

## Natural Disasters Information

### INTRODUCTION

Nimpala has a high vulnerability to both localized regional flooding and droughts. Both have the potential to result in population displacement, loss of agricultural productivity, and erosion of irrigable land. The continued process of desertification, partly caused by anthropogenic behavior as well as changing climate conditions, raises significant concerns for future social dynamics and economic potential in an already stressed environment. It also threatens biological productivity linked with ecosystem services, reducing plant biomass in the land's carrying capacity for livestock, crop yields, and human well-being.

The Eastern areas of the country have suffered the greatest level of desertification. This is clearly linked to the long internal conflict with strong evidence that the loss of pastoralists land and livelihoods led to competition and conflict.

Current climate models for the region estimate a 0.5 to 1.5 C rise in the average annual temperatures by 2050 and an approximately 5% drop in regional rainfall. The decline in rainfall is approximated over a large area and expected to have significant regional variation. These findings can be used to predict the scale of potential changes in crop yields like sorghum, millet, and gum Arabic.

Given the high risk associated with these natural events, there is an immediate need for stronger climate analysis and disaster risk preparedness.

While different sectors related to natural disasters have been analyzed in other reports, the widespread absence of reliable data has challenged analysis process. Lack of monitoring of rivers and water flow diminishes analysis capacity of the impacts of flooding.

### POLICY AND PREVIOUS STUDIES

During the end of El Bardi's presidency, his government prepared a Desert Encroachment Control and Rehabilitation Program. This created a National Desertification Control and Monitoring Unit (NDDU) in the late 1970's. After the great drought, with support from foreign donors, the NDDU established the GIS monitoring unit. This effort resulted with a baseline study of the extent of desertification. It found that 50.5% of the country was prone to desertification. This program was not funded during the civil war and thus lacks current analysis.

They received further funds from a foreign donor country to prepare the Nimpala Action Plan for integrated development and poverty reduction.

University of Aybodi conducted study of “Regional Studies of Desertification and Its Controls” to develop, test and apply monitoring methods and predict desertification to prevent the pre-drought, drought and post-drought period in 1980's drought in the central and eastern provinces.

## **FLOODING**

Despite severe shortages of water in most regions of the country, floods are also prevalent in several regions in the south and north/ northeast. They are often localized flooding caused by heavy rainfall and larger flooding due to the western river overflowing. The localized flooding are usually short in duration but cause extensive damage due to intensity. The severe flooding of the Western river has dramatically increased in frequency over the past 20 years. Flooding has also increased riverbank erosion.

## **DESERTIFICATION**

The initial signs of significant desertification were from field observations in the 1940's. Sporadic studies of land degradation followed in the 1950's and 1960's. These resulted with geographically limited conclusions and lacked comprehensive analysis. In the 1974, a major report was released by a Sir Arthur, from Cambridge University. This report, which is still widely cited and controversial, found that the Eastern desert was moving forward at a rate of roughly 5km/year. This finding, which is currently contested by other researchers, initiated debate prior to the civil war. During the 1980's and 1990's, scientists used satellite data to compare the drought of the 1980's and the previous wet seasons to determine the fluctuation in biomass as a response to annual rainfall.

Due to the great drought and poor land management, the Eastern desert's southern boundary has shifted south by an average of 50-80km in the 17 years from 1958-1975. Estimated desert advancing is at 4 to 6 km per year. Sand encroachment has moved rapidly ahead of the southern boundary of the desert and loose sand is accumulating over the formerly consolidated sandy (and locally clay) soils.

The biophysical and socio-economic indicators of desertification in Nimpala could be monitored in a future national program through several key factors. These include the destruction of soil productivity, erosion of top soil, gullying, dust storms, observed movement of sand dunes, changes in crop yields, loss of biodiversity, shifts of surface water resources, localized areas of food insecurity, poverty, malnutrition, conflicts and mass migration.

## **CLIMATE CHANGE**

Changes in rainfall patterns and increases in temperatures are expected to have significant impacts in Nimpala. Both rainfall and river flow are expected to be directly impacted within the next 30 years. This will impact the relationships with neighboring countries who share the river flows and farmers dependent on rain fed irrigation and river fed systems.

Local farmers consistently noted that the long-term impacts from the great drought and continued desertification have resulted in declining food and meat production because of soil deterioration and loss of land.

The predicted climate change models show potential for disastrous decline in crop production for the Central zones of Nimpala, with a less significant impact in the Western zone. One scenario predicted that sorghum production in the Northern region is predicted to drop by 75% due to changes in rainfall. Since many of the areas in Nimpala are located on the fringes of the desert, any variability could have significant impacts on the rain-fed crop production. The shift in rainfall is already a major concern. An initial variability analysis of rainfall data

collected prior to the civil war shows that annual precipitation varies from 250 to 850mm with an average annual variation of 65% in the far eastern desert areas and 15% in the more humid zones in the central part of Nimpala.

The prolonged droughts, of increasing frequency in the eastern desert, have caused a significant decline in vegetation cover, increasing risks to erosion and overgrazing. All regions of the country have been exposed to drought conditions and increased unpredictability of rainfall, but impacts have been highest in the eastern zones. The eastern zones is estimated to have close to a 39% reduction in average annual rainfall from 1941-1978. The Northern areas are estimated to have a roughly 15% decline while the southern zones are estimated to have a 22% decline in average annual rainfall. In addition to the great drought and other short-term droughts, research in the area shows that there is increasing evidence of long-term regional climate change.

## **THE GREAT DROUGHT**

The prolonged drought had long-term detrimental impacts on the country. The impacts of this prolonged drought and scale is almost unprecedented, having turned millions of hectares of already poor soil and arid desert grazing land into desert. This change is considered to be directly linked to the conflict in the region, having increased the stress on the livelihoods of pastoralists.

## **POLICY REMARKS**

These natural disasters such as drought, desertification, and floods are major contributing factors to Nimpala's problems around conflict, population displacement, and food insecurity. Addressing these issues will require significant investment from the government to improve management of natural resources through new policies, enforcement of existing laws and regulations, and improved infrastructure. There is an insufficient current focus on sustainable development, as the majority of projects continue to focus on humanitarian relief.

Many of the disaster risk reduction recommendations are parallel to other development projects, there are two key issues that need to be addressed first: improved data collection and analysis and second, national awareness of potential risks associated with climate change.