



*Applying Environmental Security Concepts
to Enhance Peace and Stability*

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Theme of this Talk

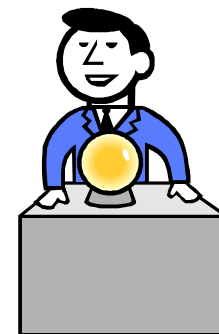
- Introduce Environmental Security as a component of defense/security policy consideration – **A significant component of National Interest of Every Nation**
 - Science is frustrated with politics
 - The public policy makers are frustrated with scientists
 - We don't speak the same language

Environmental Security is the common ground to understand our mutual interests



Outline

- A strategic view of Environmental Security
- Define strategic Environmental Security analysis
- Offer one approach to Environmental Security analysis
- Propose a Future for Environmental Security





Environmental Security Defined

Environmental security is a process that effectively responds to changing environmental conditions that have the potential to reduce peace and stability in the world. Accomplishing our environmental security goals mandates planning and execution of programs to prevent and mitigate anthropogenically induced adverse changes in the environment.

Environmental security –

The Human Dimension

From the -- The American Declaration of Independence -1776

*..... that they are endowed by their creator with certain unalienable rights, among these are, **life, liberty, and the pursuit of happiness.***

Hierarchy of Human Values

- Life
 - Food – Arable lands that
 - Water
 - Absence of disease
 - Energy
- Liberty - Freedom to choose
 - Religion
 - Government
 - Cultural norms
 - Movement
- Pursuit of Happiness



Providing life sustaining conditions is a basic human pursuit and this defines environmental security



Norman Myers, *The Environmentalist*, 1986

“ ...national security is not just about fighting forces and weaponry. It relates to watersheds, croplands, forests, genetic resources, climate and other factors that rarely figure in the minds of military experts and political leaders,”



National Defense Strategic Analysis

- Define Outcome or endstate → ■ Sustainable environmental ecosystem
- Measurable facts → ■ Rate of change in H₂O, air, arable land
- Assumptions → ■ Linkages between environment and security
- Courses of Action → ■ Environmental sustainment along with other instruments of national power
- Risk Analysis or cost/benefit → ■ We win – Environmental protection is cheaper and less risky

What in the world is worth fighting for ?

Science of Environmental Security

- Water as a Scarce Resource
 - Fresh Water
 - Oceans
- Global Climate Change
 - Carbon dioxide and greenhouse gases
 - Global warming
 - El Nino / La Nina
 - Ozone depletion in the stratosphere
- Land Use –
 - Deforestation-- Biodiversity and the rainforests
 - Desertification
 - Waste disposal – hazardous and solid wastes
- Energy Resources
 - Food
 - Heating and cooking
- Health Protection

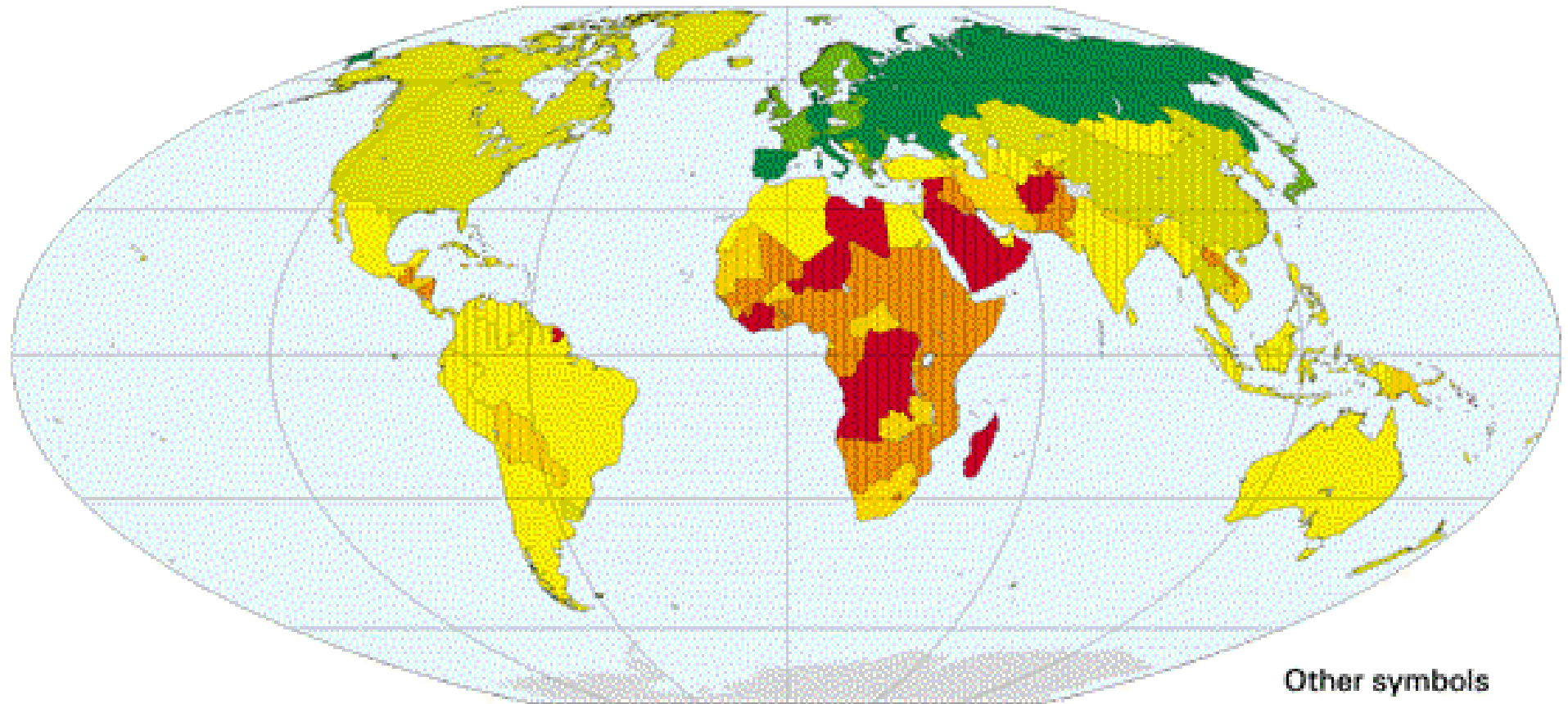




Environmental Security Strategic Analytical Model

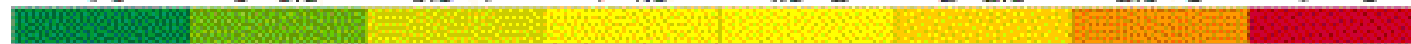
- Select the critical environmental variables
 - Population growth rates
 - Loss of arable land rates
 - Water resources variable
 - Deforestation rates
 - Pollution index
 - ??????
- Select environmental measures of regional stability
- Correlate environmental variables to social security/stability with paired tests of independence
- Maximize correlations (R values) for minimum variables

Population Growth



Average annual population growth rate, 1995-2010 (%)

< 0 0 - 0.5 0.5 - 1 1 - 1.5 1.5 - 2 2 - 2.5 2.5 - 3 > = 3




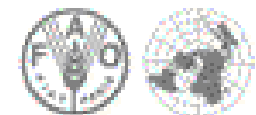
Dietary energy supply per caput less than 2700 Calories (1992-94)



Other symbols

 Data not available

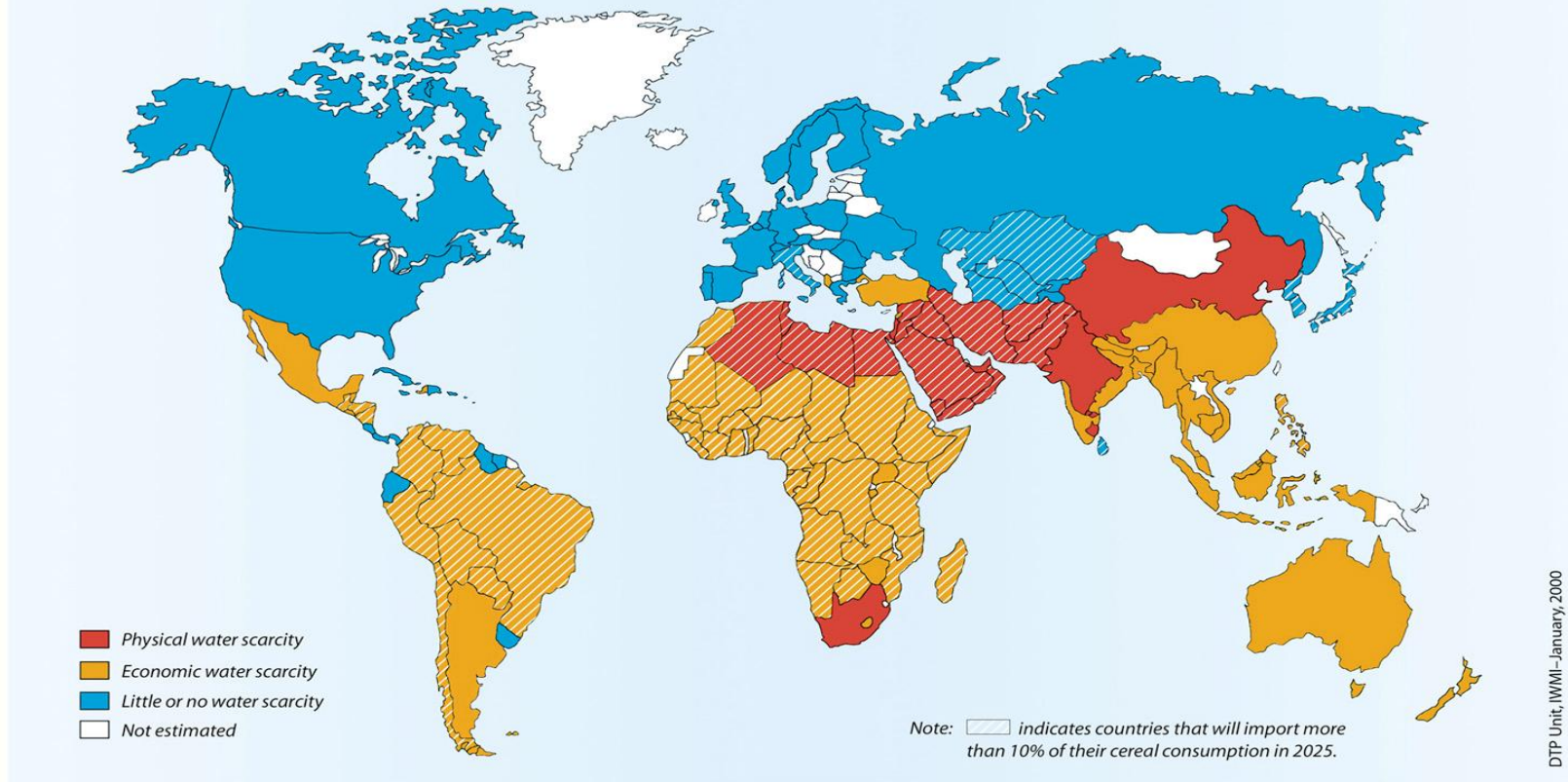
 Water bodies



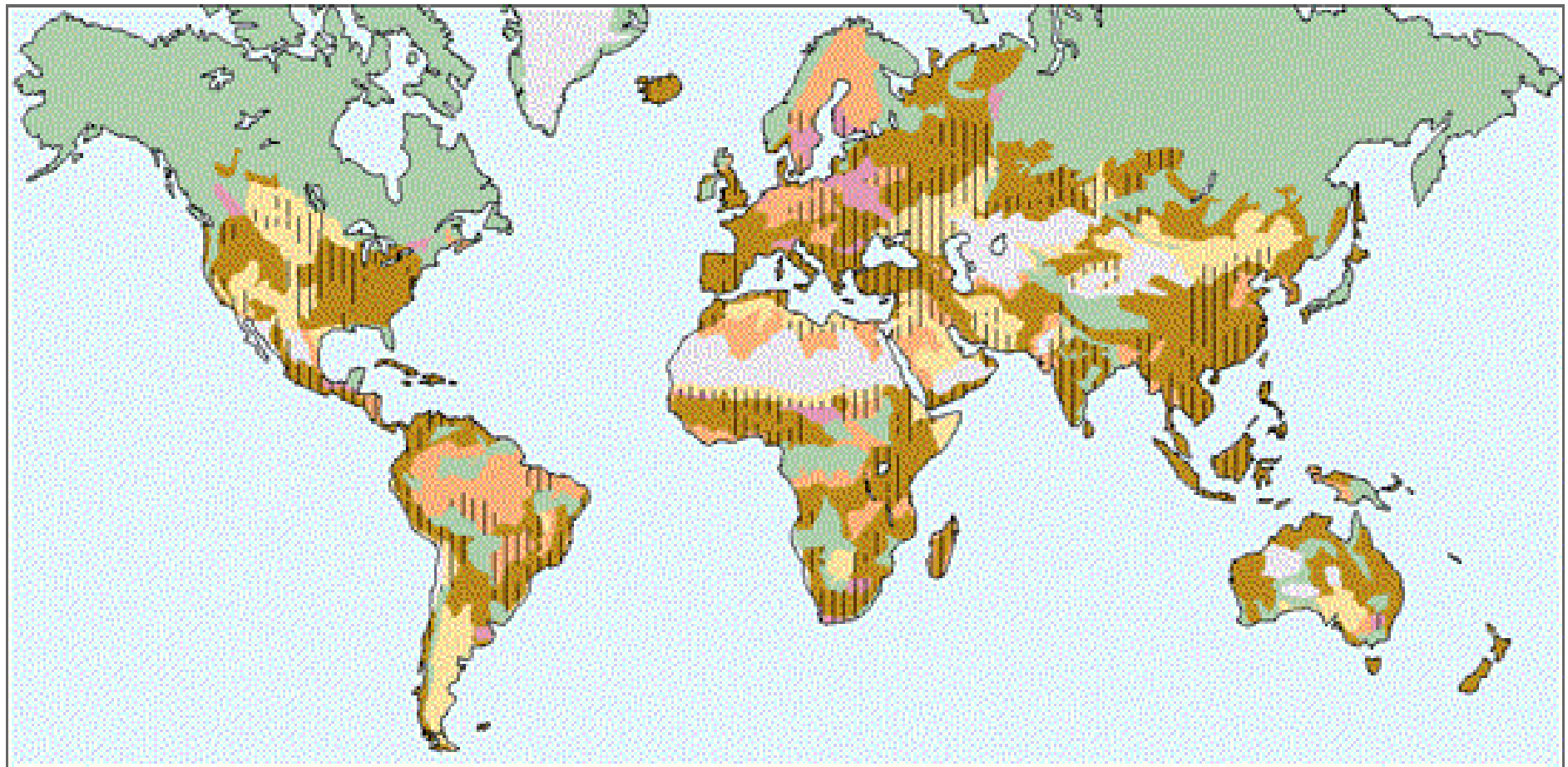
Copyright © 1996 by FAO - GIS

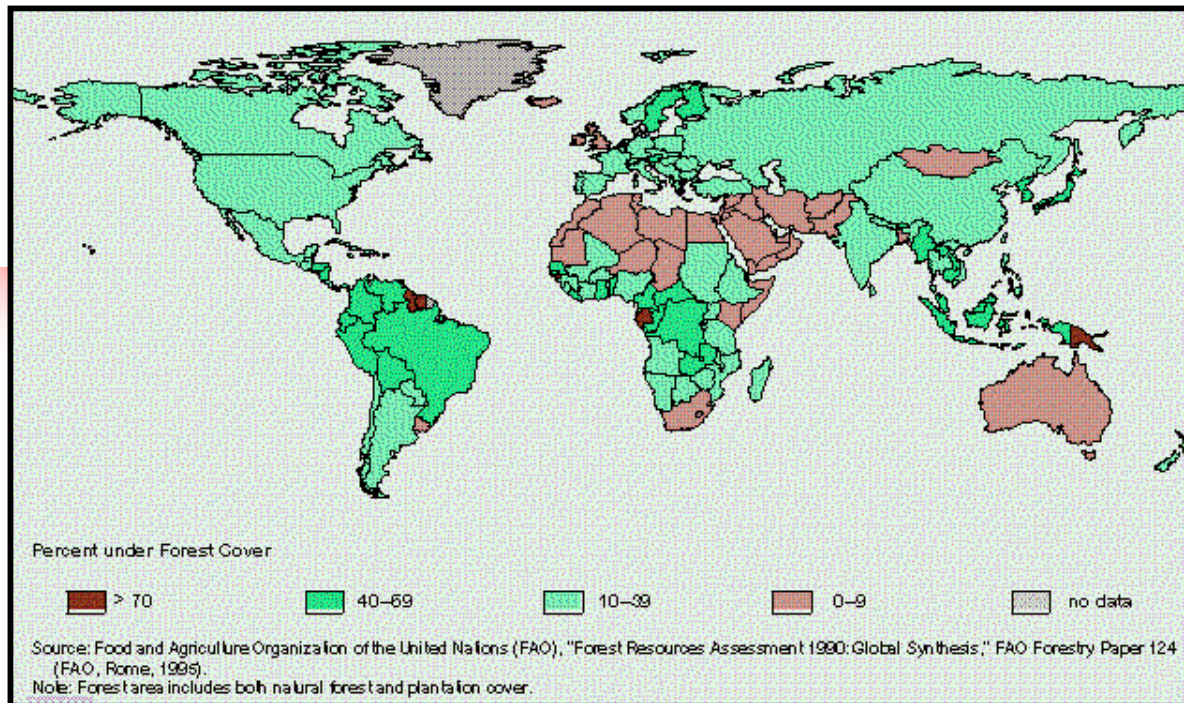
Source: UN Population Division, 1994 revision

Projected Water Scarcity in 2025

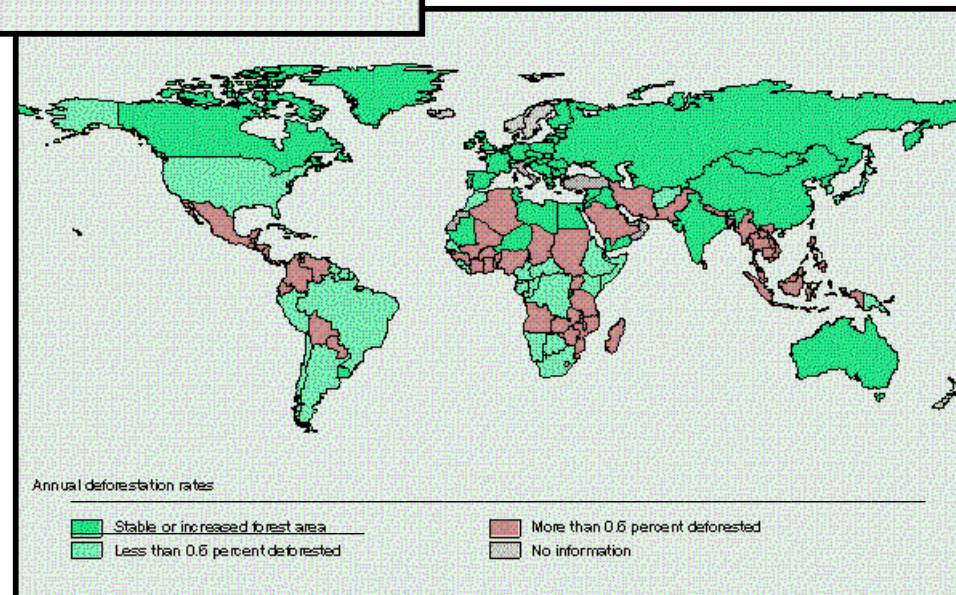


Human-induced soil degradation





Distribution of Forests Worldwide



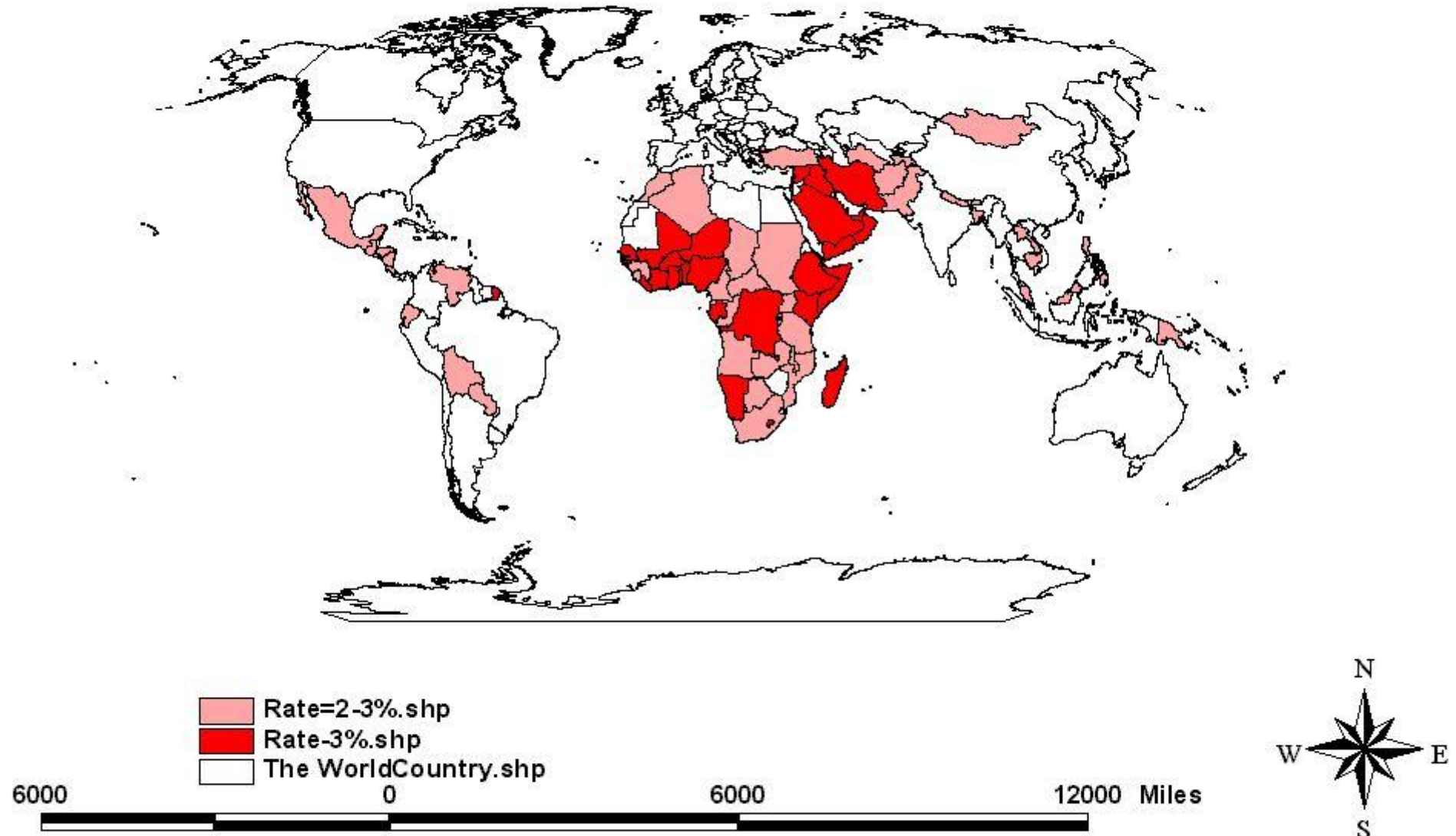
Estimated Annual Deforestation Rates, 1980-1990

Analysis



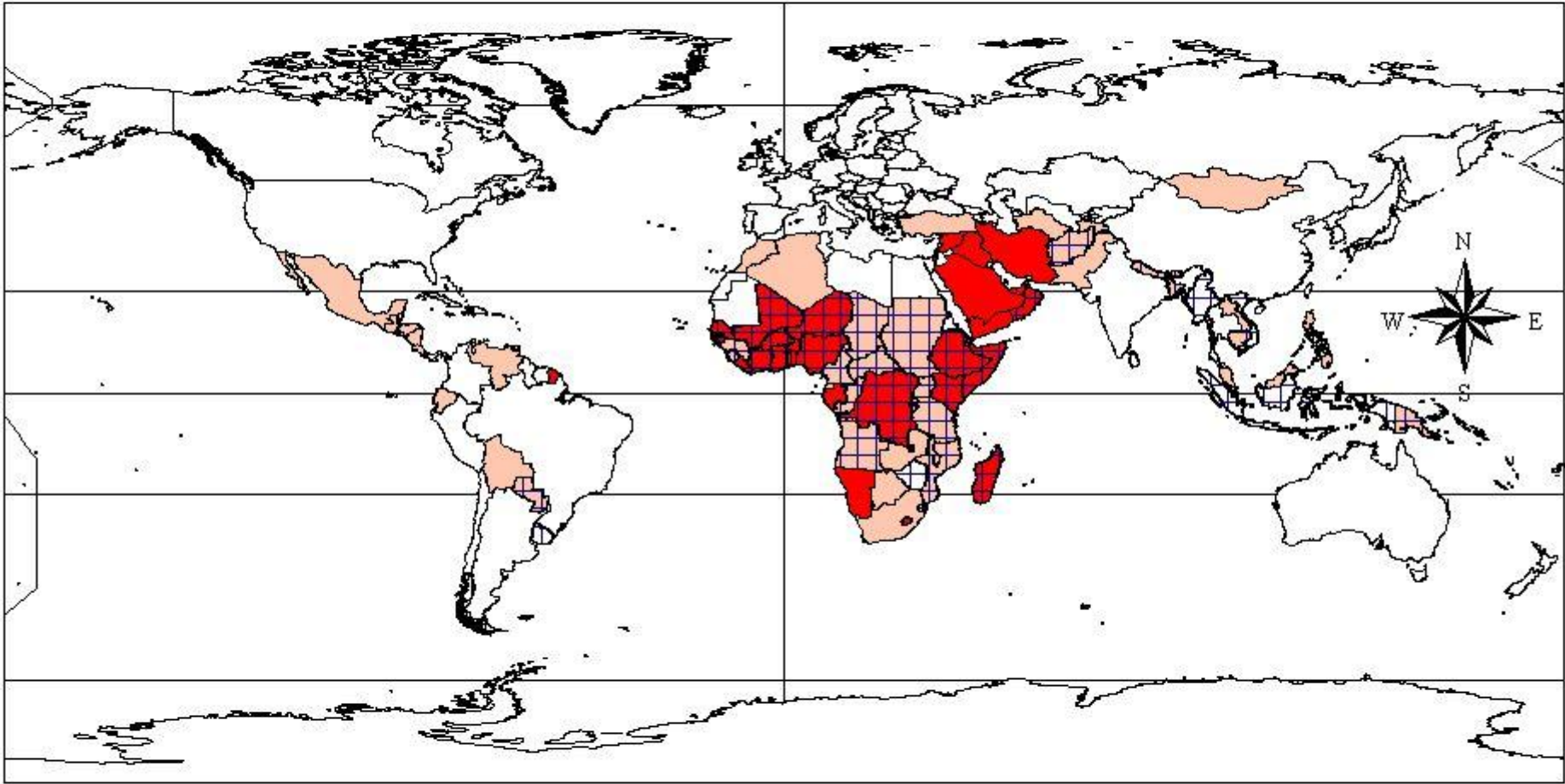
Figure 3 - 3




Population Natural Growth Rates



Source: Rand McNally. Goode's World Atlas. 1995. pa 27.

FIGURE 4 - 4
Correlation of Water Scarcity with Population Growth Rates

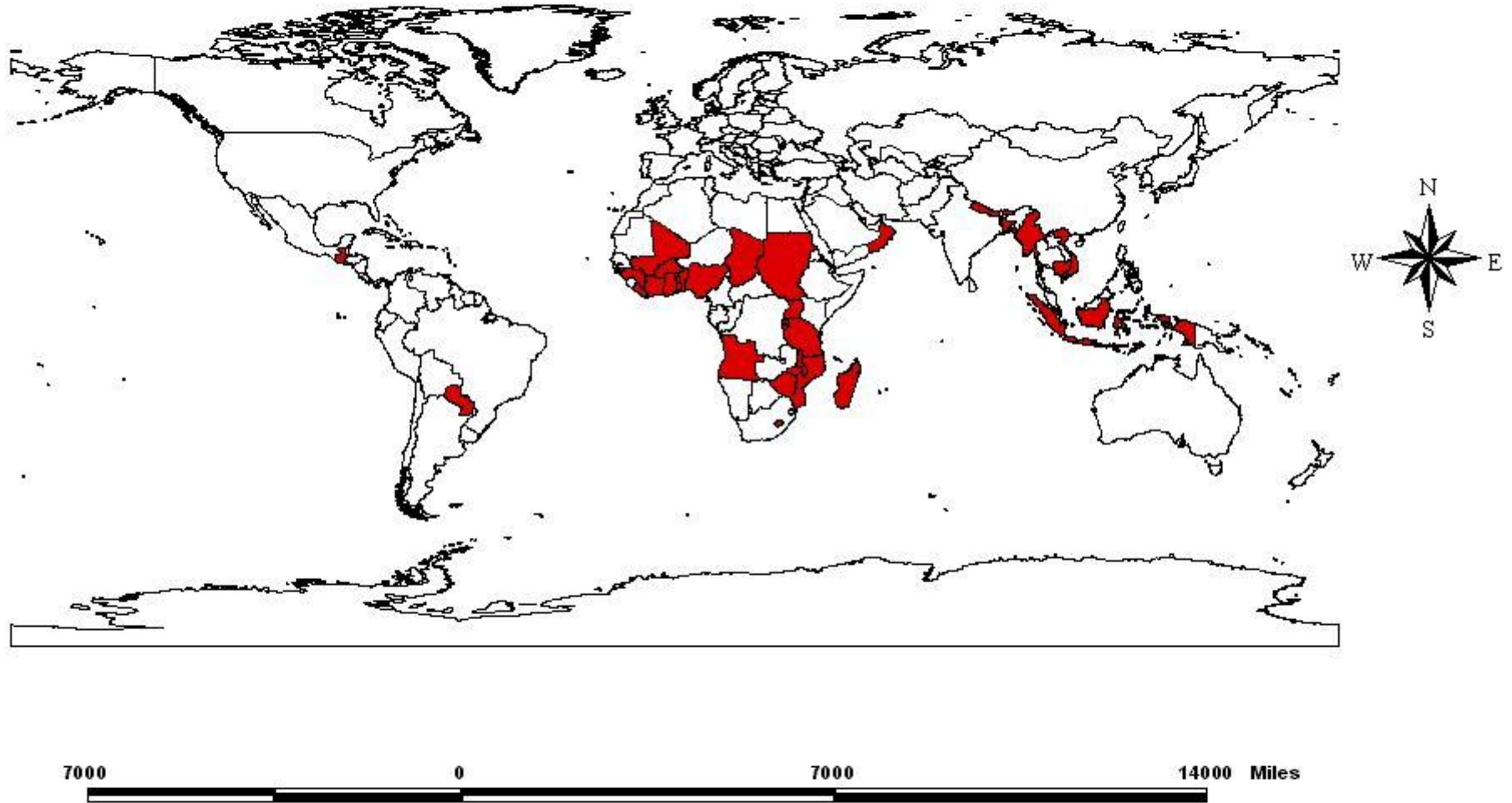


-  Less than 50 Liters Water/ person /day
-  Population Growth >2 % and < 3 %
-  Greater than > 3% Population Growth Rate

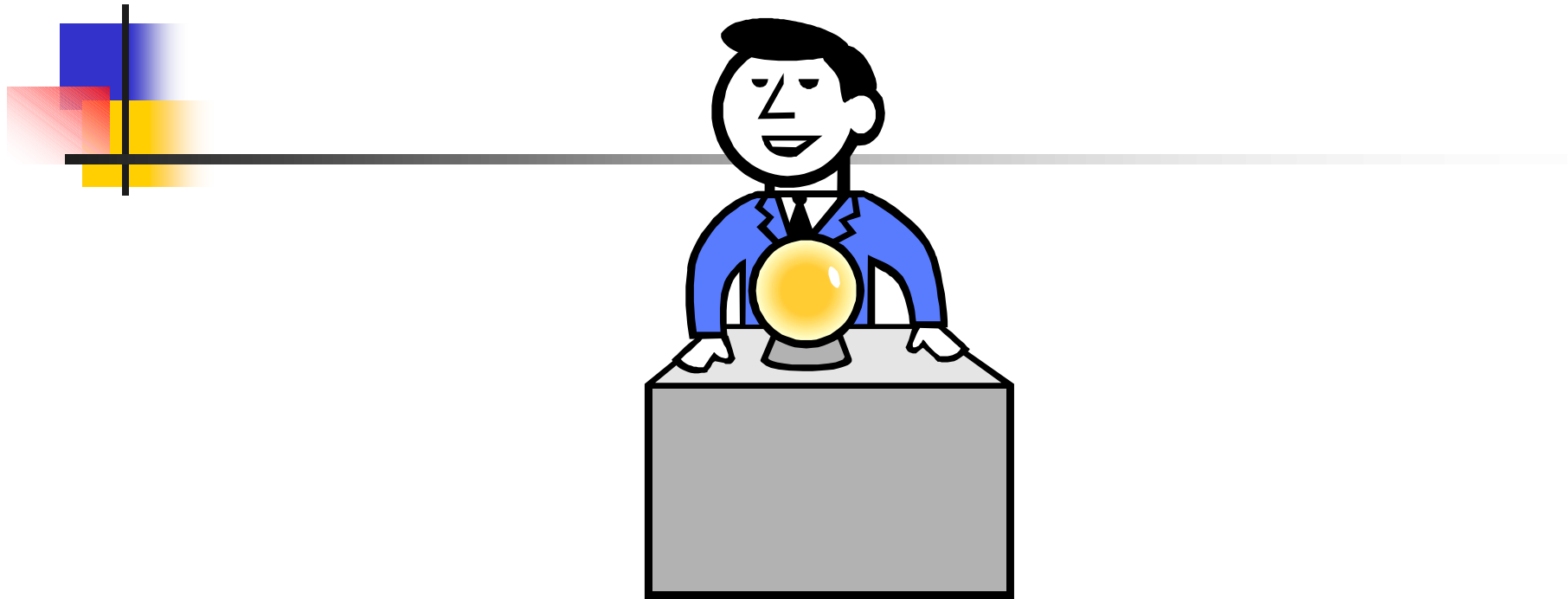
0 7000 Miles



FIGURE 4 - 7
Areas of Deforestation
and Water Scarcity



Building a Crystal Ball

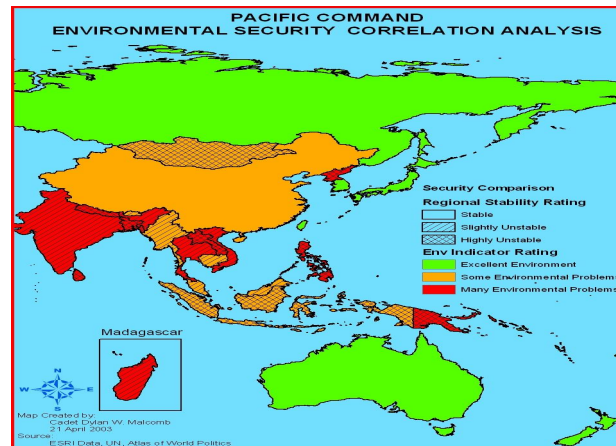
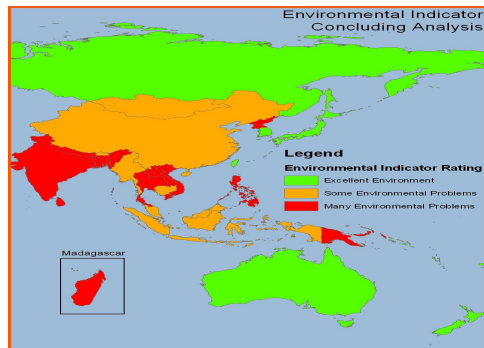
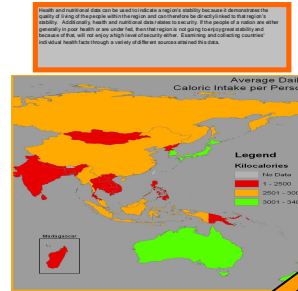
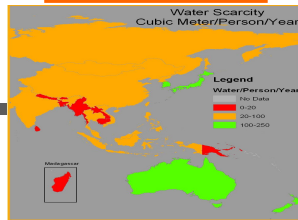
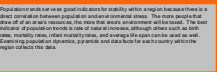


THE RING OF FIRE

ENVIRONMENTAL SECURITY IN THE PACIFIC RIM

Environmental security is the process of responding to environmental issues that could potentially affect U.S. national security, and it is a part of the U.S. National Security Strategy. This project is tasked and designed to correlate environmental security issues with the overall stability of the Pacific Command area of responsibility. To do this we have analyzed various environmental indicators, such as population, water, health, nutrition, pollution and urbanization. Correlating this data with current destabilizing regions according to social, economic and historical data, our group will show the correlation between current risk areas and environmental factors.

ENVIRONMENT



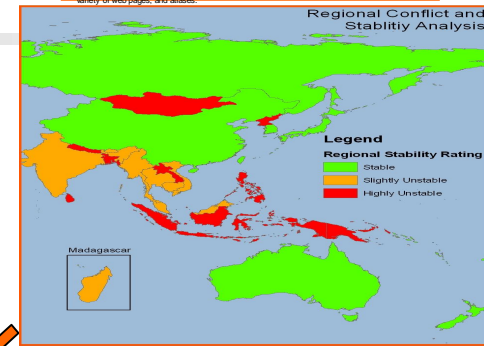
REGIONAL STABILITY



In order to determine the overall stability, not the environmental stability, of the areas within the PACOM AOR, four different factors were taken into account and given a rating of green (stable), amber (slightly-unstable) and red (unstable). The four factors analyzed were economic stability, recent conflict within the area, the plurality of the population, and the social stability of the areas. Each of these factors were based on a variety of different aspects of the areas.

- Economic Stability includes: annual GDP, recent economic trends, economic production base, and net private capital flows.
- Recent Conflicts includes: civil wars, regional conflicts, and interstate wars between 1991 and 2001.
- Plurality of Population includes: refugee flow, percent minorities, and linguistic diversity.
- Social Stability includes: the Index of Human Development, Literacy Rates, Caloric intake, and demographics.

For each of these four factors each area was given either a red, amber, or green rating based on research and a number of different sources including: Godde's World Atlas, the CIA Factbook, a variety of web pages, and others.



CONCLUSION

Our analysis concludes that there is indeed a strong correlation between the environmental indicators that our group analyzed (Water, Population, Urbanization, Agriculture, Land Use, Pollution, Health and Nutrition) and the Socioeconomic factors that are currently used to analyze stability (Economy, Culture, Historical Conflicts and Government). This correlation supports our thesis that nations suffering from several environmental problems tend to have societies in conflict.

Using this conclusion, our project team has assessed that regions indicated on the map in red with cross-hatches are At-Risk countries that may cause conflict or destabilizing affects for the PACOM region in the future.



Water scarcity can also be used as an indicator of the level of stability in a region. Countries that have high population growth rates tend to have water scarcity. The amount of water that a person has to use can be an indicator of the level of stability in a region. The amount of water that a person has to use can be an indicator of the level of stability in a region. The amount of water that a person has to use can be an indicator of the level of stability in a region.

Health and nutritional data can be used to indicate a region's stability because it demonstrates the quality of living for people in the region and also demonstrates the quality of the region's economy. Additionally, health and nutritional data allows to see if the people of a nation are able to afford to live in a stable and secure environment. The amount of health and nutritional data can be used to indicate a region's stability because it demonstrates the quality of living for people in the region and also demonstrates the quality of the region's economy.

High population growth rates are a good indicator for stability within a region because there is a direct correlation between population growth rates and economic growth. The more people that live in a region, the more the region's economy will grow. The amount of population growth in a region is a good indicator for stability within a region because there is a direct correlation between population growth rates and economic growth.

Our project team's environmental indicator analysis is a comprehensive compilation of a variety of environmental indicators. Regions are highlighted in green (stable) or red (unstable) environments for all indicators. Environmental indicators that are highlighted in green (stable) or red (unstable) environments for all indicators are highlighted in green (stable) or red (unstable) environments for all indicators.

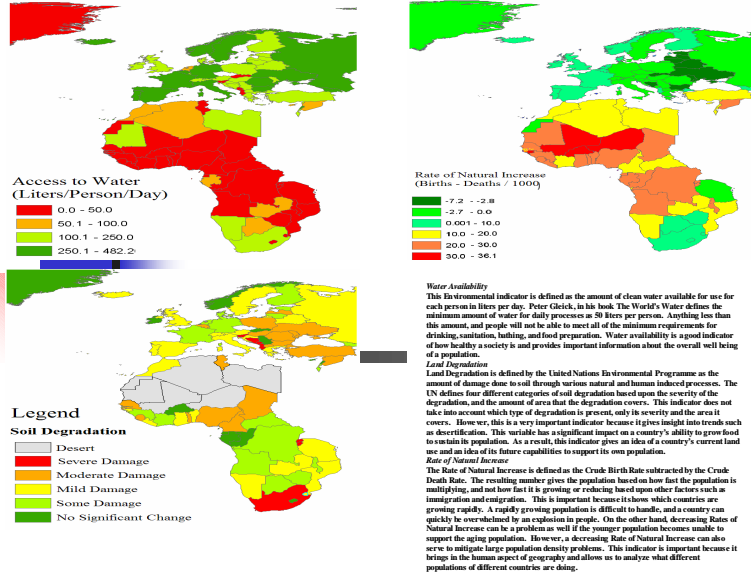
Map Created By: Carol Dyer W. Malcomb
 21 April 2003
 Source: © SRI Data, UN, Atlas of World Politics

Environmental Security Analysis

Project Overview

The goal of this project is to identify environmental factors within EUCOM that might lead to future conflict. Once these factors are identified, work in these areas can be focused to mitigate these factors and prevent future disputes over resources. The first step was identifying environmental indicators that would allow us to determine the overall wellbeing of a population, and what resources they had and what they lacked. These factors were assembled and analyzed using Geospatial Information Systems. Next, areas of political instability were identified. Instability was overlaid with environmental indicators to determine if a correlation was present, and to see if instability could be explained with environmental factors. Finally, this is used to predict future conflict within EUCOM.

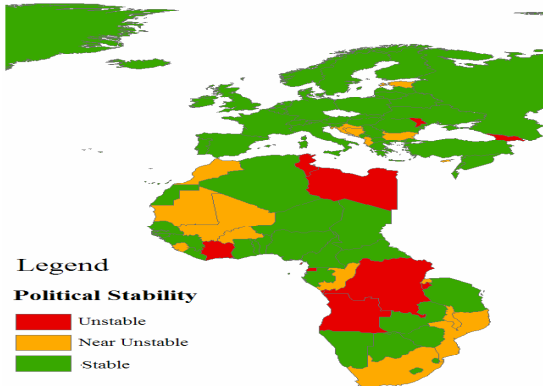
Environmental Indicators



Regional Stability

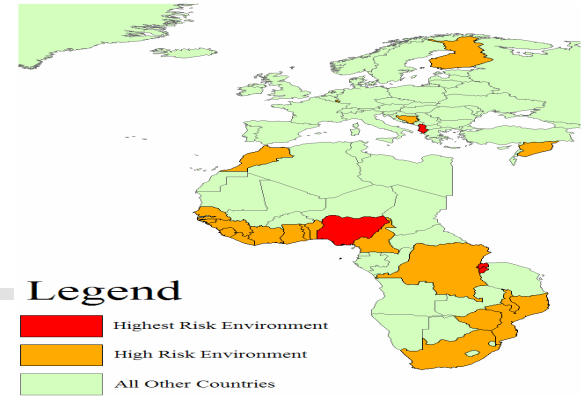
Regional Stability

This map indicates the relative stability of the countries within EUCOM. The stability of a country was determined by studying the political pressures within a country and the succession of power over the last decade. The data used is from the CIA World Fact Book. Areas marked in red indicate significant opposition to the current regime or a recent history of conflict in the succession of power. Areas marked in amber indicate countries that have political problems, but no armed conflict. Areas marked in green are considered relatively stable, with little opposition to the current government.



Combining Environmental Indicators

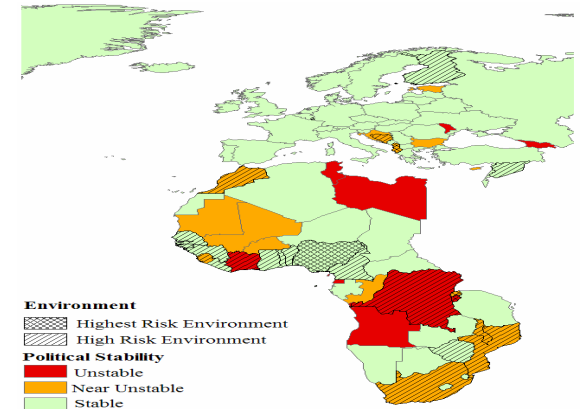
Several Environmental Indicators were used in the creation of this map. Population density, Rate of Natural Increase, Availability of clean water, Deforestation, and Soil Degradation were all incorporated. Various greenhouse emissions were also considered, but were not used in the making of this compilation. This map ultimately reflects those countries who are in the highest concern bracket of multiple environmental indicators and those countries that are in the next highest bracket of concern of multiple environmental indicators.



Model

Conclusion

There is some correlation between our environmental indicators and the present security situation of the world. This is most obvious in the southern part of Africa, including South Africa, Rwanda, and Burundi. There are currently several countries that show environmental problems but have not developed instability yet. We believe these are the most important areas to watch for future conflicts or humanitarian problems. The most stable of these areas is such are the coastal nation of sub-Saharan Africa.





Summary

- Security is a much larger issue than wielding military power
- Peace is not the absence of war, but the existence of stable communities of people who have the basic human needs satisfied
- Environmental degradation is a major threat to peace and stability in the world
- Solutions must work toward curing the basic problems not treating symptoms -
 - POPULATION +
 - Global Climate Change
 - Loss of arable lands
 - Water Issues
 - And more
- Protecting peace means assuring regional stability
 - Military power can actually support environmental security
 - Manpower
 - Logistics
 - Monitoring
 - Protection of critical resources
 - Engineering

Environmental security provides a scientific tool to correlate to the political/social dimension of stability and security