

BENNO HANSEN

ECOWAR - NATURAL RESOURCES AND CONFLICT

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AND CONFLICT**

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*Regards
Benno Hansen*

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1. Introduction

“All wars are fought over natural resources.”

Driving home from a visit to a community gardening project this controversial statement was made by the local permaculture enthusiast. A bit over-simplified I thought to myself. But an interest was sown.

Since July 2007 I have been posting to my blog Ecowar whenever I have encountered news and information supporting or countering the statement linking human conflict to spoils of the Earth. And I have actively sought out this type of information. Because I am experiencing his statement gaining weight. Evidence is aplenty.

In fact, my very first blog post was about a Chinese study correlating climate change with wars throughout history. A statistically significant correlation supporting the statement that ignited my research. This result, however, seemed to spur more questions than it answered: Did this correlation imply causation? Which mechanisms are in play in between climate factors and the outbreak of fighting? While far from a conclusive proof of the validity of the statement statistically significant correlations are essential if to address an issue rationally.

This present text sums up on the blogging project in four parts: a historical review, a brief look at current conflicts influenced by natural resources, a chapter summing up on academic theories about the links between natural resources and conflict and finally a cautions prognosis for future development. The historical part is a collection of cases in chronological order, the part about current conflicts are organized by geography and the predictive part an analysis resource by resource.

Behind the excitement of the stories and observations lie an unsaid postulate following from the first, one that I will have to compose myself:

“No wars are fought just for the reasons they were excused by.”

Because referring to natural resources as the cause for war is a taboo. Thus, any exposure is interesting. But actually, the political significance runs deeper when the expected consequences of climate change are considered and compared to the awareness of the threat of terrorism. A much ignored paradox briefly addressed by US Senator John Kerry in 2009.

“It's tragic that we live at a time when if one were to dismiss the threat of terrorism, you'd be sent home in the next election. But there are no similar political consequences if you dismiss the science or the threat of climate change.”

- John Kerry, US Senator.

But are there consequences to politicians unaware of the impending scarcity of natural resources in general? Comparatively little.

Types of natural resource conflict

The distinguishing of states of societies in just two categories – being in peace or in war – is too simple. It is insufficient for intelligent discussion. And quantitative analysis lumping all types of natural resources into one statistic is usually meaningless. Conflict is just one group of a very wide array of possible interactions. Many of the factors that influence interaction between groups or countries could lead to diplomacy, cooperation or similar relations just as well as to war.

Throughout this report many types of conflict will be discussed in relation to natural resources, not just “war”: Simple crime, organized crime, deliberate pollution, rioting, mass protests, rebellions, terrorism, dictatorships, embargoes and more. One type of conflict may escalate or dwindle into another and some are described differently by opposing sides in it; some arbitrarily

define “war” as conflicts where casualties exceed 1000 soldiers. Two main types of large scale conflict would be on the one hand those focused on disrupting or attaining power – typically attacks on government – and those of skirmishes seeking to separate from power – typically freedom fights.

The concept of natural resources is similarly wide. There are many differences between the issues arising from cocaine production control, diamond trade, those concerning oil fields or to those attached to opium poppy fields. Most broadly they can be grouped in two: those located in fixed sites (natural deposits) and those spread across a certain area suitable for production (agricultural crops, secondary production).

One of the central papers (Le Billon) works with a typology of four different types of natural resource conflicts. These four types arise from distinguishing, first between fighting close to or far from the center of power, then between the influence of resources being tied to fixed or diffuse locations. Listing these with examples where a resource has at least exerted an influence if not driven the conflict entirely they are as follows:

- *Coup d'etat* (proximate/point)
Algeria (gas), Angola (oil), Chad (oil), Congo–Brazzaville (oil), Iraq–Iran (oil), Iraq–Kuwait (oil), Liberia (iron ore, rubber), Sierra Leone (rutile)
- Rebellion/rioting (proximate/diffuse)
El Salvador (coffee), Guatemala (cropland), Israel–Palestine (freshwater), Mexico (cropland), Senegal–Mauritania (cropland)
- Secession (distant/point; ie. Morocco vs West Sahara about phosphate)
Angola/Cabinda (oil), Caucasus (oil), D.R. Congo (copper, cobalt, gold), Indonesia (oil, copper, gold), Morocco/West Sahara (phosphate), Nigeria/Biafra (oil), Papua New

Guinea/Bougainville (copper), Sudan (oil)

- Warlordism (distant/diffuse; ie. Afghan quagmire about opium)
Afghanistan (opium), Angola (diamonds), Burma (opium, timber), Caucasus (drugs), Cambodia (gems, timber), Colombia (cocaine), D.R. Congo (diamonds, gold), Kurdistan (heroin), Lebanon (hash), Liberia (timber, diamonds, drugs), Peru (cocaine), Philippines (marijuana, timber), Sierra Leone (diamonds), Somalia (bananas, camels), Tadjikistan (drugs), Former Yugoslavia (marijuana, timber)

Truth may be the first casualty of war. But conscience is probably close in line. Once fighting has begun less hesitation is exerted from looting a treasure in the conflict area or destroying a resource otherwise probable to strengthen the opponent. Although both activities are banned by the Geneva Conventions. Thus, even conflicts not initially centered around natural resources often become part “ecowars”. It would be meaningless to constrain an investigation such as the present to just inter-state formally declared wars over natural resource deposits.

What this investigation is not about

This is an overview rather than a comprehensive account: for example, the complete histories of oil and diamonds would add relevant chapters; as would an analysis of wartime politics, the Colonial Age, crime related to environmental issues, a total dissection of the Israel vs. Palestine conflict and many other subjects.

The indirect or direct destruction of a natural resource, most often by polluting or exploiting an area or site for short-term financial gain could be interpreted as a long-term act of aggression towards future users of it. This interpretation goes a bit beyond the scope of

linking natural resources to conflict as we know it, hence will not be discussed in detail. But in some cases it is very much worth keeping in mind.

In some cases even human beings are reduced to resources. Describing this phenomenon could include accounts of slavery throughout history, “human trafficking”, child soldiers and even cannibalism today. These gruesome topics are more prevalent than what is to be considered in comfort. But a bit besides the core subject of linking natural resources to conflict hence excluded.

In many cases the absence or abundance of natural resources have influenced conflicts that were not about them at all to begin with. Some mention of such phenomena are not to be avoided in a thorough discussion. However, only brief note are made of a few incidents where the natural resource plays only a tactical role, for example the invention of moats and a few cases of bombings of dams. In many other cases, entire wars have been said to have been fought for just reasons of liberation, but have actually been suspiciously connected to resources, usually drug crops, precious minerals or oil. The bulk of the conflicts mentioned here are of the latter type.

Finally, this is not about trying to prove the dominant role of any single root cause to all human conflict. This is not about eliminating any particular factor as a cause for conflict. This is simply about looking at many different natural resources in many different conflicts. Trying to measure their impact.

Interlude A: 80,000 years ago just south of the glaciers

I sat on the shore of a beautiful, quiet lake watching my family eat the deer I had killed earlier that day. Grateful for the full belly and exhausted from the hunt and the long walk. It had been many days without meat before this kill and I knew it could be many days before the next. I knew my children and woman had been as hungry as I or hungrier thus allowed them a feast, ignoring my own growling stomach.

I closed my eyes and thought back with happiness to the hunt and the kill. But more troublesome memories disturbed the joy: the burden I had carried, the more and more desolate lands I had wandered, the ice cold winds and the glimmering horizon of frost in the distance. How long could I survive here, for how long could I and my woman provide meat and berries enough for ourselves and our children?

Then I heard another cracking sound. One too many to ignore. Having finished eating the meat now the children had been cracking the bones of the deer to suck out marrow. And there couldn't be many bones left.

“Halt,” I interrupted my son who had helped in the hunt, “is that the last bone?”. His disappointed nod confirmed my suspicion and I reached out for it. I held it up for all to see. “In our hunger we forgot to offer the first bite to the gods. We must offer them the last.”

For a moment we all took a grave look at the broken bone. I then flung it into the lake where it disappeared below the water and back into Gaia's womb.

“We need the kind care of the gods. We need the bushes to nurture us with ripe, tasty berries and the steppes to send deer our way to

fill our stomachs,” I improvised as a prayer towards no god in particular. “And we need them to send away the murderous hordes of scrawny, hairless *gliksins* who attacked us from the warm end of the world, we need them to stop the eternal frosts and snows from coming ever closer from the cold end of the world. We need them to tell us if to walk towards the sunset or the sunrise in our search for safety,” I thought to myself sparing my family of the more scary choices I would have to make.

The lake which I and my family were sitting at was on soil that would later become known as Denmark. Someone would find the broken bone in the lake and put it in the National Museum. Long before that my people had all died: starved, got murdered or raped, enslaved and then killed. Some even eaten. Only traces of our DNA is now left in some Europeans. The people we called *gliksins* conquered the world and would later name themselves “*sapiens*” and the skeletons of our people they would find in old earth they named “Neanderthal”.

We were roaming what later became known as Europe in search of food and shelter. Just like the *gliksins* who out-competed us. And just like they have done ever since in their never-ending quest for resources.

2. Looking back: Historical conflicts over natural resources

Pre-agricultural, hunter-gatherer *Homo sapiens* has been described as the “noble savage” - free and happy people unburdened by institutions. The truth is, of course, more complex but it does seem that many of our recurring woes are systemic and inherent to our civilizations rather than our biology.

On the other hand one very early example predates even agriculture: The extinction of Neanderthals which seems to have been caused by a combination of cooling climate and *Sapiens'* expansion northward 35,000 years ago. And simple types of territorial conflicts seem to be universally human – since we share it with even our biological cousins, the chimps.

History is full of stories of fights, skirmishes, battles and wars. This chapter looks back on only a tiny fraction. The following pages are meant to verify historical support for the argument that conflicts have most often been about access to resources. However, readers should be sure to familiarize themselves with the later chapters on methodology (beginning pages 77 and 123) before concluding that this report proves all conflicts are fought over resources. Because it doesn't – with sufficient amounts of hindsight bias you can make any postulate appear proven.

Since the dawn of civilization

Starvation destroys an army more often than does battle, and hunger is more savage than the sword. [...] whoever does not provide for food and other necessities, is conquered without fighting.

- Vegetius, 4th century

The explanations for the onset of organized conflict include the

emergence of a need to coordinate, expand and protect agricultural activities. Not just acquisition of arable land but also the construction of irrigation and granaries. The significance of irrigation and granaries is compelling: it required investment, work and bureaucracy while it instilled loyalty as the steady flow of food they helped produce would not be something a farmer would just move away from. Thus, the onset of agriculture provided the environment for stratified and defensive societies – some of which evolved into stratified and aggressive societies. Early farming was constrained by the availability of arable land, fresh water, sunlight and a few other factors. Archaeological evidence does not suggest that the first stratified societies reached the limit of agricultural productivity. But droughts or a bad harvest could have inspired people in villages where the food had run out to simply attack neighboring villages that had food reserves.

The earliest known real state established, the Akkadian Empire, collapsed after only a century when a drought hit around 2300 BC. The rulers retreated south and built a wall to help fend off raiders. For thousands of years from then on the rise and fall of states crudely followed climatic patterns. Even the collapse of the Roman Empire coincided with a drought in Central Asia which drove people and their forces from the area towards both China and Europe.

One invention of the time that is still with us and is often taking the blame for conflicts and wars is organized religion and priesthood. However, throughout history religious societies have been mostly peaceful: There have been several kingdoms explicitly tolerant of multiple religions (one example being in India during the most intolerant times in Europe, the Middle Ages) and violent religious rule is actually the historical exception.

Sometimes nature obviously influences civilization: An Icelandic volcano erupted in 1159 and a period of increased warfare and 50% population reduction in Bronze Age Scotland followed. More than

600 years later, in 1783, another Icelandic volcano erupted and a decade of climatic impacts contributed to a series of famines that helped trigger the French Revolution.

The Chinese civilization is, among many other things, one of record keeping farmers, warring dynasties and outstanding scholars. Like elsewhere, the Chinese have traditionally explained their wars by political, social, psychological and other anthropocentric causes. And have explained the apparent cycles of warfare by pseudo-scientific rules of thumb about the aging of empires. In 2007 Chinese researchers investigated whether climate changes have catalyzed historical events by its importance for agricultural productivity (Zhang, 2007). They found that temperature – itself dependent on sunlight – is the most important climatic factor due to its very direct effect on growing season lengths, precipitation reliability, summer warmth etc.

Other studies have shown how agricultural harvests usually went up during warm periods, down during cold periods and how double cropping rice was only possible during warm periods. Today's China is warm enough for double cropping but agricultural outputs world wide are limited by climatic factors. China's extensive historical records literally body-counting three millennia back in time and a set of five different weather data measurements merged into one provided their extensive data. The war data was pruned to 899 wars between the year 1000 and the year 1911. And the weather data was synchronized with emphasis on the most reliable methods - studies of tree rings, corals, ice core studies, historical documents etc. All of which correlate beautifully in regard to oscillations. Population data are available from the year 1741 to the year 1851 “only”. A thorough mathematical correlation from climate to war frequency done on a macro-historical level clearly shows how climate change is a major factor.

The cyclical pattern and the correlation is very strong: it is quite obvious how cold phases coincide with periods of high war

frequency. All periods of high war frequency are in cold phases, all cold phases have high war frequency, the coldest periods have the most extreme war frequencies and all dynasty collapses occurred in or right after cold phases. The cycle is mostly plus/minus 0.5 degrees from the average temperature, but a 1 degree cooling coincided with the fall of the Ming dynasty. Population growth is seen to rise (to 1.3%) during the 1741-1805 warm phase and drop (to 0.6%) during the 1806-1850 cold phase. The war periods generally lag the onset of cold phases by 10 to 30 years which makes sense since it would take some time for the reduced agricultural productivity to manifest as resource limitations and overpopulation.

Traditional history has been simplifying events, reducing causes of warfare to financial, political and ethnic ones while largely ignoring the ecosystem. Current global warming is different from the warm phases of his study, as it is both natural and anthropogenic, highly unpredictable and affecting entirely different societies. However, even if the developed world manages to sustain itself most people still rely on simple farming techniques that are highly susceptible to ecological stress and shortages of essential resources may “very likely” trigger future conflicts among groups of people.

If you occupy your enemies' storehouses and granaries and seize his accumulated resources in order to provision your army continuously, you will be victorious.

- Medieval Chinese military handbook

Even when in abundance and not being the object of concerned attention natural resources can strongly influence conflicts. Wars aren't fought on chess boards – they're fought on land which also hosts natural resources and wars require resources to even begin. One of the most essential resources for human survival has always influenced conflicts: water.

From around 2500 BC a conflict known as the “Lagash-Umma

Border Dispute” provides a very early example of water used tactically. Urlama, King of Lagash from 2450 to 2400 BC, diverted water to deprive Umma (present-day Iraq) of water. There are plenty of similar examples from the ancient history of the Fertile Crescent. Then there is the classic example: The moat. A water-filled ditch encircling fortified dwellings has been a staple of defensive tactics throughout most of history. This too was used in the ancient Fertile Crescent: From 605 to 562 BC king Nebuchadnezzar fortified Babylon by engineering defensive moats from the Euphrates. There are far too many historical examples of water used tactically for this report to mention them all; a fraction will have to do. But the interested can find plenty more at the Pacific Institute's worldwater.org website.

Ancient peoples have been fighting over various resources, not just water. An excellent exploration of historic examples of natural resource scarcity leading to societal disintegration has been done by the American professor of geography Jared M. Diamond in his book *Collapse* from 2005. Later, some of his overall conclusions are being used in the theoretical and forecasting chapters (see p. 98). But first a quick overview of his cases.

Diamond's historical examples include the collapse of viking settlements on Greenland (and North America), the statue building societies on Easter Island, Polynesians on Pitcairn Island, the settlements of the North American Anasazi tribe and the Central American Maya civilization. In each of these cases violence was involved. In the case of the Mayan kingdoms this included large scale warfare while in most others people were merely skirmishing with neighboring societies or fighting among themselves as their settlements were nearing their ends. It is crucial to mention how Diamond has also found some examples of success stories including tough choices on agricultural practices and strict enforcement of environmental laws which in hindsight as well as foresight have saved societies.

Colonization

The pre-industrial era of European expansion saw ruthless and brutal exploitation of far off lands and peoples. The era of Colonialism is defined as equivalent to imperialism and “*the policy and practice of a power in extending control over weaker peoples or areas*” in Collins English Dictionary, 2009. With such a definition it shouldn't really be necessary to discuss that the main conflicts of the time were about access to or plunder of natural resources. Even human beings were reduced to resources: Slavery – actually a state subsidized industry only later to be outlawed – transported about 11 million Africans to the “New World”, the Americas. About as many people died on their way from capture to colony. Moreover, the European conquest of America killed 80-95% of the native population through both violence and exposure to new diseases.

“[The] population crash, representing about 20% of the global population, led to massive regrowth of forests, which removed enough CO₂ from the atmosphere between 1500 and 1700 to have been a significant cause of the Little Ice Age. Reforestation in Europe following the Black Death a few centuries earlier may also have contributed to the cooling.”

- Mazo, 2010; p. 61-62.

But in the early Colonial times a near-global multi-millennial trade war over spices also came to a violent finish. It was a centuries old mostly non-violent conflict that occasionally flared into brutality. Amazingly, this trade war indirectly contributed to the collapse of the Roman empire that spent two digit tonnes of gold on importing spices annually. Later it helped spread the plague to Italy when plague infected corpses were used by Mongols as catapult ammunition against slave trading Europeans.

“After the year 1500 there was no pepper to be had at Calicut that was not dyed red with blood.”

- Voltaire, 1756

Trade spread Islam by providing suitable customs and laws. For centuries the Arabs guarded a profitable monopoly on selling Asian spices to the Europeans simply by inventing fairy tales of the origins of the spices. Actually, they brought the spices from India and even farther away through a remarkably peaceful market. When the Portuguese (Pedro Álvares Cabral and Vasco da Gama) finally navigated around Africa to find unarmed trade vessels, they immediately exploited it with extreme violence: Bombardments of random cities, torture of innocent traders, mass executions, extortion *et cetera*. Later in the 16th century the English and Dutch stepped up to compete in spice trade and global violence:

“Clove production was concentrated on the central islands of Ambon and Ceram so that it could be more tightly controlled; the ancient groves of clove trees on other islands were uprooted, the clove pickers massacred, and their villages burned down. Where clove production was permitted, the growing of other crops was outlawed, to ensure that the local people would be dependent on the Dutch for their food.”

- Standage, p. 99

Similar regimes were established to control nutmeg and mace production. Locals were enslaved for workforce, power was ruthlessly enforced by mercenary samurai warriors hired in Japan and problematic villages razed.

One of the first consumer boycotts happened in the 1790s when the British demanded slavery free tea. Half a century later the British traders established a system of acquiring tea in exchange for silver earned by illegal opium sales. As China fought back the opium smugglers, they drew England into a military campaign which ultimately brought the dynasty rule to an end. European consumers and rulers alike were just happy to see Asian trade grow – only some Chinese worried about the devastating effect of large scale

opium imports.

In USA year 1748 a ferry house on the Brooklyn shore of East River burned down. New Yorkers accused Brooklynites of having set the fire to protest East River water rights. The US and Canada provide many examples of civilians sabotaging dams and reservoirs and at least one murder. In the 1870s and 1880s violence between villagers, ranchers, and farmers erupted over water rights in New Mexico, USA. While immigrants had fought to colonize the continent, the native American population had dropped by perhaps about 90% due to violence, displacement, exploitation and exposure to new diseases. As this time and place of gun-slinging “cowboys” fighting over grazing rights, waterholes and gold mines has since materialized in cultural understanding as that of the “Wild West”, this chapter can end without a discussion just like it began: Obviously the Colonial Age and the Wild West were times of violent conflict over natural resources.

Industrialization

While German emigrants founded new countries elsewhere, Bavaria kept remarkably comprehensive crime statistics. This shows significant correlation between the amount of rain, the price of rye and the rate of property crime: They rose and fell together.

War even inspired culinary research: Around the year 1800 the French invented canned food for soldiers' rations but failed to keep the technology to themselves. Canned food revolutionized warfare as armies could now march to attack enemies much farther away than without it. Until this invention all planning of military campaigns was largely one of planning foraging and plunder.

Large scale fertilization of fields yet again changed the game as fields became more productive, efficient farmlands raised the resiliency of nations and the natural deposits of the fertilizing minerals became targets of extraction.

“[...] huge deposits of sodium nitrate [...] had been discovered in Chile. Exports boomed, and in 1879 the War of the Pacific broke out between Chile, Peru and Bolivia over the ownership of a contested nitrate-rich region in the Atacama Desert. (Chile prevailed in 1883, depriving Bolivia of its coastal province so that it has been a land-locked country ever since.)”

- Standage, p. 204-205

In the United States of America industrialization transformed the nation which until then had been largely unaffected by the businesses of the rest of the world. A growing working class became more and more unhappy in the industrious nation. But no interruption of the exploitation of the natural resources upon which the industrial revolution was based could be tolerated. When in 1913 copper miners went on strike a mysterious incident of mass panic killed 73 people at the “Italian Hall” Christmas party. Someone falsely cried “fire” at the crowded gathering of mostly women and children, and people were crushed in the resulting stampede to escape. An incident the following year is surrounded by corruption, not mystery. As coal miners went on strike in 1914 the National Guard was called upon to intervene and have this crucial industry restarted. Three union leaders were shot and tents with women and children sleeping inside were set afire.

“We saw the militiamen [aka National Guard] parley outside the tent city, and, a few minutes later, Tikas [a union leader] came out to meet them. We watched them talking. Suddenly an officer raised his rifle, gripping the barrel, and felled Tikas with the butt. Tikas fell face downward. As he lay there we saw the militiamen fall back. Then they aimed their rifles and deliberately fired them into the unconscious man’s body. It was the first murder I had ever seen, for it was a murder and nothing less. Then the miners ran about in the tent colony and women and children scuttled for safety in the pits which afterward trapped them. We

watched from our rock shelter while the militia dragged up their machine guns and poured a murderous fire into the arroyo from a height by Water Tank Hill above the Ludlow depot. Then came the firing of the tents. I am positive that by no possible chance could they have been set ablaze accidentally. The militiamen were thick about the northwest corner of the colony where the fire started and we could see distinctly from our lofty observation place what looked like a blazing torch waved in the midst of militia a few seconds before the general conflagration swept through the place. What followed everybody knows.”

-Godfrey Irwin, electrical engineer and random witness of the Ludlow Massacre.

In the 1930s the US Great Plains were stricken by droughts and storms. The area's agricultural practices were far from geared to the situation: Massive soil erosion and obvious declines in life quality resulted. The area became known as “The Dust Bowl”. Close to 2.5 million people had to move away.

Most went to neighboring states but about 300,000 traveled to California. They were received as “ignorant filthy people” and called “Okies”. Some argued Bible in hand that Okies were “inferior” and it was even suggested to pay them to be sterilized. They were beaten, their shacks burned and they were accused of “communism”. In 1936 Los Angeles police stopped migrants at the state border.

The World Wars

Neither the first nor the second world war can be said to have been fought over natural resources (other than territory) as such. Rather they can probably be summarized as exceptions to the rule, guided by popular sentiments for nationalism and democracy. But during the first world war, WWI, food and fodder still played a major tactical role. Supplies had to be transported by boat and train first,

then horse cart or truck to the front. As motorized warfare gained a much larger importance, fuel took over the tactical importance of fodder.

One of the too often ignored fights of the second world war was the Japanese invasion of China. However, this conflict gives a particularly large scale example of water used tactically: In 1938 the defending generals destroyed dikes to flood the advancing troops. Partly successful the maneuver also killed an unknown number of Chinese civilians estimated to be between tens of thousands and about one million. Later the occupying Japanese poisoned wells with typhoid and other pathogens.

When Germany invaded The Netherlands a similar tactic was used: the “New Dutch Water Defence Line” constructed in 1885 succeeded in flooding large areas but not in stopping the Germans. Throughout the world war hydroelectric dams were routinely bombed as strategic targets. The Dnjeprostroj Dam on the Dnieper River was first destroyed by the retreating Soviet army, then reconstructed by the occupying Germans only to be demolished again as the German army retreated.

At the North African battlefield German tank general Rommel commanded a campaign based in Tripoli, Libya, against the British based east of them in Egypt. If the Axis could defeat the Allies in North Africa they would cut off Middle Eastern oil supplies. But the war machine needed oil itself: Between 30% and 50% of Rommel's oil was used to transport oil to the tanks in the front line. The farther his troops advanced, the less efficient his army operated. The British held onto their Egyptian stronghold.

“The battle is fought and decided by the quartermasters before the shooting begins.”

- Erwin Rommel, German WWII general

In 1943 the British air force bombed at least two German dams resulting in major property damage and at least about 1,300 mostly

civilian deaths. As the battle was brought to Nazi Germany ground, the retreating German army repeatedly blew up dams to flood the advancing allied forces. This happened in Italy, France and Germany. And in one case they did the opposite: The Italian Rapido River was dammed to flood a valley occupied by US forces.

As the war was being won and lessons were to be learned President Roosevelt's January 11, 1944 State of the Union advocated a "Second Bill of Rights":

"People who are hungry and out of a job are the stuff of which dictatorships are made."

One of the consequences of the Second World War was, of course, the formation of the United Nations and Israel. The underground below the territory designated for Jewish colonization holds little freshwater – but there is on Palestinian grounds north of Gaza, in the Syrian Golan Heights and in rivers flowing from Lebanon. Perpetual strife over those resources are virtually built into the creation of Israel. When the disgruntled Arab nations attacked the new Jewish state, again water was used tactically: In 1948 Arab forces cut off West Jerusalem's water supply.

The Soviet blockade of West Berlin in the post-WWII times was answered by USA with an unprecedented air bridge providing food for the Berlin inhabitants. A 1949 ad for Douglas Aircraft Company carried the slogan *"Milk... new weapon of Democracy"* and pictured a girl holding a glass of milk and an aircraft dropping glasses of milk, not bombs. The Cold War had begun. Finally, the WWII can be said to have been the last major conflict in which USA waged conventional war. From then on a trend accelerated towards a focus on counter-insurgency; perhaps a trend of military adaptation to climate and resource conflicts.

MILK...new weapon of Democracy!

Supplied by air transport alone, 2½ million Berliners sample a new way of life

• In today's diplomatic battle for Berlin, hope for democracy is being kept alive for millions in Western Europe by the U. S. Air Force.

Flying Douglas aircraft almost exclusively, Yankee crews have poured over half a million tons of supplies into Berlin since last June. This impressive feat has strained to the limit our resources in air transport. It has shown why cargo planes in sufficient numbers must be considered essential to any modern military defense program.

Needed—and desperately—are larger, faster types of aircraft designed exclusively for air transport. And to meet this need, Douglas is now building the giant Douglas DC-6A. Able to fly 30,000 lb. loads at 300 mph, the DC-6A will make available to the military services a cargo transport of rugged dependability, capable of supplying world-wide bases in any kind of national emergency.

DOUGLAS

>> SERVING MANKIND AROUND THE WORLD

DOUGLAS AIRCRAFT COMPANY, INC.

Illustration 1: Douglas Aircraft Company, Inc advertisement, May 1949.

The Cold War era

In the decades following the second world war the US-capitalist versus Soviet-communist superpower stand-off had an overwhelming influence of on virtually every corner of the world. Including, not least, on conflicts which presented themselves as soft spots for gaining influence on smaller governments. Resource issues were hidden behind political propaganda or avoided because the superpowers would sponsor their allies generously. The Korea and Vietnam wars fall into this category.

In at least one case, however, the cold war situation helped draw the USA into another country's oil war. The British depended on pumping their oil in Iran and watched in horror as a democratic decision in 1951 fell out in favor of nationalization. A campaign by Britain and its allies to blockade and boycott Iran didn't convince the Iranians to hand over the oil rights again. But when Dwight Eisenhower was elected as US president Britain managed to convince him a regime change was necessary to keep the country safe from Soviet influence. In 1953 the CIA orchestrated a coup.

Since then the US has relied on securing Middle Eastern oil supplies by almost any means necessary. It has become an occasionally scorned upon cliché to talk about “war for oil” by now. Obviously few wars are fought for one single reason alone, but the influence of oil is impossible to deny.

“Let our position be absolutely clear. An attempt by any outside force to gain control of the Persian Gulf region will be regarded as an assault on the vital interests of the United States of America, and such an assault will be repelled by any means necessary, including military force.”

- US President Jimmy Carter, 1980

Another case is the mysterious death of UN Secretary General Dag Hammarskjöld, a Swedish diplomat and economist who worked hard to promote peace and tended to favor the independence of

nations. On the 18th of September 1961 the Douglas DC-6 transporting him and his delegation to cease-fire negotiations between government and rebels in the Democratic Republic of the Congo crashed near the copper mining city Ndola, Zambia. The search and rescue mission was delayed. Official inquiries have failed to conclude on the cause of the crash and are inconsistent in certain details. These investigations were partly managed and influenced by the British military who were also there to protect British mining companies. The mining companies supported the rebellion while the president had Soviet sympathies.

"Dag Hammarskjöld was on the point of getting something done when they killed him. Notice that I said, 'when they killed him'."

- Harry Truman, 33rd President of the United States (1945–1953)

Dag Hammarskjöld's death is fuelling conspiracy theories to this day. August 2011 Göran Björkdahl, a Swedish aid worker, and the British newspaper The Guardian, published new research supporting the theory that British mercenaries shot down the UN DC-6.

Especially during the 1970s Cold War proxy wars laid the foundation for conflicts still unresolved in several African countries; including Angola, Ethiopia and Somalia. (Read much more about Africa from p. 42.)

A third example: The forest cover of Cambodia declined from about 73% in 1969 to about 30-35% in 199. This tragedy was inseparable from the particularly muddled Cold War spin-off conflict between the brutal Khmer Rouge rebels and the corrupt Phnom Penh government. During the Cold War external donors supported the warring parties. But as that came to an end Pol Pot came up with the idea of funding their war by illegal logging and the government quickly copied the concept. When a certification scheme was set in place to cut the money flow to Khmer Rouge the

Cambodian government simply re-sold rebel timber; preferring the income from corrupting the certification to undermining the lifeline of their enemies. When in 1995 it was disclosed that the Cambodian rebels made as much as 20 million US dollars from timber sales every month the US government tightened its stance on foreign aid to countries collaborating with the Khmer Rouge and within years Pol Pot's forces had disintegrated.

Also, Pakistan, India and Bangladesh are in continual dispute over the Ganges and Indus rivers. Bangladesh presents one of the more typical cases of cross-boundary environmental situations leading to mass migration. A small less developed country with a huge and growing population straining its natural resources to a breaking point. Its geography happens to make it particularly vulnerable to both accumulated environmental stresses (soil erosion etc.) and periodic natural disasters (namely floods).

Then in 1975 the neighboring country built a barrage, diverting water away from Bangladesh. Salt water intruded into the sinking fresh water aquifers and land productivity plummeted. 35 million people were directly affected. Some 12 to 17 million Bangladeshis have migrated illegally to India and about half a million to other areas in Bangladesh. Migrants have since clashed with residents over social, ethnic, religious, national and other proximate issues. Countless people have been killed in these clashes.

Both science fiction movies (Mad Max, Water World and others) and news media journalists have been creative with the writings on the wall. Today “water wars”– the idea that widespread wars could erupt from conflicts over water resources – is a rather stable term. Judging by hits on Google by November 2010 the term has about 20% the attention that “peak oil” has. But does history really forebode this wet world war? One writer examined the records and gave up writing a book on the subject:

“There are 263 cross-boundary waterways in the world. Between 1948 and 1999, cooperation over water, including

the signing of treaties, far outweighed conflict over water and violent conflict in particular. Of 1,831 instances of interactions over international freshwater resources tallied over that time period (including everything from unofficial verbal exchanges to economic agreements or military action), 67% were cooperative, only 28% were conflictive, and the remaining 5% were neutral or insignificant. In those five decades, there were no formal declarations of war over water.”

- Wendy Barnaby, writer

Such a conclusion could not be sold to a wide audience as a book. But it did end up as an article in *Nature* in 2009 from where the quote is taken. The question is whether the conditions will stay the same or if they will change enough for societies to become more aggressive.

The Geneva Conventions

In 1977 Protocol I relating to the *Protection of Victims of International Armed Conflicts* was amended to the Fourth Geneva Convention relative to the *Protection of Civilian Persons in Time of War* of 1949. It includes two articles quite specific on protection of the environment (quotes from genevaconventions.org):

Methods or means of warfare that are intended or may be expected to cause widespread, long-term and severe damage to the environment are prohibited.

- (Protocol I, Art. 35, Sec. 3)

Attacks against crops, livestock and agricultural areas needed for food production for the civilian population are prohibited. [...] Attacks against civilian drinking water installation and irrigation works are prohibited.

- (Protocol I, Art. 54, Sec. 2)

Recent ecowars

Contrary to what has been claimed, the end of the cold war and the establishment and consolidation of the Geneva Conventions, WTO and other international organizations did not end history. Nor is every conflict necessarily part of and explainable in the context of a world wide collision between a democratic West and a theocratic Islamic world.

Angola

After attaining independence from Portugal in 1975 a 27 year civil war linked to the cold war broke out. The Marxist-Leninist MPLA, supported by Cuba and the Soviet Union, fought the anti-colonial, anti-communist but still socialist UNITA that was diamond trade funded. An election in 1992 placed MPLA in government and the end of the cold war brought an end to international donors sponsoring the war. But UNITA continued the fight as rebels while the government funded their rule with oil. The result has been called “the ultimate natural resource war” because its battles seemed largely to be determined by the relative world market prize on diamonds and oil. UN sanctions on UNITA diamonds was the beginning of the end to the rebellion.

The almost three decades of civil war may have caused 1.5 million dead and 4 million displaced Angolans. Today the country is still recovering: land mines litter the countryside, infrastructure is being rebuilt on loans, oil provides 85% of the GDP, two in three live below the poverty line and most people depend on subsistence agriculture. Corruption is widespread and its ports are being used to transit cocaine from South America to Europe. Population pressure and export demand is causing deforestation, overgrazing, soil erosion and desertification.

The Gulf Wars

When Iraq invaded its little neighboring country, Kuwait, it was clearly an illegal act of aggression intended to get more oil and power for Saddam Hussein's dictatorship. But such illegalities are committed quite often by despots around the world – and the Western leaders had to convince their voters they had higher purposes than securing oil deliveries in freeing Kuwait. The liberation was excused by stirring up sentiments against Saddam Hussein – in fact an old ally of the USA – and by fabricating horror stories about the brutality of the invading Iraqi army. In internal papers, however, the US president was clear about his intentions:

“Access to Persian Gulf oil and the security of key friendly states in the area are vital to US national security. The United States remains committed to defending its vital interests in the region, if necessary through the use of military force, against any power with interests inimical to our own.”

- US President George Bush in “National Security Directive 54”

Similarly, before the second Gulf War Vice President Dick Cheney on at least one public occasion mentioned oil – in between mentions of the falsely alleged weapons of mass destruction – in his reasoning for the “liberation”:

“Armed with an arsenal of these weapons of terror, and seated atop ten percent of the world's oil reserves, Saddam Hussein could then be expected to seek domination of the entire Middle East, take control of a great portion of the world's energy supplies, directly threaten America's friends throughout the region, and subject the United States or any other nation to nuclear blackmail.”

- Dick Cheney, August 2002

On the other side of the Atlantic in November 2002 the British

Foreign Office invited the oil company BP to discuss opportunities posed by “regime change” in Iraq. Publicly both denied any speculations over a connection between Iraqi oil reserves and motivations for war. But minutes revealed years later tells a different story:

“Iraq is the big oil prospect. BP are desperate to get in there and anxious that political deals should not deny them the opportunity to compete. The long-term potential is enormous...”

- Foreign Office memorandum, 13 November 2002

The quotes above are just tips of icebergs in a sea of circumstantial evidence that the wars were about oil. However, it is true for both US led coalition wars with Iraq that simply buying the oil would have been much cheaper and simpler. Clearly, none of them can be seriously categorized as old fashion conquests or raids for plunder. But they cannot be explained without taking into account the presence of oil reserves either.

Rwandan genocide

When in April 1994 the airplane of President Juvénal Habyarimana was shot down, a civil war pitting the Hutu tribe versus the Tutsi tribe was ignited. In about three months as much as 20% of the country's population was slaughtered; estimates vary from half a million to a million with Human Rights Watch saying about 800,000 dead. The complete story is a complex mix of post-colonial traumas, tribe rivalries, foreign meddling as well as environmental constraints and population growth.

Simple math shows the situation is difficult for this poor, small country with a rapidly growing population and similarly growing strain on ecosystem services. However, in the years following the genocide and civil war some progress was seen; one being the establishment of mountain gorilla reserves. The benefits include

protection of wilderness areas, increased tourism income and increased trust with neighboring countries with which the reserves have to be managed in cooperation. Furthermore, in 2006 a complete ban on charcoal production was passed to curb rampant deforestation. While being a wise move, this unfortunately also encouraged illegal logging for charcoal production in Congo, smuggling of it and a shadowy economy based on selling it in Rwanda.

Sierra Leone and Liberia

From 1968 to 1985 the small West African Sierra Leone was governed by a corrupt regime living off diamond extraction and trade. In 1991, warlord Charles Taylor of the neighboring Liberia sponsored and supported a very brutal rebellion in Sierra Leone. Even after he became president of Liberia in 1997 he still sent his own troops to partake in the “civil war” on the side of the rebels (RAF). One of the obvious reasons for his interest was the diamond mines just on the other side of the border. A 2001 UN endorsed embargo on diamond trade with Sierra Leone and Liberia caused the RUF to give up their fight. Charles Taylor shifted his income to logging so in 2003 an embargo on timber was installed.

As much as a third of the population of Sierra Leone fled during the fighting and tens of thousands were killed. While rich on diamond resources and fertile lands the country is poor. Charles Taylor is facing charges for war crimes in The Hague and UN peace keeping troops are keeping up a fragile security situation in Liberia.

Kosovo conflict

Much has been said about the conflicts in and around former Yugoslavia. Regarding Kosovo this includes rumors of drug trafficking criminals taking part in the war. For the present report,

however, one particular case provides a rather unique example of warfare caused pollution: the bombing of the Pancevo complex.

An industrial infrastructure complex located at Serbian Pancevo was bombed on twelve incidents by NATO air forces. Besides striking the Serbian ability to wage war, this also immediately released 80,000 tonnes of burning oil into the surroundings; reportedly causing black rain in neighboring villages. Concerns about the environmental impact was shared with the locals by even Bulgaria and Romania and a UNEP task force was later sent to evaluate the situation.

2,100 tonnes of ethylene dichloride, eight tonnes of metallic mercury, 460 tonnes vinyl chloride, 250 tonnes of liquid ammonia had accompanied the oil pollution. These are all highly toxic substances and plenty of reason for concern as they spread with the wind and in sludge carried by the Danube River. While on the one hand NATO claimed precision bombings had minimized the pollution the media probably in some cases exaggerated the toxic effects.

As a direct consequence of this incident, in 2008 the UN Post-Conflict and Disaster Management Branch was established to help understand and address environmental impacts of conflict.

Cochabamba Water Wars

Despite the advertising properties of its nick name this “war” was really a series of protests over plans to privatize the water supply in one of Bolivia's largest cities, Cochabamba. Privatizations had been taking place during two decades as the Bolivian government followed directions for qualifying for loans from the World Bank and the water sector was sold off rather cheaply to the only bidder. The new management promptly raised fees by 35% forcing many poor families to spend more money on water than on food.

The anger united many different groups of the Bolivian population:

poor families living in slums, farmers needing water for irrigation, workers unemployed following privatizations, left-wing middle-class sympathizers, international activists, the then-Congressman/since-President Evo Morales and more. During protests streets were blocked and the economy of the city suffered. The mayor answered with tear gas, arrests and imprisonment of key protesters in a far-off jungle prison. Protests continued and the president stepped up with declaring a “state of siege”. Dramatic incidents include an army captain being first wounded then dragged from his hospital bed and beaten to death by angry protesters and striking police officers firing tear gas at soldiers.

In the settlement water prizes were brought back to pre-2000 levels. The international buyers were held free of compensation demands from the unrest and the infrastructure of the water supply was left to further deteriorate. Today poor neighborhoods buy their water off unreliable independent tank trucks charging as much as ten times the official prizes.

Côte d'Ivoire

Having enjoyed decades of peace and prosperity – and the somewhat telling nickname “Africa's Miracle” – Côte d'Ivoire (The Ivory Coast) was split in a government controlled south and a rebel controlled north in 2002. The rebel forces were funded by diamond smuggling and taxes on the cocoa and cotton production. Since about two fifths of the world's cocoa comes from Côte d'Ivoire this sector alone constitutes about a third of the country's economy; yielding some 30 million US dollars for the rebels in 2006 alone which was more than their diamond income.

For years leaders on both sides of the conflict shared an interest in maintaining the status quo which had a convenient side effect of enriching them personally. But international embargoes and political pressure works to bring about democratic elections; as does diversification of the country's agricultural industries and an

oil and gas sector that has recently outgrown the cocoa sector.

The first climate change disaster incident?

Hurricane Katrina hit New Orleans in 2005. A combination of human and natural factors combined to aggravate a disaster situation: The Mississippi River had been turned into a maritime highway destroying natural sedimentation, land clearing and draining of swamps eliminated natural coastline protection, and compromises led to levee building only protecting from hurricanes level 3. The false sense of security from the levee only led to more risky development.

80% of the population fled the area when weather forecasts told of the impending hurricane. Including 100,000 elderly and poor who were evacuated by the government. Shortly after Hurricane Rita hit US government estimates a total of nearly 2 million people were displaced. New Orleans was smashed. One year after Katrina hit 2,180 people had died as a direct consequence of the storm, more than 200,000 people lost their jobs, about 335,000 homes were destroyed and only about 40% of New Orleans' population had returned.

Across the river from New Orleans the city of Gretna had the police block the entry of displaced people firing warning shots in the process. Rhode Island, South Carolina and West Virginia insisted more than half the evacuees they'd accepted were violent criminals. The city of Houston reported a rise in homicides of 70% in November and December 2005 and 28% in February 2006 compared to normals. In March 2006 75% of Houston residents answered a poll they felt "strained" by the 150,000 migrants living there.

It is safe to conclude, both distant and near history is full of examples of resource conflicts. Fights, skirmishes, wars and all

other possible types of conflicts have been fought over natural resources and natural resources have influenced many if not most conflicts. But are these examples of historical value only – or does natural resources still influence human conflict? The following chapters will review the evidence.

Interlude B: Year 1219 on a muddy battlefield and year 2010 in an air conditioned tent

“God is on our side,” King Valdemar II rounded off his little encouraging speech, “for we bring the light of Christ to the heathen, for we are on a holy mission blessed by the Pope himself”.

“For we are doomed to die on this muddy hillside; or flee like cowards and be lucky if we are allowed to live like scorned traitors in our own villages,” I thought to myself, “because we have joined ranks with the invaders and now the Danish king will lead us to our death, not on a victorious crusade”.

We were the Livonian Brothers of the Sword. Some of us had already deserted and the rest of us were considering it. Perhaps King Valdemar II of Denmark really was just here to plunder, his Papal blessing a blasphemous disguise. Certainly, our military campaign had not been blessed in fortune thus far. In fact, most of my Baltic brothers were grouping in the back of the improvised stronghold, perhaps ready to form a defensive shield wall and simply walk out of the battle. I, however, was nearer the king with a splendid view of the enemy troops gathering. Some noise of clamor gained in strength behind us, causing knights to look over their shoulders rather than pay attention to their shouting commander.

“My king, my king,” a rider came shouting. A servant boy who seemed to have jumped the nearest horse in a rush, clearly in panic, now jumped off it again and bowed to his king. Without permission he continued: “It’s an ambush. Or assassins? Our camp is being attacked from behind. They are killing the bishop!”.

So that was the clamor, not Baltic knights arguing if to flee or fight. I spurred my horse and rode to my countrymen passing Danes

looking at each other in bewilderment or to their king in desperation. *“To arms!,”* I shouted, *“heathen thugs are attacking Bishop Theoderich”*. To the holy bishop I owed loyalty if not to the foreign king whose promises of gold I had yet to see fulfilled. And I knew most Baltic soldiers felt like me.

Most Baltics followed me immediately and more were scrambling to. As I came to the ruins of the bishop's camp, a Revalian knight met me holding high the bloody head of Bishop Theoderich. *“Surrender and perhaps we spare your life, we have killed your Danish king,”* he shouted in my own language. They had mistaken the bishop for the king. *“You have killed a holy priest and for that you deserve your death,”* I shouted and my Livonian Brothers stormed the ambushers in anger. The Christian Baltic Knights killed the heathen assassins. The king's knights saved the banner of Bishop Theoderich, renamed it *Dannebrog* and made us swear fealty upon it again, claiming it had been sent to him from God. Meanwhile a German prince led his troops in a valiant counter attack that shocked the defending army and ultimately saved us. The Danish, Baltic and German crusaders were victorious under the same banner, a red flag with a white cross. They then looted the lands in the name of God.

“To arms, soldier,” the king commanded. No, wait, it was the lieutenant waking me up early. I had been dreaming. The paperback *History of Danish Wars* was on my belly where I had dropped it falling asleep. I put the book aside, swung my stiff legs to the floor and rubbed my eyes. Today's schedule came to me and I smiled as I put on my cap because I wouldn't be needing my helmet: We were to visit a NATO sponsored Afghan girl school today.

“You better put that away and pick up some extra ammo, Jens. Democracy class is cancelled, we're escorting a fuel truck convoy this morning,” the lieutenant said with some regret in his voice.

3. Observing: Conflicts and natural resources today

“Reduction of arable land, widespread shortage of water, diminishing food and fish stocks, increased flooding and prolonged droughts are already happening in many parts of the world.”

- “The Solana Report” by the European Union, 2008.

“Environmental security and climate change in particular are now issues which threaten world security and peace.”

- Wendell King, US Army Brigadier General

This chapter describes a selection of resource conflicts going on today. It is by no means exhaustive. Although environmental issues take little notice of man-made borders the following examples are largely ordered by nation borders.

The Arctic

In 1984, a Danish Minister planted the Danish flag on a 1.3 km² (0.50 square miles) rock in the icy waters between Greenland and Canada. By this gesture sovereignty was claimed over the small island called “Hans Island” (or in Danish “Hans Ø”, in Greenlandic “Tartupaluk”). July 2005 Canadian Defence Minister Bill Graham set foot on the island prompting Deputy premier of Greenland, Josef Motzfeldt, to state that the island had been occupied by Canada.

And that was just the tip of the iceberg. Since the 70ies Canadian and Danish soldiers, tourists and politicians have been removing and planting flags, building cairns, posting diplomatic notes as well as leaving behind alcoholic beverages for the next visitor to enjoy on Hans Ø. Besides the friendly jest between Canada and Denmark there is a growing seriousness to the issue; one illustrating a trend:

As the Arctic region is melting due to climate change and natural resource reserves are running out elsewhere the increasingly accessible resources there become more and more interesting.

The North Pole and the Arctic Ocean is place number 11 in *100 Places to Remember Before they Disappear*; a coffee table picture book issued in time for the 2009 COP15 climate change summit in Copenhagen. The poles are melting as one of the most directly observable consequences of global warming. The stunningly beautiful picture number 11 shows a great icebreaking ship, tiny in the backdrop of vast sea ice, accompanied by a text concluding that *“disputes will arise over who is entitled to its resources, disputes that could potentially trigger confrontations”*.

In the words of Marsha Walton, CNN: *“shipping and energy companies are salivating at the prospect of smaller ice caps, which makes Arctic drilling and commerce easier.”* Of course, these businesses are looking ahead to a market of fuel prices greatly increased. The Arctic is thought to contain 25% of the planet's undiscovered oil and gas, about 200 billion barrels of oil. And their eagerness leaves politicians of Arctic nations busy as precise sub-ice borders were never fully agreed upon.

Fortunately, these nations share good diplomatic ties and are nowhere near needy enough to risk conflict over these resource rights – which could easily have been the situation elsewhere in the world. September 2010 Canada, Russia, Norway, the United States and Denmark met in Moscow to discuss territorial claims. Russian Prime Minister Vladimir Putin said:

“Serious political and economic interests are indeed crossing over in the Arctic. But I have no doubt that problems, including the continental shelf problem, can be solved in the spirit of partnership. It is well known that it is difficult to survive in the Arctic on your own. Nature itself makes people, nations and states help each other there. Unfortunately we are faced with alarmist predictions of a

looming battle for the Arctic. We are monitoring the situation and making responsible forecasts.”

And Putin has good reason to advocate peaceful cooperation since his country is already leading the race there, Russian scientists are making the case that the continental shelf extends from Russia far into the Arctic and business deals are already being negotiated. In fact, Russia plans to invest 312.8 billion US dollars on exploration and promise extra tax breaks for oil corporations wanting to do business in the Arctic. They have sent a submarine to plant the Russian flag on the sea bed and plan two new brigades of arctic marine infantry but complain about NATO's presence. Meanwhile, spinning on the good news of peaceful cooperation diverts attention from the environmental concerns.

Perhaps less spectacular is the warming of the Bering Sea between Russia and USA. But this sea is the source of some 2 billion US dollars worth of fishing shared by these two old rivals. And as the waters warm the ecosystem and biodiversity is changing completely: Some fish will swim north, some stocks will decline. These issues will be seen elsewhere on Earth as well: Fishermen will have to try and follow the fish, quotas in shared waters will have to be continually negotiated and some catches could crash to near nothing as fish populations reach unsustainable numbers.

Africa

If one continent is to be the ground zero of future resource conflicts it will probably be Africa. Here many countries already suffer from dangerous combinations of weak governments, poverty, crime, overpopulation, economic resource export dependence, cultural and ethnic animosities, environmental degradation and instability nearby threatening to spread. All of which can combine to explosive cocktails.

Democratic Republic of the Congo (DRC)

“We have seen how environmental damage and the collapse of institutions are threatening human health, livelihoods and security. These risks can also jeopardize fragile peace and development in post-conflict societies. The environment and natural resources are crucial in consolidating peace within and between war-torn societies. [...] Protecting the environment can help countries create employment opportunities, promote development and avoid a relapse into armed conflict. [...] let us renew our commitment to preventing the exploitation of the environment in times of conflict, and to protecting the environment as a pillar of our work for peace.”

Quote Ban Ki-Moon, November 2008. United Nations Secretary-General at the time. Quite an authority firmly stating the link between natural resources and conflict here. But what does it have to do with Congo? The quote is from an interview done on the “International Day for Preventing the Exploitation of the Environment in War and Armed Conflict” - observed by few each year on November 6 - while on his way to negotiate peace in Congo.

The civil war in Congo has raged for decades and is a complex of struggles for control of natural resources such as water, timber, diamonds, gold, copper, cobalt, coltan, cassiterite, niobium, tungsten and zinc. However clear and succinct Ki-Moon was in the interview his visit didn't solve all of the problems. As of September 2010 the CIA still describes parts of the country as “unstable”, its national army as committing “atrocities on citizens” and about 1.4 million of its own people as internally displaced.

Precious minerals have been extensively mined in the eastern provinces since the beginning of the 20th century. But due to the collapse of the state, widespread corruption and physical destruction of infrastructure the national mining companies

collapsed too during the 1990s. An artisan mining regime was established and controlled by militias; now even the state army takes its share among the other armed groups with its officers acting as a criminal network interested only in keeping up the status quo of business. The entire scheme is violent: The digging work itself is hazardous, militias and mine owners fight each other and repress workers and traders get assaulted and robbed while transporting goods. It is also an environmental problem as the ground water is polluted with chemicals, the natural parks deforested and hunted for wild animals, hillsides swept away and arable land left unproductive.

The amounts of minerals mined and even the exact location of mines are unknown to anyone or kept secret. But the regime is highly organized and includes the exploitation of countless underpaid workers, tax fraud, smuggling and bribery along the production and transportation lines. Neighboring countries including Burundi, Rwanda and Uganda profit from the trade too. Networks of Lebanese, Indian, Pakistani and Russian businessmen make sure the conflict minerals end up for sale to industries in Europe, the United States, the Middle East and Asia.

Uganda

East of DRC and west of Kenya Uganda is situated in the middle of Africa where its recovery from civil war and struggle for democracy has mostly been off the western media radar. But one of the world's most brutal militias still hide in the jungle: The continued existence of the infamous Lord's Resistance Army (LRA) led by Joseph Kony has been a mark of shame upon the international community. In recent years oil has been found in the underground below Lake Albert on the border between Uganda and the DRC while deposits of several types of valuable minerals have been found throughout the country. This has attracted companies from Russia, China, India, Australia and South Africa as well as

military personnel from the USA.

Heritage Oil and Tullow Oil are guessing the 2.5 billion barrel or larger Lake Albert field is the largest onshore (non-oceanic) field found in sub-saharan Africa in more than two decades. Production of 150,000 barrels of oil per day by 2015 place Uganda among top 50 oil producing nations is planned. Irish Tullow Oil is now accused of having bribed three Ugandan ministers with 100 million USD in July 2010 in return for concessions. The ministers resigned in October 2011. Tullow denies allegations, maintain an anti-bribe image and have funded a lake rescue station which they claim has already saved the lives of more than 70 local fishermen. Also in the deal are French Total and Chinese Cnooc. Those corporations are expected to claim 2/3 of the 3-4 billion USD hoped to be made annually.

A leaked US embassy cable (Wikileaks, #08KAMPALA393) reveals Uganda has been asking for help stepping up security in and around the oil rich area. John Morley of Tullow Oil is quoted for saying that as oil activity on Lake Albert increases, a security presence would be vital. The cable mentions *“several clashes on Lake Albert between oil companies and entities from the [DRC] demonstrate that oil production has increased local tensions and exacerbated cross-border hostilities”*. In 2007 a British drilling platform worker was killed by Congolese soldiers who claimed the barge had strayed into Congolese waters. Although the Ugandan and Congolese governments are talking and are in agreement concerning the precise geography of the border the armed forces on the Congolese side of the border are not always government-related.

Several militias fight in the area and during the summer of 2011 thousands had to flee their homes, hundreds were kidnapped. Adding to the Congolese militias the Democratic Liberation Forces of Rwanda (FDLR) rebels as well as the LRA add to the insecurity. FDLR is a Hutu group whose two top leaders are held in France

and Germany on charges of crimes against humanity yet whose troops raped at least 154 civilians from July 30th to August 3rd, 2010, in the town of Luvungi, DRC. LRA is the Ugandan theocratic militia of self-proclaimed prophet Joseph Kony, who claims to be acting on orders from spirits sent by God, and whose ranks have been inflated by an estimated 66,000 children abducted for soldiering. October 2005 the International Criminal Court (ICC) issued arrest warrants on Kony and four other leading members of LRA; the 33 charges include murder, enslavement, sexual enslavement and pillaging.

Recently, the Ugandan president spent 780 USD million on six Russian jet fighters. A decision that raises eyebrows in a country with a GDP of less than 500 USD per capita.

“We don’t live in an enemy-free neighbourhood. So, don’t look at the purchase in terms of cost. The Great Lakes region is one of the most unsafe regions.”

- Ugandan presiden Yoweri Museveni

Since 2008 the US have donated more than 40 million USD on supporting the Local counter-militia efforts. And October 2011 100 Green Berets were sent as military advisers for the governments of the region. They received a warm welcome.

“For 20 years, the government of Uganda has been pleading with our American and European friends to help in the LRA problem, because these are international terrorists. We wanted our friends to help in providing technical support — such as intelligence — because they have the best.”

- Uganda's acting foreign minister Henry Okello Oryem

The link between the US troops and the oil is still a “conspiracy theory”. Obama and the US is simply making friends while helping the world get rid of monsters. Human Rights Watch has advocated for intervention for years. Yet US American knee-jerk reactions

were dominated by right-wing isolationism and political grudges on one hand, left-wing anti-war sentiments on the other. President Museveni, who first seems to have orchestrated the addition of a third presidential term to the constitution then won a low turnout election disputed by international observers, is already speaking of “his” oil.

Kenya

This East African developing nation – dissected by the equator – has seen some textbook climate change in its arid regions and side effects in its cities. Late 2008 droughts provided the conditions for livestock epidemics, failed harvests, economic woes and even deadly fights over boreholes.

“We have confirmed the killing of four people. Two are missing and we got a fresh report about the injury of four police officers”

- Red Cross spokesman Titus Mungaú to Reuters.

July 2009 BBC reported of a crime syndicate diverting half of Nairobi's water for farm irrigation. The United Nations World Food Program estimated 3.8 million Kenyans to be in need of emergency food aid. In the city water was rationed and feared a possible source of diseases. Even electricity was rationed – because the dams producing it were running dry. Blackouts is bad for businesses and the economy.

“A lot of young men are becoming unemployed and they can't provide for their families. Crime will definitely go up.”

- hotel manager Irungu wa Kogi to Associated Press.

At the time Prime Minister Raila Odinga expressed fears of an impending “catastrophe” and that inter-clan violence could ensue. But in 2010 Kenyan politicians have reacted by adopting a new constitution with powerful environmental messages:

“Every person has the right to a clean and healthy environment, which includes the right - a) to have the environment protected for the benefit of present and future generations through legislative and other measures.”

- Article 42.

Among other ambitions in the constitution Article 69 puts a responsibility on the state of keeping at least 10% of the nation's territory forested. About 40% of The Mau Forest, natural water tower of the nation, has been felled in recent decades. In part due to recent farm settlement immigration in this home of the sustainable hunter-gatherer Ogiek people.

In time for the 2010 conference on the UN Convention on Biodiversity in Nagoya, Japan, UNEP and local authorities estimated the value of ecosystem services from this forest to total about 1.3 billion USD. Perhaps an abstract figure – but broken down it includes sustaining tea plantations on its borders worth 163 million USD, hydro-power worth 132 million USD, stopping soil erosion worth no less than 98 million USD, carbon storage worth 89 million USD, inviting tourism worth 65 million USD, sustaining fisheries worth 21 million USD and more.

To save its valuable forest the Kenyan government has begun a difficult resettlement program. Meanwhile, internally displaced people have been living in camps since election unrest in 2007 and are awaiting the enforcement of another resettlement program. In February 2011 the 70-year-old Kuria Wakaba was killed and seven others critically injured with machetes: The Maasai community oppose the government plan to resettle 850 families in the Rift Valley where first British colonists, then well-connected Kenyan politicians have been edging them out of their ancestral lands. Meanwhile extended droughts inspire cattle raids between tribes in northern Kenya where enormous refugee camps already overflow with desperate Somalis.

Niger Delta and Lake Chad

Lake Chad lies where the borders of Chad, Cameroon, Niger and Nigeria meet. This lake is an essential source of life in a very arid region of all more or less “failed states”. Competition between tribes and nations is already intensifying as the lake is drying up rapidly. To make things worse, the Tuareg nomads are hostile to foreign corporations mining in the desert.

A French company has bought uranium mining licenses from the Niger government but only about 10% are in use because of local opposition. The Tuareg nomads who live in poverty atop the world's third largest uranium deposits resist being pushed off the territory by ambushing mining personnel and even fighting army troops. Existing mines have caused radioactive pollution – even of villages full of unsuspecting locals.

The Niger River meets the ocean in the Niger Delta along the south coast of Nigeria. This area is about the size of Ireland, home to beautiful nature, oil pollution, ethnic violence, overpopulation and mass poverty, rising seas and increasing storms, decline in freshwater availability, increased spreading of diseases combining to a considerable risk of migration. The delta has huge oil reserves being developed by multinational corporations that have at times been working with kleptocratic governments doing little oversight – and some would say still are. Rampant theft of oil worsens pollution and oil fields are occasionally attacked by the Movement for the Emancipation of the Niger Delta (MEND). In July 2011 Nigerian media reported of something as simple as villages fighting over a disputed piece of land. Using both venomous spears, bow and arrow as well as modern weapons at least 15 people were killed, more than 30 reported missing and many villages razed.

The Nile

In the fall of 2010 Egypt threatened the Nile upstream countries not

to increase their use of the river's water. A 1929 treaty by the then British colonial rule has reserved 80% of the Nile's entire flow for Egypt and Sudan but May 2010 Ethiopia, Uganda, Tanzania, Kenya, the Democratic Republic of the Congo, Burundi and Rwanda agreed to disagree with the old treaty.

“Not only is Egypt the gift of the Nile, this is a country that is almost completely dependent on Nile water resources. We have a growing population and growing needs. There is no way we can accept this kind of threat.”

- spokesman for the Egyptian Foreign Ministry, Hossam Zaki

As part of their diplomatic efforts to ease tensions Egypt hosted a friendly football tournament in January 2011. But what does a football tournament have to do with water conflict?

“The tournament aims to create awareness among all countries sharing the Nile Basin, to safeguard the water resource for the benefit of future generations. [...] Let's face it, football is politics. That's why countries pour money into hosting tournaments.”

- senior Egyptian official.

Egypt won the tournament beating Uganda in the final. But the real game over the Nile isn't over as upstream countries continue to develop their infrastructures.

January and February of 2011 the people of Egypt as well as several other North African and Middle Eastern countries gathered in unprecedented protests. While it seems the overwhelming sentiment of the people in the streets is for less repression and corruption, more freedom and democracy, most – but not all – Western commentators nervously mentioned the danger of radical Muslim influences.

“This isn't just about the Muslim Brotherhood and it isn't just about politics. [...] This is about hunger, about poverty,

about food production about a change of world economy. [...] The demographic change is very significant [...] It's perfectly understandable how this spark went off, although it's not simple to predict when it's going to happen [...] This is a global ecological phenomenon, of rising world populations, increasing climate unsustainability and pushing up against the barriers of food productivity in many places. [...] My rule of thumb is the dry lands are the most combustible part of the world, all of the Sahel to the Horn of Africa, across the Red Sea to Yemen, Iran, Iraq, Afghanistan, Pakistan. This is all one vast ecological zone of extraordinary stress, with a lot of war in it already. [...] This is one large swathe of 10,000 miles of potential instability.”

- Jeffrey Sachs, Earth Institute

Somalia – Africa's east coast

When the 2004 tsunami brought devastating waves to most shores not sheltered from the Indian Ocean it hit the already troubled Somalia too. Only about 300 locals were killed and as such the incident was dwarfed by the destruction elsewhere. But with the big wave evidence was washed ashore: Radioactive uranium waste, industrial wastes, hospital wastes, chemical wastes and heavy metals like lead, cadmium and mercury. Locals experienced respiratory infections, coughing, mouth bleedings, abdominal hemorrhages and chemical reactions on their skins. Only Europeans reading the smallest newspaper articles were briefly reminded of a hidden trade in pollution conducted mainly by the Italian mafia families.

Obviously, this export of pollution must also have a negative effect on the ocean biology and the fisheries. An issue only compounding an already controversial trade in fishing rights leaving the waters trawled by European fishermen while the technologically inferior

locals are left with less and less fish in their nets. These hardships to the coastal communities have combined with the conditions of an already war torn and corrupt nation to produce a flourishing trend of open sea piracy. The pirates feel perfectly justified.

“[Our motive is] to stop illegal fishing and dumping in our waters ... We don't consider ourselves sea bandits. We consider sea bandits [to be] those who illegally fish and dump in our seas and dump waste in our seas and carry weapons in our seas.”

- Sugule Ali, Somali pirate

It has become a staple part of Western media entertainment how Somali fishermen arm themselves with AK-47s and hijack unprotected tankers carrying billions of tons of crude oil right past their poor villages. And it has become a growing tale of heroism how European warships increasingly are sent to protect the valuable tankers and container ships. The Somali government – despite financial aid and apparent willingness to employ child soldiers as young as nine – are struggling to maintain its position and are unable to patrol its waters. Meanwhile, the news from the Somali inland is a cycle of stories of drought, flooding and conflict.

A 2011 UN report shed some light on the details of the al Shabaab militia which looks more like a government than the government does. It generates 70-100 USD million a year from various trade schemes, taxes, “jihad contributions” and extortion. Some of this money is demanded by gunpoint at roadblocks but much is earned in more sinister ways. For example by exporting charcoal, importing sugar and manipulating the accounting to allow illegal money transfers to fill up the artificial surplus.

“In a very real sense, al Shabaab is becoming a business: a network of mutually supportive interests in Somalia, Kenya, the Middle East, and even further afield. Even businessmen who are not ideologically aligned with al Shabaab have little incentive to see the Islamists displaced by a predatory

and corrupt Transitional Federal Government."
- UN Report.

The list of Somali woes is long. A terrorist militia extorting its own people even during a drought of historical proportions, chopping down trees to export charcoal when the country is suffering from some of the worst deforestation and desertification in the world. A very weak government, rapidly degrading ecosystem services and an international community giving up.

Sudan: Kordofan and Darfur

Everyone has heard of the western Sudanese region called Darfur. Over and over again. Because from 2003 to 2007 it was the epicenter of the national conflict between the nomadic Muslim-Arab north and the settled non-Muslim black south providing endless disaster stories for world media. But few Westerners know more about the place than that it's a "failed state".

"Much of the unrest in Darfur and the misery is due to water shortages [...] There have been two long episodes of drought during the past 20 years, each lasting for about seven years."

- geologist Farouk El-Baz, Boston University Center for Remote Sensing

Fundamentally, there is a vicious cycle between environmental degradation and civil war going on: Droughts caused desertification which triggered the war and the war worsened the environmental crisis in return. The drought aggravated tensions between Darfur's ethnic African tribesmen and nomadic Arabs who fought for their lives over shrinking grazing lands and scarce water. Violent skirmishes over water and grazing rights also persist among pastoral populations along the country's borders. The refugee situation is a puzzle: People are internally displaced, millions flee the country and hundreds of thousands have also fled to Sudan

from conflicts in neighboring countries. A strong correlation between annual temperature variations and civil war in the 1980-2002 period for the area has been shown statistically.

On Mount Marra, the highest peak in Darfur, there were about 100 trees for each acre of land in the 1990s. By 2001 that figure was down to 50, and it is now about 20. Perhaps Darfur is no longer pretty enough for a photograph in a project like *100 Places to remember before they disappear*? Anyway, Sudan also has a big forest of “hashab” trees (Latin: *Acacia senegal*) in Kordofan east of Darfur which is the source of the largest production of rubber in the world. This place is featured in the climate change coffee table book. But business is slow both because of the nearby Darfur trouble, drought and rising temperatures which has caused a severe decline in forestry productivity. If this region of Sudan also loses its livelihood the country will face another huge challenge.

And the list of issues in Sudan goes on. In recently established South Sudan oil has been found and drilling rights licensed to Chinese corporations. April 2010 two Sudanese people were convicted of killing four oil workers, two of them Chinese. Both were hanged – other than that news reports were very short on details. During 2011 what looks like a poorly disguised proxy-war escalated via tribes and militias.

Furthermore, the well known – infamous if you will – U.S. security company known as Blackwater but now named Xe Services has been trying to get into the Sudanese “market”. It is headed by an evangelical Christian and has offered its services to the southern non-Muslim groups. And since the customer was short on cash it offered to get paid in natural resources. In change for training the army of the southern region in 2007 Blackwater asked half the gold, iron, diamonds, oil and natural gas reserves. Not exactly war for resources - but highly selective security for resources. Unfortunately for them Sudan was under sanctions and a 42 million USD fine was negotiated with the Barack Obama administration –

with about as few details in the press as when the Chinese oil workers were killed.

Ironically, Darfur also showcases a paradox of conflict leading to environmental improvements as some depopulated areas have seen beginning regrowth of natural vegetation.

Zimbabwe

While showing off as a “parliamentary democracy” with presidential elections Zimbabwe could look like a *de facto* dictatorship. President Robert Gabriel Mugabe got 85.5% of the votes in the severely flawed and internationally condemned 2008 election. The president’s “land reforms” consisted of army veterans violently taking over farms owned by whites. A move badly damaging an important business that at one time provided 400,000 jobs, turning the country from being a food exporter to a food importer and receiver of humanitarian food aid.

The country also runs a mining industry similar to that of Congo. Army units are given turns overseeing the mine in an effort to keep troop morale from disintegrating along with the rest of the country. Children work in the mines for minimal or no wages and anyone in the way are beaten or worse. Robert Mugabe’s regime in one case attacked mine workers with three military helicopters killing more than 200 people.

Supposedly, conflict zones and dictatorships are barred from exporting diamonds according to The Kimberley Process Certification Scheme. But there are irregularities: Guinea has reported an impossible 500% increase in diamond production and Lebanon is exporting more rough diamonds than it imports despite having no mines. No action has been taken against any of these countries still operating with Kimberley certification. Rich consumers everywhere are buying diamonds like they always have.

Asia

No meaningful summary nor complete description of Asia is possible in this context. First of all because of the vastness and diversity of this continent. Across entire regions scarred by decades of warfare, from corrupt suppliers of energy sources to island nations slowly disappearing into the rising sea some issues do not allow omission.

Afghanistan

Afghanistan has suffered from decades of fighting between both rebel groups, governments, super powers working by proxy, international occupying forces, warlords, criminal gangs and most likely several other types of armed groups defying any of these descriptions. Being a huge country rich on several types of resources and strategic assets, experiencing all the common vicious circles of environmental degradation any brief description will struggle to do justice.

Landmines cluttering fields and internal displacement have driven farmers to clear cutting of precious forests, in turn robbing the country of income from for example pistachio nuts, causing deforestation, soil erosion, overuse of scarce water wells. While four in five are directly dependent on the natural resources a steady migration is taking place from countryside to urban areas. Most foreign interests seem to be in fighting Taleban forces but some effort is directly aimed at reversing the environmentally based hardships: The Afghan Conservation Corps has among other things planted more than five million trees and UNEP is ever lobbying the Afghan government for passing and enforcing stricter environmental laws.

While NATO forces continue to be the main Western contribution to the area, the radical Muslim Taleban fighters have no shortage of angered recruits from a population growing desperate from

drought, unemployment, hunger and economic deprivation. As the ends justifies the means during wartime the otherwise moral high horse seated Taleban provide loans and seeds to farmers willing to start growing opium and even help harvest the cash crop to secure an income of about 125 million US dollars a year. International projects encourage farmers to shift from opium to wheat – but wheat use six times more water than poppy which is worth 50 times the price. The poppy crop is a strategy of climate adaption no moral argument will easily beat.

Tian Shan and Himalaya: Kazakhstan, China

From the glaciers atop these mountain ranges a steady cycle of precipitation and thaw has provided freshwater for plants, animals and people for centuries. Further down the diminishing streams every conceivable environmental issue is to be found in the many different Asian countries.

Tian Shan glaciers provide the water for the breadbasket and powerhouse of Kazakhstan. But due to miniscule drops in precipitation through the last 50 years they have shrunk by 36% already. Climate change will most likely accelerate this drastically. Competition for the remaining water resources will intensify in this neighborhood of seriously troubled nations.

Kyrgyzstan and Tajikistan are upstream countries with lots of water fresh from the glaciers. Uzbekistan and Kazakhstan are downstream and suffering from the worst drought in decades. The latter are asking for more water from the former, claiming water belongs to everyone and rivers should flow free. But Kyrgyzstan is asking for natural resources in return and Tajikistan is constructing what will become the highest dam in the world. Kazakhstan refuse to trade in naturals – probably preferring world market prices – and Tajikistan insist on damming the river since their energy supply is already rationed. Negotiations stalled in the summer of 2011 and Uzbekistan cut its gas export to Tajikistan and allegedly also holds

up Tajik exports on its border.

Kazakhstan and the state uranium company (Kazatomprom) is one of the world's top producers of uranium: Within its borders are one-sixth of known global reserves and in 2009 it mined more than 14,000 tonnes of uranium to beat Canada as the world's number one producer. The sale of some uranium assets is under scrutiny: A former head of Kazatomprom and seven other executives have been arrested.

China is diverting rivers of freshwater from the melting glaciers in Tibet. No volume of appeals to the humanitarian concerns of the Chinese government is likely to convince them to set aside their obligations to see to the needs of their own people and industries. Internally, although still a rather totalitarian regime, China is experiencing everything from theft of oil from pipelines to rioting over rampant pollution.

The Spratlys

The Spratlys are a group of islands in the South Chinese Sea contested by Brunei, Malaysia, Taiwan, Vietnam, the Philippines, and China. Most of these countries maintain a limited military presence on some of the islands while claiming rights to more of them. In 1988 China sunk a Vietnamese ship to keep them from occupying more islands.

In recent years countries have been building up their presences, constructing landing strips and bunkers. March 2011 the Philippines hired a British oil company to do seismic surveys in hopes of finding more oil in the waters of the Spratlys. This move infuriated China whose diplomats promptly warned anyone against extraction of resources and claiming more territory.

Singapore and Cambodia

Singapore, the success story of Asia, is growing. Not just

economically: Its land area has increased by about 20% in recent years and a further 100 square kilometers are already in planning. This is possible only by importing vast amounts of sand - 14.6 million tons in 2010. Malaysia banned sand export already in 1997. Entire Indonesian islands have been deleted from the world map so they too banned exports in 2007 but smuggling is said to continue. Vietnam followed with a ban in 2009.

Today sand companies have their eyes on Cambodia. Although sand export being partially banned since 2009 both corruption and poverty allows plenty of exports to continue. Nearly 800,000 tons a year is said to move from the area of Koh Kong to Singapore alone. Worth hundreds of millions of dollars the local governor (and businessman) is currently defying a temporary government ban to allow further research.

Besides the coastal lines being weakened, leading to loss of land, the destruction of the sea bed has caused about 85-90% drops in catches of fish, crab and lobster and a near 100% drop in tourism where digging machinery and sand carrying boats ruin the atmosphere day and night. An NGO had just successfully established a culture of catering to ecotourists, to discourage locals from poaching. Meanwhile inland, agribusinesses claim new territory by forcibly evicting villagers, burning their houses and belongings to the ground reports Amnesty International.

The Middle East

Just like Asia, although much smaller, The Middle East defies any attempts at briefly rounding up the situation there. Being one of the birth places of agriculture and still home to enormous farming sectors – including some production of drug crops (mainly marihuana and khat) it has experienced millennia of power shifts. About 360 million people or 1/20 of the world's population lives in the heart of the Arab world – but the region has only about 1/70 of Earth's renewable freshwater supply. On the other hand some of the

Arab countries – or at least some of the people in some of the countries – have been able to live luxurious lives from oil incomes.

Politically no short description will suffice as the region is a quagmire of ethnic, religious and economic interests operating in a landscape scarred by past conflicts and on a map partially drawn by outside parties. To the casual Western observer Middle East governments appear to be totalitarian, incompetent, corrupt, powerless or most if not all of the above. Clearly there are human rights issues in several of the countries and insurgent groups prone to terrorist tactics active in some.

Conflicts in the region that have been described as being over natural resources include the Palestine versus Israel and the Iraq wars. In both cases a multitude of alternative reasoning, valid complaints and bad excuses have been used for engagement in the conflicts. The Gulf wars were already mentioned in the historical chapter but the Palestinian Territories cannot be omitted here as its people are suffering from years of mismanagement and destruction of its water infrastructure, confiscation of arable land for alleged Israeli security concerns and other reasons. Scarce resources are being polluted as well as wasted. When in 2006 the radical Hamas was elected to govern Gaza things went from bad to worse because foreign donors ceased their support. Most infrastructure serves a population four times the size it is designed for. For example, in March 2007 the earthen wall of a sewage pond leaked to flood a village, killing four.

One country seems to have several of the above mentioned ingredients but is getting only a fraction of the attention: Yemen. It is poor, dried out, oil and khat producing, partly governed by tribes and harboring even al-Qaida. As late as May 2010 terrorists bombed an oil pipeline in retaliation for an airstrike.

Finally consider Amman in Jordan: Historically situated ideally for a fertile capital. But now human over-use of water resources and climate change is lowering the water level of the Dead Sea by one

meter per year because less and less water flows by the Jordan River. Agricultural land is turning into desert as you read this. A glance at a map and it becomes obvious this can become a very, very big problem.

Turkey

About 4.3 million people have emigrated from Turkey which makes it the 10th largest exporter of workers.

Perhaps most telling of all is the attitude of the Turkish military which has warned its politicians that climate change and resulting water shortages are a direct security threat. At the same time the country is buying weapons from Israel and the west, allowing US military bases on its soil, slowing down the flow from rivers by dam construction - while monetizing on selling water. Recent finds of gas fields in the Mediterranean Sea has caused discussions about rights with Lebanon, Cyprus and Israel.

North America: USA and Mexico

The United States of America and *Estados Unidos Mexicanos* are making up their own microcosm of north-south issues. About 12 million people have moved across their mutual border making it the worlds largest migration corridor.

Hosting about 43 million in 2010 the United States of America is by far the largest receiver of migrants. Most have come from Mexico, China, the Philippines, India or Puerto Rico but people come to North America from all over the world. With almost 12 million people having left the country by 2010 (almost 11% of the population) Mexico is the worlds top emigration source (although barely ahead of India and Russia). In 2009 alone these immigrant workers sent home about 48 billion US dollars to their families. Mexicans receive some 20-25 billion US dollars annually from their relatives working in other countries. At the current trend a

10% drop in Mexican crop yields 2% more migrate to the US and it is estimated 10% of 15 to 65 years old Mexicans could attempt US migration as a result of global warming.

One could, perhaps, be excused for assuming that the USA, first among the countries of the first world, sees no resource conflicts. But not only is US consumption among the leading causes of climate change globally. Internally, fierce discussion has also erupted on how to meet the challenges posed by the effects of climate change: In the south states (Atlanta, Georgia, others) have a hard time agreeing on sharing water resources and in coal mining areas environmental concerns conflict with the interests of mine workers and owners. And when the Colony Collapse Disorder recently killed off countless bees theft of beehives rose significantly as their pollination of nearby crops serve an economically important role in agriculture. Similarly, theft of expensive solar panels and used restaurant grease for biofuel recycling is a growing problem.

South and Central America

South America has been significantly influenced by North American foreign policy as the USA both actively opposed any nearby Communist tendencies during the Cold War and also actively inspired liberalism and capitalism there. It is a continent rich on various minerals, arable land, untouched nature and crude oil. Prolonged periods of lawlessness in several countries has allowed the establishment of some of the world's most powerful criminal organizations making astronomical amounts of money from cocaine production and smuggling. Most South American countries have seen violent rebellions – and in Colombia civil war has become the norm – but recently popular leftists have won democratic elections in several countries. This chapter will scratch the surface of conflict over natural resources in South America.

Guatemala

Just south of Mexico much smaller Guatemala is one of the most unequal countries in the world: Although half of the population lives in the mountainous and jungle-clad countryside, 80% of the farmland is in the hands of just 5% of the population. Half of the population live below the poverty line and about 1 in 6 in extreme poverty. Poverty rates are highest in the large indigenous population. A civil war pitted leftist guerillas against dictators backed by an American tropical fruit corporation (United Fruit Company now know as Chiquita) from 1960 to 1996. The nation was traumatized with about 100,000 deaths and about one million people having had to flee their homes.

In recent years hundreds of indigenous villagers have been chased from their rural homes, their huts burned as the military clear the area for richer farmers or agricultural businesses.

“This has been the government with the most violent stance against the campesino struggle. It has carried out 115 evictions since 2007 because of its ties to strong economic groups, which mean its actions have been in line with the interests of local and transnational companies.”

- Israel Macario, Agrarian Platform.

Three recent examples: March 15, 2011 over 3,000 Q'eqchi Maya Indians were evicted from their homes in the Polochic Valley in the province of Alta Verapaz. The security forces burnt or bulldozed the families' humble shacks and destroyed their subsistence crops with machetes and tractors. The Q'eqchi had lived there for generations but the valley has been sold to an agricultural business. Early August 2011 more than 250 families were evicted from land in the province of Retalhuleu. One farmer was killed by police during this eviction. That land is currently being converted for large-scale production of sugar cane for export. August 23, 2011 soldiers burnt down the village of Nueva Esperanza in the province of Petén forcing 91 campesino families totaling 286 people off the

land. The Guatemalan government has registered about 1,400 separate disputes concerning almost 3,000 square kilometers of land.

Honduras

South of Guatemala, Honduras has had a similar history of dictatorships fighting leftist guerillas and is currently facing similar issues. Contrary to Guatemala the population of Honduras consist mostly of Mestizo (people of mixed Spanish and indigenous heritage) but inequality is at least as bad with 65% living below the poverty line. To the country whose history coined the term “banana republic” land grabs is not a new phenomenon. The European Union funding it by buying carbon credits and biofuel from the perpetrators is, however.

“[...] the global rush for production of biofuel and access to carbon credits is making it profitable for national and international business to maintain the unequal distribution of land between Honduras' poor and the elite. It also makes it possible for international institutions, corporations and donors to support domestic land grabbing or the status quo of unequal land ownership where serious human rights abuses occur. [...] there is no global human rights mechanism incorporated in the global carbon market that can prevent countries from buying carbon credits from CDM-projects in developing countries, which include land grabbing tactics or land issues where human rights are violated.”

- “Stolen Land, Stolen Future”, p. 4

The Bajo Aguan valley on the north coast is a hot spot for not just land disputes but drug trafficking and crime in general. The elite owns most of the land which is increasingly used for production of internationally subsidized biofuels and other export crops. During the year 2011 about 40 people were killed in conflicts between

security forces and landless peasants. In October 2011 about 45 people were killed in a clash between poor squatting peasants and authorities.

The Green group in the European Parliament demands of Climate Commissioner Connie Hedegaard that the EU should stop buying carbon credits via the CDM project from the Honduran palm plantations.

Colombia

“Travelers should exercise vigilance at all times due to the level of violent crime. Although kidnapping and homicide rates in urban areas have dropped in recent years, they remain high.”

- Lonely Planet travel guide book, “Introducing Colombia”

Government, gangs, Marxist rebels, right wing death squads and indigenous groups fight each other in Colombia. Most are linked to the cocaine economy in one way or another. International oil corporations are blackmailed and jungle dwelling hunter-gatherers step on landmines they have no grasp of. The summary below is very far from a complete account of the hardships of Colombia.

2.1 million Colombians – 4.6% of the population – have left the country to make a living elsewhere; most of them in USA, Venezuela, Spain and Ecuador. Of the educated Colombians the figure is 10.4%. The Marxist FARC rebels tax people in the territories they occupy and to counter that right wing paramilitaries have evicted small scale farmers whose lands total between 3.5 and 6 million hectares of farmland since the 1980s. Years of civil war has displaced many Colombians internally and for those people something as simple as getting their daily meals can be a problem. Today, former politically motivated armed groups are degenerating into smaller gangs of criminals and the Colombian government has begun a campaign to reclaim the lands farmers have lost. A

campaign that will meet fierce resistance, even in courts.

In 2006 alone, the United Nations reported the spraying of approximately 172,000 hectares of coca crops. How has the Chemical War on Drugs fared in Colombia? Most biologically interesting is the reports of a glyphosate resistant - "Roundup Ready" - variety of the *coca* bush! And yes, there have been reports of health problems in farmer populations and damage to legal crops. Local medical personnel have reported increased visits due to skin problems, gastrointestinal infections, acute respiratory infection, and conjunctivitis following spraying.

"The twelve indigenous peoples have been suffering under this plague as if it were a government decree to exterminate our culture and our very survival. Our legal crops -- our only sustenance -- manioc, banana, palms, sugar cane, and corn have been fumigated. Our sources of water, creeks, rivers, lakes, have been poisoned, killing our fish and other living things. Today, hunger is our daily bread. In the name of the Amazonian Indigenous people I ask that the fumigations be immediately suspended."

- José Francisco Tenorio, Amazon farmer.

A short, short summary is that billions of American tax payer's money have been spent, wide stretches of Colombian biosphere scorched, coca production continue, cocaine prices are down and abuse on the rise, the civil war is still raging and the Monsanto stock price is up and climbing. Of course, each of these results have been influenced by numerous factors, not just Roundup.

An additional problem recently escalated is illegal gold mining. In January 2011 it was reported how a laptop captured from left wing rebels FARC by the Colombian government had contained information about how the group had started business in gold mining. It turns out it's not just FARC but multiple sides in the conflict that are turning their eyes on gold as cocaine becomes harder and harder to produce while more gold mines are located

and gold prices are up. Paramilitaries related to right, left or apolitical outlaw groups launder the profits through, for example, cattle ranching.

One city, Antioquia, has the highest mercury pollution levels found anywhere according to one United Nations investigation. Lawless miners use the liquid form of the toxic heavy metal without restraint or concern and an estimated 67 tons are released every year. About 30,000 miners take part in the gold rush, shrugging at the danger of working in waters thick with mercury.

Peru and Ecuador

The border between these two countries was a constant source of tension and scene of several incidents of military conflict over the course of more than 150 years. But today it is an example of how conservation might solve more issues than wilderness preservation. Since a 1998 treaty the controversial border territories have been designated “peace parks”. By establishing protected nature reserves on the formerly disputed territories there is no longer any reason to fight over them. In stead wildlife as well as the local communities are benefiting.

Internally, however, the two countries still have their own issues to deal with. In extension of free trade agreements the Peruvian government has plans for “developing” the Amazon homelands of many indigenous communities - opening them for oil, mineral, logging, and agricultural exploitation. Drilling for oil has already caused severe incidents of pollution with societal consequences.

Recent development plans take little notice of indigenous territories. Locals have been protesting some of these initiatives claiming they are unconstitutional and in violation of the UN Declaration on the Rights of Indigenous Peoples. In June 2009 police intervened on anti-oil protests and fighting erupted. Body counts vary; one is as high as 81. November 2011 several locals

were injured when police dispersed anti-gold mine protesters. Shortly thereafter a government mining official resigned citing a lack of social responsibility in the projects.

In Ecuador, both American and European oil companies seem to have the military at their command as local villagers must accept road block controls even to access their own villages. Prostitution is institutionalized as soldiers receive a monthly ticket to the base brothel. Why the hostile locals? Why the need for protection? First of all because Ecuador is home to what is called the “Amazon Chernobyl” portrayed in a documentary film from 2009 by Joe Berlinger.

The US oil mastodon Texaco began extraction in the 70s apparently enjoying the absence of environmental regulations to the maximum extent possible. More oil and polluted water was systematically spilled in the jungle than most accidental oil spills have ever polluted. Transportation to the shore for shipment to the US was arranged by construction of a pipeline which has been in deterioration ever since. In 1992 Chevron moved to escape responsibilities by selling local activities off to an Ecuadorean company but a court case suing them for about 27 billion US dollars in reparations continued.

Today environmentally inclined tourist guides will angrily take you on the “Toxic Tour” of open oil spill pits and rusted extraction equipment left in the Ecuadorean Amazon. While elsewhere in the same jungle some tribes – scared by the Texaco experiences of their neighbors – are fending off energy corporations by spears, bows and sustainable tourism. In February 2011 an Ecuadorean judge fined Chevron eight billion US dollars for the massive pollution (approximately 2800 times the size of the 1989 Exxon Valdez spill in Alaska and 150 times the size of the 2010 BP Deepwater Horizon disaster in the Mexican Gulf). But the corporation refuse to pay, being partly backed by the US government, and appears to be willing to appeal indefinitely if possible.

Denmark, Europe

This chapter has been about almost every other place than Europe. Before closing it, however, it must be noted that even deep inside this wealthy, safe and well administrated continent the increasingly expensive natural resources are becoming objects of theft.

For example, from about year 2010 in Denmark people began reading news reports in mild disbelief: Truck drivers are having their gasoline stolen out of their tanks, graveyards are looted of bronze figures and the national railways get copper wires stolen off of their tracks. Similar incidents are reported from England, USA and other western countries.

Finally, no text about current natural resource incidents would be complete without mention of the “land grab” trend. Having accelerated especially after the year 2008 food riots and increasingly encouraged by rising biofuel demand poor countries see increasingly large areas of fertile land bought up or leased by multinational agricultural businesses or similar organizations from the richer parts of the world. In an Oxfam report the scope of this trend is estimated to about 227 million hectares of arable land. Land from which poor subsistence farmers are evicted and from where produce is exported to the investor's home land or sold to the highest bidder on the world market.

News reports and current events are as full of examples of conflict over natural resources as history is. This is a surprise to some as many subscribe to a notion of current times being the epitome of civilized behavior. It is true that the average modern person lives a much safer and longer life than almost any person have done in past times. But resource conflicts are still with us – and perhaps they are even a guiding principle behind world events? Only thorough, educated analysis of all available information can verify or reject these apparent connections – the following chapter

summarize such academic investigations.

Interlude C: 18th of September 1961 in a DC-6 above Ndola, Northern Rhodesia

“Mr. Hammarskjöld.”

The colors painted by the setting sun across the sea, clouds and mountains were warm but the air was chill. High above intricate moving patterns were ever created and abandoned by the flocks of birds leaving for warmer lands. Soon cold winds and blankets of snow would transform this northern land and he would walk along peaceful frozen lakes where children would skate and he would feel at home.

“Mr. Hammarskjöld,” the voice repeated and Dag Hammarskjöld, Secretary-General of the United Nations, awoke to his harsh responsibilities. He was not at home in peaceful Sweden, he was in the heart of Africa.

“Yes?,” he invited the U.N. Aide whose hand was still resting on his shoulder after having shaken him into consciousness to brief him in a concise choice of words.

“There are airplanes asking us to land,” he said. Earning only a stare he added nervously: *“they are British warplanes, they talk of a situation”*.

Letting out a yawn from his drowsiness combined with a sigh from his impatience with imprecise information the Secretary-General pulled aside his blanket, got to his feet and moved past the aide and towards the cockpit. British military planes on the radio? He would get to the bottom of this quick because he had little patience left for Brits in Congo!

“...this is important, we are here to help you. Please land your aircraft on the strip by Ndola,” a British accent commanded on the radio as Dag entered the cockpit. The pilots looked helplessly towards him.

“Repeat after me,” Dag addressed his captain, “This is a United Nations aircraft. We are following a strict schedule and act on a mandate from the international community. Please communicate any concerns you may have regarding flight safety according to normal procedure.”

“Eeeh,” the captain activated his microphone and held it to his mouth, “This is the United Nations. We have a schedule and act on international community mandate.” After a short pause he finished: “Please follow normal procedure regarding flight safety.”

Dag stared at the pilot for a short moment. *“Good enough,”* he then said, *“proceed towards our destination as planned. And let me sleep, please.”*

Within minutes he was asleep again, the Swedish autumn mountain scenery yet again materializing before his inner eye. Determined he ignored the lowered voices and radio noise from the cockpit.

But after a while he was brutally dragged from his dreams again. He stared directly into his aide's now wide open and very worried eyes. *“They're warning us, they will shoot!”* he offered.

“They say they'll fire warning shots,” another aide raised his voice. It was in the middle of the night but now everyone appeared to be awake if not alarmed.

Then a series of high pitched thunderclaps seemed to go off from somewhere behind and above them, flashes of bright light shot towards the windows by the wing on the right side of the DC-6. Some screamed, some shouted vile insults to their attackers, some threw themselves to the floor. As if any of that would do them any good. Determined Dag Hammarskjöld started towards the radio. These British brutes were going to deal with the wrath of the civilized world, he'd make sure.

“I said, fire across his nose, not bloody up it, Billy,” someone could be heard saying on the radio.

Then a blast of fire seemed to burst from the side of their DC-6 in a deafening roar that shocked through everything. Dag was tossed to the floor like a doll, grabbed onto something then felt the contents of his stomach protest as gravity pulled the plane towards the ground and his body appeared to lift itself from the floor of the plane.

In the cockpit the pilot was putting up an impossible fight to maintain control of the partly propelled, mostly aerodynamic mastodon of scrap metal now hurtling towards the ground below.

4. Thinking about it: theories of peace and war

Correlation is not causation. And vice versa. Both logical explanations and data to support them are needed before theories can properly establish. Scholars have been hard at work both linking and un-linking natural resources to conflict.

“Environmental factors are only one, and rarely the decisive, contribution to a complex interaction of other political, social and economic factors underlying conflict. [...There is] no evidence to date that environmental problems have been a direct cause of inter-state warfare.”

- Mazo, 2010; p. 38

The above observation is of course important to acknowledge when studying “ecowar” - the term is a bit dramatic if understood to suggest that inter-state warfare is guided directly by ecological factors. And Jeffrey Mazo has another important point: while ecology does influence politics and conflict, the precise impact is a complex matter:

“Just as no specific weather event can be definitively attributed to climate change because of normal variation within a complex system, specific social or political developments cannot be definitively attributed to climate or other environmental factors.”

- Mazo, 2010; p. 139

All that being said, warfare has also been described as an adaptive ecological strategy of humankind in situations of limited resources. Even if the developed world gets by in a world shaped by stresses caused by modern global warming most people world wide still rely on simple farming techniques that are highly susceptible to ecological stress. Shortages of essential resources may “very likely” trigger future conflicts among groups of people. Studies

have had a tendency towards looking at only rebellions and rioting as resource conflicts. While this is probably not entirely correct it is curious how Zhang found best climate-conflict correlations when looking at rebellions only.

“Deforestation was a or the major factor in all of the collapses of past societies described in [my book, Collapse.] Other valuable natural habitats besides forests are also being destroyed. [...] But biodiversity losses of small inedible species often provokes the response, 'Who cares?' [...] Elimination of lots of lousy little species regularly causes big harmful consequences for humans, just as does randomly knocking out many of the lousy little rivets holding together an airplane. [...] Thus, because we are rapidly advancing along this non-sustainable course, the world's environmental problems will get resolved, in one way or another, within the lifetimes of the children and young adults alive today. The only question is whether they will become resolved in pleasant ways of our own choice, or in unpleasant ways not of our choice, such as warfare, genocide, starvation, disease epidemics, and collapses of societies. While all of those grim phenomena have been endemic to humanity throughout our history, their frequency increases with environmental degradation, population pressure, and the resulting poverty and political instability.”

- Jared M. Diamond, *Collapse* p. 488-489.

Natural resources have motivated, financed and shaped conflicts. In fact, among many other things a UNEP report from 2009 says that *“natural resources play a role in at least 40 percent of all intrastate conflicts”*. And that seems a modest estimate. The report also says, however, that no wars are fought exclusively for resources.

“While it would be an error to reduce armed conflicts to

greed-driven resource wars, as political and identity factors remain key, the control of local resources influence the agendas and strategies of belligerents.”

“Beyond motivating or financing conflicts, the level of dependence, conflictuality, and lootability of a resource can also increase the vulnerability of societies to, and the risk of armed conflict. Yet, there is no environmentally deterministic relation at hand.”

“Most empirical evidence suggests that countries economically dependent on the export of primary commodities are at a higher risk of political instability and armed conflict.”

- Le Billon, 2001.

In his analysis of growth philosophy the German scholar Wolfgang Sachs looks at the impending resource scarcity and what there is to do about it. Of the four types of reactions possible which he defines one – exclusion – is directly confrontative while the three others could indirectly inspire conflict as well.

“Everybody who is right in his mind, in the world, knows that we are entering a new historic age. Everybody who is clear in his mind knows that, let's call it universal encompassing environmental scarcity is to be with us for the 21st century. [...] There are four possible reactions.”

1. *“Keep out people who might add to the aspirations; so it is a logical answer to go for exclusion.”*

2. *“Expansion is a logical response [nuclear power, genetic technology, capture and storage of CO₂, geoengineering].”*

3. *“Get better in the way we use things; so efficiency is another logical answer.”*

4. *“Revise the aspirations.”*

- Wolfgang Sachs.

But two points are worth noting before moving on: Facing resource conflict there is always the choice of cooperation. And the UNEP report from 2009 observed that “*natural resources and the environment can contribute to peacebuilding*” (drawing 1).

The insecure circumstances of conflict environments may inspire crime too: In some cases growing illegal drug crops becomes more inviting.

“In times of conflict, opium is the Afghan currency. It's not heavy and you can carry it with you. Prices continue to rise, and just a few kilos is a Swiss bank account for a farmer. Compared to pomegranates or wheat, opium has a tremendous shelf life, well over five years; try storing a bucket of fruit for that long.”

- Jean-Luc Lemahieu, U.N. Office on Drugs and Crime, Afghanistan

The negative impacts of adding illegal drugs to a conflict are too numerous to count and would tend to further spin a vicious circle of problems. Most prominently it helps transform arable land into rebel group financial resources.

Demonstrating causation

Ross (2004) discussed causality issues that any investigation on environment-conflict links should pay attention to. For example “reverse causality”: Years of unrest can drive off manufacturing businesses, in turn leading to a higher dependence on exporting natural resources. Which then in turn can fuel outright conflict. Also, both resource dependence and war can be caused by a third variable, or several variables. Many states dependent on the export of some local commodity have several other issues: Poverty, corruption, harsh government etc. All of which could inspire conflict.

Le Billon (2001) claims some studies insufficiently account for

countries with or without resources that have developed peacefully (Norway, post WWII Japan etc) and reminds us the parts of nature we call resources are probably resources just because of our cultural ideas. Fights over extracted resources focus on territory control whereas fights over produced resources focus on trade control.

In 2010 peace researcher Päivi Lujala set out to look closer at the influence of the more exact locations of the resources. Previous research had either only suggested a link between natural resources and conflict or had sought to explain it by an indirect effect through resource abundance tending to corrupt weak governments. Lujala's analysis did find significant links – but that is not to say that indirect causation does not occur. Lujala writes confidently in the introduction that *“new data on localities of hydrocarbon fields throughout the world, shows that crude oil and natural gas directly affect rebel movements [...] easily extractable resources, such as gemstones, have an effect on rebel groups.”*

A statistical analysis such as Lujala's checks for influences other than the ones investigated – profitable natural resources – to make sure apparent correlations aren't really symptoms of other causal links. The same tests were in this case run for presence of mountainous regions, forest cover, language differences, difficult weather and a few other factors. It is worth noting that separatist conflicts (over territory rather than government power) and conflicts with one or more sides being democratic were shown to last longer, while countries suffering from poverty and overpopulation are more prone to conflict onset.

Lujala also defines the grey area between rebel and criminal – the slippery slope between civil war and looting: *“natural resources, especially those that are easily exploited, provide motivation and means for rebel uprisings.”* In other words, rebellions may just be organized crime with political agendas attached. Of course, even more or less “legitimate” rebel groups could be driven to resource

exploitation if their financial resources are exhausted in a prolonged conflict.

Before concluding a connection between natural resources and war has been established please read the later discussion of hindsight bias (page 123).

Tricky correlations (Theisen, 2008)

Inspired by the growing body of literature linking natural resource scarcity to conflict, dating back at least to the 1960s but gaining momentum in recent years, Norwegian Ole Magnus Theisen published a review of the statistical literature on this link in 2008. In short, his conclusion was that large scale violence was generally not correlated with statistical significance to scarcity of natural resources; but instead to poverty and poor governance.

The literature reviewed by Theisen has argued resource scarcity was the main cause of the Rwandan genocide, violent local clashes in Kenya, South Africa, Assam, Chiapas, Sudan and elsewhere. With varying significance land degradation, freshwater scarcity, population density (growth), deforestation, youth bulges, deviations in precipitation and similar factors have been shown to increase the risk of violent civil conflict. The problem is: When updating and expanding the datasets of two of the previous studies, Theisen was unable to replicate the statistical results.

Performing a re-computation of two statistical studies Theisen found most links previously found to be significant now fell out of traditional intervals of interest ($P < 0.1$, at least). But in the first evaluation high levels of land degradation still set off the alarm bells as it appears to significantly increase the risks of conflict onset. And in the second evaluation the existence of oil resources were confirmed to increase conflicts. (The two studies didn't test for the exact same links and also showed links to non-natural resource causes, for example political stability.)

Theisen points out some of the problems with the studies he revisits (and with his own): Statistics have problems with investigating complex interactions such as those from natural resource scarcity to conflict. Ecological fallacies are easily committed when calculating on national averages. Furthermore, which area is degraded and which is a rich land is sometimes in the eye of the beholder. These and similar concerns describe the problem of demonstrating causation. Take, for example, a mismanaged forest on the border between two countries: Deforestation may not only deprive locals of ecosystem services but also affect river flows, precipitation patterns and other ecological factors. To read about deforestation being statistically insignificant to the political stability of a poor country, but land degradation being of determining importance is exhausting on ones ecological training – because, of course, deforestation in an area would most likely worsen land degradation in the same area. If one of the countries is small and the other country large, perhaps cutting down the trees will ultimately wreck the agriculture of the small country while only having some near-inmeasurable impact on the gross domestic product of the larger country.

Much has happened and much has been written since Theisen published in Journal of Peace Research. Perhaps Theisen's paper is going to be one of the last “skeptical” papers? In the light of the ongoing resource conflicts (see chapter starting page 40) and the research done since 2008 (summarized on the following pages) it's hard to imagine Theisen not moderating his conclusions if he was to revisit his own research.

From hunger to riot (Lagi, 2011)

The Romans are said to have believed that civilization is never more than three meals away from anarchy. A statistical study of the FAO food price index and the riot frequencies is backing up the link between the two.

Working with the hypothesis that “widespread unrest does not arise from long-standing political failings of the system, but rather from its sudden perceived failure to provide essential security to the population” Marco Lagi and colleagues correlated food prices to riots. When marked on a graph of the UN food price index, riots clearly cluster around price spikes. Most of the riot incidents that fall more or less outside a spike can be explained by additional extraordinary circumstances. The probability that the “Arab Spring” should have randomly coincided with the price peak is estimated to be less than 6%, much less if riots in each country are considered individually.

The researchers do not conclude “high food prices cause riots”. What they say, is that expensive food could be one factor among others setting the stage for riots. When populations are hungry, it takes lesser trigger incidents to kick-start a riot. The researchers are confident enough to predict “food riots occur above a threshold of the FAO price index of 210”. If prices are persistently higher than that, they speculate global unrest will occur. As of the summer of 2011 extrapolations of the average price index estimates exceed the riot thresholds some time during 2012 or 2013.

From migration to conflict (Reuveny, 2008)

Looking at the Dust Bowl, Bangladesh and Hurricane Katrina, Reuveny identified three main similarities: The three societies all depended on their environments for a livelihood, human actions or lack thereof exacerbated the disasters and political, economic, sociological and psychological factors overlapped with environmental ones. A number of obvious differences were noticed too.

Standard migration theory takes into account economic, political and other forces – but not environmental ones. Doing so could have serious implications as governments have signed treaties to accept political refugees, not “environmental” ones. However, already in

1985 a paper on droughts and land degradation in sub-Saharan countries concluded these problems caused “population movements”.

It's pretty much stating the obvious: If you live from the land and suddenly you can't, you're a lot more likely to simply leave the area. It's a different type of border you seek to cross though: While “traditional migrants” would seek to cross a cultural or political border, environmental migrants just wish to leave the stricken area.

The mechanics of “ecomigration” issues is described in four parts which does not exclude each other:

- *“The in-migration can burden the destination's economy and resources, promoting native-migrant competition for jobs and other resources”*
- *“the arrival of in-migrants may upset the existing ethnic balance”*
- *“in-migration can enable ploys to exploit the situation and induce suspicions about such ploys”*
- *“the conflict may follow existing fault lines”*

In-migration is more likely to cause trouble in poor receiving counties than in rich. And migrating women, children and elderly having family ties in the receiving area are least likely to cause conflict. Trouble risk is also correlated to migration mass and period: The more and the faster migration is, the more problematic it could become.

Reuveny finishes his theoretical chapter with a pinch of optimism:

“Migration can benefit the receiving area through several channels, including increasing the labor force and tax-base.”

This optimist view is at least in part supported by the World Bank that watches closely how migration affects the global economy. In

2009 migrant workers were sending home funds of at least three times the amounts given in development aid or about the same amounts directly invested by industries. And they were also considered to be providing a service by trying to move to where their work is valued the most.

From weather patterns to civil war (Hsiang, 2011)

Global patterns of civil conflict are directly associated with planetary-scale climate change. Specifically in tropical countries, the risk of civil war has just been shown to double in warmer El Niño years (to about 6% risk per country per year) compared to cooler La Niña years (when the risk is about 3%).

“When you think about it, car accidents happen all the time. But they become more likely based on some environmental conditions, like when it's raining or icy. [...] What we found is quite a bit stronger than a mere correlation.”

- Solomon Hsiang

Hsiang and colleagues ran a wide selection of statistical methods with on the one hand a data set of occurrences of organized political violence of more than 25 battle-related deaths and on the other hand climatological records of the El Niño / Southern Oscillation (ENSO) phenomenon.

Looking into their analysis, the authors note how some conflicts seem to be re-occurring events and some seem to be merely 'displaced' in time, accelerated by the climatic shifts but not necessarily caused by them. Also, low-income countries are most strongly affected. But are they more at risk of climate induced conflict because they are poor and lack the means to mitigate the effects of environmental impacts? Or are they poor because their political stability is sensitive to the ENSO cycle, perhaps even inherently unstable, conflict prone and poor because they are

located where the ENSO climate pattern is strongest? Or is a third factor, not considered in this study, influencing or guiding the sensitivity to climate and poverty in relation to conflict proneness?

The increase in conflict risk during the about three degrees Celsius warmer El Niño years roughly corresponds to the decrease observed when average income is increased tenfold. So, could climate wars 'easily' be eliminated by raising the incomes in tropical countries by a mere 1000%? Hsiang and colleagues warn against generalization of their results to apply to global anthropogenic climate change without thorough discussions of climate-conflict links.

From climate change to conflict

“Climate change is neither necessary nor sufficient to cause conflict.”

- Jeffrey Mazo

“[Climate change is] an act of aggression by the rich against the poor.”

- Ugandan President Yoweri Museveni, 2007.

Any type of extreme weather or significant and persistent changes in weather – climate change related or not – can have a severe effect on peace and security in an area. History is full of examples from incidents of floods, earthquakes and other natural disasters.

Climate change, one of its main effects being an overall global warming, leads to droughts and general drying out of areas. Since water is an absolute necessity for human life and since shortages directly affect agricultural outputs, climate change will cause increased food insecurity, especially for the poor. Thirsty and hungry people are quick to turn to crime, rioting or both. Climate change will also cause some coastal areas to be flooded, some wild game animals to migrate or become extinct and many other small and big changes in our ecosystems. A link between climate change

and reduced economic growth in poor countries, but not rich, has been demonstrated statistically (Mazo, 2010; p. 101) – and absence of economic growth can have drastic consequences in the new globalized world order.

Climate change causing conflict isn't a simple cause and effect relationship. It cannot be said often enough: Both sociology (which would be the social science to predict and explain conflict) and ecology (the natural science accounting climatic impacts) are complex areas of understanding. But climate change has a tendency to incite further conflict where such already exist and in some cases war is already looming. For example, the Cold War proxy-wars have left unresolved conflicts lingering across the globe now to converge with climate change effects. Historical case studies suggest three paths from climate change to conflict:

- Sustained trends: Conflict has the potential to emerge after a sustained period of divergent climate patterns.
- Intervening variables: Climate change alone won't cause conflict but, along with other factors, will contribute to and shape it.
- The need for conflict triggers: An assassination, extreme natural event, or random act of group violence is usually required to ignite violent conflict.

Current climate change conflicts are crudely lumped in two categories:

- Hot areas: Between smaller groups (tribes, cities) fighting in desperation for access to resources mainly made scarce by changes in precipitation and increased evaporation (“water wars”).
- Cold areas: Between states seeking the opportunity to exploit resources made available by warming temperatures.

The above principles are suggested as guidelines for preparing for

the wars and fights of the future.

Attempting to block immigration caused by desperation with regulations and physical barriers – which is a trend already seen – may just exacerbate the conflict risk.

Many rich countries will be simultaneously shifting to low-carbon economies to meet demands on climate change adaptability. This shift must be peace-friendly and supportive of the adaptive development happening in poorer countries. For example, a switch to bio-fuel in richer countries contributed to food prices rising by 30% in 2008, which directly caused violence in over 30 countries.

Quantifying the mechanisms

Running complex statistical analysis on large data sets isn't exactly the stereotypical sociological method. But it has led to many insights.

Data from a particularly ecologically fragile area in Zhang's historical study says a 2°C drop in average temperature would shorten the growing season of grass by as much as 40 days in turn leading to the death of 90% of the area's domestic animals. Which would be catastrophic to most farming systems. The war periods generally lag the onset of cold phases by 10 to 30 years which makes sense since it would take some time for the reduced agricultural productivity to manifest as resource limitations and overpopulation. The study goes into more detail; for instance correlations are particularly strong for wars of type “rebellion” and stronger in the (wet, warm) south than in the (arid, cold) north.

Locally, rainfall often has a negative effect on violence in that it discourages fights. But economists have found that one of the most reliable predictors of civil war in Africa during the 1980s or 1990s was lack of rain – as droughts led to food shortages which led to unrest.

One study (Collier & Hoeffler) details how resource dependence

can incite conflict (the onset of which is what can cause the “Dutch Disease” as explained on page 88):

“[...] data suggest that resource dependence has a non-linear effect: it increases the likelihood of conflict until the resource exports-to-GDP ratio is 32%; beyond this point it diminishes the likelihood of conflict.”

Ross (2004) singled out three main mechanisms:

- Oil increases the likelihood of conflict, particularly separatist.
- Lootable commodities such as gems and drugs tend to lengthen existing conflicts.
- There is no link between legal agriculture and civil war. (Despite most wars being fought in countries with large agricultural sectors.)

In some cases though, it appears to Ross that diamonds have shortened wars by facilitating military victories.

Some of the more exact results of the work by Lujala includes:

- *“If resources are located inside the actual conflict zone, the duration of conflict is doubled.”* And...
- *“oil and gas reserves have this effect on duration regardless of whether there has been production or not.”*
- Regarding the initiation of rebellion *“onshore [not offshore] oil production increases the risk of conflict onset by 50%.”*
- And *“secondary diamond production [post-extraction processes] increases the risk of conflict onset by more than 40%.”*

Hydrocarbons have traditionally been categorized as non-lootable as production usually requires substantial international industrial

activities. But Lujala finds oil reserves even not in production do have effects and explains it by rebels potentially being “*willing to engage in a long conflict [...] if the future price is large enough*”. Among reserves in production exceptions are seen in Nigeria where large scale looting occurs and in Columbia where rebels extort oil companies. However, note that regarding gas “*production has no effect on conflict onset.*” Gas probably appears too hard to loot?

The UNEP report from 2009 measured that “*intrastate conflicts that are associated with natural resources are twice as likely to relapse into conflict in the first five years*” (drawing 1).

The Dutch Disease

What happens to a country when one of its industries substantially expands its exports? The new sales and influx of money will raise the value of the country's currency. Thus, it becomes cheaper to import goods – but also raises the prices on locally produced wares relative to foreign buyers. This can have a severely adverse effect on a country's other industries.

Sudden and large increases in exports of certain products is what happens when a deposit of natural resources are found and extracted. And it was the negative effects to the trade balance of the Netherlands that inspired *The Economist* to name the term “The Dutch Disease” when offshore Dutch North Sea oil was found in the 1960s. In due time the Dutch managed to gear their already diverse and strong national economy to handle the new situation.

But for a poor, politically weak or unstable developing nation the sudden wealth dumped on some parts of its society can be devastating to its other parts. For example, before Nigeria began exporting oil it had a thriving agricultural sector and was a food exporter. Now they have only the oil and email scamming, it seems. The symptom has also been observed in Chile, Azerbaijan, the Philippines and many other places. But each case is complex

financially and subject of much debate as to the precise mechanics.

Red alert: Uganda

The oil field below Lake Albert, Uganda (already stimulating cross-border guerrilla warfare, see page 44) inspired the analysis “Oil Extraction and the Potential for Domestic Instability in Uganda”.

“If Museveni gains access to substantial oil revenue, the combination of considerable oil funds and strong presidential powers could increase the ability of his government to remain in power indefinitely. [...] Increases in corrupt behavior would essentially require secrecy in government dealings. A reduction in government transparency in oil and tax revenue management would then incentivize Museveni’s government to become increasingly autocratic in its relationship with the public and political opponents, as has so often been the pattern in other oil producing states.”

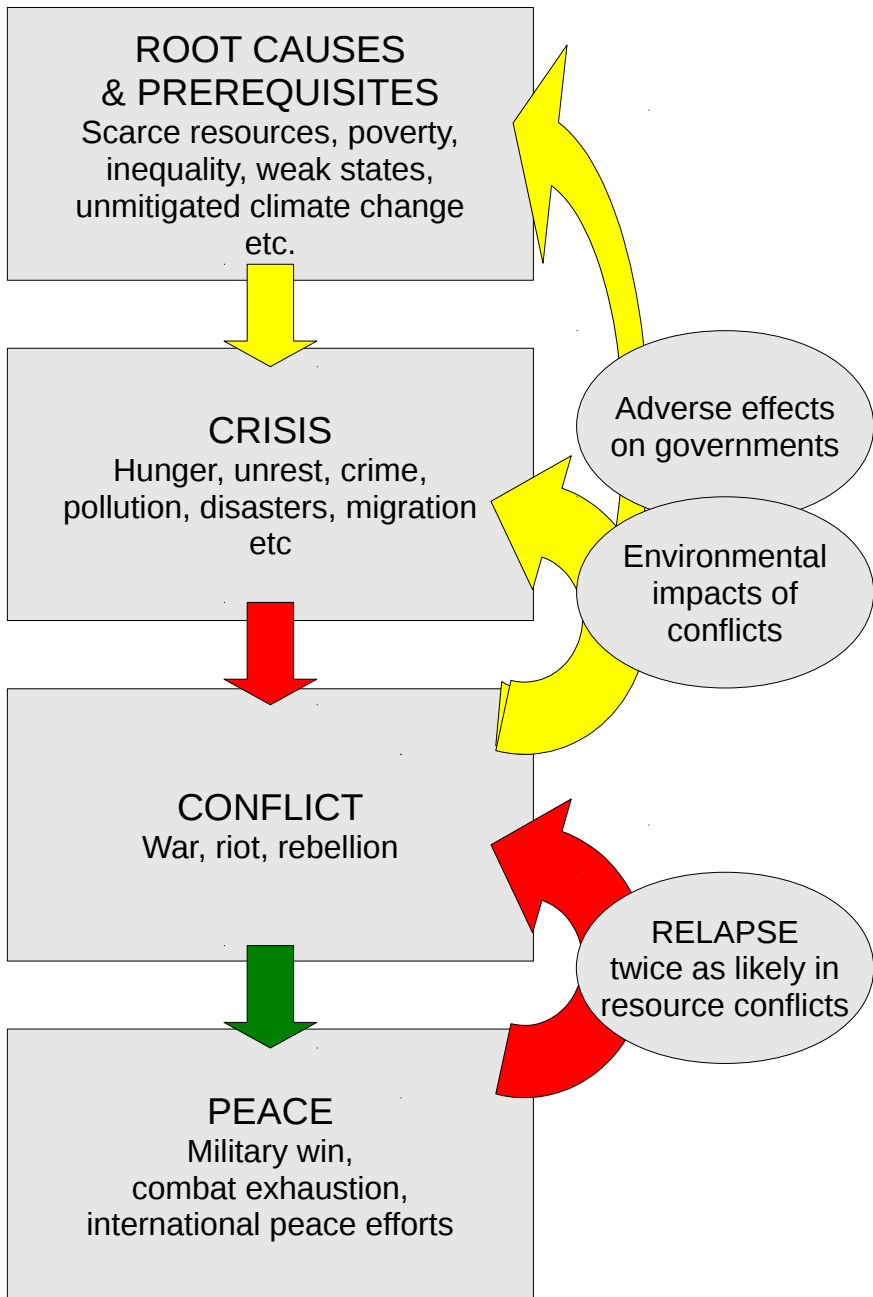
“If the government does not reinvest revenues into public works to soften the blow of economic change, domestic instability may ensue [...] The poor and disaffected youths are the most likely to turn to violence in order to redress socio-political grievances. A young, growing, and increasingly urban population indicates the potential for civil strife in Uganda. The added stress of urban migration associated with oil production may only exacerbate the dynamics behind civil strife. [...] If Museveni’s government makes its decisions public and is held accountable, it is more likely to choose anti-corruption policies that are favorable to the public interest.”

The report estimates the risk of civil war in Uganda as 1.96% if the new found resource wealth is handled wisely, 14.05% if not. Dutch Disease effects could be both mitigated and worsened by the fact

that multiple industries are likely to boom: In 2010 firms from Russia, China, India, Australia and South Africa started operating in Uganda after finds of copper, iron ore, cobalt, tin, gold and platinum.

“We must be Africa’s Norway. We must manage our oil resources in the stellar manner in which Botswana has managed its wealth from diamonds.”

- Bank of Uganda Governor, Emmanuel Mutebile



Drawing 1: Causation flowchart.

The physics: Energy budget of resource exploitation

Only one productive process is taking place on Earth: photosynthesis. Everything else depends on breaking down the products and by-products of photosynthesis. And photosynthesis depends on water, sunlight for providing the energy needed and carbon dioxide for the basic building block of life. Everything else depends on breaking down the sugars and breathing the oxygen produced from photosynthesis.

Early generations of humans as well as our cousin apes depended entirely upon what photosynthetic products they could find in their immediate surroundings. The invention of farming changed that completely – for the reasons described in the earlier historical chapter and because production of edible photosynthetic products was vastly increased. First, wild plant species were bred to crop species; progressively more advances were made: irrigation, crop rotation, husbandry and more. The tolerance of ecological ups and downs was raised in human populations and it would take more environmental stresses for them to be driven to fights.

Probably one of the next significant inventions in respect to productivity was slavery. And, unfortunately, in a historical perspective one only recently abandoned. When abolition of slavery was discussed, industrial interests strongly opposed, arguing Western economy and perhaps civilization would simply collapse.

Fertilizer could be produced chemically when Fritz Haber invented nitrogen fixation and natural deposits would not have to be fought over any more. Since then it has only contributed to the demand for fossil fuel as the process is energy intensive. Curiously, Haber also eagerly developed chemical weapons for the German army to use in the 1st World War - which drove his wife to commit suicide and

earned him protests when later he was awarded the Nobel Prize.

In many ways slavery was replaced by fossil fuels. It is somewhat interesting to see how the arguments against reforming dependence on fossil fuels today are strikingly similar to the arguments against ending slavery just one or two centuries earlier. And the proponents of unlimited use of oil and gas are right that just like previous advances in society's energy budget and resource exploitation this one has been a revolutionary change upon which our entire modern world is shaped.

Advances in battery technology, solar cell technology, genetic modifications to produce bacterial oil and similar likely and/or inevitable near future inventions will probably revolutionize our world just like crop breeding, fertilizer and oil did. But how will the transition be? And will near future solutions turn into distant future battlefields? Will we learn from mistakes of our past? The following will not predict the future – but it will crudely attempt to eliminate the most obviously impossible and hint at least unlikely scenarios.

Interlude D: 12th of December 2002, The White House

George Walker Bush, President of the United States of America, was eager to hear what the CIA Director, George Tenet, could present on the status on Iraqi weapons of mass destruction at this staff meeting. Possible anthrax and mustard gas reserves didn't satisfy him so he pressed on for intelligence on nuclear capabilities. Tenet granted him that perhaps Saddam Hussein would be able to construct nukes in five to seven years; then continued talking about possible biological and chemical weapons but disappointed his audience by finishing: *"but we can't prove intent"*.

"Until he launches," Vice President Dick Cheney joked ironically.

"Their military is deteriorated, infrastructure is shattered..."

Secretary of State Colin Powell raised his deep voice, now tired of speculation and already seeing where this conversation was going.

"Why is British Intelligence telling us now that this guy is trying to buy up a few hundred tons of yellow cake from Niger?," Cheney countered.

"We still have no backup on that," Powell stated patiently and then Tenet backed him up.

But Cheney continued: *"Well, we know this: That Saddam is talking to Zarqawi, who is talking to al Qaeda and Atta met Saddam's intel chief in Czechoslovakia. There is no doubt that they're linked."*

Powell and Cheney only had time for a brief exchange of doubts and confidence in this conspiracy theory before President Bush asked the Secretary of Defense, Donald Rumsfeld, for his opinion. He began: *"Sir, the absence of evidence is not the evidence of absence. Just because you do not have evidence that something does exist does not mean you have..."*

“Can your intel say where these WMDs are?” President Bush interrupted him, irritated by such philosophical observations and wanting to get to the point.

Rumsfeld produced a blurry satellite image of Iraq with some red markings on it: *“Well, my people think they've found something in the area around Tikrit. But we also have leads around Baghdad. And to the areas east, west, south, and north somewhat.”*

Acknowledging that the WMDs had not been proven to exist Bush summed up: *“We know this guy Saddam's hiding stuff. We know the U.N.'s one big international mosh pit.”* Then, thinking of his main problem – convincing the public: *“We got a lot of maybes, probablys and buts from Brother George which John Q. Public ain't gonna buy.”*

The CIA boss quickly suggested perhaps future intelligence would yield better evidence of Iraqi nukes and insisted the present intelligence on biological and chemical weapons were good enough. Then Powell, the military man in the room, again suggested that U.N. protocol and standard democratic procedure should be followed. This time it was Rumsfeld who lost his patience with Powell: *“I think we're all adults in this room and we recognize that 9/11, no matter how horrific it was, and it was, was also an opportunity this time for us to get it right. Drain the swamp. Sweep up all the bad guys in one big move. Things related and not. Otherwise, sir, they will be back.”*

“I thought we just did that in Afghanistan. We keep the focus on sweeping up Bin Laden,” Powell asked.

Horried Rumsfeld objected: *“You want to call Afghanistan a war, Colin. You know there were no real targets to bomb there. It was an exercise.”*

From his seat on a chair by the wall Senior Advisor to President Bush, Karl Christian Rove, chipped in: *“In any case if we don't act, all of us will be out of here in 2004. And that's the bottom*

line.”

Colin Powell turned in his chair to stare directly and intensely at the spin doctor: *“So this is all about politics, Karl? I'm confused as to what you're doing in this room.”*

Bush quieted his adviser but got up to go and sit beside him. Powell continued asking the hard questions. Why now? Why Iraq? Why not take out al Qaeda and bin Laden in Afghanistan? Why not protect America to avoid future terrorist attacks? No-one in the room were impressed.

Tired of diplomacy and wanting to get to *his* point, Vice President Dick Cheney got up and changed the presentation on the monitor to a world map: *“You wanna know what I see, Mr. President? I see a world where in about 25 years America's reserves are gone. Done. Demand is up 30, 40 percent. And we have two oceans blocking us from the world reserves. You think we're gonna have allies then? We're at 5 percent of the world's population. We use 25 percent of its energy. You think Russia and China are gonna help us out when they need those resources themselves? Eighty percent of the world's future energy reserves are right here in Eurasia, where the prize ultimately lies. Oil, gas, water. Iraq alone, 10 percent of the world's reserves 60 of 80 oil fields are still undeveloped.”*

“And probably another 100 billion gallons in their western desert. They are floating in a sea of oil,” Deputy Secretary of Defense Paul Wolfowitz added.

“We have bases in more than 120 countries all over the world,” Cheney continued, *“If we include Iraq, look what happens. We are at the fertile choke point of civilization. The Tigris-Euphrates, the biblical cradle. We drain this swamp, like Don says. We rebuild it. We develop its resources to the maximum.”*

“So, what is our real exit strategy on Iraq, Dick?,” Colin Powell offered his military concern rhetorically.

Cheney let that one linger for a second before he revealed it:

“There is no exit. We stay.”

“Spoken like a true oilman,” Powell resigned.

Cheney just continued: *“Where do you see a lack of American presence? Right in the heart of it all. What's missing? Iran. The mother lode. Third largest oil reserve in the world. Forty percent of the world's oil goes right through here, the Strait of Hormuz. Control Iran, control Eurasia, control the world. Empire. Real empire. Nobody will fuck with us again.”*

“You scare people when you talk like that,” Bush the politician objected, *“The working Joe's not thinking about oil. We're talking 9/11 terrorists... WMDs. We're talking freedom and democracy. We're talking Axis of Evil.”* He went to reclaim the seat at the head of the table and started an attempt to conclude like a statesman: *“Now, I'm not gonna negotiate with myself. I'm a gut player, always have been. And I am just so bone-tired of this Saddam. He's always misunderestimated me. I don't want our soldiers invading in that desert heat. We have got to get this war going before summer, Rummy.”*

Powell attempted a last protest: *“For the record, this is against the spirit of the U.N. Resolution.”*

“Good. All right, gentlemen, it's a great meeting. Best yet,” the president cut through. He winked at Karl Rove and folded his hands for prayer: *“Let's close this out.”*

5. Looking ahead: dystopian ecowar or utopian ecopeace?

“Lack of respect [for Earth] extends even to earth's human descendants, the future generations who will inherit a vastly degraded planet if world peace does not become a reality, and destruction of the natural environment continues at the present rate. [...] Global communication is possible, yet confrontations take place more often than meaningful dialogues for peace.”

- The Tibetan Dalai Lama on his Facebook page, March 2010.

Not only are non-renewable resources running out and some renewable resources being used faster than they can regenerate. Demand is at the same time rising due to population growth as well as increasing consumption per capita. This chapter describes those factors and resources thought to be most relevant in shaping our future energy and resource security.

Jared Diamond identifies five factors typically causing societal collapse (climate change, hostile neighbors, collapse of essential trading partners, environmental problems and failure to adapt to environmental issues) and twelve environmental problems facing mankind today. The first eight of which have historically contributed to the collapse of past societies:

1. Deforestation and habitat destruction
2. Soil problems (erosion, salinization, and soil fertility losses)
3. Water management problems
4. Overhunting
5. Overfishing
6. Effects of introduced species on native species

7. Overpopulation
8. Increased per-capita impact of people

Further, he says four new factors may contribute to the weakening and collapse of present and future societies:

1. Anthropogenic climate change
2. Buildup of toxins in the environment
3. Energy shortages
4. Full human utilization of the Earth's photosynthetic capacity

Jared Diamond isn't claiming that environmental issues are the root causes of all collapses of societies – indeed he states that “*military or economic factors alone may suffice*”. As we have seen, however, environmental and military causes provide a devious combination.

Fossil fuels

“War for oil” has been a concept already denied by some while criticized by others. In Le Billon's 2001 clinical dissection of resource related conflicts both the Iraq vs Iran and the Iraq vs Kuwait conflicts are put in the *coup d'etat* (proximate/point) category and are tagged “oil”. Since then military campaigns have come curiously close to pipelines across Asia as well as the Middle East and the importance and influence of oil derived products has become increasingly clear to people. The mostly non-violent uprisings across the Middle East in early 2011 sent shock waves around the world: Oil prices jumped everywhere, stock values dived in many places, renewable energy advocates were inspired to speak up again and even The Economist magazine published an issue with the headline “Blood and oil” advertising an analysis of Muammar Gaddafi's trouble clinging to power in Libya.

Considering war as an extension of diplomacy it is worth noting the

extensive negotiations taking place in the yearly UNFCCC (United Nations climate change network) conference. An extension to or replacement of the Kyoto Protocol is being sought: Oil producing countries ally with a set of countries that are rich and geographically relatively safe against poor, vulnerable, oil buying, alternative energy producing and/or environmentally inclined countries. Obviously, many countries defy this simplified lineup and negotiations progress slowly or not at all.

These diplomatic, military and revolutionary conflicts are not going to go away by themselves. But exactly how the future will unfold as power balances shift from changing resource prices and availabilities is very hard to guess – especially since the world is getting more and more globalized, squeezed smaller and smaller by the advances in communication technologies. Most importantly, although currently omnipresent in any security consideration, oil will not determine events alone. Its influence is locked with competing energy sources and other essential resources.

One example of just how unprepared and counter productive we are for a resource scarce future of runaway climate change is the widespread use of bottled water. Distribution by plastic bottles is an extremely energy consuming and polluting business. US Americans spend 1.5 million barrels of crude oil every year producing plastic water bottles of which only one in four is recycled. The remainder is fueling an escalating global plastic pollution issue as well as infusing phthalates and other toxic chemicals into our ecosystem. Water is the subject of the next chapter; fossil fuels are further discussed in the climate change chapter.

Water

Industrialization has led to increased water consumption. Freshwater demand is climbing at twice the rate world population growth. 70% of our supply is taken by industrialized agriculture –

and agriculture is increasingly industrialized. In some places, like the Middle East, an approach to water shortages is construction of desalination plants - consuming vast amounts of energy thus in themselves contributing to the build-up of green house gasses. Lack of water is not just a theoretical influence on the ecosystem as a whole with hypothetical trickle down effects further down the cause and effect models. It isn't a luxury item to be grudgingly missed either. It is a very basic resource. People who run out of water thirst and die.

Situations of water scarcity arise from a complex of factors including increasing demand from a growing population, a growing consumption of water demanding foodstuffs such as meat and luxury fruits, mismanagement of resources due to poverty and inadequate administration, depletion of non-renewable deposits, over-use of renewable sources, increasing evaporation due to global warming and locally decreasing precipitation due to a changing climate. All of these problems are intensifying.

“In many ways [water] is the most dramatic expression of mismanagement of natural or nature-based assets [...] The day a person or a community is bereft of water is the day that your chance of even the most basic life or livelihood is gone and economic activity seeps away. Unchecked climate change will mean that some parts of the world will simply not have enough water to sustain settlements both small and large, because agriculture becomes untenable and industries relying on water can no longer compete or function effectively. This will trigger structural changes in economies right through to the displacement of people as environmental refugees. [...] In rich countries, there's always the potential of channeling water from one river basin to another. But even there people are hitting the limits of what we can do with money and infrastructure because there simply isn't enough water any more.”

- Achim Steiner, executive director of UNEP

The historical chapter provided various examples of “water wars”. In the theoretical chapter it was stated that in the past water conflicts have mostly led to cooperation, not war. But will this peaceful trend be possible to sustain? Demand is very likely to go up, supply very likely to go down. Leading to cooperation or conflict. A government that cannot secure safe water supplies for its population is a government losing legitimacy and control. Where severe drought coincides with otherwise weakened political stability, “failed states” will continue to be the result.

In 2008 the European Union evaluated the threats from climate change and central to their conclusions were the issues around water supplies:

“Climate change will alter rainfall patterns and further reduce available freshwater by as much as 20 to 30% in certain regions. A drop in agricultural productivity will lead to, or worsen, food-insecurity in least developed countries and an unsustainable increase in food prices across the board. Water shortage in particular has the potential to cause civil unrest [...] The overall effect is that climate change will fuel existing conflicts over depleting resources, especially where access to those resources is politicised.”

- “The Solana Report” by the European Union, 2008.

One region where water scarcity is already felt and is also likely to worsen is the Middle East. The population there is projected to grow by about 55% during the next 15 years bulging to about 568 million people by 2025. A population increase bound to further stress the shrinking natural water resources. And by the end of the century climate change will diminish precipitation by about 25% with a matching increase in evaporation rates.

Strong cases for protection of water resources are being made. The late Wangari Maathai, Kenyan Nobel Peace Laureate, called for action on climate change and resource degradation while directly linking these issues to local conflicts:

"Protecting forests is extremely important [...] also very important for conflict [...] many of the local conflicts that we were having, especially in East Africa, [...] were being fed by competition over resources. Especially over land, [...], farming land, water, watering points [...] And many of these conflicts are unavoidable unless we learn to manage the resources in a responsible way, in an accountable way and also we learn to share these resources in a more equitable way. Now, these are words, but when you translate them into practicalities on the ground it is actually [...] possible to stop people fighting. If there is no water and there is only one watering point people will fight over that watering point. If the rivers stop flowing [...] people will fight. And usually when people fight, that's when [the developed, rich world hear about the developing, 3rd world and begin to wonder] 'why are they fighting?'. Well they are fighting over resources because either those resources are degraded, they are diminished or they are exhausted or they are not being shared equitably."

- Wangari Maathai, speech at Copenhagen University on July 6th, 2011.

Solutions will include better water management, increased efficiency of water use, new investments by governments, organizations, businesses and communities and many other technological and financial initiatives. Management of water supplies will no longer be the simple chore of borehole engineers and plumbers only; it will include ecologists, sociologists, climatologists, farmers, politicians and almost everyone else.

While the issues of climbing oil prices and impending water scarcity may seem fixable when seen in isolation, their dual curse is obviously more troubling. And there are more issues not to be left out of the equation; only the most obvious of which are discussed in the following chapters.

Nuclear power and uranium

When discussing peak oil and climate change one topic is often brought up like a rabbit out of a magician's hat: nuclear power. On one hand it is true that the nuclear power plants themselves do not emit carbon dioxide like coal power plants do. On the other hand proponents of this type of energy usually omit mention of the facts that nuclear power is based on a finite resource – uranium – requiring mining, transportation and storage. Processes all of which add considerable risks, costs and carbon dioxide emissions.

Today, production is concentrated in few countries and about 60% of the world's uranium comes from the top ten productive mines. Three countries supply about two thirds: 27% is mined in Kazakhstan, 20% in Canada and 16% in Australia. Namibia (9%) and Niger (6%) add considerable third world sources while the powerful nations Russia (7%), USA (3%) and China (about 1.5%) maintain some production too. These are figures from 2009 that totaled to about 51,000 tonnes – which despite having grown from less than 36,000 in 2003 only amounts to about 76% of the world demand. The remainder is taken from decommissioned Cold War nuclear warheads.

While supply is still behind, demand is rising: 436 nuclear power reactors run today and experts estimate demand for about 100 more to be build within the coming decade. Since only a finite amount of uranium is present on Earth, sooner or later it will run out; based on current consumption rates and given known ore resources about a century's worth of nuclear power plant fuel is available. The lowest hanging fruits have been picked first and the last deposits will be increasingly expensive to extract adding to the cost of generating electricity by nuclear power.

Peak everything

Industrialization as we have known it has led to global warming

which in turn aggravates our water issues. Industries have been wasteful as long as resources have been abundant. Careless consumption has led to unimagined problems and only deep need has at times made societies reconsider their ways.

Peak oil and increasingly scarce fresh water is discussed occasionally by media and NGOs. Resources that may not be rare yet but the availability of which are otherwise influenced by political or geographical factors have only recently surfaced in the public awareness. Such as when China in 2010 ceased all exports of “rare earth metals”. But, of course, many materials commonly used today will run out eventually assuming consumption continues unchanged. A 2007 estimate of how long some common resources will last raised eyebrows – not just because of some worryingly low estimates but also because of the very low estimates when calculated from a world consumption rate at about half that of the US. If everyone lived like a North American the world would literally soon – or already – be gone.

Platinum, for example, we were estimated to have a safe 360 years of use left. Except if everyone starts consuming it like in the US – then there is only about 42 years left. With indium the same figures are 13 and four years respectively. For tantalum they are 116 and 20 years. Why would the world start consuming at US rates? Because platinum is used in fuel cells and catalysts, tantalum is in cell phones and camera lenses while indium is used in LCD screens. All products that are used increasingly world wide.

Similar numbers could be listed for many other resources. But of course miners are looking for new reserves, suppliers are racing to increase production efficiency and producers are always looking out for alternative materials for their end products – efforts increasingly worth the effort due to climbing prices. Indium, for example, cost 60 USD per kilogram in 2003, 1000 USD per kilogram in 2006.

Climate change

“[...] the expected cost of climate change-induced ecomigration and conflict will likely rise quickly [...]”

- Reuveny.

We are only just beginning to see signs of possibly climate change influenced conflict situations. The near-future, the next couple of decades, will likely see more of the same, gradually increasing. And the near-future climate will develop irrespective of political decisions of today as the positive effects of our efforts will take a long time to manifest.

Jeffrey Mazo divides the climate change security threats in three categories:

1. Resource wars (not expected to be a major factor in the next three decades),
2. State instability (already happening and likely to increase) and
3. Boundary disputes (unprecedented and probably only relevant in case of long term high sea level rise).

Can climate change cause migration and large scale conflict in the future? Reuveny concluded it can. The evidence of impact scale is worrying already; history is there to suggest it will repeat itself. For starters, even the relatively insulated West will experience direct effects: For example, one extrapolation predicts the rise in temperature to increase the death rate for US American men by 1.7% and for women by 0.4%. A subtle change – but none the less one with its influence on society as a whole. Still abstract but probably more deadly: The link between temperature and conflict in sub-Saharan Africa is projecting an increase in conflict from 11% to 16.9% of countries in a given year by 2030.

If sea levels rise by just 1 meter more, 260 million people will be exposed to flooding. Most of these would be Asians but at least

some 14 million Europeans as well. These people will have to move somewhere or build many large dikes. Imagine something like 130 Katrinas but with permanent land loss and in countries less able to cope with the situation. Bitterly ironic since climate change is largely caused by rich, developed countries.

“The impact of climate change will make the poorest communities across the world poorer. Many of them are already affected by conflict and instability and thus face a dual risk. International Alert’s new research finds that the consequences of climate change will fuel violent conflict, which itself hinders the ability of governments and local communities to adapt to the pressures of climate change. We’ve identified 46 countries at risk of violent conflict and a further 56 facing a high risk of instability as a result of climate change.”

- International Alert report, 2009.

Australia expects increased illegal migration and fishing as Pacific islands succumb to rising sea levels and climate change impacts fishing grounds.

“Environmental stress, caused by both climate change and a range of other factors, will act as a threat multiplier in fragile states around the world, increasing the chances of state failure. [...] Climate change is unlikely to increase the risk of major conflict [...] From a defence planning perspective, we don’t know how quickly these changes will occur, exactly what their impact will be, or how states and societies will react [...] Nevertheless, climate change may affect security by increasing stress on fragile states, state and societal competition for resources, environmental threats to ADF infrastructure and increasing the frequency and severity of extreme weather events.”

- Australian Defense Force report, January 2007.

In the globalized world of today large scale crisis like climate

change will affect people around the globe. Few will be able to insulate themselves. This world wide instability trend has been noted by high-ranking security personnel everywhere; as they adjust their battle plans they warn the public.

“Climate change will have a significant impact on our overall security environment both in the south and in the north.”

- Anders Fogh Rasmussen, Secretary General of the The North Atlantic Treaty Organisation (NATO) on his own YouTube channel.

“[Climate change] will place an avoidable and unacceptable burden on our young men and women in uniform now, and in generations to come.”

- retired US Vice Admiral Dennis McGinn.

“Climate change could have significant geopolitical impacts around the world, contributing to poverty, environmental degradation, and further weakening of fragile governments. Climate change will contribute to food and water scarcity, will increase the spread of disease, and may spur or exacerbate mass migration. While climate change alone does not cause conflict, it may act as an accelerant of instability or conflict, placing a burden to respond on civilian institutions and militaries around the world. In addition, extreme weather events may lead to increased demands for defense support to civil authorities for humanitarian assistance or disaster response both within the United States and overseas. Energy efficiency can serve as a force multiplier, because it increases the range and endurance of forces in the field and can reduce the number of combat forces diverted to protect energy supply lines, which are vulnerable to both asymmetric and conventional attacks and disruptions.”

- US Department of Defense's Quadrennial Defense

Review 2010.

“The change wrought by a warming planet will lead to new conflicts over refugees and resources; new suffering from drought and famine; catastrophic natural disasters; and the degradation of land across the globe.”

- The US National Security Strategy 2010 by the Obama administration.

Catalogues of initiatives for alleviation or solution have been proposed. Based on experience from the past, adaptation to climate change needs to be conflict-sensitive, peacebuilding needs to be climate-proof, a low-carbon economy must be supportive of development and peace, poor countries' social capacity to understand and manage climate and conflict risks must be strengthened and climate-related migration should be planned for and coped with peacefully.

Perhaps climate change will just nudge geopolitical development in – mostly unfortunate – directions, not revolutionize the history of environmental impacts to solely cause warfare. But consider that already troubled nations will experience the effects of climate change while being in difficult positions of response: North Korea can expect more drought and some floods which could drive them into absolute desperation; Afghanistan, Pakistan, Iran and Iraq should expect more droughts; Myanmar refuse to cooperate even on tsunami alert networks; and Israel and the Palestinian Territories face droughts like the rest of their neighboring countries while already having water disputes entrenched in their fights and discussions. Nudges could tip balances.

On July 20th, 2011 the UN Security Council (UNSC) agreed upon a statement linking climate change to conflict:

“The Security Council expresses its concern that possible adverse effects of climate change may, in the long run, aggravate certain existing threats to international peace

and security. [...] The Security Council expresses its concern that possible security implications of loss of territory of some States caused by sea-level-rise may arise, in particular in small low-lying island states.”

The statement faced opposition from some countries, Russia, India and China among others, and required amendments to pass the vote. The supporters of the initiative, including the UNEP, the US and the small island states had to put forth all evidence and insist.

“[Climate change] is a threat as great as nuclear proliferation or terrorism... neither have ever led to the disappearance of an entire nation, though that is what we are confronted with today... I often wonder where we would be if the roles were reversed. What if the pollution coming from our island nations was threatening the very existence of the major emitters?”

- Marcus Stephen, President of Nauru, July 20th, 2011 at UNSC meeting

“The military runs scenarios of what the future will bring. What they see is not so much an increase in conventional warfare between states as an increase in humanitarian crisis, civil war, banditry, religious wars, state breakdown. And they realize that the armed forces will be called on to respond with various forms of low-intensity conflict: counter-insurgency, direct intervention, humanitarian intervention, shoring-up allied states, as well as increased training and advisory roles in these conflicts.”

- Christian Parenti, sociologist and author

Predictions

Climate change literature often encompasses many other issues. It is impossible to discuss the subject without mention of fossil fuels. It is hard to qualify the severity of the topic without discussing

droughts, floods, food security and similar issues. To even begin addressing possible solutions alternative energy sources must be evaluated. Thus, it is perhaps not surprising that a book about climate change contains the most lengthy and detailed look at possible future incidents and development.

In his book *Climate Wars*, Gwynne Dyer details four scenarios of future climate change induced conflict. The future scenarios are not predictions. They are rather not-unlikely cases told with some necessary filling from the writer's own imagination and experience. The longer into the future one tries to imagine, the more uncertainty is in play – but the first scenarios are quite imaginable. Although summed up in chronology below they are not necessarily interlinked while also not mutually exclusive.

The scenarios are combined with similarly chronological notes of notable scarce minerals, their use and which countries have the largest deposits of them. Similarly ordered according to approximate depletion or severe scarcity estimates, the value and costs of their use, extraction, recycling and possible alternatives will increase leading up to these estimated years. The power of countries holding a scarce resource is likely to increase like the value of the resource itself – as can the susceptibility to the Dutch Disease (resource curse).

First, incident scenarios:

1. Russia 2019: The Colder War. The oil and gas revealed beneath the melting North Pole and the new trade routes opening between fewer and fewer icebergs does not lead to war between Russia and the USA. Of course. But it does lead to a lot of discussions on interpreting traditions for drawing sea borders as well as incidents of alleged violations of said disputed borders. Not just regarding drilling but also with incidents of detained fishermen. After years of non-violent conflict - during which the negotiations under UNFCCC has suffered greatly - Russia comes out

much stronger: Its northern shores have benefited most from new sea routes due to their head start with a strong fleet of sea ice capable ships and well settled infrastructure, they have strong claims for some of the new resources and it's all coupled with some positive climatic impacts on the nation's agriculture.

- Indium 2020: Used for LCDs (modern monitors and high tech screens). 22% of current reserves located in China.
2. United States 2029: The US-Mexican border is finally sealed off forcefully and completely after surges of refugee influx caused by runaway desertification in a country whose farmers are already struggling financially. The United States of Mexico collapses and several northern regions are effectively ruled by warlords. Inside the USA a strong ethnic group of Mexican heritage is increasingly in opposition to the rest of the country.
 - Silver 2036: Used for jewelry and catalytic converters.
 3. Northern India 2036: India and Pakistan have shared glacier fed rivers for their water supply for decades although otherwise having a periodically hostile relationship. Droughts worsened by climate change, growing populations and increasing consumption have tempted governments to blame the hardships of their peoples on externalities - the neighbours - and forced Pakistan to ration food. After years of fragile peace a military coup and an attack on a dam escalates into an exchange of nuclear warheads. The result is hundreds of millions of casualties and two devastated countries still ruled by the same governments.
 - Antimony 2037: Used in drugs. 62% of current reserves located in China.

4. China 2042: During the 2030s two kinds of terrorist groups are added to the ones previously known to be desperate enough: some from disgruntled oil exporting countries experiencing unforeseen financial losses and some from within the West made up of "leftists" furious at their governments for doing much too little of what they have been asking for (renewable energy etc.) while stepping up efforts on what they have been arguing against (geo-engineering, nuclear power etc.). The former cannot attack inside the West and instead aim at those of their neighboring countries who have begun exporting, for example, sunlight generated power. The latter accomplishes some minor attacks on airlines and even a more serious one on a nuclear power plant. While the world heats and the people of the West become increasingly divided over geo-engineering suddenly China and Indonesia acts without anyone's agreement. The Earth is dimmed by "artificial volcanic sulfur" being released into the atmosphere. Unfortunately, shortly after the project has begun working a real mega-size volcanic eruption triples the effect. The following years harvests fail world wide: hundreds of million of people die from starvation and almost as many from the armed conflicts, local genocides and mass-migration it incites.
5. The Year 2045: The EU has collapsed and the Northern Union of Scandinavia, Poland, Germany, Benelux and France is fending off hordes of immigrants while the north of Italy has separated itself from the south of Italy. Russia is enjoying relative prosperity due to positive effects on its agriculture but is also facing some trouble over disputed Siberian territories eyed by a re-united China. Britain and Japan is guarding their shores fiercely while stacking nuclear arms. Temperatures are up and still rising.
 - Tin 2047: Used in cans and solder. 31% of current

reserves located in China, 22% in Brazil.

- Lead 2049: Used in lead pipes and batteries. 25% of current reserves located in China, 19% in Australia.
- Gold 2052: Used in jewelry and dental care. 40% of current reserves located in South Africa.
- Zinc 2053: Used for galvanization. 20% of current reserves located in USA, 20% in China and 17% in Australia.

6. United States and United Kingdom 2055: The American people never learned to understand the problem of climate change. Peak oil hits hard and the globalized food trade largely collapses: “in this new and unforgiving world, self-sufficiency was the sole basis for security” [p. 182]. Gulf Coast states are devastated by hurricanes and floods, California's agriculture collapses from perpetual drought. A third party - called “The Goddies” - gains major political influence and the borders are shut tight. Similarly in Europe, the northern countries are getting overrun by people leaving the southern EU states. European Union collaboration starts to strain as food aid is sent south and northern borders tighten despite treaties. Increasingly, the border patrols sealing off Africa and the Middle East is made up of soldiers from northern Europe but eventually these countries decide to pull back and guard only their own territories.

- Uranium 2066: Essential for nuclear power. 23% of current reserves located in Australia, 16% in Kazakhstan. See Nuclear power and uranium page 104.
- Copper 2068: Used for wire, plumbing and coins. 38% of current reserves located in Chile.

- Nickel 2007: Used in batteries and turbine blades. 19% of current reserves located in Australia.

Dyer also describes two multi-year scenarios:

7. A Happy Tale: Sincere and determined action is taken to combat climate change - but humanity is convinced to action only after combinations of conversely harsh shocks from peak oil causing price leaps, a series of brutal natural disasters around the world and a Bangladesh threat of a radical geoengineering initiative on their own if the rest of the world does not cooperate. Global diplomacy works - but too late and too little. A green society keen on geoengineering is created but only some are fortunate enough to survive with it.
8. Wipeout: 150-200 years into the future the average temperature has climbed by about 9 degrees from failure to curb climate change. Two groups of civilized settlements survive along the Arctic shores and small, more primitive societies here and there where conditions allow. Inland territories on continents suffer complete desertification. Increasingly, the oceans start to smell like rotten eggs. A process is sparked in which hydrogen sulfide is being released to deteriorate the quality of air for all breathing forms of life while also breaking down the ozone layer. Which in turn will help scorch the remaining life in ultraviolet radiation. Only the harshest and luckiest life forms will make it to the other side of the “greenhouse extinction” event. A phenomenon that was known to paleontologists, not climatologists. The progress of which no human will live to experience, only few will recognize as it starts.

If the above scenarios seem a bit dystopic it is worth noting that *Climate Conflict* by Jeffrey Mazo, a strictly scholarly book on the same subject, reports of broad consensus among researchers that

the security implications beyond 40 years into the future might indeed be dramatic:

“Without early and severe reductions in emissions, the effects of climate change in the second half of the twenty-first century are likely to be catastrophic for the stability and security of countries in the developing world [...] many informed observers believe that unmitigated climate change beyond the end of the century could pose an existential threat to civilization.”

- Mazo, 2010; p. 120.

It is a peculiar project to argue in warnings of future trends when these already appear to be unfolding. Climate change diplomacy, drought and migration infused conflicts, extraction rights border talks and many other small scale resource conflicts could all add up to future large scale conflicts or even wars. Cultural trends (for example “islamism”) exist too and will no doubt intermingle to either worsen or lessen resource conflicts. Such and other more hypothetical issues will be addressed in the following and final chapter.

Interlude E: A couple of months ago on a drought stricken East African savannah

Samuel was a slim and tall Samburu warrior that lived in the north of Kenya, where he herded some twenty camels and numerous goats. He was wealthy and for Kenyan standards led a fulfilling life until the droughts struck the nation.

Trading meat and milk for cereals and household materials, Samuel had put a little cash aside and had read second hand school books as his herds grazed peacefully on the grasslands. Although he had only attended a school for a few years in his childhood, he had been picking up on both math and writing.

But beginning a few years ago droughts had forced him to slaughter a few more animals than planned and sell the meat below the prices he had hoped for. Expecting a change of luck with the weather instead the droughts had continued and worsened. Most of the animals that he had not had to eat himself had disappeared or died.

Finally, he had went to the village where his cousin, Moses, lived. Only to find the village near emptied; a sister to his cousin's wife living in Moses' hut.

“Moses have gone to do business,” she said. Clearly she didn't know exactly what Moses was doing. *“I can milk your goats for you,”* she had offered and Samuel saw the hunger in her eyes.

Samuel searched the village for people he knew or who knew of Moses. He found some cardboard boxes which he tore apart in little pieces – the surviving goats would live on those for some time. Since no-one was looking he even ate a piece himself.

“Jambo,” someone sitting in the shade of a hut said. Samuel hadn't seen him; a dazed young man like himself leaning against the mud wall. He went to present himself; the villagers name was Lucky.

After the pleasantries which were genuine and heartfelt given the circumstances the young man produced a mobile phone from a pocket in his shredded, dusty garment. *"You can send Moses a text message on my phone,"* he offered, but seeing the helpless expression on Samuel's face, he continued: *"I'll send Moses a message, tell him of your arrival"*.

Not knowing what to say, Samuel began explaining about his plans to expand his herd and learn more about math and economy. But he trailed off. *"Your herd,"* the sad stranger said, *"my field"*. He lifted his arm to gesture at the empty, sandy enclosure starting just a few meters away from his hut. A few dry corn stalks still protested the drought. They sat in silence for a while.

Beep-beep, a noise came from the mobile phone. Slowly and with a sigh of hope and preparedness for disappointment its owner picked it up to read from it. *"Come to the city. Bring your goats and camels to sell. Have a job for you with a coast patrol,"* Lucky read. *"You're lucky,"* he said tonelessly.

"I'm a herder! I can't sell my last goats! Tell Moses that," Samuel protested. *"Ask him why he isn't working on his farm? With my goats and his farm we can make it work!"*

"I'll ask him why you have to sell the goats," Lucky offered.

Beep-beep, again. *"We need as much cash as possible for buying a gun for you. The rest we will pay with what we earn from the first rich ships we toll. Then we will buy our own boat and after that we'll be rich. Hurry up, I'm waiting for you!"*

6. Contemplation: Conclusions and afterthoughts

The man quoted in the introduction for the link between natural resources and wars (see page 6) was arguing that basically when he was growing his own potatoes he was in his own small way promoting world peace. I am beginning to see his point.

He's feeding himself and his family without polluting the environment with pesticides, without importing precious phosphorus fertilizer and without the huge carbon-footprint of nitrogen fertilizers. Future generations and neighbors are not getting poisoned, no third world countries will have to be exploited for minerals and energy sources and if world food market financial bubbles burst at least he will still be eating potatoes. Perhaps if international efforts would likewise shift its focus from oxymoronic foreign policies like “bombing for peace” to pro-actively working on peaceful projects to create crisis resilient societies a relatively happy future is not impossible at all?

It appears no major modern financial theory can do without growth of the economy. Growth of the economy as we know it is almost always tied to growth of resource exploitation, growth of pollution, population growth and other types of growth. Much of this growth is detrimental to the global environment. Economic models for securing the welfare of the people without exhausting our credit with Earth's bank of resources are most urgently needed.

Economists do discuss most of the issues mentioned in this report. But usually in rather traditional terms linked to text book capitalism. Sometimes it could look like all they do is to provide excuses: An academic explanation of the troubles of resource rich yet financially poor countries such as the Dutch Disease theory (see page 88) is perhaps a bit too convenient for the multinational corporations operating in these countries: the explanation assumes

profits in fact are directed into the local economy, which perhaps they not always are to a reasonable extent.

International law

As described earlier, the Geneva Conventions were established after the World Wars to ensure future wars did not escalate in inhuman brutality undermining future peace in the process. Mostly they address treatment of prisoners and civilians as well as what levels of violence are to be considered acceptable. Regarding natural resources they aim to halt their destruction and specifically mention agricultural assets and drinking water (see page 29). It could be argued that several of the conflicts mentioned throughout this report are in violation of Geneva Convention protocols.

In July 1998 the Rome Statute of the International Criminal Court (ICC) was adopted by the United Nations General Assembly as 120 nations voted in favor, 21 abstained from voting and only China, Iraq, Israel, Libya, Qatar, the United States and Yemen voted against. This court is currently meant to prosecute perpetrators of genocide, crimes against humanity, war crimes and crimes of aggression. It has also been suggested to enlarge its field to include terrorism (defeated due to lack of a definition), drug trafficking (defeated due to lack of resources and practical reasons), use of nuclear weapons and use of weapons of mass destruction.

Currently, a one-woman campaign is being waged by the British lawyer Polly Higgins to have a fifth type of crime added to the list prosecutable by the ICC: ecocide. By ecocide she means extensive destruction of ecosystems severely diminishing the peaceful enjoyment of a given territory by its current or future inhabitants. Let international law protect all life, not just human life; extend the interpretation of the paragraphs from governing just military actions to govern corporate and community actions as well; ban the actions that we have seen spin the vicious circle (see page 91). Similarly, formal recognition of ecomigration would make sense.

Another paragraph or not – it would help a great deal if existing laws were more highly respected and upheld forcibly. But surely, enforcing the crime of ecocide would be a significant move. It would be directed against mass disruptions of the ecosystem such as the tar sands operations in Canada where extremely large areas of forest are bared to deserts of wet gravel. But as the collective impact of human society is beginning to gain recognition as “the sixth mass extinction”, following previous extinction events such as meteor impacts and unexplainable dinosaur species disappearances, an initiative such as ecocide legislation could find both broad appliances and opposition. Perhaps it really could be a necessary attack at the roots of the problems of biodiversity losses that are undermining the foundation of nature and ecosystem services, essentially making ecosystems less sustainable and people poorer. Perhaps people have to realize the routine extinctions of today are acts of violence against Earth.

Resource control

Privatization is the preferred solution of traditional capitalist growth philosophy seemingly unaware of the fact our ecosystem is finite. Since many natural resources are essential prerequisites for life, is private ownership not inevitably a controversial subject? Will any incentive for profit really solve our issues? Unfortunately, evidence supports another conclusion. Observed consequences include transfer of wealth from local communities to US or European based multinational companies, rising prices and failure to protect publicly owned resources.

The US National Security Strategy 2010 by the Obama administration states that *“basic human rights cannot thrive in places where human beings do not have access to enough food, or clean water, or the medicine they need to survive”* (p. 39). Thinking of their own country and its needs the same report states *“dependence upon fossil fuels constrains our options and pollutes*

our environment” (p. 8) and “as long as we are dependent on fossil fuels, we need to ensure the security and free flow of global energy resources. But without significant and timely adjustments, our energy dependence will continue to undermine our security and prosperity. This will leave us vulnerable to energy supply disruptions and manipulation and to changes in the environment on an unprecedented scale.” (part III).

Both recycling and theft of increasingly rare minerals and other resources have a big future.

Reaching agreements

“All diplomacy is a continuation of war by other means.”
- Chou En-Lai

In the chapter about current conflicts and the diplomacy over Arctic resources we saw an example of peaceful cooperation (see page 40). First of all, we have already found more than enough fossil fuel reserves to cause extreme climate change. We don't need the Arctic reserves to do that. A fact so blindingly obvious since they are only becoming accessible *because* of the melting ice caps. British green pundit George Monbiot's gave a speech at Klimaforum09 (alternative COP15) in which he said:

“If governments were serious about climate change [...] they would be putting proposals here at Copenhagen this week to determine which parts of carbon reserves would be left in the ground. [...] they would also be proposing a total global moratorium on all prospecting for new reserves of coal, oil and gas.”

Secondly, the Arctic may be melting but it's still a harsh environment, difficult to operate complex deep water drilling in. In the words of one Greenpeace protestor, tied to a test drill platform:

“It is a reckless prospecting endeavor, trying to find new oil

reserves in this fragile and pristine environment.”

Even angry neighbors suing to halt windmill projects will agree that “society” should do something about climate change. But facing the prospect of making a profit we are hard pressed to find people willing to let it go in the name of environmental sustainability.

Warnings about the security risks of climate change have come from NATO and US as well as military leaders of smaller countries, academics and NGOs, and are interesting in themselves. But there is another message from the cautious minds of the armies to the haggling societies split on environmental priorities, action versus inaction cost-benefit analysis discussions and main stream nihilism versus ecocentric awareness. In questions of uncertainty with high risks associated decisions have to be made with incomplete knowledge.

“If you wait for 100% certainty on the battlefield something bad is going to happen.”

- retired US Vice Admiral Dennis McGinn.

At some point there will be no more time for Bjørn Lomborg and UNFCCC. For many environmentally inclined people this point in time is already in the past – soon it could be reached for governments around the globe.

Objections

Three main categories of arguments are typically made over the significance of resources in conflict or, more specifically, projects such as the present where incidents are listed to illustrate a point: hindsight bias blame, false narrative denial and pointless predictions complaints. Each of these are briefly discussed below in that same order.

The first is the most rational complaint; hindsight bias is a very real

danger. News events are wrapped up in little stories that makes sense to the respective audiences. Journalists and authors have to do this in order to get any readership. In blogging even more so – in fact, a lot of bloggers appear to be doing a project of confirming their own ideas. Am I any better myself as I collect stories on ecowar.blogspot.com to confirm my theory? Have I just been googling for news to confirm my own hypothesis?

In extension of the hindsight bias it is also important to acknowledge that one cannot assume a deterministic relationship between environmental factors on one hand and politics and conflict on the other. It has been mentioned elsewhere as well and deserves reiteration: geopolitical developments and wars are complex, multi-variable influenced and largely unpredictable in detail.

Second, even discussing the role of natural resources is frowned upon by many. So I have experienced myself and so I understand some of the authors whose research I have read have too. Many people may be offended that the popular narrative to reason the cause of war they themselves have been supporting is somehow questioned by formulating additional or alternative explanations. For example, religion is so often put to blame and the spread of democracy used as part of the excuse for war. To those voting and paying for wars to combat militant fundamentalists of other faiths and replace their governance with democracy (usually an equivocation for neoliberal capitalism) the mention of the influence of natural resources is an annoyance.

But there are mistaken objections from other political affiliations as well: some may think the discussion of resource conflicts is meant to absolve individuals and groups from responsibility; and some may fear the discourse is set to argue in favor of increased military spending. The dangers would be loss of international pressure on governments to cease war campaigns, loss of momentum in bringing war criminals to justice, more money spent on arms and

funds diverted from relief and development aid.

That would induce reluctance in, say, human rights and anti-war activists from joining a climate movement. To some extent a counter-productive position as quite often the military is the only institution capable of response in crisis situations. But fundamentally just faulty logic and a dangerous tendency against rationality. If natural resources influences conflicts the precise influence should be investigated.

Third, why try to do something about theoretical problems of the future? We can't see them, we can't predict them properly and we're likely to be able to do something about them later if they occur. Rich, complex societies can keep off consequences for extended periods of time. Sometimes their elites and leaders even live in isolated ignorance. Caring about human rights abuses in rare minerals mines or a future increase in hurricane frequency is a choice to people living in big, isolated, inland houses; only a pressing concern to people whose only choice is to work in such a mine or who live from season to season by subsistence farming on coastal lands.

But as Jeffrey Mazo puts it:

“Increased complexity means increased fragility, as well as more severe consequences when systems finally fail.”

- Mazo, 2010; p. 66

It may be a bit cinematic, but one need only think of the action of a zombie movie where the main characters typically huddle up in a shopping mall or on the roof of a cafeteria. Without the complex system maintaining the necessities of life a modern person is scrambling for the last cans of preserved food while the subsistence farmer is likely still a subsistence farmer.

To avoid collapse societies need to be strong and resilient to possible disaster situations. When disasters do happen, it is usually easy to point to a guilty party of failure. But all the little successes

that strengthen the system and absorb otherwise dangerous impacts are usually overlooked and rarely recognized. Money spent on safety measures or precautionary principle guided practices are often considered to have been wasted if no accident happen to illustrate how well the money was spent.

In other words: some of the morals of discussing climate change and impending resource scarcity is counter-intuitive to the existing political system. And although the future is impossible to predict exactly, without some informed ideas about how the future will most likely unfold improving society's ability to strengthen and secure itself is impossible.

Closing remarks

“I know not with what weapons World War III will be fought, but World War IV will be fought with sticks and stones.”

- Albert Einstein, 1947

Albert Einstein famously warned civilization as we know it would vanish in the face of nuclear war. Today, nuclear weapons are still a cause for concern but other issues seem more urgent.

I hope my research has shed some light on the causes for strife within human civilization. As mentioned in the introduction: When I first set out to research the connections between natural resources and conflict I was inspired by the conspiracy theory-like musings of a sustainability activist. A lot of things have changed since then!

For example, just before NATO attacked Libya in 2011 a journalist interviewed an expert on national Danish TV and one of his questions went something like (from memory): *“Libya has only 2% of the world's oil reserves, is that enough for us to intervene?”* Unfortunately I was a bit too stunned to memorize the answer.

“Our enslavement to oil has required the repression of

millions of Arab people. As they shake off their bonds, so must we."

- Naomi Klein, Canadian author, February 2011

The food price propelled anti-dictatorship "Arab Spring" did help inspire European and North American anti-inequality protests. And protesters did connect the dots between environmental degradation and financial crisis.

"Every bank which you are down here protesting finances extreme energy -- fracking, tar sands development, mountaintop removal, deep water drilling."

- Josh Fox, director of the documentary "Gasland"

"The 1% are willing to spend billions impeding democratic initiatives, which is why every so-called environmental issue is also about building a democratic culture. [...] Like so much else these days, the crash, as it happens, will not be suffered in equal measure by all of us. The one percenters will be atop the hill, while the 99% will be in the flood lands below swimming for their lives, clinging to debris, or drowning."

- Chip Ward, Occupy Wall Street blogger

I had another everyday experience to illustrate the change when I asked my bike repair shop to change a tyre. When I wrinkled an eyebrow at the price, the man explained that rubber prices had risen by 300% this year *"because of China"*.

Also, a notable far-right American "Tea Party" figure has not only admitted but openly supported the war for oil policy completely:

"Of course we should go to war for oil. We need oil. That's a good reason to go to war."

- Ann Coulter, April 2011

Perhaps and hopefully a World War III as Einstein feared it will never happen. But on the other hand, perhaps a third global conflict is already well in advance. And it's being fought with neither

nuclear bombs nor sticks and stones. It's being fought with mass media propaganda, social network counter-culture, forced evictions, mass protests, brain washed suicide bombers, extrajudicial killings, secret service torture, perpetual counter-insurgency and organic potatoes. It's being fought in secret bases, in our back yards, on desolate plains and mountaintops, in court rooms and at global conferences. Many of the battles we never hear about and many people are utterly misguided or clueless about the geopolitical trends guiding the reality they live in.

Resource scarcity is beginning to affect our lives and our geopolitical choices. And everyone knows. Everyone from activists and experts to journalists and bike repairmen knows – or should be able to realize: All wars are fought over natural resources.

Interlude F: Requiem for Mankind

I am Man. I am a farmer and a warrior. Architect and conqueror. Sociopath and degenerate. I haven't always been. Or rather: i don't remember exactly how it all began and I don't even remember how it came to an end.

I am a literate. Me personally being one of the last on the planet, I suspect, as I venture to this forgotten place: the library. I sneak in leaving as few traces as possible, then make it to the fourth floor. Here I have stockpiled unharmed books from the other floors, the ceiling is still near-complete, the staircases to the third floor are blocked, I have three hidden escape routes and several excellent positions for defense. It's almost as formidably fortified as the house I call home. To get back to my story: What is certain is that I am a beast of nature. An animal like any other animal. I live here on planet Earth. I eat and defecate, I kill, I die.

Let me tell you a short, short version of it all. My sincerest apologies for inconsistencies of chronology. It's a long and complicated story. And recollecting it is nearly traumatizing as I'm almost in a state of shock due to the current affairs of my kind. Perhaps that's why I need to tell you, whoever you are. To stay human. To make sense of my memory and the hundreds of books I have been reading here at the library. My fellow humans have abandoned all hope. Words fail me. Humanity is in terminal decline, has descended into cannibalism, tribal warfare and worse. I can safely speak on behalf of mankind because *I* am what is left. I am Man.

My first memory is roaming the plains of Africa. Not too stressful a life, I tell you. We'd just stroll around. We'd follow flocks of antelopes and other ungulates, picking up whatever edible fruit, berry, root or what have you we'd come across. Sometimes we'd kill an animal and eat that too. We were gatherers and hunters - and prey too, but we learned to outwit our hunters. Having a friend

eaten by a lion is a good reminder of the food chain though. In the footsteps of the animals we followed our culture appeared. We partied around the camp fire. We painted stories of our life on rocks. We talked. No other animal did this. All of a sudden we were Mankind. Because we were curious, but also because we grew in numbers and had to break up and spread out. My ancestors invented the plough, baked bread, brewed beer, cultivated crop plants, constructed the pyramids and set foot on the moon. I scrape mold off the few fruits I find then slowly chew them with those teeth that still do not pain me.

To sum it all up very shortly we mastered photosynthesis, which is the single most important chemical reaction. It is the capturing of carbon dioxide, water and sunlight in plants that produce oxygen and carbohydrates. It is the foundation of all life on Earth. Later we invented the combustion engine which ran on fossil fuel.

Unfortunately, excessive use of this technology seems to have disrupted the global ecosystem to such an extent a chain reaction of disasters were caused. We also made other great inventions – and apparently took great risks. I haven't yet discovered any text that conclusively reveal what exactly went wrong. What finally caused the collapse. Probably, it was a combination of accidents and the rivalries and animosities our cultures had nurtured for centuries.

Today I am a hunter-gatherer again. Except I have no tribe, my prey is scarce and I am also hunted. Mostly, I am a scavenger of canned food. I don't know how it came to this; the books reveal only little of the decline. But I remember some of it; the parts I survived myself. When I was a boy and things went from bad to worse. People had been leaving the city for some time. One day another wave of anarchy followed from another disaster or riot we didn't hear of and we survived by hiding. But electricity did not return, the machinery of the city started malfunctioning. Fires erupted, spread, then died out leaving the city interspersed with scorched concrete tombs. Dogs and cats and other animals were roaming the city or howling in starvation and desperation from

their accidental captivity of abandoned apartments and houses. After about a week the desperate howls stopped as the pets died – and had I known what I know now, I would have went to pick up the carcasses for cooking.

By now, walls are cracking, buildings are covered in crawling plants, trees grow in the streets. Some constructions have simply collapsed in rubble while others stand to bear witness of a lost civilization now home to pioneer weeds and birds nests. Rats and birds are everywhere, foxes are very common. Recently, I have seen a large cat which I think must have been a lynx and on some nights I can hear howls which must be from packs of wolves roaming in the distance. Some parts of the old city is now entirely green, the streets now below layers of bushes, grasses and soil.

Others are completely desolate with only a few insects populating pieces of wood or pools of foul smelling water. Soils in such places can be orange, greenish or ash gray. These are sites of extreme pollution; the inventories of factories left untended now have millions of barrels of all sorts of chemicals leaking. I stay clear of such places, of course. Then there is the old city center, which now looks like a hostile fjord, the remaining, desolate sky scrapers reflecting their contours in the polluted water. The sea has risen and human made dikes been defeated.

A sound! Discarded scrap metal accidentally kicked along a stretch of asphalt would be my guess. Then silence for half a minute followed by nearly indiscernible steps of two, perhaps three, people in stealth retreat. I hold my breath for a couple of seconds, eyes fixed on my shotgun which never leaves my side, then calmly, confidently I finish these words. I will have to continue the story later. Now I will have to put down the pen and pencil, pick up my weapon and move without a sound from shadow to shadow and check if trouble is coming my way.

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Acknowledgments

For inspiration, support, critique, invaluable information:

Peace researcher Jan Øberg

Bio-ethicist Janne Foghmar

Permaculture enthusiast and architect Tony Andersen

Communications specialist Joelle Bassoul Mojon

Malaria expert Bart Knols

Klemens Maya

Peace researcher Rebecca Sargent

Dr. Peter H. Gleick

Gideon Polya

Wikipedia contributors and supporters

Google News developers

Publishers who turned the manuscript down providing good
reasons for doing so

Notes regarding the interludes

The Canadian writer Robert J. Sawyer came up with the fictious term “gliksin” for a Neanderthal word for *Homo sapiens*. The broken bone is still the most ancient item on display at the national Danish museum. Theoretically that bone could have been broken by other means than Neanderthals eating it but archaeologists consider it likely was.

According to legend the Danish flag, *Dannebrog*, fell from the sky during the Nordic Crusades. Twice actually. By this divine intervention the impending defeat was transformed to victory. Similar myths exist in Sweden, England and other states. Historians have proposed a handful of possible real life backgrounds for the myth; the bishop's banner having been adopted by the king is one of the more probable.

The crash of the DC-6 carrying United Nations Secretary-General, Dag Hammarskjöld, is claimed to have been an accident by some, believed to have been sabotage by others but said to have occurred about as portrayed in this fictionalization by some of his colleagues. This latter version is also supported by recent investigations (see chapter beginning p. 26).

The White House staff meeting of December 12, 2002 has been transcribed and interpreted from the movie “W” by Oliver Stone (2008).

Samuel the Kenyan herdsman to be pirate was conceived by Bart Knols and a UN YouTube video.

The post-apocalyptic survivor's tale is inspired by a Danish radio show about the decay of civilization in the absence of human maintenance.

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