CDMP II). Now it is essential for **t**he Department of Livestock services working out the cost of implementing the five-year Action Plan, in consultation with the various divisions of DLS. A distinction is being made between activities which are part of the regular Livestock development programs and the incremental work that will be financed under the Action Plan. Cost effective priority programs for immediate implementation and others to be started in the next 5 years will be identified, with special attention on the needs of the poorest and most vulnerable livestock farmers in the community, the need to create an enabling environment to promote climate resilient investment, and on ensuring that knowledge, data and experience on adaptation is shared with other countries in the region. It is estimated that a $32 million programs will need to be initiated in Years 1 to 5 e.g., for immediate actions such as strengthening disaster management, research and knowledge management, capacity building and public awareness programs, and urgent investments such as cyclone shelters for animals and input supply. The Government of Bangladesh has established a National Climate Change Trust Fund. Development partners may contribute to this fund, establish different funds or use other financing mechanisms.

9. Implementing Action Plan

Under the overall guidance of concerned Ministry Fisheries and Livestock, Programs funded under the Plan will be implemented by the Ministry with the involvement donor agencies, civil

society and the private sector. The Disaster and Climate Risk Management Action Plan in livestock sector has been developed by the department of livestock services in consultation with the people of disaster prone areas, including NGOs, research organizations and the private sector. It supports on the National Adaptation Program of Action (NAPA), published in 2005. It also supports the National Plan for Disaster Management(NPDM) published in 2010(Final).It will be reviewed and revised as experience and knowledge are gained in implementing adaptation and related research programs.

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X. APPENDICES:

Appendix - 1 Activity as per Standing Order on Disaster (2010) for MoFL and DLS

Ministry of Fisheries and Livestock

The Fisheries and Livestock secretary:

The Secretary of Ministry will ensure following responsibilities in addition to his normal duties. The Ministry also need to take proper management practices on prevention and control of Emerging Zoonotic diseases with potential risk of human health and specific focus to Avian Influenza.

Risk Reduction

(a) Designate the Focal Point for Disaster in the Ministry.
(b) Conduct sectoral risk assessment with an especial emphasis on bird flu and other related zoonotic diseases and prepare a sectoral risk reduction action plan.
(c) Ensure budgetary provision of the ministry to ensure implementation of the plan.
(d) Mainstream disaster management principles and practices within the national development plan of the Ministry of Fisheries and Livestock.
(e) Develop program for research with regards to hazard analysis and its affect in fisheries and livestock.
(f) Ensure budgetary provision of the ministry for its disaster management affairs.
(g) Implement the policy of undertaking risk assessment and risk reduction activities which affect the services of the Ministry.
(h) Ensure prevention and control of emerging Zoonotic diseases with potential risk of human health with specific focus to Avian Influenza
(i) Implement the policy of undertaking training, awareness and education programs with livestock and fisheries industries concerning risk assessment and risk reduction activities.
(j) Manage emergency preparedness including the identification of high lands for livestock shelter, and the stockpiling of animal and poultry emergency stocks of vaccines and medicines.
(k) Prepare and manage an inventory of livestock and poultry numbers in high risk areas.
(l) Develop schemes and systems for the management of livestock during emergencies, including the provision of emergency feeding, livestock evacuation, and for post event industry rehabilitation.
(m) Manage risk to the trawler fleet by ensuring that all boats are registered with the Marine Fisheries Department, and that all boats have suitable safety equipment including radio and wireless and life jackets.
(n) In consultation with the Bangladesh Water Development Board, undertake risk reduction activities in salt water ingestion, by ensuring government embankments and sluice gates are constructed to a proper height and sufficient strength
(o) In coordination with the Bangladesh Agricultural Development Board, ensure the availability of power driven pumps for evacuating coastal ponds.
(p) Implement awareness activities with fishermen regarding hazards, risks and risk reduction options, including individual preparedness for cyclone/flood season.
(q) Develop a sectoral risk mitigation and preparedness strategy plan of the ministry.
(r) Develop an emergency sectoral response plan of the ministry.
(s) Establish a risk communication system of the ministry.
(t) Prepare a sectoral contingency plan for disaster management and risk reduction activities of the ministries.

(u) Ensure incorporation of disaster risk reduction considerations in the programs and policies and plans of the ministry and its agencies
(v) Coordinate the ongoing disaster risk reduction activities by relevant offices

Emergency Response

Normal Times
(a) Examine the preparedness status every three months as per own Contingency Action Plan for ensuring security and protection of valuable assets through fruitful utilization of time at rehabilitation stage.
(b) Take the required steps for the collection and dispatch of reports.
(c) Identify probable areas likely to be affected by disaster.
(d) Open separate emergency funds so that the post-disaster recovery needs can be met immediately.
(e) Train up and make the officials of Fisheries and Livestock about disaster preparedness, loss and damage to environment and rehabilitation.

Alert and Warning Stage

(a) Instruct different levels of officials of the Directorate under his control for taking security steps for protection of own buildings and stores and keeping all measures at the highest stage of preparedness.
(b) Designate one Liaison Officer for keeping link with the EOC of the Ministry of Food and Disaster Management and Disaster Management Bureau.
(c) Instruct officers at different levels of the Directorate to render all types of assistance to and cooperation with Divisional Commissioners/Deputy Commissioners, Chairman, Upazila Disaster Management Coordination Committee, Chairman, UDMC and CPP Officials.

Rehabilitation Stage

(a) Arrange quick inspection and survey of loss and damage of all assets and stores together with that
of cattle, poultry, fisheries, fish hatcheries, fish ponds, trawlers and other structures and .
(b) Finalize evaluation of loss and damage and prepare short and long term rehabilitation schemes in
respect of livestock, poultry, fish farms, hatchery, fishing trawler, training and research institutes, medicines and chemicals etc and submit report to appropriate authority for funds.
(c) Implement approved schemes through release of funds.
(b) Coordinate with the local administration and other Ministries for rehabilitation programs
(c) Prepare completion report of relief and rehabilitation programs and submit to National Disaster Management Council.
(d) Develop plans for the import of livestock, as necessary during rehabilitation operations.
(e) Undertake field operations to support affected people, fishermen, pisciculturists, and farmers in the
protection, relief and rehabilitation of livestock or fisheries stock as appropriate, including health care aspects, feeding, stocking and stock protection.
(f) Provide technical advice on the issues of relief, rehabilitation on the livestock and fisheries industries.

The Director General, Department of Livestock Services (DLS)

The DG of the department of Livestock Services (DLS) will perform the following duties in addition to his normal duties.

Risk Reduction

(a) Designate a Disaster management Focal Point.
(b) Consider disaster And Climate change risks in the plan of action of the DLS.
(c) Implement the action plan
(d) Undertake training, awareness and education programs with poultry and livestock industries concerning risk assessment and risk reduction activities including bio-security management of livestock and poultry farms..
(e) Manage emergency preparedness including the identification of high lands for livestock shelter, and the stockpiling of animal and poultry emergency stocks of vaccines and medicines.
(f) Prepare and manage an inventory of livestock and poultry numbers in high risk areas.
(g) Develop schemes and systems for the management of livestock during emergencies, including the provision of emergency feeding, livestock evacuation, and for post event industry rehabilitation.
(h) Support the Ministry of Fisheries and Livestock and prepare a sectoral contingency plan for disaster management and risk reduction activities of the ministries.

Emergency Response

Normal Times
(a) Designate one Liaison Officer in the Directorate as Focal Point for disaster management
(b) Review every three months about the state of preparedness as per the Directorate's own Contingency Action Plan and maintain liaison with subordinate offices, officials of concerned field level government offices and CPP
(c) Alert all field officers in the concerned cyclone/flood prone area to take security steps before the start of cyclone/flood season for the purpose of protection of own assets such as stores in poultry farms, shelter place for cattle in the cattle farms etc.
(d) Select and earmark high lands in consultation with local administration and CPP, for use as shelter of livestock for their protection against severe floods during flood season and against tidal bores during cyclone.
(e) Arrange for emergency stocks of medicines and articles for protection and control of livestock and poultry, against contagious and infectious diseases.
(f) Arrange a survey of the number of livestock and poultry in cyclone/flood prone areas and prepare an inventory. Update the same at regular intervals.
(g) Assist the local administration with shifting of livestock to safer places in the event of imminent cyclone/tidal bore and prepare plans for vaccination and treatment well in advance.
(h) Prepare schemes for supplementary arrangements for rehabilitation of livestock and recouping their loss.
(i) Take up schemes for procurement of animal feed on emergency basis for distribution in the affected areas.
(j) Take steps for training of field level and mid level officials and staff to cope with cyclone/floods, environmental pollution, and works

Disaster Stage

(a) Designate one Liaison Officer in the DLS for maintaining link with the EOC of the MoFDM.
(b) During floods assist the local administration for operations relating to the rescue and shifting of stranded livestock and poultry.
(c) During floods, arrange for the quick vaccination and treatment of livestock and poultry at shelter places.
(d) Conduct vaccination of animals in affected areas (before floods)

Rehabilitation Stage

(a) Prepare measures for the purchase of livestock under loan and supply of animal feed as rapid relief and coordinate with other Ministries/Department.
(b) Arrange a rapid survey to assess the loss and if necessary import livestock.
(c) Form veterinary and dispatch Veterinary Doctors Teams on emergency basis for affected area.
(d) Prepare measures for the rehabilitation of livestock and supplementary arrangement for lost cattle wealth. The DLS will maintain permanent fund for this purpose.
(e) Prepare measures for the procurement of animal feed on emergency basis for distribution in affected areas. The Directorate of Livestock will arrange emergency fund for this purpose.
(f) Send to IMDMCC reports containing information of lost/dead livestock/poultry, diseased livestock/poultry and epidemics.
(g) During floods, send a report of shifted/rescued livestock to IMDMCC with the address of shelter places.
(h) Assist, and cooperate with the local administration for organising relief and rehabilitation immediately.
(i) Assist local administration for returning livestock to respective area and to the owners from the evacuation centres.
(j) Assist the affected people for procurement of food to livestock and poultry until return of normal supply.
(k) Implement all schemes on emergency basis for rehabilitation of livestock including selected animals.
(l) Implement the import plans of livestock and poultry for distribution in the affected areas.

Field Offices of the DLS

In addition to their own responsibilities the offices of DLS at district(DLO), Upazila(ULO) and Union level(VFA) will perform the following duties within their respective areas.

Risk Reduction

(i) Designate a disaster management Focal Point to participate in all the Disaster Management Committee Meetings and record meeting minutes.
(j) Identify the local level risks in the livestock sector and prepare a local level risk reduction action plan
(k) Implement the action plan utilizing the allocation under Annual Development Programme budget
(l) Prepare and manage an inventory of livestock and poultry numbers in high risk areas.
(m) Undertake training, awareness and education programs with the small and medium poultry and
livestock farmers concerning risk assessment and risk reduction activities.
(n) Prepare the local level contingency plan for disaster management and risk reduction activities of the ministries.

Emergency Response

Normal Times
(a) Every year in the month of April before the start of cyclone season alert all field level officials of the Directorate and the farmers will review the preparedness for safety of livestock, poultry and domestic animals and their feed.

(b) In order to keep the animal wealth under a disciplined safety arrangement starting from the lowest level, examine the preparedness measures as per own Contingency Action Plan in the cyclone/tidalbore
prone areas with the subordinate offices, CPP and farmers representatives.
(c) In order to protect livestock/poultry against the onslaught of cyclone/tidal bore, select local high land, hillocks or fortified earthen mounds for use as their shelter place in consultation with the local administration and publicise the same locally.
(d) Arrange for emergency stocks of medicines and implements in cyclone/tidal bore prone areas for fighting and control of infections and contagious diseases of livestock and poultry.
(e) Ensure reserve stock of animal feed in cyclone/tidal bore prone areas.
(f) Conduct survey in the cyclone/tidal bore prone areas in April every year for a census of livestock and poultry.
(g) Arrange orientation training locally for cyclone disaster preparedness of own officials/staff.

Disaster Stage

(a) Designate one Liaison Officer for the local Disaster Control Room.
(b) Arrange assistance to local administration and people/agencies including Union Parishad for rescue and evacuation operations of stranded livestock and poultry during floods.
(c) Arrange vaccination and treatment of livestock and poultry in shelter places during floods.
(d) Arrange wholesale vaccination programme of animals in affected areas during floods.

Rehabilitation Stage

(a) Prepare measures for loan/grant for purchasing of livestock and supply of animal feed in affected areas.
(b) Conduct immediate survey for determination of damage, loss and needs, and arrange import of livestock from other areas.
(c) Send field teams on emergency basis for treatment of animal in affected areas.
(d) Send a detailed report to departmental head containing the numbers of lost livestock/poultry, diseased livestock/poultry.
(e) Collect the latest reports of the location of every livestock shelter and number of shifted/collected livestock at every such shelter.
(f) Assist, and cooperate with local administration in all matters for organising immediate relief and rehabilitation work.
(g) Prepare local measures of supplementary arrangements for recoupment of loss of perished livestock and poultry and for rehabilitation of affected livestock and poultry.
(h) Prepare procurement plan of animal feed and other feed for emergency distribution in the affected areas.
(i) Assist the farmers for the return of livestock to owners from evacuation centres.
(j) Assist affected people for procurement of feed for livestock and poultry.
(k) Arrange for receipt of loans from Bangladesh Bank for purchase of livestock and poultry for rehabilitation of livestock and poultry including selected animals.

Appendix:2

Format for collection of report from Upazila Livestock Office

Name of Upazila: Name of district:
No of Villages: No Unions: No of cattle population:
No of sheep: No of goat: No of chicken:

Sl. No	Category of animals/loss of other assets	No/quantity	Unit price per each	Total price (Tk)
1	Animals and birds			
	a. Cattle			
	b. Buffalo			
	c. Goat			
	d.Sheep			
	e. chicken			
	f. Duck			
	g. others			
Sub total				
	Damages of Shed			
2.	a.Cow shed/shelter			
	b.Goat shed/shelter			
	C.Poultry shed(Duck + Chicken)			
	d.others			
Sub total				
	Damage of Fodder crops			
3.	a.Napier/Para/others fodder	acres		
	b. Mashcali			
	c. Khesari			
	d.Others			
Sub total				
Grand total				

Appendix:3

For rehabilitation a proposal for rehabilitation should be submitted to the Ministry with the following sample format.

Sl. No	Budget Items	Subside per head (No/quantity)	Unit Price (Tk. Per animal/ birds/price per kg feed)	Number of beneficiaries	Total amount (Tk. In million)
1. a	Vaccine				
b.	Medicine				
c.	Distribution of ducks (No)				
d.	Distributions of chicken (No)				
e.	Distributions of goat (No)				
f.	Distributions of cow/calf (No)				
g	Others				
Sub total					
2.	Shed construction and reconstruction				
a.	Cow shed/shelter				
b.	Goat shed/shelter				
c.	Poultry shed(Duck + Chicken) shelter				
d.	Others				
Sub total					
	Concentrate feed distribution to cattle ,Goat and Chicken				
3.a.	Cattle	kg			
b.	Goat	kg			
c.	Poultry	kg			
d.	Others				
Sub total					
	Cultivation of fodder crops				
4.a.	Maize seed	kg			
b.	Mashcali	kg			
c.	Khesari	kg			
d.	Napier/para cuttings	no			
e.	Others				
Sub total					
Grand total					

Appendix: 4

Disaster Management operational Action Matrix (Prepared with the recommendation from TWG, Action plan committee and the resource person attending seminar):

Flood:

Options for DRR & CCA in Livestock sector	**Activity**
Mitigation	• . The people in the flood prone areas will raise the entire homestead/ only dwelling houses including animal shelter or part of the premises or close to premises should elevated to stay even during flood. • The construction of farm building should be well structured. • Smallholder should have the facilities for killa/flood shelter for animals as well. • Regular vaccination should be conducted against infectious diseases. • Raise the tube-well platform above the flood level. • Increase capacity of govt. vaccine production lab. • Capacity building of DLS.
Preparedness	• Development of early warning system about emerging diseases, flood, cyclone etc. • Stock piling of essential vaccine and medicine, protective coverall for Zoonotic diseases prevention. • Stock piling of concentrate feed, hay, straw, rice bran, rice polish, wheat bran, maize bran and urea molasses block etc. • Make plan to form a veterinary medical team care during and immediately after flood.. • The preservation of crop residues like straw, maize Stover, hay etc should be kept in the elevated mounds or platform made on bamboo or wood in the premises covering by triple or polythene. • Capacity building of the DLS officers through training and demonstration. • Maintain communication with the govt. vaccine production laboratories. • Include NGO'S and other associated govt. agencies.
Response	• Declare the period of emergency and cancel leaves for all related officers and staffs as per SOD. • Formation of Veterinary medical team at centrally, district level

	and Upazila level to provide quick and effective services to the ailing animals and birds. Collection and conductions of vaccines to prevent severe outbreaks where necessary. • Rescue of flood trapped animals and birds • To arrange the temporary shelter and feed & water supply of rescued animals and birds. • To prevent epidemics proper counseling to the farmers through announcement, poster, electronic and print media. • A monitoring team established to supervise and monitoring the entire activity with the senior officials of the DLS. • To implement the emergency activities the DLS will ensure the supply of finance within 24 hours in consultation with the MoFL as per SOD.
Rehabilitation	• The DLS should prepare a rehabilitation plan under the directives of the Ministry of Fisheries and Livestock (MoFL). • The Department of Livestock Services should have to collect proper information of flood damage from each Upazila which would be very helpful for the preparation of rehabilitation program. The Upazila livestock office will collect the report through public representative with detail information including the name of owner specially those who lost their cattle, sheep, goat and poultry farms due to flood. After the collection of the report the livestock office will verify at least 10-20% cases for its authenticity and prepare the final list of the affected farmers with due diligence.(format in the appendix 2& 3 should be used) • The rehabilitation program include, nutrition supply, mass vaccination, Veterinary care, fodder cultivation, animal shelter/shed reconstruction etc. • Mode of operation of rehabilitation program to be implemented rules and regulation
Adaptation	• Premises should be elevated above the 1988 or 1998 flood level • Water logging tolerant breeds of fodder cultivation • Killa with cyclone/sidr resistant shelter for animals to be constructed. • Reduction of green house gas emission through proper management of excreta of animals and birds. The setting up of **Biogas** plant can reduce the emission of methane gas from the excreta of livestock. • Cultivation of Saline tolerant fodder in the coastal sides. • Communicate with other department of the govt. to make

	Dams, embankments in the coastal side. • Green belt in the coastal side. • Elevation of School ground, Madrasa, college, Upazila premises, Union parisad premises, hospital ground etc. • Capacity building training to be given to the officers and the farmers. • Public awareness creation. • Technology transfer: Preparation of concentrate feed, UMS and urea block by the farmers should encourage by the DLS.

Appendix-5

Cyclone/Sidr/Aila/Tidal surge.

Options for DRR & CCA in Livestock sector	**Activity**
Mitigation	• Should built houses for human and shelters for animals which can endure the extreme high speed storm originated from cyclone/ sidr /Aila/NARGIS etc. • Development of Early warning system for livestock farmers. The upazila livestock office will maintain a list of dairy and poultry farms including the address and mobile number to send emergency evacuation message to the farmers as part of the early warning system. • DLS will motivate the people for the Creation of Green belt in the coastal area (Main responsibility-Ministry of Environment and Forest). • Embankment (water development board) • Dike (water development board) • Polders (water development board) • Land reclamation (water development board) • Cultivation of saline tolerant Fodder crops (DLS)
Preparedness	• Development of Early warning system for livestock farmers. • Plan to provide specific responsibility to a specific officer. • Procurement of necessary equipment for immediate response. • Conduct training course for farmers to raise awareness. • Arrangement of training of DLS staffs on post cyclone management of livestock. • Maintain communication and coordination with Metrological department, Water development board, SPARRSO and other

	weather related department of the govt. • So, as part of the preparedness program the DLS should create awareness about the issue and advise people to arrange fresh water from tube well or any other suitable sources. • Maintain communication and coordination with NGO's and other social organizations through meeting, workshop, seminar to ensure their participation at the time of necessity.
Response	• As per SOD the DLS officer will participate in the respective disaster management committees for immediate action.
Rehabilitation	• Reconstruction of damaged cattle and poultry houses for restocking. • Start relief operation among the most vulnerable livestock owners for purchasing animals again to restart their business. • Make linkage the less vulnerable farmers with financial institutions like Bank or NGO,s to get loan to restart their livestock enterprise. • Arrange source of pure drinking water for animals as because the cyclone/ storm surge catches huge amount of saline water which make the inland water sources saline. It was observed that in the post cyclone situation there was causalities of animal life due to drinking of saline water. • Distribution of kinds among the affected farmers, like the distribution of cattle, chicken, ducks, feed, fodder seed etc. • Setting of more tube wells with elevated/raised platform.
Adaptation	• Plan and implement an investment program to secure the coastal area for adaptation of climate risk in livestock sector. • To protect the coastal belt, an extensive network of polders has already been constructed in Bangladesh. However, with the sea level rises expected as a result of • climate change, the heights of the dykes will need to be raised further. Also, there are some additional lands and small islands, which need to be protected through the • construction of new polders or extension of existing ones. The construction of the above dykes/polders etc will be made by the Water Development authority but the Department of Livestock Services will communicate with the respective authority to speed up the process. • With sea level rise, drainage congestion may become a major problem in the polders. River levels will be higher, making it more difficult to drain local rainfall from the polders. Also, the capacity of the existing sluices and regulators may be insufficient. These water management structures will need to be assessed and remedial measures undertaken, where necessary. The current structure and network of killa will also need to be reviewed. • Analysis of meteorological data to improve predictions of changes in the pattern of cyclonic events. As earlier explained in the flood

	that the DLS should establish a small unit to communicate all other relevant department of the govt. to develop an early warning system for livestock farmers. • Cultivate saline tolerant fodder crops. • Provide proper counseling to the farmers to construct their animal shelter above the cyclone surge level. • Plan and advise the people to make houses which can withstand in the extreme level of tidal surge.

Appendix-6

Drought

Options for DRR & CCA in Livestock sector	Activity
Mitigation	• Climate adaptive Housing should be built. The floor and roof height should be adjusted. **The height of the edge of the roof of poultry and dairy shed should be minimum 10 ft from the floor and floor height should be at least 2.5 ft -3 ft.** The roof materials should be tiles or non radiation type of materials. The fence of the dairy and poultry shed should be net type stating from the top of the floor for proper ventilation. • Increase irrigation facilities for crop/fodder fields. • Natural reservoir should be created to catch more rain water in the rainy season l in the ponds, canals. • The re-excavation of unexploited pond, digging of canals, dredging of rivers for creating water sources. • To reduce the dependency from underground water. • Cultivation of drought tolerant fodder crops • Conduct more research for drought tolerant cattle, sheep, goat and poultry breed. • Educate farmers for the preparation of silage, hay, concentrate feeds for dry season feeding. • Use cow dung beneath the fodder line in case of line sowing fodder crops to increase the water holding capacity of soil.
Preparedness	• Develop training program for high and mid-level officials of the Government, NGOs and private organizations/associations and provide training in collaboration With research centers and universities on the preparedness of drought. • Preparation of plan on dry season feeding of livestock should be prepared by DLS. • DLS should procure feed and should create a stock of concentrate feed for distribution among the farmers. • Traders should encourage to collect more and more dry feeds from non

	drought areas to make it available in the drought prone areas. • NGO's has more flexible system to finance the traders to establish new feed enterprises, so that involve NGO's • If drought starts in the drought prone areas or in the most part of the country as like as 1978, collection of reports regarding drought and compile it for further preparation of DLS to combat against drought. • Should have a plan on the distribution of concentrate feed and other counseling to the farmers through the quantification of the need of the farmers.
Response	• Declare emergency of the drought affected area. • Cancel leave of the relevant officers to manage the situation. • In case of extreme scarcity of drinking water steps to be taken to supply of drinking water through deep tube well until the availability of water. • The poor and vulnerable farmers should be identified and Steps to be taken to supply a portion of concentrate feed to the farmers as relief. Counseling to the people through electronic and print media. • Supply of different feed ingredient should be increased and also to ensure the retail price to the open market. • Increase irrigation facilities in the fodder plot and crop land.
Rehabilitation	• A detail information of the affected farmers should be collected by the DLS. • Conduct relief operation among the affected farmers through the distribution of cash money, specially the poor vulnerable farmers.
Adaptation	• Excavation of pond and other water reservoir to catch more rain water for use in the dry season or at the time of drought by the people with active assistance of the Govt. • The Govt. will attract the donor funding to create some open water reservoir in the govt. khash land for the use oe water by the community people. Improve and develop technologies by using renewable energy, reuse of wastewater for artificial recharge and flood water harvesting to increase water supply and to increase energy efficiency. Those techniques will be used in small-scale and at several suitable locations and clusters that are really suffering from water shortage problem. • A long term drought adaptation plan should be prepared by govt. to achieve Millennium Development Goal(MDG).

Appendix-7

Emerging diseases:

Avian Influenza

Options for DRR & CCA in Livestock sector	Activity
Mitigation	• Strategic research • Vaccination of poultry. • Communication and awareness building. • Radio, TV and print media publicity. • Training programs. • Strengthening of bio-security of poultry farms. • Working in collaboration with BLRI, OIE, WHO,SAARC and other national & international organizations. • Capacity building of DLS.
Preparedness	• Communication and awareness building. • Radio, TV and print media publicity. • Training programs. • Strengthening of bio-security of poultry farms. • Storage of all necessary equipments for stamping out activity. • The govt. should have massive network for surveillance and regular reporting system. • Capacity building of CDIL and FDIL.
Response	• Depopulation of all birds in 1 Km radius of infected premise in case of backyard poultry • Depopulation of the infected farm only, in case of commercial farm. • Destruction or decontamination of all contaminated materials of the infected premise. • Complete disinfection of infected and contaminated premise, transport and vehicle. • Movement control of poultry and poultry product in the control zone. • Surveillance program for early detection. • Post outbreak surveillance in outbreak areas. • Compensation for 100% of culled birds/eggs. • Motivation for bio-security in farming practices. • Supervision and disinfection in wet markets • Disinfection of vehicles in border entry points and entry points of districts and sub-districts. • Should follow the OIE guideline as well.
Rehabilitation	• Provide compensation to all affected farmers for restocking.