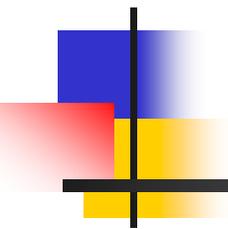


A Strategic Analytic Approach to the Environmental Security Program for NATO

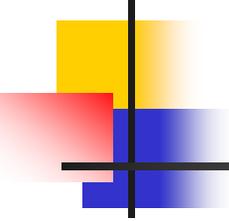


W. Chris King, Ph.D. P.E.

Brigadier General, US Army retired

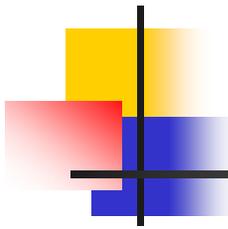
Dean of Academics, US Army Command and General
Staff College

Fort Leavenworth, Kansas



Outline of the discussion

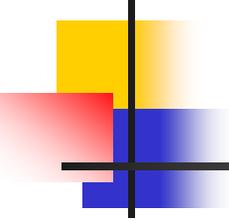
- Describe Environmental Security as an important component of strategic defense analysis
- Introduce a model for strategic environmental security analysis
- Describe applications for environmental security in defense planning based on
 - A Case study of Afghanistan



Theme of this discussion

- Without a sustainable environmental setting that provides for basic human needs- no stable peace can exist, and therefore -
- Environmental Security is a component of defense/security policy assessment – A significant topic of National Interest of Every Nation

Environmental Security is the common ground which explains the mutual interests of security and the environment



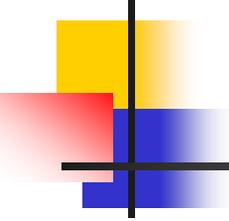
Environmental Security Defined

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 defense programs to prevent and mitigate anthropogenically induced adverse changes in the environment which impact sustainable living conditions for people in a region

Dirty water kills people – no water kills everything

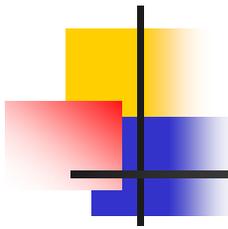
Arable land is a perishable resource

When we try hard enough, we can make air a toxic chemical, but why?



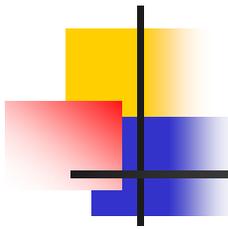
“ ...national security is not just about fighting forces and weaponry. It relates to watersheds, croplands, forests, genetic resources, climate and other factors that rarely figure in the minds of military experts and political leaders,”

Norman Myers, *The Environmentalist*, 1986



Analytical Model

- What are the environmental parameters that impact security and stability?
- What are the interrelations between critical environmental security variables?
- For each parameter, what is the threshold of concern for that parameter?
- Maximize the correlation between the summary environmental parameters and current and historical regional stability data.



Analytical Model

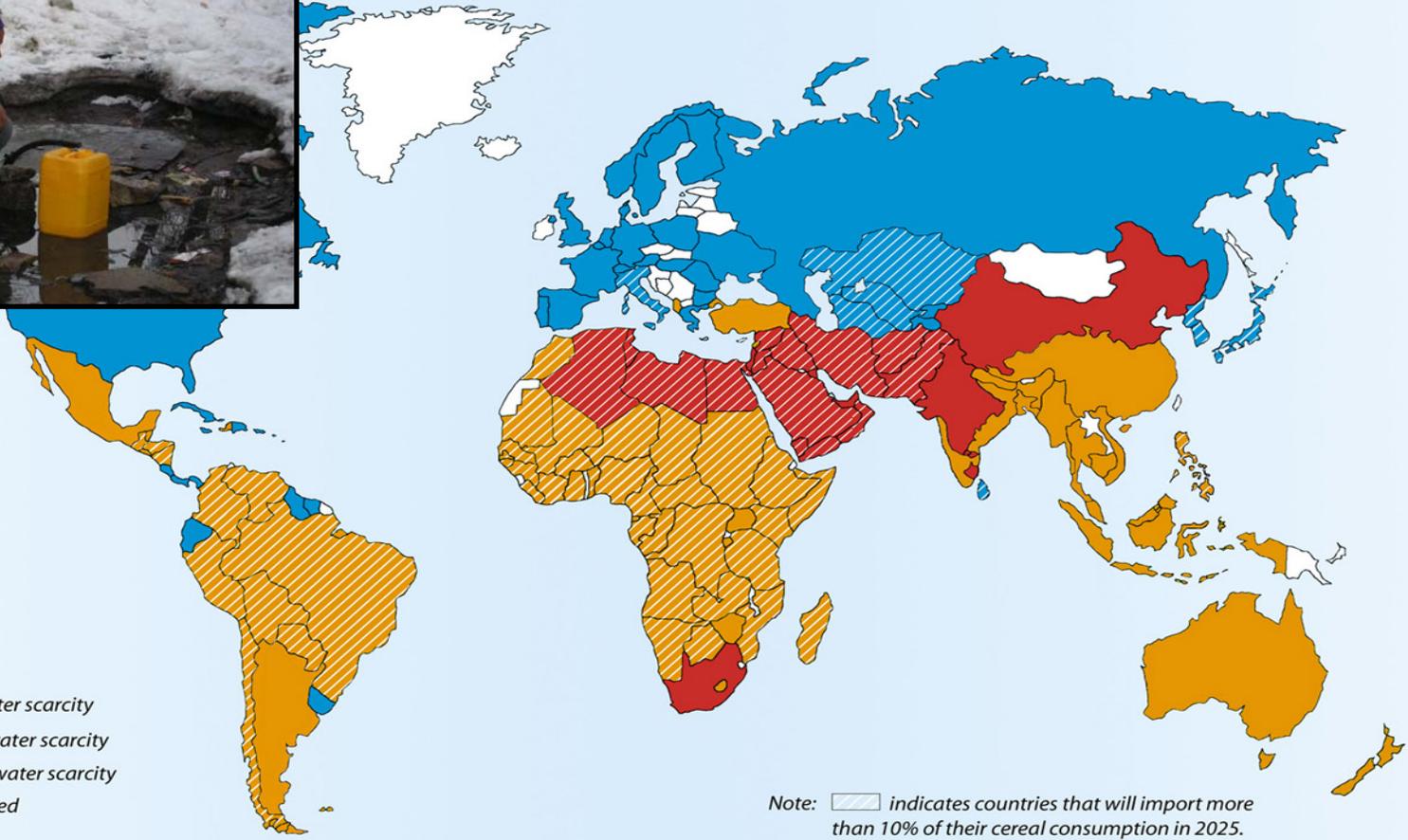
- What are the environmental parameters that impact security and stability?
- What are the interrelations between critical environmental security variables?
- For each parameter, what is the threshold of concern for that parameter?
- Maximize the correlation between the summary environmental parameters and current and historical regional stability data.

What are the environmental parameters that impact security and stability?

The Science of Environmental Security- menu of environmental concerns (disasters)

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

Projected Water Scarcity in 2025

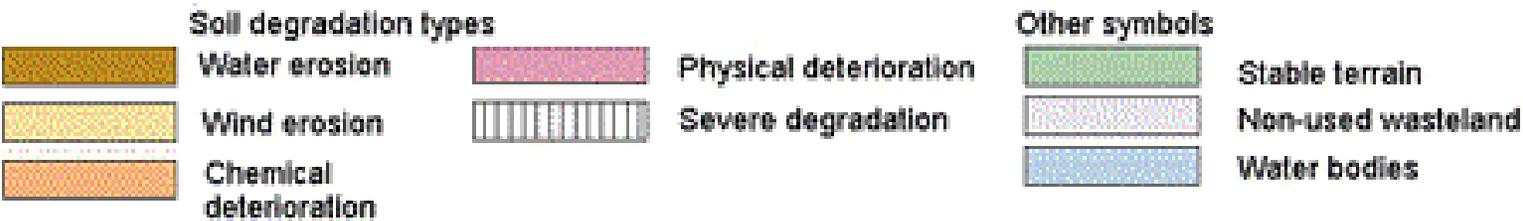
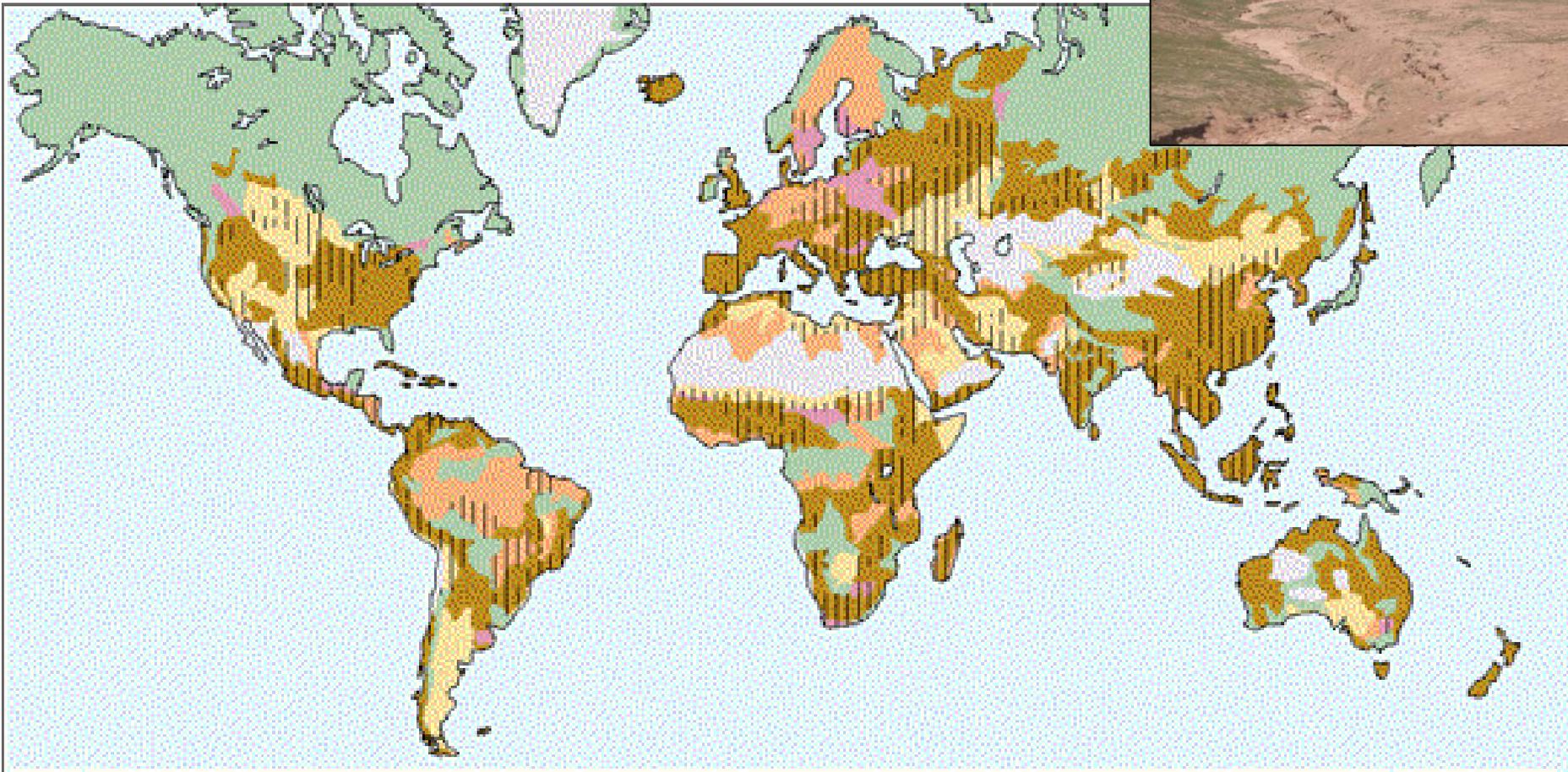


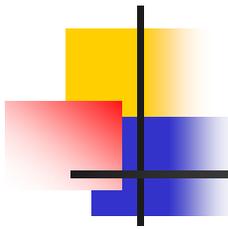
- Physical water scarcity
- Economic water scarcity
- Little or no water scarcity
- Not estimated

Note:  indicates countries that will import more than 10% of their cereal consumption in 2025.

DTP Unit, IWMI—January, 2000

Human-induced soil degradation

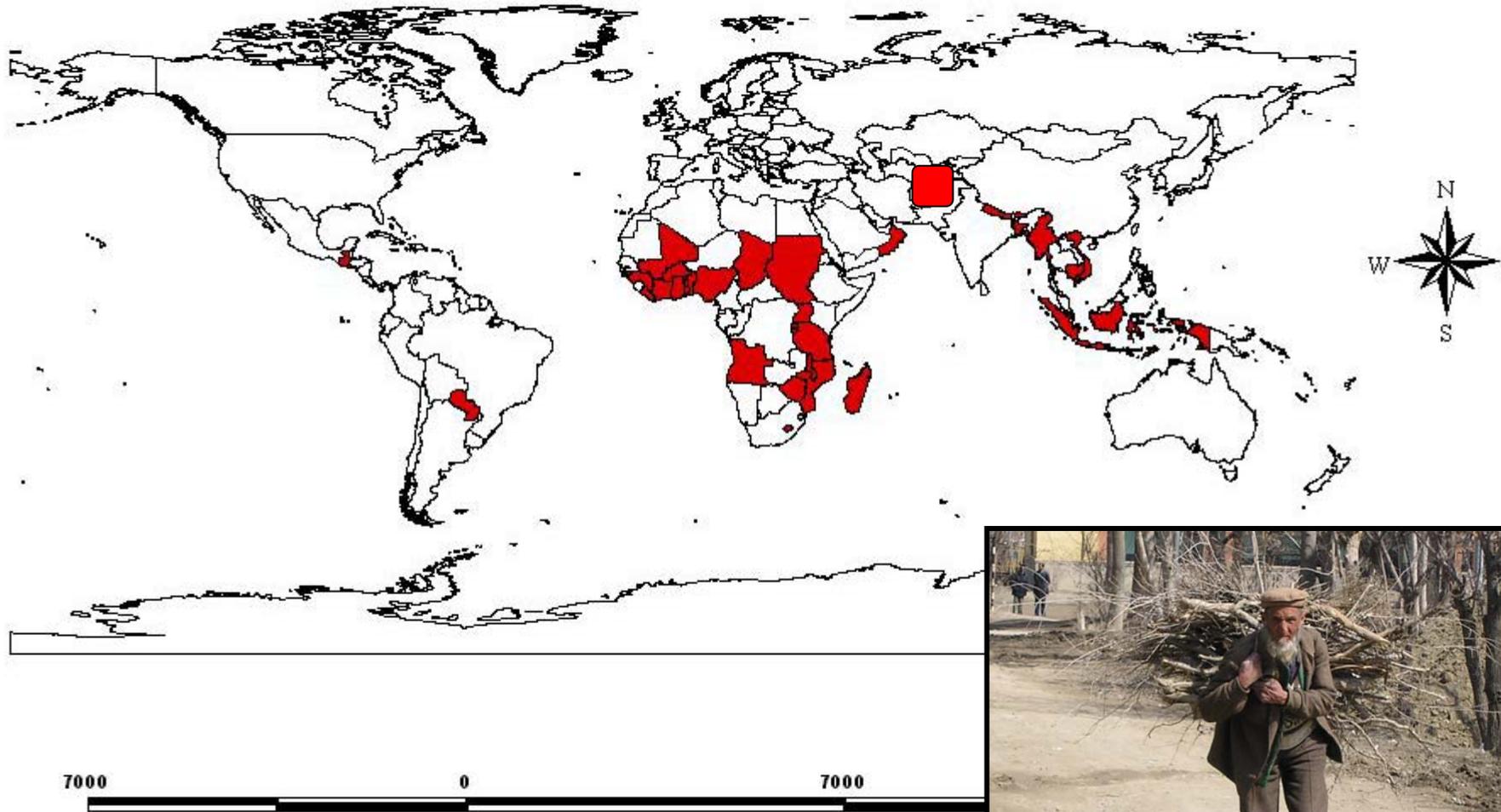


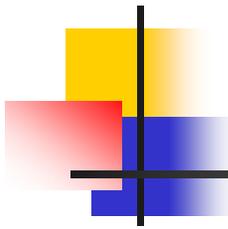


Analytical Model

- What are the environmental parameters that impact security and stability?
- **What are the interrelations between critical environmental security variables?**
- For each parameter, what is the threshold of concern for that parameter?
- Maximize the correlation between the summary environmental parameters and current and historical regional stability data.

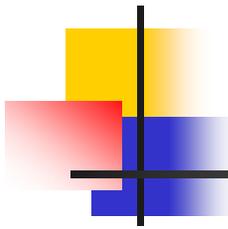
FIGURE 4 - 7
Areas of Deforestation
and Water Scarcity





Analytical Model

- What are the environmental parameters that impact security and stability?
- What are the interrelations between critical environmental security variables?
- For each parameter, what is the threshold of concern for that parameter?
- Maximize the correlation between the summary environmental parameters and current and historical regional stability data.

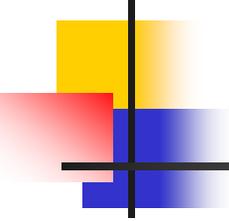


Method of analysis

- Start with a data base of stability (next slide)
- Conduct statistical correlations of groups of environmental parameters with stability index.
- Conduct correlations for threshold values of critical environmental parameters

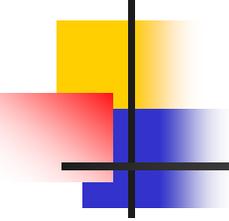
			Indicators of Instability											
			Demographic Pressures	Refugees and Displaced Persons	Group Grievance	Human Flight	Uneven Development	Economy	Delegitimization of State	Public Services	Human Rights	Security Apparatus	Factionalized Elites	External Intervention
Rank	Total	Country												
1	113.7	Sudan	9.2	9.8	10.0	9.0	9.1	7.7	10.0	9.5	10.0	9.9	9.7	9.8
2	111.4	Iraq	9.0	9.0	10.0	9.5	8.5	8.0	9.4	8.5	9.7	10.0	9.8	10.0
3	111.1	Somalia	9.2	9.0	8.5	8.0	7.5	9.2	10.0	10.0	9.7	10.0	10.0	10.0
4	110.1	Zimbabwe	9.7	8.7	8.8	9.1	9.5	10.0	9.5	9.6	9.7	9.5	9.0	7.0
5	108.8	Chad	9.1	8.9	9.5	7.9	9.0	8.3	9.5	9.1	9.2	9.6	9.7	9.0
6	107.3	Ivory Coast	8.6	8.3	9.8	8.4	8.0	8.9	9.5	7.9	9.2	9.6	9.3	9.8
7	105.5	Dem. Rep. of the Congo	9.4	8.9	8.8	7.6	9.1	8.0	8.3	8.7	8.9	9.6	8.6	9.6
8	102.3	Afghanistan	8.5	8.9	9.1	7.0	8.0	8.3	8.8	8.0	8.2	9.0	8.5	10.0
9	101.3	Guinea	7.8	7.4	8.1	8.3	8.5	8.5	9.6	8.9	8.6	8.1	9.0	8.5
10	101.0	Central African Republic	8.9	8.4	8.8	5.5	8.6	8.4	9.0	8.0	8.2	8.9	9.3	9.0
11	100.9	Haiti	8.6	4.2	8.0	8.0	8.2	8.4	9.2	9.0	9.1	9.3	9.3	9.6
12	100.1	Pakistan	8.2	8.5	9.0	8.1	8.5	5.8	8.7	7.1	8.7	9.5	9.5	8.5
13	97.7	North Korea	8.0	6.0	7.2	5.0	8.8	9.6	9.8	9.5	9.7	8.3	7.9	7.9
14	97.0	Burma	8.5	8.5	9.1	6.0	8.9	7.6	9.1	8.3	9.8	9.0	8.2	4.0
15	96.4	Uganda	8.1	9.4	8.5	6.0	8.5	7.5	8.5	8.2	8.2	8.3	7.8	7.4
16	95.9	Bangladesh	8.6	5.8	9.6	8.4	9.0	6.9	9.0	7.4	7.8	8.0	9.5	5.9
17	95.6	Nigeria	8.2	5.6	9.5	8.5	9.1	5.4	9.1	8.7	7.1	9.2	9.5	5.7
18	95.3	Ethiopia	9.0	7.9	7.8	7.5	8.6	8.0	7.9	7.0	8.5	7.5	8.9	6.7
19	95.2	Burundi	9.1	8.9	6.7	6.7	8.8	8.2	7.1	8.9	7.5	6.8	7.5	9.0
20	94.9	Timor-Leste	8.1	8.5	7.1	5.3	6.5	8.5	9.5	7.9	6.9	9.0	8.8	8.8
21	93.6	Nepal	8.1	5.2	8.9	6.1	9.2	8.2	8.5	6.6	8.8	8.3	8.5	7.2
22	93.5	Uzbekistan	7.7	5.4	7.1	7.1	8.6	7.5	9.2	6.8	9.0	8.9	9.2	7.0
23	93.4	Sierra Leone	8.6	7.4	7.1	8.7	8.7	8.7	8.0	8.0	7.0	6.5	7.7	7.0
24	93.2	Yemen	8.0	6.7	7.3	7.2	8.7	8.0	7.8	8.1	7.2	8.0	9.0	7.2
25	93.1	Sri Lanka	7.0	8.6	9.5	6.9	8.2	6.0	8.9	6.5	7.5	8.7	9.2	6.1
26	93.0	Republic of the Congo	8.7	7.3	6.8	6.1	8.1	8.3	8.5	8.8	7.9	7.9	7.2	7.4
27	92.9	Liberia	8.1	8.5	6.5	6.8	8.3	8.4	7.0	8.6	6.7	6.9	8.1	9.0
28	92.4	Lebanon	6.9	8.6	9.0	7.0	7.1	6.3	7.3	6.4	7.0	9.0	8.8	9.0
29	92.2	Malawi	9.0	6.0	6.0	8.0	8.8	9.2	7.9	9.0	8.0	5.4	7.5	7.4
30	92.0	Solomon Islands	8.5	4.8	8.0	5.1	8.0	8.0	8.5	8.5	7.1	7.7	8.8	9.0
31	91.3	Kenya	8.4	8.0	6.9	8.0	8.1	7.0	8.0	7.4	7.0	7.1	8.2	7.2
32	91.2	Niger	9.2	5.9	8.9	6.0	7.2	9.2	8.2	8.8	7.1	6.7	6.0	8.0
33	89.7	Colombia	6.8	9.5	7.4	8.4	8.4	3.8	8.2	6.0	7.4	8.3	8.5	7.0
33	89.7	Burkina Faso	8.6	5.6	6.4	6.6	8.9	8.2	7.6	8.9	6.6	7.6	7.7	7.0
35	89.4	Cameroon	7.0	6.8	7.0	7.9	8.7	6.1	8.5	7.5	7.2	7.7	8.0	7.0
36	89.2	Egypt	7.7	6.5	7.8	6.2	7.8	7.0	9.0	6.7	8.5	6.1	8.3	7.6
36	89.2	Rwanda	9.1	7.0	8.7	7.6	7.1	7.5	8.5	6.9	7.4	4.6	8.2	6.6
38	88.8	Guinea-Bissau	7.6	6.5	5.4	7.0	8.6	8.0	7.2	8.5	8.0	8.0	6.8	7.2
39	88.7	Tajikistan	7.7	6.1	6.3	6.4	7.3	7.3	9.0	7.3	8.6	7.8	8.8	6.1
40	88.6	Syria	6.5	8.9	8.0	6.8	8.1	6.8	8.5	5.3	8.5	7.4	7.5	6.3
41	88.2	Equatorial Guinea	8.0	2.0	7.0	7.4	9.0	4.0	9.4	8.6	9.4	8.9	8.5	6.0
41	88.2	Kirgizstan	7.5	6.2	6.8	7.4	8.0	7.5	8.2	6.3	7.9	7.9	7.5	7.0
43	87.5	Turkmenistan	7.0	4.5	6.2	5.6	7.3	7.4	9.0	7.7	9.6	8.5	8.2	6.5
44	87.2	Laos	8.0	5.5	6.5	6.6	5.7	7.1	7.9	8.0	8.5	8.2	8.6	6.6
45	86.7	Mauritania	8.7	6.2	8.0	5.0	7.0	7.8	6.8	8.1	7.1	7.4	7.9	6.7
46	86.6	Togo	7.5	5.4	6.0	6.5	7.5	8.2	7.7	8.0	7.8	7.8	7.6	6.6
47	86.4	Bhutan	6.5	7.5	7.0	6.7	8.7	7.9	8.0	6.5	8.5	4.6	8.0	6.5
48	85.7	Cambodia	7.6	5.9	7.3	8.0	7.2	6.4	8.5	7.6	7.1	6.2	7.5	6.4
48	85.7	Moldova	7.0	4.7	7.3	8.4	7.5	7.5	7.9	7.1	6.8	6.3	7.5	7.7
50	85.5	Eritrea	8.1	7.1	5.4	6.0	5.9	8.4	8.3	7.7	7.4	7.3	7.2	6.5
51	85.2	Belarus	8.0	4.6	6.5	5.0	7.5	6.8	9.1	6.9	8.5	6.7	8.5	7.1
52	85.1	Papua New Guinea	7.5	3.5	8.0	7.9	9.0	7.3	7.8	7.8	6.1	7.0	6.7	6.5
53	84.9	Angola	8.5	7.5	5.9	5.0	8.7	4.2	8.6	7.7	7.5	6.2	7.5	7.6
54	84.5	Bosnia	6.1	8.0	8.3	6.0	7.2	6.0	7.6	5.6	5.3	7.3	8.3	8.8
55	84.4	Indonesia	7.0	7.5	6.0	7.5	8.0	6.5	6.5	7.0	7.0	7.3	7.2	6.9
56	83.2	Philippines	7.0	5.7	7.2	6.7	7.6	5.8	8.2	5.9	6.8	7.6	7.8	6.9
57	82.8	Iran	6.2	8.6	7.1	5.0	7.2	3.3	7.8	5.7	8.7	8.3	8.9	6.0
58	82.3	Georgia	6.3	6.8	7.6	5.7	7.0	5.7	7.9	6.1	5.4	7.8	7.8	8.2
59	82.0	Bolivia	7.4	3.7	7.0	7.0	8.5	6.4	7.2	7.4	7.0	6.2	8.3	5.9
60	81.4	Guatemala	7.0	6.0	7.1	6.7	8.0	7.0	7.4	6.6	7.1	7.3	5.9	5.3

Foreign Policy Magazine
Failed State Index 2007



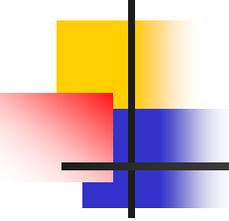
Analytic Findings

- Environmental degradation = failed states with up to 98 % accuracy
- Critical environmental parameters vary across geographic domains
- Population pressure is common in all domains



How Can We Use Environmental Security Analysis

- Analyze future threats
- Predict regional impacts of changes in key environmental factors
- Assist in planning programs to avoid or mitigate destabilizing environmental conditions
- Focus rebuilding efforts
- Disaster planning and training



Afghanistan Facts

- 23.8 million, 12.3 million males -44m by 2025
 - 3.88 % growth rate, 3rd in the world
 - 2.7 % RNI
 - 6.90 fertility rate, 8th in the world
 - Life expectancy -43.1 years
 - Median age – 18 years
 - Infant mortality rate -147
- 13 % access to safe drinking water
 - 39L/day/person (minimum std is 50)
- 21% access to sanitation in 1970, 12% today
- Management of solid and hazardous waste does NOT exist.
- Less than 3 % forest
- Percent arable lands – 12 % including 3 % in forests
 - Food production dropped by 40% 1995 to 2000
- Air Quality - ???

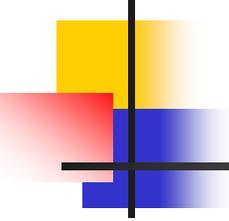
Environmental Security Analysis

F= Awful
 D= Bad
 C= Average
 B= Good
 A= Good and improving

	RNI %	Fertility rate	Water Data	Arable land	Forest Data	Crops	ES Risk
Sudan	2.9	6.0	F	F	F	F	Extreme
Iraq	3.1	5.5	D	D	F	D	High
Somalia	2.5	6.3	F	F	F	F	Extreme
Zimbabwe	1.5	3.7	F	D	F-	F	High
Chad	3.1	6.6	F	F	F	F	Extreme
Ivory Coast	2.3	5.4	F	C	NA	F	High
Dem Rep of the Congo	3.2	7.2	F	C	C	F	High
Afghanistan	2.7	6.9	F	F	F-	F	Extreme
Guinea	2.7	6.2	F	D	D	F	High
Central Africa Republic	2.7	5.4	F	C	C	F	High
Haiti	2.5	5.7	F	F-	F-	F	Extreme
U.S.	0.6	2.0	A	B	B	A	Low
France	0.6	1.9	A	A	A	A	low

population data is 1995 based

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



Summary

- Defense and security is a much larger issue than wielding military power
- Protecting peace means assuring regional stability
- Environmental degradation is a major threat to peace and stability in the world
- Environmental parameters can be strongly correlated to social political stability, thus strategic security analysis can include environmental security.
- Environmental security analysis provides a powerful tool to plan defense and offers hope to reduce and mitigate future threats.
- **Peace is not the absence of war, but the existence of stable communities of people who have the basic human needs satisfied**

Closing thought -
One picture is worth 1,000 Powerpoint slides

