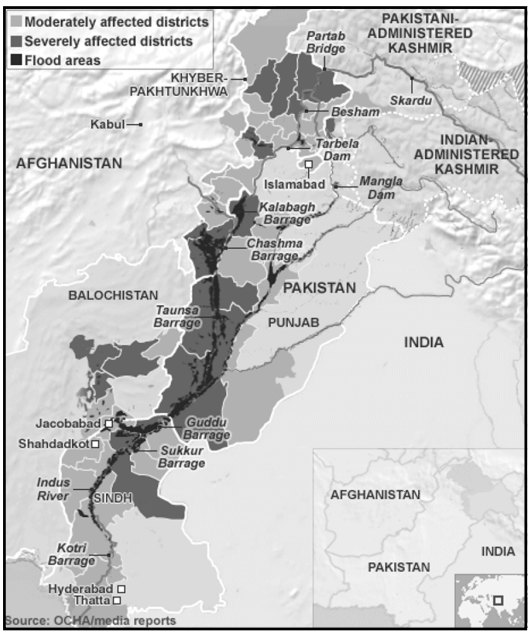
Strategic Disaster Responses

Pakistan's floods demonstrate the strategic implications of natural disasters, particularly during conflict, and of disaster management choices

The strategic ramifications of the 2010 floods in Pakistan[1] have yet to be fully grasped, both for their impact on Pakistan and on the regional security situations, and for their impact on the conduct and outcome of the US-led Coalition war against the *Taliban* in neighboring Afghanistan.

Other current flooding issues — including those in Indonesia, Hungary, and so on — will also have political and economic repercussions, but the occurrence of Pakistan's flooding in the midst of a domestic Pakistani political crisis, an internal war, and the international strategic reliance on Pakistan as a component of the war in Afghanistan, have created a confluence of factors with major ramifications.

Meanwhile, new tools are being developed which could dramatically, rapidly, cheaply, and efficiently address the issue of the provision of potable water to disaster-affected communities, turning the immediate disaster into opportunities for stabilization. The new technologies available to maximize the immediate flow of potable water — the difference between viability and non-viability of a situation — and cut a large part of the petroleum logistics chain of conflict and disaster relief could literally be a "game changer".[2]



Flood-impacted areas as of late August 2010

What is critical, however, is to first recognize an emerging pattern which this analyst described in a report of July 3, 2008, entitled "The Energy-Food-Water-Security Matrix": "The immediate and direct strategic linkages between energy, food, water, social stability, and strategic power are now more profound and global than ever before, thanks to emerging technology and the globalization of markets and trends."[3]

First, the Problem

The short-, medium-, and long-term outcomes for Pakistan, the region, and international interests will depend to a large extent on the responses to the disaster by the Government of Pakistan, and, particularly, the United States, which has significant interests riding on the stability of Pakistan. Despite the precariousness of both Pakistan Government and US interests, there seem to be few moves underway other than those to shore up the immediate political interests of both parties, and even then only from a very narrow standpoint.

Defense & Foreign Affairs Special Analysis noted, on September 20, 2010: "The immediate loss of life and property has been the smallest part of the equation in Pakistan, but long-term loss of life, social dislocation, and political ramifications will be far greater as the loss of crops, planting cycles, livestock, infrastructure, and food stocks begin to take a toll on the populations of the affected areas, adding distinct pressures to the Pakistani domestic political and electoral processes. This, and the surge expected of malaria, malnutrition, and other health concerns as a result of the flooding, will impact negatively on the viability (and even the ability) of the Government of Pakistan to play the rôle which the international community demands with regard to the conflict in neighboring Afghanistan."[1]

The Immediate, Direct Health Impact of Major Flooding

The immediate impact of the Pakistan flooding, even by late August 2010,

1 See Copley, Gregory R.: "Aprés le Deluge: Watershed Strategic Ramifications Can Be Expected from Pakistan Flood Disaster", in this edition (9-2010) of *Defense & Foreign Affairs* ***Strategic Policy.*** Also published "Watershed Strategic Ramifications Can Be Expected from Pakistan Flood Disaster", in *Defense & Foreign Affairs Special Analysis*, September 20, 2010.

2 In the same way, for example, that the introduction of blast-resistant vehicle seating began changing death and injury levels in military vehicles in Iraq and Afghanistan, dramatically altering political perspectives and operational outcomes. See, for example, Copley, Gregory: "The Strategic-Tactical Relationship: For Want of a Nail …", in *Defense & Foreign Affairs Special Analysis*, March 11, 2008, and also in *Defense & Foreign Affairs* ***Strategic Policy***, 2-2008. The thesis explains that tactical successes or failures can often accumulate to determine strategic outcomes, but too often we ignore the linkages between tactics and strategy. This report was a case study of US vehicles in Iraq.

3 Copley, Gregory: "The Energy-Food-Water-Security Matrix", in *Defense & Foreign Affairs Special Analysis*, July 3, 2008, and in *Defense & Foreign Affairs* ***Strategic Policy***, 6-2008.

was that more than 160,000 sq.km. of Pakistan was flooded, directly affecting some 17-million people. The immediate death-toll of some 1,500 deaths (and 2,300+ injuries) did not appear to reflect the strategic catastrophe, but one report noted: "As of August 18 [2010], there had been an estimated 204,040 cases of acute diarrhoeal disease, 204,647 acute respiratory disease cases and 263,356 cases of acute skin diseases."[4]

Of particular concern was the fact that the flooding overwhelmed much of the agricultural region of Pakistan, not only affecting current and future crops, and the health and lives of the people in the flood zone, but also the ability of Pakistan to feed its population in the coming year and beyond. This would be particularly critical if the agricultural community was permanently reduced in numbers. It should be kept in mind that the strategic viability and sovereign independence of a state ultimately — as history has demonstrated — sits on a base of the ability to produce a national food surplus.

Thus the immediate health impact of major flooding, or of a national-level natural disaster, can have profound long-term implications if incorrectly addressed.

A total of 173,906 people died in the immediate effects of the 9.0 magnitude *tsunami* — caused by the Sumatra-Andaman Islands Earthquake — of December 26, 2004; most of them in the Indonesian (Sumatran) province of Aceh, where 104,055 were initially reported to have died in the immediate effects of the event. Subsequent estimates raised the known death toll to 227,898 people, and some showed an even higher estimate.

In fact, the subsequent death toll may never be accurately known — or correctly attributed to the disaster — because the follow-on death toll from major disasters often occurs as a result of the destruction or pollution of water supplies, and the impact of this lives on for years and decades. Even by 2005, the World Health Organization said that 3.4-million people died each year as a result of water-related diseases caused by pathogenic micro-organisms.

In 2006, the WHO's Program on Disease Control in Humanitarian Emergencies: Communicable Diseases Cluster released a document entitled "Communicable diseases following natural disasters: Risk assessment and priority interventions".[5] Just in the area of post-disaster diarrhoeal disease, the WHO group noted: "In Aceh Province, Indonesia, a rapid health assessment performed in the town of Calang two weeks after the December 2004 *tsunami* found that 100 percent of the survivors drank from unprotected wells, and that 85 percent of residents reported diarrhoea in the previous two weeks. In Muzaffarabad, Pakistan, following the 2005 earthquake, an outbreak of acute watery diarrhoea occurred in an unplanned, poorly-equipped camp of 1,800 persons. The outbreak involved over 750 cases, mostly adults, and was controlled following the provision of adequate water and sanitation facilities. In the United States, diarrhoeal illness was noted following hurricanes *Allison* and *Katrina*, and norovirus, Salmonella, and toxigenic and nontoxigenic V. cholerae were confirmed among *Katrina* evacuees."

A Pakistan Army Mil helicopter flies over flooded areas of Jampur near Dera Ghazi Khan, Pakistan, on Thursday, Aug. 19, 2010.

The report also noted the surge in Hepatitis A and E transmission following disasters, particularly flooding. The report noted: "In endemic areas, hepatitis E outbreaks frequently follow heavy rains and floods; it is generally a mild, self-limited illness, but in pregnant women case-fatality rates can be up to 25 percent. Clusters of both Communicable diseases following natural disasters: risk assessment and priority interventions hepatitis A and hepatitis E were noted in Aceh following the December 2004 *tsunami*".

The report also noted: "Leptospirosis ... a zoonotic bacterial disease that is transmitted through contact of the skin and mucous membranes with water, damp vegetation, or mud contaminated with rodent urine. Infected rodents shed large amounts of leptospires in their urine. Flooding facilitates the spread of the organism due to the proliferation of rodents and the proximity of rodents to humans on shared high ground. Outbreaks of leptospirosis occurred in Taiwan, [the People's Republic of] China, associated with Typhoon *Nali* in 2001, and following flooding in Mumbai, India, in 2000."

In short, the absence of adequate mechanisms to supply potable water on an ongoing basis to affected communities leads to a protracted health issue and to ongoing economic problems, making recovery difficult and slow.

Domestic Political Response to the Pakistan Floods

The flooding in Pakistan coincided with a political impasse in the country which would, by itself, have posed a significant challenge to the stability of the country and to efficient decisionmaking. The flooding both compounded the political paralysis and at the same time opened up the prospect of a massive movement of people, which would have political implications merely because of the demographic changes to voting regions.

Agricultural experts have indicated that, if managed properly, the Pakistan flooding of 2010 could result in record crop harvests in 2011, given that the flooding deposited a new layer of rich sediment across wide areas of the country's farmlands. That record crop outlook, however, would be predicated on the Government of Pakistan, and the provincial governments, ensuring that the population was enabled to stay on the land to remediate their farms, and also ensuring that an adequate and timely supply of seed grain was available to the farmers within the next month or two.[6]

Because of Pakistan's internal politi-

4 Akpoghenetga, Onome: "10,000 Villages: Pakisan Floods and Water-borne Disease Spread", in the web-based journal, *The Faster Times*, August 24, 2010.

5 Watson, John; Connolly, Maire; and Gayer, Michelle (eds.): "Communicable diseases following natural disasters: Risk assessment and priority interventions". Geneva, 2006: World Health Organization.

6 According to *The Defense & Foreign Affairs Handbook on Pakistan* (Copley, Hussain; International Strategic Studies Association, Alexandria, Virginia: 2008), in the section on agriculture written by Andrew Pickford: The Indus River runs a course through Ladakh district of Jammu and

Pakistan during the past decade had possibly **the highest growth rate in agricultural output of any large nation**, but it also had **the highest population growth rate** in the world, and the **highest rate of urbanization**.

The population growth and movement eclipsed the remarkable agricultural achievement of Pakistan, and had ensured that the country's sustainability and stability issues were not resolved.

cal crisis, the actual response may be the exact opposite of what was necessary.

The coalition which has sustained the Pakistan People's Party (PPP) in office under Prime Minister Yousaf Raza Gilani against fierce competition from the Pakistan Muslim League-Nawaz (PML-N) has been dependent for parliamentary control on the support of the predominantly-urban-based *Mohajir Quami* Movement (MQM). The present political crisis, however, centering around the Supreme Court's challenges to Pres. Asif Ali Zardari (co-chair, with his son, of the PPP), and devolving onto the PPP-led Government of Prime Minister Gilani, has meant that the MQM has begun courting other parties — ie: primarily the PML-N — with a view to changing its allegiance in the National Assembly.

Without considering, in this report, the intricacies of the Supreme Court's challenges to the President and the Government, it is clear that the parties have been preparing for the prospect that the Government could collapse, and that new elections could be called.[7] The PPP has unsuccessfully attempted to push through re-districting of electoral zones, in order to remove the entrenched power of the MQM in some key cities. Thus, with new elections possible at some time in the near future, the PPP faces the prospect of being defeated by a possible liaison of the PML-N and MQM.

One answer to this has been for the Government to remove people temporarily displaced by the floods and to re-settle them, without recourse, in the MQM-dominated cities. The displaced people have come from heavily PPP areas, so the effect of this mass movement of displaced people would be to gerrymander the voting patterns in favor of the PPP.

The result of this has been for the Government to neglect a balanced approach to addressing the flood disaster, and to jeopardize — almost certainly — the prospect for a rapid recovery of the nation's agricultural output. This would have a severe impact on the internal war against the Pakistani *Taliban* and other *jihadist* or disaffected movements, as well as on the overall strength of the country from an economic and social standpoint. Significantly, the Pakistan Armed Forces has stayed out of the political fray and has focused heavily — with the National Disaster Management Authority (NDMA), led by retired Lt.-Gen. Nadeem Ahmed — on actually addressing the direct needs of disaster relief while the Armed Forces at the same time had to fight the *Talibani* insurgency which has benefited directly from the lack of support which the Government has given to the disaster victims.

Some US analysts have postulated that the corrupted practices of the political parties, and the resumption of financial corruption, would lead to a new military take-over in Pakistan, but *Defense & Foreign Affairs* sources within the senior ranks of the military indicate that the military is resolved not to take power, and to let the politicians take the full blame for the various disasters, including mis-handling the disaster re-

Kashmir and Northern areas, flowing through the North in a southerly direction along the entire length of the country, to merge into the Arabian Sea near Pakistan's port city Karachi. It has 20 major tributaries. The irrigation system provides water to the fields which accounts for around 90 percent of agricultural production. It is this reliance on a key river system that limits Pakistan's strategic depth and makes it vulnerable to both natural events which could impact the flows, but also gives India the ability to harm the viability of the Pakistan state by targeting one key resource and flow.

Wheat is Pakistan's most important agricultural commodity and represents 13.7 percent of the total value of agriculture sector and three percent of the Gross Domestic Product. Since the start of the "Green Revolution" in Pakistan, wheat production has steadily risen, and, with continued governmental support, production is expected to increase from the present production level of 22-million tonnes to 30-million tonnes by 2015. Cotton, wheat, rice, sugar cane, fruits, and vegetables are some of the key crops grown in Pakistan. Wheat production is vulnerable to extreme weather, especially in non-irrigated areas. The impact of climate change may be a major driver of variability in weather patterns and consequently rain-fed crops, but also access to water through the Indus River system. However, its impact on rainfall distribution and volumes may require change in agricultural practices much faster than can be accommodated. Increased investment in irrigation infrastructure may help deal with less predictable rainfall patterns, although this would require significant capital outlay.

Pakistan has emphasized the quality of its rice production to increase exports to the Middle East, and rice yields have increased sharply following the introduction of new varieties. Pakistan is one of the world's largest producers of raw cotton; however, it is highly susceptible to adverse weather and pest damage.

Recently, it has been identified that there has been a decline in the levels of productivity rates in Pakistani agriculture. The main reasons for this include matters such as access to modern varieties of seeds and fertilizers which have not been able to keep in pace with the rate of growth of population, implying a decline in *per capita* production. This being said, the impact of modern seed varieties and chemical fertilizers on aggregate wheat production has been substantial. In essence, improving levels of agricultural production become negated if the population is growing at a faster rate than the yields are increasing.

7 On September 27, 2010, the Supreme Court met to review whether Presidential immunity should be revoked from Pres. Zardari in order to expose him to prosecution outcomes from convictions handed down against him by a Swiss court. The Supreme Court granted the Government of Prime Minister Gilani a two week delay, which the Government had requested, in its decision, and adjourned the hearing to allow the Government to prepare for its defense of the immunity status. Pres. Zardari and his late wife, former Prime Minister Benazir Bhutto, were convicted by a Swiss court in a $15-million money laundering case in 2003, even though they had denied all charges. The corruption charges against Pres. Zardari and other political leaders were set aside under an amnesty enforced by former Pres. Pervez Musharraf in 2007, under the National Reconciliation Ordinance (NRO). The NRO, which was enforced by former Pres. Musharraf, was ruled unconstitutional by the Supreme Court on December 17, 2009. As well, the Supreme Court was expected to rule on whether Pres. Zardari was, in any event eligible to remain as President, given his insistence on retaining the co-chairmanship of the Pakistan People's Party (PPP). The Presidency is Constitutionally required to abjure participation in party politics.

IWC's trailered water purification unit: Finally, a deployable system which does not depend on diesel, or filters, or chemicals. The unit can stand alone in the field for years without spares, and pump out up to 30,000 US gallons a day of potable water. It was designed to be fully "soldier-proof" and can generate additional electricity to power sat-phones or laptops.

sponse. Moreover, as a number of senior military officials have indicated privately, the Armed Forces are too busy facing an existential struggle for the nation by suppressing dissident activities — particularly spilling back into Pakistan from Afghanistan — to consider taking power again.

The fact that *al-Qaida* leaders Osama Bin Laden and Ayman al-Zawahiri made the Pakistan floods — in particular, a criticism of the Government's response to it — a component of their messages to *jihadists* and the Pakistani population, highlight the failure of the Government to move effectively to resolve the plight of flood victims.

Indeed, the Government's response to the floods is in almost direct contrast to the efficiency with which the previous Government of then-Pres. Pervez Musharraf and the Armed Forces addressed the 7.65 magnitude earthquake (epicentered 95km north of Islamabad) disaster of 2005, in which more than 73,000 people lost their lives and some 128,000 were injured. More than 3.5-million people were left homeless.[8]

Pakistani domestic population groups as well as the international community have raised questions as to how well the Government has dealt with the flooding crisis thus far, and the apparent gerrymandering of the population base for short-term political purposes does nothing to help allay distrust. Assuming, then, that the Government is indeed committed to providing — ahead of party political interests — material support to restoring people to their homes, and thereby helping to restore agricultural productivity as the essence of national stability, there are a number of factors which must be urgently addressed:

- 1. Immediate provision, *in situ*, of emergency potable water, food, shelter, and communications to affected populations;
- 2. Immediate gathering, as a national endeavor, of grain seed stocks to distribute to farmers within the coming month(s) to ensure an early return to national agricultural/foodstock productivity, and to ensure that farmers will stay on the land;
- 3. Clear dominance of the security/survival chain in affected areas by Government forces, such as the NDMA, Armed Forces, and other agencies, plus Red Cross/Red Crescent, in order to forestall loss of "hearts and minds" to *jihadist/Talibani* groups;
- 4. Commitment of engineering capabilities to rebuild — and improve — logistical framework to ensure more sustainable and viable roads, rail, electricity, and communications to bring the affected regions more effectively into "modern Pakistan". The flooding broke much of the tribal mold, at least temporarily; the response by the Government will determine whether the resultant population shape will be a return to isolated, traditional tribalism, or whether the opportunity will be taken to make the populations part of modern Pakistan.

What had been significant in Pakistan during the past decade was not only the fact that the country had possibly the highest growth rate in agricultural output of any large nation, but that it also had the highest population growth rate in the world, and the highest rate of urbanization. The population growth and movement had, as a result, eclipsed the remarkable agricultural achievement of Pakistan, and had ensured that the country's sustainability and stability issues were not resolved.

The increasing urbanization rate which would have been caused naturally by the flooding disaster — causing people to leave the land and migrate to the cities — was compounded by the PPP move to gerrymander key city voting patterns to neutralize the MQM. This promises to contribute to the problems facing Pakistan in the medium term.

A Major Step Toward Positive Outcomes: Potable Water

Most traditional, and even modernizing, societies in South Asia and the Northern Tier have functioned with a minimal dependency on petroleum products. Conversely, Western forces, moving in to — in this instance, Pakistan and Afghanistan — combat insurgency and to relieve the impact of natural disasters, have depended heavily on petroleum products for transportation, air power, electrical power generation, and water purification.

According to the Brookings Institution, approximately half the logistical requirement to support US forces in the field, as exemplified by the Iraq and Afghanistan engagements, has been fuel movement.[9]

As a result, the targeting, by Pakistani *Taliban*, of Coalition fuel convoys traveling through Pakistan to Afghanistan, has been a strategic move, as has been the targeting of such convoys by Afghan *Taliban*. Equally, the early conduct of the most recent Iraq war by US forces involved mass use of truck convoys for both fuel and potable water, via Kuwait, necessarily diverting operational priority to logistics ahead of the prosecution of combat goals. The US move to establish water purification plants in Iraq diminished the dependence on, and vulnerability of, convoys, but the move was still heavily fuel dependent.

In the case of the Pakistani flood relief — and, indeed, disaster response in any part of the world — a key requirement will be to deliver sustained supplies of potable water to civilian victims, as well as to relief forces operating

8 According to a statement of the International Federation of Red Cross and Red Crescent Societies on March 13, 2007, "approximately 6,300 educational institutions were damaged or destroyed in the earthquake affected area. According to Pakistan's Earthquake Reconstruction and Rehabilitation Authority (ERRA), almost 90 percent of these institutions are now operational, though many are still outdoors or in temporary structures, such as tents. Approximately 850 teachers and 18,000 students were killed in the quake." The modernization of educational institutions and their ability to bring rural Pakistani students into mainstream occupations is regarded as of key importance to the creation of a national identity and unity of purpose in the country, and at the same time obviating the appeal of *jihadism.*

9 Warner, Jerry; and Singer, P.W. : *Fueling the "Balance": A Defense Energy Strategy Primer*, Brookings Institution, Washington, DC, 2009, p.2.

in the field. This challenge is compounded substantially when a significant logistics tail — particularly for the constant requirement for diesel fuel — for such an operation is required.

New capabilities are now becoming available which have drawn on the lessons — the failures — of water purification systems provided by national forces and United Nations relief operations over recent decades. Most of these systems required heavy diesel-dependent power generation to function, as well as a requirement for extensive support components such as filters and chemicals. These systems merely reflected the Western approach to field deployment: expensive, and unsustainable.

UN compounds throughout the Middle East and Africa have no-longer functioning, fuel and filter dependent water purification plants standing idle in the corners of parking lots.

A new, highly mobile and low-cost/high volume water purification system — which this analyst has inspected at length — has just completed several years of development by York, Pennsylvania-based International Water Corporation (IWC), which is totally independent of diesel power generation and the regular demand for filters or chemicals. The wheeled unit, which can be towed or airlifted into place (multiple units can be carried, for example, in a C-130 *Hercules*, or be heli-lifted in single units), has only a 4ft x 8ft footprint, weighs some 4,000 lb. (1,880.2 kg), and can lift totally contaminated water from ponds or wells and produce some 30,000 gallons (113,562.35 liters) of potable water a day, or twice that amount of washing water. It is powered by integral solar panels and/or wind power. A diesel unit could be hooked up if desired, but — as seen by this analyst in operations on a cool, cloudy day — that would rarely be necessary. It can produce multiple lines of water output including utility water and UV-treated potable water, simultaneously.

The unit costs only some $150,000, and can operate for years in the field without back-up supplies or external electricity [the unit can be powered by solar, wind, battery, generator, AC power, or gravity]. Indeed, the unit can usually spin off enough surplus electricity to power satellite or cellular telephones, or laptop computers. The unit is robustly soldier-proof, and can be deployed rapidly into most field areas, even in difficult terrain where support would normally be difficult.

Its cost also makes it the perfect "leave behind" for a village when the relief forces depart, ensuring a long-term positive benefit for remote rural areas which may have had far less desirable water supply options even before the disaster.

The hard way: An Australian Army sapper from the 3rd Combat Engineer Regt. operates a truck-mounted water purification unit in Afghanistan. Earlier-generation water purification plants have depended heavily on diesel power, chemicals, and regular filter changes, adding to the logistical burden in deployment and sustained operations. They have not been designed as relatively maintenance-free "leave behind" units which could bolster civil-military relations and minimize the need for external support for remote villagers.

The low unit cost, and far lower lifecycle costs than anything else available, and high reliability makes the IWC unit a vital new component of national disaster-response capabilities as well as meeting the deployment needs of all forces on deployment. Even within the US, a major concern in disaster relief following such events as Hurricane *Katrina* (and many other events), has been the immediate supply of potable water. Clearly, given the reality that US deployed forces consume an average of 22 US gallons (83.279 liters) of petroleum products per man, per day, it is incentive enough to be able to deploy the capability to provide potable water without a heavy logistics tail.

Moreover, as recent *Taliban* actions in north-western Pakistan have indicated, the major vulnerability of conventional forces — not to mention cost — has become their logistics tail. A recent well-documented report by Adam Cobb, entitled "IEDs, Casualties, Fuel, and War: a Report on the Marine Corps Energy Summit, 13 August 2009", in the [US] *Marine Corps Gazette*, noted:

According to CMC [Commandant, US Marine Corps], a brigade-sized formation uses half a million gallons of fuel a day in combat. A single forward operating base uses an estimated 500-million gallons a year. Secretary of the Navy Ray Mabus noted, "The cost of fuel in a ground vehicle in theater starts at $15 a gallon and goes into the hundreds." Taking into account long supply lines and force protection measures, in January 2001 the US Defense Science Board estimated fuel could cost as much as $400 a gallon at the point of use. The reality has been much higher again.[10]

The ability to achieve rapid response to potable water requirements to support troops in the field and to relieve disaster victims — thereby altering the strategic equation — without the necessity to expend the current volume of diesel fuel dramatically changes the game. The ability to fight the major adversaries — insurgency, unrest, and privation — on more than equal terms is one of the advantages which the ready and reliable supply of non-fuel dependent water provides. This is the game-changer. ★

The ability to fight the major adversaries — insurgency, unrest, and privation — on more than equal terms is one of the advantages which the ready and reliable supply of non-fuel-dependent water provides.
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10 Cobb, Adam: "IEDs, Casualties, Fuel, and War: a Report on the Marine Corps Energy Summit, 13 August 2009", *Marine Corps Gazette*. Online at: http://www.mca-marines.org/gazette/article/ieds-casualties-fuel-and-war.