

DISASTER MANAGEMENT AND DATA NEEDS IN NIGERIA

Nigeria is located between 4°N and 14°N of the equator. The western frontiers runs from 3°E and the eastern reaches nearly 15°E of the meridian. It is bounded by Cameroon to the east, Chad to the northeast, Niger to the north, Benin to the west and the Atlantic Ocean to the south. Nigeria has a federal form of government and is divided into 36 states and a federal capital territory. Nigeria has a population of over 120 million and covers an area of 923,768 sq km. At its widest, it measures about 1,200 km from east to west and about 1,050 km from north to south. The country's topography ranges from lowland along the coast and in the lower Niger Valley to high plateaus in the north and mountains along the eastern border. Nigerians suffer significantly from various types of disasters. Disasters such as floods, landslides, tidal waves, coastal erosion, sand-storms, dust-storms, locust/insect infestations, oil spillage and other man-made disasters have claimed many lives in Nigeria and rendered many homeless. In general, Nigeria has a relatively weak economy with an under protected and expansive environment. The contribution of these characteristics make Nigeria's environment especially vulnerable.

Disaster is an event, natural or man-made, sudden or progressive, which impacts with such severity that the affected community or individual has to respond by taking exceptional measures. This phenomenon has become an issue of growing concern throughout the world. There has been a dramatic rise in the frequency and magnitude of disasters, threatening large populations living in diverse environments in recent years. Natural disasters had tripled since the 1960s killing hundreds of people and destroying millions of dollars of property each year. These losses will increase as more people reside in areas that are subject to these disasters.

The general increase in population in the last two decades has placed more people at risk whenever an extreme weather event occurs. Also the significant increase in human settlement particularly on floodplains over the past

thirty years has increased the risk of flooding. If these trends continue, the costs associated with natural disasters will continue to increase.

DISASTER MANAGEMENT IN NIGERIA

In 1976, the Federal Government of Nigeria established the National Emergency Relief Agency (NERA) to coordinate its disaster response activities. The Agency was purely a relief organisation focussing only on post disaster management. The increase in deaths from natural and man-made disasters makes mitigation and prevention of disasters an urgent priority.

Thus in 1999, the National Emergency Management Agency (NEMA) was established to replace NERA and to manage disasters in Nigeria in all its ramifications.

The National Emergency Management Agency, amongst other things, has a mandate to:

- a) Formulate policy on all activities relating to disaster management in Nigeria and co-ordinate the plans and programmes for efficient and effective response to disaster at national level;
- b) Co-ordinate and promote research activities relating to disaster management at the national level;
- c) Monitor the state of preparedness of all organisations or agencies which may contribute to disaster management in Nigeria;
- d) Collate data from relevant agencies so as to enhance forecasting, planning and field operation of disaster management;
- e) Educate and inform the public on disaster prevention and control measures;
- f) Co-ordinate and facilitate the provision of necessary resources for search and rescue and other types of disaster curtailment activities in response to distress call.

DISASTER MANAGEMENT AND INFORMATION

Disaster Management is the systematic observation and analysis of disasters to improve measures relating to prevention, mitigation, preparedness, emergency response and recovery.

Today, lack of understanding of the relevance of space acquired data to development efforts, inadequate efforts to address the information needs of various economic sectors including the analysis and application of such information and the scarcity of skilled and educated man-power are among the bottle necks that confront sustainable development efforts.

People in desperate poverty often could not cope with the magnitude of disasters. Desperate actions often ended in outcomes that prevented their living through a subsequent disaster. This is the more reason why disaster must be managed by applying various options of the technology available.

Satellites remote sensing is indispensable for disaster mitigation work. Information provided by satellites is critical for decision-making. Maps can be produced for risk assessments. For example, it can be used to map the various areas that are prone to flooding. This will allow for better targeting of the people in the areas perceived to be most in danger for purposes of early warning and response.

Natural hazards prevention must play a prominent role in global efforts to reduce human suffering and damage to natural and built environments. Disaster mitigation is both possible and feasible if the sciences and technologies of space are applied. The main types of disasters in Nigeria are floods, drought, oil spill, bush fire and landslide.

FLOODS

Floods are among the most devastating natural hazards in the world, claiming more lives and causing more property damage than any other natural

phenomena. In Nigeria, at least 20 per cent of the population is at risk from one form of flooding or another. This includes the whole spectrum from the rich urban residents of Victoria Island, Lagos to poor farmers and fishermen in Benue and Niger trough and the coastal regions of Nigeria.

An average of about 100 people are killed and millions of dollars of property is damaged by heavy rainstorm and flooding each year.

Images from weather satellites are used routinely for weather predictions. Data from remote sensing can be relayed to provide early warning of impending flood conditions. Geographic Information Systems (GIS) and remote sensing are useful for risk analysis and calculation of the various areas that are more at risk of flooding. That allows for better targeting of the people in the areas perceived to be most in danger. A flooding contingency plan can be made based on regional and weather forecasts, geographic information systems, ground stations and satellite imaging.

During flooding, timely and detailed situation reports are required by authorities to locate and identify the affected areas and to implement corresponding damage mitigations. During this period of response or relief, it is essential that information be accurate and timely in order to address emergency situations like search, rescue and relief. Space information can help to augment ground information for real-time damage assessment and extending threat to life and property. Space imagery integrated with GIS can also help in preparing flood recovery plans. Information collected on the mitigation, preparedness, response and recovery phases can be integrated into master flood prevention projects.

OIL SPILL

Oil spill disaster is caused either by tanker break up at sea, illegal discharged and tanker clean up. Oil spill especially in Nigeria could also result from sabotage. Oil is both physically and chemically hazardous with disastrous consequences in marine environments that are exposed to both chronic and

acute pollution. The two major applications of space technology to oil pollution are:

- ❖ Law enforcement surveillance of coastal and inland waterways for violations of pollution regulation
- ❖ Monitoring of accidental spills to aid clean-up operations.

The three aspects of oil-spills monitoring are:

- i. Detection of oil spills
- ii. Estimation of thickness and volume of spills
- iii. Identification of the type of crude oil or refined oil in a spill.

Space derived information will be needed to detect locate and track oil spillages so that vital information can be relayed to relief workers, clean-up agencies and the local population.

DROUGHT

Drought is one of the most important natural disasters in Nigeria. It is often aggravated by human actions. Since drought affects very large areas for months, even years, it has a serious impact on regional food production, often reducing life expectancy for entire populations and economic performance of large regions.

During the drought of 1972-1973, about 300,000 animals representing 13 per cent of the livestock population of north-eastern Nigeria were estimated to have died. Agricultural yields dropped to between 12 per cent and 40 per cent of the annual averages. In the drought of year 1987, crop yields ranged between 56 per cent and 75 per cent of the 1986 totals.

The consequences of environmental breakdown as a result of a prolonged drought led to massive economic losses, destruction of ecological resources food shortages and starvation for millions of people.

Information that will be needed for drought disaster includes those to be used for prediction, monitoring, early warning, impact assessment and recovery. Such information which can be provided by space technology includes:

- Climate variability
- Persistent anomalous circulation patterns in the ocean and atmosphere
- Initial soil moisture
- Knowledge of stored water available for domestic stock and irrigation uses
- Land use types
- Demographic and infrastructure around the impacted area
- Intensity and aerial extent
- Water management
- Crop management

BUSH FIRE

Bush fire threat tends to be seasonal. Speed of onset may vary. It can be rapid under conditions of high temperatures and high wind, when major fire fronts advance very quickly. Also, fragments of fire from a front may be carried forward by the wind, starting new fires further ahead. Effects of bush fire can be very destructive, especially in loss of building, timber and livestock. Recovery from effects on the environment may take several years.

Wildfires occur almost everywhere in Nigeria where combustible materials are available, particularly in the dry season. Nigeria suffers enormous losses through uncontrolled wildfires. A comprehensive study in seven states in Nigeria indicates that of the 12, 274 hectares of plantation established, 1,122 hectares was affected by fire while 1,7885.3 hectares or 14.55% was completely destroyed in 1992/93 alone. This loss amounted to over 20million Naira (over \$2 million) and the trend seems to be on the increase. The effect of this to agriculture and human settlement is unimaginable.

Satellite remote sensing makes it possible to identify the fires that are hottest. This allows the fire fighters to analyse the conditions of the area and prioritise fire-fighting efforts.

LANDSLIDES

Landslides occur in areas of relatively steep topographic slopes underlain by unstable materials. Slides are often the result of high concentrations of soil moisture that lubricate the surface materials. Landslides may cause severe damage to structures and systems (building may be buried or villages swept away). Rivers may be blocked, causing flooding, crops may be affected. Sometimes, areas of crop-producing land may be lost altogether. When landslides are combined with very heavy rain and flooding, the movement of debris (e.g. remains of buildings uprooted) may cause high levels of damage and destruction.

Areas that are susceptible to landslides can be identified from remotely sensed data by the hummocky appearance that is characteristic of unstable slopes.

People at risk from disasters, whether natural or human in origin can take actions that save lives, reduce losses, speed response and reduce human suffering when they receive accurate warnings on time. Space derived information can provide accurate and warning techniques as better sensors are deployed to measure key variables, employ better dynamic models and expand the understanding of the causes of disasters.

Finally, any effort at managing disaster must apply prevention strategies to reduce the impacts of natural and man made disasters. We cannot decide how many storms will strike, nor how fiercely the winds will blow, or the waters will rage. But we can decide - we must decide together - the impact they will have on our lives and on the ecosystem. This requires a collective approach by all stakeholders.