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## Understanding, Living, and Sharing Islam

# PRESENTATIONS

# Developing a Spritual Environmental Ethic with Muslim Students

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## Abstract

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The foundational Islamic-Environmental concepts should allow Muslim children to live a life that is pleasing to their Creator and beneficial to His Creation. This article outlines eight basic maxims essential to actualizing an environmental ethic with Muslim students and provides a practical example of how these maxims can be applied.

## About the Author

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## Developing a Spritual Environmental Ethic with Muslim Students

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### **Introduction**

Various environmental crises of the modern world, from climate change to rapidly dwindling sources of potable water, are at the forefront of global attention. Success and even survival for any group, community, or nation will be defined by how well they can live in balance with and not in opposition to their environment. Islamic schools in the West have the opportunity to embrace the task of preparing Muslim children to meet these challenges, using the tools and precepts of their faith as motivation for this success. However this should not be the only driver for Muslim students to have a comprehensive understanding of their environment. Any true Islamic spirituality development in students must be grounded in a proper orientation and in depth understanding of the reality of Allah's created world.

The Sanad Learning Center (a unique Islamic School in South Florida) and the University of Miami's Islamic Environmental Research group (*Entrusted Environment*) conducted three field trips and a workshop for elementary to high school students during the summer of 2009 to develop an Islamic environmental ethic through instruction, activities, and role-modeling with the students.

This paper explains eight simple yet profound foundational Islamic Environmental Maxims; discusses how they can be taught in Islamic Schools; and uses the Sanad Learning Center activities as a Case Study for the application of these Maxims.

### **Islam and the environment**

The partnership of Islam and environmental challenges presents a resource which may prove to be critical in facing the global environmental crisis. Hussein A. Gezairy, Regional Director for the Eastern Mediterranean Region of the World Health Organization (WHO), stated that "Religion has a strong influence in the Eastern Mediterranean Region. Many of the principles of Islam call upon people to look after their health, to avoid health hazards and risks, and to raise their standards of hygiene" (Gezairy, 1988). In addition, a recent study in Egypt concluded that "religious teachings and religiosity are shown to be associated with pro-environmental behavior, thus lending support to the presence of an Islamic environmental ethic" (Rice, 2006, p. 373).

The concept of using Islam as the basis for environmental ethics has demonstrated significant historic and recent successes. One recent example is in Yemen (97% Muslim), where a cartoon character was used to motivate the country's citizens to conserve water using the Islamic concept that water is a "mercy" and "blessing" of God that must be maintained (Hill, 2008 and Yemen Embassy, 2004). Another successful program in Zanzibar, Tanzania, tackled the environmental problem of using dynamite for fishing. Established governmental bans had little impact until finally coupled with the support of religious leaders who used the Quran to advise fishermen that this practice was in opposition to their faith. One local fisherman summarized why the religious message had succeeded where government decrees failed: "It is easy to ignore the government, but no one can break God's law" (Dickinson, 2005).

Therefore, there is clearly great potential for programs/strategies to increase environmental ethics from an Islamic perspective within Muslim populations. For the present global village, this will mean significant benefit. However, this approach requires a sound understanding of the fundamental Islamic environmental maxims, in order to provide the basis for developing a firmly established environmental ethic in Muslim societies, and more specifically with Muslim children.

## Foundational Maxims

*Maxim 1: The environment is created by Allah.*

According to Islamic understanding, everything in existence falls under one of two categories: Creator (Allah) and creation (everything other than Allah). Creation may then be divided into what is imperceptible to an individual (the unseen world such as angels, paradise, souls) and what is perceptible with one's five senses. **The term environment may be defined as every perceptible creation of Allah. Therefore, the first foundational concept is that the environment is a creation of Allah.** In the Quran, which Muslims hold to be the final, unaltered words of Allah to humankind, this concept is encompassed by the verse, "*Allah is the Creator of all things, and He is the Guardian and Disposer of all affairs*" (Q. 39:62). Everything belonging to the environment is also created with a specific purpose and endowed with qualities to fulfill that purpose. Allah says (using the royal *We*), "*Verily, all things have We created in proportion and measure*" (Q. 54:49). Therefore, nothing was created in vain, devoid of purpose: "*Did you then think that We had created you in jest, and that you would not be brought back to Us (for account)?*" (Q. 23:115). From the bird's creation with lightweight organs enabling its flight (Smith 2001, p. 167) to the harmony of leaves brushing against the wind, all these environmental components are designed with perfection and with a specific purpose decided by the Creator.

In addition, when a human "creates" something, whether a sketch or a space shuttle, he/she prizes and loves his/her "creation" and would not want it to be dealt with disrespectfully or used in a way inconsistent with what was intended. **In understanding that Allah has created the environment Himself and all that it contains, one will reconsider harming the environment.** "Harm" may be understood simply as a disruption of the created balance, which could include littering (i.e., placing something outside of its designated place), releasing harmful chemicals in

the air and water, or even not washing one's hands after relieving oneself and thus introducing illness to the healthy body that belongs to the Creator and is also a part of the environment.

*Maxim 2: The environment is sustained by Allah.*

The next foundational concept is that Allah also sustains the environment because, as mentioned earlier, Allah is the Guardian of creation (Q. 39:62). Therefore, without Allah, the environment would come into a state of nonexistence because all creation depends on Allah, while He is completely independent from creation. Allah says regarding one of His creations (humans), "*O people! It is you that have need of Allah, but Allah is the One free of all wants, worthy of all praise*" (Q. 35:15). For example, life would be impossible if water did not stay at the surface but sank to the core of the earth as Allah warns, "*Or the water of the garden will run off underground so that you would never be able to find it*" (Q. 18:41), or if nutrients did not continue to exist in soil to grow crops, "*See you the seed that you sow in the ground? Is it you that cause it to grow, or are We the Cause?*" (Q. 56:63-64). Therefore, human existence is based not only on

the creation of the environment by Allah, but also on its uninterrupted sustainability by the “Sustainer,” one of the traditional 99 Names of Allah. Today, “sustainability” has become a buzzword as humans try to return to a more natural lifestyle, emulating some aspects of this incomparable Attribute of Allah. **The fact that the environment is “connected” to the Creator through His consistent sustenance should cause a Muslim who internalizes this concept to find it difficult to harm the environment.**

*Maxim 3: The environment is a sign of Allah to human beings.*

By looking at a clock, a person may understand some characteristics of the clock-maker such as the fact that he/she exists, has a will, and possesses a certain degree of intellect. This information may be deduced by simply observing this one clock. Although Allah’s essence is understood to be beyond human comprehension, a certain level of knowledge may be attained about His Names and Attributes through divine revelation (through His Messengers), as well as through reflecting on the environment. The environment, with its infinitesimal details yet monumental size, contains an innumerable number of signs that teach about and point to its Maker, Allah. The environment informs one first of Allah’s existence and oneness through its existence and complex yet beautiful synchronization (*Q. 21:22, 27:60-61*), and second of His many Names and Attributes (such as incomparable knowledge, will, power, wisdom, beauty, mercy, creativity, and self-sufficiency). Interestingly, the Quranic verses are termed in the Quran and in any Islamic discourse as “ayat” (Arabic for signs) and not “abyat” (Arabic for verses). This is because these ayat in the Quran point to and teach about their Author, Allah. The same word “ayat” is used to describe the different components of the environment, therefore expressing the fact that the recited ayat in the Quran and the witnessed ayat of the environment lead to the same conclusion: Allah.

Allah states, *“Behold! in the creation of the heavens and the earth; in the alternation of the night and the day; in the sailing of the ships through the ocean for the profit of mankind; in the rain which Allah sends down from the skies, and the life which He gives therewith to an earth that is dead; in the beasts of all kinds that He scatters through the earth; in the change of the winds, and the clouds which they trail like their slaves between the sky and the earth;--(Here) indeed are Signs [ayat] for a people that are wise”* (*Q. 2:164*). Allah also invites people to learn about a specific attribute such as His mercy through observing the environment: *“And cattle He has created for you: from them you derive warmth, and numerous benefits, and of their (meat) you eat.... for your Lord is indeed Most Kind, Most Merciful”* (*Q. 16:5-7*). When an earthquake shakes an entire city one may remember His power, and when water flows gently over rocks one may remember His subtle beauty. When a messenger brings a message from the king about who that king is and the attributes he possesses, and one destroys the message or treats it with disrespect, that is a direct insult to the king. To those who reflect with wisdom (*Q. 2:164*) upon the environment, the King sends numerous messages or signs that teach about who He is so that they know Whom they are worshipping, and thus, develop within themselves a sense of longing to return to the One possessing these overwhelmingly attractive characteristics. **Once one truly internalizes the fact that the environment is a means to learn about one’s Creator, this alone should cause one to interact with the environment with nothing less than caution and respect.**

*Maxim 4: The environment itself is in worship of Allah.*

The environment is not only a creation sustained by Allah that teaches one about Allah; it is also itself in complete submission to and worship of Allah. Allah states in the Quran, *“The seven heavens and the earth, and all beings therein, declare His glory: there is not a thing but celebrates His praise; And yet you understand not how they declare His glory! Verily He is Oft-Forbear, Most Forgiving! (Q. 17:44).* Allah also says, *“Do you not see that to Allah bow down in worship all things that are in the heavens and on earth, - the sun, the moon, the stars; the hills, the trees, the animals; and a great number among mankind? But a great number are (also) such as are fit for Punishment: and such as Allah shall disgrace, - None can raise to honor: for Allah carries out all that He wills” (Q. 22:18).* These verses bring to light several points. First, although everything is in worship of Allah, humans do not understand the method by which they worship. Reflecting on these verses, one may perceive that the glorious orchestra of birds chirping in the morning and evening or the traveling of a photon at 671 million miles per hour may be their respective methods of worship. However, this worship is not limited to the animate environment, as Allah teaches about the hills in the company of Prophet David: *“It was We that made the hills declare, in unison with him, Our Praises, at eventide and at break of day” (Q. 38:18).*

Besides the more specific actions of worship stated in the above verses (e.g., declaring Allah’s glory, bowing down in worship, declaring His Praises), worship generally means submission and obedience to the Will of Allah. The environment—whether it be a microorganism, plant, or stone—is acting exactly as it was commanded without the possibility of disobedience because it possesses no free will. The word “Muslim” may be defined as one who submits one’s will to the Will of Allah (Esposito, 2002, p. 153) and thereby attains peace. **Therefore, in a sense, the environment may be seen as “Muslim.”** However, the human (the soul, but not the body, because the body functions in complete submission to Allah without will of its own) is not always in worship. Unlike the rest of the environment, humans have free will granted to them by Allah. Allah demonstrates this in verse 22:18 where only when mentioning the category of people does He state that of “a great number” not all are in worship. Therefore, one who is in a state of submission (Islam) is in a state of complete harmony with the rest of creation. It is only when humans disobey the commandments of Allah that this harmony is broken, and hence wastefulness, greed, pollution, and much evil in the environment are witnessed. **How then should one interact with the environment, which is a grand congregation of prayer in worship of Allah, but with utmost respect and the smallest amount of disturbance?**

This does not mean, however, that one should not utilize the environment for necessities like sustenance, clothes, and shelter because a just and sustainable usage does not disturb the environment’s worship; indeed, such usage is one of the reasons for its creation and hence also part of its worship.

*Maxim 5: The environment is a witness for or against human beings.*

The environment is also “aware” of the actions of human beings in terms of their worship or disobedience of Allah. Allah states about the earth on the Day of Judgment, “*On that Day will she [i.e., the earth] declare her tidings*” (Q. 99:4). Elaborating on this verse, the Prophet Muhammad (peace be upon him) taught that “her tidings” are what the earth witnesses of the actions of every male or female servant of God that took place on it (i.e., the earth) (Sunan at-Tirmidhi, #2429). The Prophet Muhammad (peace be upon him) is reported to have said, “Allah and His angels and the people of the heavens and the earth, even the ants in their rocks and the fish, pray for blessings on those who teach people good” (Sunan at-Tirmidhi, #2685). Not only will the animals and inanimate objects respond to human actions, but one’s own body will also witness against every injustice one commits: “*On the day when their tongues, their hands, and their feet will bear witness against them as to their actions*” (Q. 24:24). **Knowing that the environment witnesses for or against people, a Muslim must interact cautiously with the environment.** One does one’s utmost to please his/her witness so that person will testify for and not against one in the worldly court of law. How should one then interact with the witnesses of the grand court of the hereafter, which are neither forgetful nor can be bribed from speaking the truth?

*Maxim 6: The environment is entrusted to human beings.*

The foundational concepts already mentioned above explaining how the environment is created, sustained, a sign, in worship, and a witness, should upon reflection be sufficient to establish the nature of the relationship between a Muslim and the environment. However, to clarify this interaction further, Allah specifically addresses the role of humans within the environment through His Prophets. **This role is one of a trustee or steward of the environment, entrusted to protect and not to abuse it by interacting in a way that Allah has commanded, resulting in both the well-being of the environment and the well-being of the individual in this world and the next.** Allah says, “*We did indeed offer the trust to the heavens and the earth and the mountains; but they refused to undertake it, being afraid thereof: but man undertook it; He was indeed unjust and foolish*” (Q. 33:72). Allah also states, “*Behold, your Lord said to the angels: ‘I will create a vicegerent on earth.’ They said: ‘Will you place therein one who will make mischief therein and shed blood?’- while we do celebrate Your praises and glorify Your holy (name)?’ He said: ‘I know what you know not’*” (Q. 2:30). And finally another verse states, “*And He has subjected to you, as from Him, all that is in the heavens and on earth: behold, in that are signs indeed for those who reflect*” (Q. 45:13). The Prophet Muhammad (peace be upon him) teaches us that “Verily, this world is sweet and appealing, and Allah placed you as vicegerents therein; He will see what you will do” (Sahih Muslim, #6606). To be a trustee is significantly different from being an owner and therefore humans do not own the environment, which would allow freedom of usage based on the owner’s desires. Humans are simply entrusted with stewardship of the environment for the short life of this world. **The proper usage of the environment is that which is dictated by its Creator and Sustainer, resulting in a relationship between the Muslim and his/her environment of balance, moderation, and respect.**



Allah has made it clear in the Quran that corruption on the earth is not beloved by Him. Allah says, speaking of human corruption on earth, “*When he turns his back, His aim everywhere is to spread mischief through the earth and destroy crops and cattle. But Allah loves not mischief*” (Q. 2:205); “*Mischief has appeared on land and sea because of (the recompense) that the hands of men have earned, that (Allah) may give them a taste of some of their deeds: in order that they may turn back (from Evil)*” (Q. 30:41). Allah has also mentioned some of the types of corruption of the environment that people will fall into such as wastefulness. Allah says, “*Verily spendthrifts are brothers of the evil ones; and the evil one is to his Lord (himself) ungrateful*” (Q. 17:27). Allah also praises those who are moderate, and are neither wasteful nor stingy: “*Those who, when they spend, are not extravagant and not niggardly, but hold a just (balance) between those (extremes)*” (Q. 25:67).

Allah points out two specific cases which today are especially critical in the context of wastefulness. “*O Children of Adam! wear your beautiful apparel at every time and place of prayer: eat and drink: But waste not by excess, for Allah loves not the wasters*” (Q. 7:31). The amount of both food/drink and clothes, two basic necessities of life, which are wasted today is heart-wrenching. As much as 50% of food across the developed and developing world is wasted (Lundqvist, 2008) while 6.5 million children under the age of five die in developing countries each year from malnutrition and hunger-related diseases (UNICEF, 2007). This is obviously not the intended behavior of a trustee of the environment.

*Maxim 7: Allah sees, hears, and knows all that human beings do.*

As discussed above, a Muslim must first learn about the reality of the environment and his/her proper role in this environment. However, the drive to internalize and actualize this knowledge sometimes requires further realizations. One of these is internalizing the fact that Allah is All-Seeing, All-Hearing, and All-Knowing: “*He it is Who created the heavens and the earth in Six Days, and is moreover firmly established on the Throne. He knows what enters within the earth and what comes forth out of it, what comes down from heaven and what mounts up to it. And He is with you wheresoever you may be. And Allah sees well all that you do*” (Q. 57:4). The all-encompassing nature of the knowledge of Allah is vividly illustrated by the following verse: “*With Him are the keys of the unseen, the treasures that none knows but He. He knows whatever there is on the earth and in the sea. Not a leaf doth fall but with His knowledge: there is not a grain in the darkness (or depths) of the earth, nor anything fresh or dry (green or withered), but is (inscribed) in a record clear*” (Q. 6:59).

Within Allah’s domain of knowledge is the knowledge of everything one does. **Every time one causes corruption in the environment, Allah sees and hears every aspect of this action.** To bring this reality even closer, Allah says in verse 57:4 above that “*He is with you*”; that is, Allah is not a distant entity, but a close and watchful Lord. For the believer who obeys Allah’s commands, including those of not causing disorder in the environment, this is a source of comfort, knowing that the All-Merciful is always so close. For the person who intends to cause corruption, this should be a warning that He is



much closer than this person may think. Allah says, *“It was We Who created man, and We know what dark suggestions his soul makes to him: for We are nearer to him than (his) jugular vein”* (Q. 50:16).

Such a person blessed with knowledge of Allah’s nearness and His knowledge of one’s every deed should reach the point of feeling shame in disobeying and breaking the trust between oneself and Allah by tossing waste on the ground, carelessly using water, or continually polluting the air with an old vehicle that failed to pass the emissions inspection.

*Maxim 8: Human beings will be held accountable for this trust of the environment*

For most people, however, such shame is lacking, and therefore Allah reminds us that regardless of our awareness of Him and our level of spirituality, either an immense reward or severe punishment awaits those who keep or break the trust with Allah, respectively. Allah states, *“Know you that Allah is strict in punishment and that Allah is Oft-forgiving, Most Merciful”* (Q. 5:98). Allah’s mercy infinitely surpasses what one’s mind can ever imagine. However, those who earn the Most Merciful’s punishment will be exposed to a severe punishment like no other seen in this world. Not an iota of injustice committed against the environment—including against one’s own body, other individuals, plants, animals, and inanimate objects—will go unaccounted for: *“Then shall anyone who has done an atom’s weight of good, see it! And anyone who has done an atom’s weight of evil, shall see it* (Q. 99:7-8).” Allah gives respite so wrong-doers may repent and reverse their evil to good, but if left unresolved, these actions will be recompensed in the next life.

The reality is that with the “privilege” of free will comes accountability. Without free will there would be no accountability because this would be unjust, a quality impossible to belong to the one whose name is The Just (Allah). **Allah will ask on the Day of Judgment about this trust and whether one has interacted with the environment in the manner that He loves or based on one’s lowly desires such as arrogance, greed, and wastefulness.** This is the test for which this life exists, so that Allah gives one a chance either to obey or to disobey and then either to be rewarded or to be punished based on the ultimate and complete justice of the All Knowing, All Wise, All Just, and All Merciful Lord. *“Blessed be He in Whose hands is Dominion; and He over all things hath Power;- He Who created Death and Life, that He may try which of you is best in deed: and He is the Exalted in Might, Oft-Forgiving* (Q. 67:1-2).

### **Developing the Spiritual Environmental Ethic**

In order to embed the maxims mentioned above into the souls of Muslim students and hence develop an environmental ethic that will give them both worldly and spiritual success, several avenues are needed. **Firstly and most importantly, the spiritual environmental ethic needs to be lived by teachers, staff, and parents interacting with the student.** As the famous proverb mentions “You cannot give what you do not have.”

Therefore, this ethic needs to be built in the hearts of those around the student either before or during attempts to establish this ethic amongst students. This may be done in the context of an Islamic school through multiple avenues. **Teachers and parents may attend workshops along with students that bring forth and contextualize the environmental foundational maxims.** The Entrusted Environment Research Group provided such a workshop for the Garden of the Sahaba academy Islamic School in Boca Raton, Florida. The workshop included teachers, parents, and middle and elementary school students. This workshop entailed an interactive presentation exploring the different maxims and discussing how they would affect ones choices in various circumstances. Students as well as teachers worked together to understand and apply these maxims. Students were then asked to write their reflections after the workshop. As one student stated after this workshop *“Allah is real and all the world is a sign of Him being real and one God only...The environment is a blessing, warning and sign of Allah. We must respect it and of course respect Allah.”*

Another avenue that is essential to building such an ethic for both educators and students is the **use of retreats that aim at providing experiential knowledge through time spent reflecting on the environmental foundational maxims in natural settings.** The Entrusted Environment Research Group in collaboration with Sanad Learning center of Miami, Florida provided a series of day retreats for teachers, parents, and students of all ages. Through visits to the world-renowned Everglades National park, a local nature preserve for sea turtles, and a trip to the local museum the foundational maxims were experienced by attendees. The format of these retreats included time for individual exploration and reflection, as well as a group lecture and discussion on what may be learned from the natural setting observed.

**In addition to the aforementioned avenues, educators must merge the divide between “Islamic” and “secular” sciences in Islamic schools.** The fact that the environment is discussed in what is sometimes termed “secular” sciences hinders the spiritual environmental ethic from developing in students and staff. This needs to be remedied by ensuring that “Islam” is not limited within a class period labeled “Islamic studies.” All the subjects (including math, language, science and history) need to be completely in tune with the Islamic spirit and taught as “Islamic studies.” For example, the foundational environmental ethical maxims may be consistently re-visited through subjects such as biology, chemistry, and physics such that they become a study of *Allah’s created world* which serves many purposes such as teaching us about Allah and giving us an opportunity to properly carry out our Trust (*Amana*) given to us by Him.

**Finally, the environmental dilemma faced by the world today should be presented to students in an engaging manner and understood as one of the main challenges they will need to confront during their generation.** With the spiritual Islamic backing discussed in this paper to tackle this problem as well as the up to date scientific knowledge about the environmental crisis of modern man, Islamic school students could lead the world by example showing how humans can once again live with, and not in opposition to, their environment.

## References

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Ali, A.Y., (1942), *The Holy Qur'an Text, Translation and Commentary*, New York, NY, McGreggor & Werner, Inc.

Dickinson, Daniel , (22 November 2008), “Eco-Islam hits Zanzibar fishermen”, *BBC News*, (2005), <http://news.bbc.co.uk/2/hi/africa/4271519.stm>.

Embassy of the Republic of Yemen in Canada, (18 November 2008), “About Yemen”, *Embassy of the Republic of Yemen in Canada*, (2004), <http://www.yemenincanada.ca/map.php>.

Esposito, J.L., (2002), *What everybody needs to know about Islam*, New York, NY, Oxford University Press.

Gezairy, H. A., (10 November 2008), “Water and Sanitation in Islam”, *World Health Organization*, (1988), [http://74.125.113.132/search?q=cache:QsNgaOJ9kZ4J:www.emro.who.int/Publications/HealthEdReligion/Water/Water\\_Foreword.htm+%E2%80%9CReligion+has+a+strong+influence+in+the+Eastern+Mediterranean+Region.+](http://74.125.113.132/search?q=cache:QsNgaOJ9kZ4J:www.emro.who.int/Publications/HealthEdReligion/Water/Water_Foreword.htm+%E2%80%9CReligion+has+a+strong+influence+in+the+Eastern+Mediterranean+Region.+)

Hill, Ginny, (8 November 2008), “Comic answer to Yemen water crisis”, *BBC News*, (2008), [http://74.125.47.132/search?q=cache:aoDgEjnj1N0J:news.bbc.co.uk/2/hi/middle\\_east/7595552.stm+rowyan+BBC&hl=en&ct=clnk&cd=1&gl=us](http://74.125.47.132/search?q=cache:aoDgEjnj1N0J:news.bbc.co.uk/2/hi/middle_east/7595552.stm+rowyan+BBC&hl=en&ct=clnk&cd=1&gl=us).

Lundqvist, J., C. de Fraiture and D. Molden, (2008), “Saving Water: From Field to Fork – Curbing Losses and Wastage in the Food Chain”, *SIWI Policy Brief*. SIWI.

Rice, Gillian, (2006), “Pro-environmental Behavior in Egypt: Is there a Role for Islamic Environmental Ethics?”, *Journal of Business Ethics*, 65, 373-390.

Smith, C., (2001), *Environmental physics*, New York, NY, Routedledge.

United Nations International Children's Emergency Fund, (10 August 2010), “The state of the world's children”, *UNICEF*, (2007), [http://www.unicef.org/sowc07/report/full\\_report.php](http://www.unicef.org/sowc07/report/full_report.php).