

Ecological Impact of Paper Production: A Case for the Abolition of Print Media

Ray A. Udejah

*Department of Masscommunication,
University of Nigeria, Nsukka- Nigeria*

Nche George Christian

*Department of Religion and Cultural Studies,
University of Nigeria, Nsukka- Nigeria*

Doi:10.5901/ajis.2013.v2n13p139

Abstract

This paper focuses on the ecological impacts of paper production. This formed the premises on which the researchers made a case for a global policy-driven abolition of print media- newspapers and magazines. A critical phenomenological approach was employed in this research and it was recommended that the phenomenal online media should urgently be a suitable substitute for the print media on the basis of the former's eco-friendly nature.

Keywords: *ecological impact, climate change, paper production, print media, online media.*

1. Introduction

The level of daily production, usage and waste of paper is worth revisiting. According to the Environmental Paper Network (EPN):

...hundreds of times a day, we touch paper – newspaper, cereal boxes, toilet paper, water bottle labels, parking tickets, streams of catalogs and junk mails, money, tissues, books, shopping bags, receipts, napkins, printer and copier paper at home and work, magazines, to-go food packaging. This list could fill a paperback (Shapely 2007).

With the invention of modern technology such as the printing press and the highly mechanized harvesting of wood, disposable paper has become a cheap commodity. Hence, half of the world's forests have already been cleared and 42% of the industrial wood harvest is used to make paper. According to the Environmental Paper Network, the average American consumes more than 700 pounds of paper yearly, which is the world's highest per capita figure. This is followed by "Western Europe – 400 pounds per person yearly, Australia – 300 pounds, while China, India and the rest of Asia are the fastest growing per-capita users". (Shapley 2007). Yet, each day, man is confronted with the realities of climate change and its attendant consequences. There has been a significant rise in sea level due to the indiscriminate melting of ice cap and several species of animals and plants are on the verge of extinction. Evidences of extreme weather conditions around the world abound, as there has been a "rise in poverty level, drought, famine and diseases with developing countries bearing the brunt of these ecological consequences" (Nche 2012, p.74). This is obviously the result of man's continuous depletion of the ecosystem through the emissions of green house gases. In America, for instance, the paper industry is the "4th largest contributor to greenhouse gas emissions and contributes 9% of the manufacturing sector's carbon emissions"

(Shapley 2007).

And there is no doubt, that the production of daily newspapers and magazines takes one of the major parts of paper production around the globe. This is despite the significant advancement in the online news and information phenomenon that seems more accessible and eco-friendly. Also, this is despite the currently intensified global eco-sustainability campaigns aimed at reducing green house gas emissions and the effects of climate change. It has been estimated that at least an 80% reduction in greenhouse gas (carbon dioxide, nitrous oxide, methane etc) emission is to be achieved as soon as possible and not later than 2050, to attain adequate ecological sustainability (Nche 2012, p. 165). Hence, something more serious and practical needs to be done in order to save the earth's ecosystem from the eminent danger.

Therefore, this paper attempts the analysis of the ecological impact of paper production, while making a case for the global abolition of daily newspaper and magazine production. It avers that the current online news and information phenomenon should replace the former, on the basis of its eco-friendly nature and accessibility.

2. The Reality of Climate Change

In spite the seriousness of the issue of "climate change, it has been variously misunderstood and undermined, like in the case of Beaty (2012) who designated climate change as an "earth-worshipping religion" on the basis of its general acceptance on faith, as opposed to hard evidence. Yet, Robert M Carter of James Cook University Queensland Australia and the host of others have out rightly denied the realities of climate change. They argue that, in contrast to the generally held view, the global temperature is not significantly warming and even if it does, there is no evidence to show that human activities are responsible. Instead, it is a natural course. This is appropriately captured in the *Wall Street Journal Editorial*, which reads "Why require the nations of this planet to spend the hundreds of billions of dollars necessary to reduce carbon dioxide and other emissions when we don't even know if the earth's climate is getting permanently hotter or if that temperature change is caused by human activity or if that change is even dangerous? (Eileen 2002). In fact, Carter (2009) argued that; Carbon dioxide is a minor "greenhouse gas, responsible for 26% of the total greenhouse effect, of which in turn at most 25% can be attributed to carbon dioxide contributed by human activity. Water vapour, contributing at least 70% of the effect, is by far the most important atmospheric green house gas". To this, Donald Wuebbles, the Harry E. Preble Professor of Atmospheric Science at the University of Illinois responded thus;

We have no evidence of a natural cycle that can do anything like this. It also exactly fits with all our knowledge of what happens with carbon dioxide and green house gases. We have known about greenhouse gases since 1824! We know the oceans are warming, the atmosphere's warming, and the land is warming. It's all happening in tune with each other (Herper 2013).

Also according to Herper (2013), the main reason for believing that the atmosphere is heating up or is "a giant heat tent" and that man is responsible is that:

This has been the basis of climate science for nearly 200 years. Joseph Fournier, the great mathematician, first made calculations about how the atmosphere keeps the earth warm in 1824. John Tyndall, a physicist, established that particular gasses, including water vapour but also methane and carbon dioxide, resulted in heat being trapped in the atmosphere. The Swedish scientist, Svante Arrhenius, showed in 1896 that more carbon dioxide would mean warming and predicted that industrial output could eventually warm the planet. The greenhouse effect is the main explanation for why Venus is the hottest planet and Mars, the coldest in the solar system.

However, beyond all these, looking critically at these skeptical positions, one begins to wonder the drive behind them. Is it to discourage moderation in human industrial activities, or to question a mere validity of some scientific postulations? Is it to discourage the change that is about taking place in human history as a result of the emerging global policies on climate change or to shy away from the responsibility of taking care of the environment? And is it to shift the blame of destroying the environment to natural factors or a mere scientific exercise? Tony Blair has stated categorically that "Global warming is too serious for the world any longer to ignore its danger or split into opposing factions on it" (www.notable-quotes.com). According to the United Nations' Intergovernmental Panel on Climate Change (IPCC) which draws on the expertise of hundreds of climate scientist around the world, the earth's temperature is significantly warming and changing, and man is largely responsible and great danger awaits any man's inaction towards its amelioration. In a speech at National Sierra Club Convention, September 9, 2005, Al Gore reportedly said thus:

Two thousand scientists, in a hundred countries, engaged in the most elaborate, well organized scientific collaboration in the history of humankind, have produced long-since a consensus that we will face a string of terrible catastrophes unless we act to prepare ourselves and deal with the underlying causes of global warming (www.notable-quotes.com).

Indeed, these are no longer theoretical matters, as the evidences and consequences of climate change have become part of daily experiences in several cities and countries of the world. For instance, sea level is rising due to indiscriminate melting of glaciers and Arctic sea ice, extreme weather conditions are experienced and heavier rainfall cause flooding in many regions like Pakistan, Philippines, Thailand, Nigeria, South Africa etc. Extreme drought and famine have become common especially in African countries like Kenya, Ethiopia, Somalia etc as crops are withering due to higher temperatures. And diseases are unusually increasing. In fact, according to World Health Organization (WHO) estimates, the global warming that has occurred since the 1970s caused over 140,000 excess deaths annually by the year 2004 (www.who.int).

According to scientists, "these ecological disasters are just a tip of the ice berg, when compared to the magnitude of danger climate change holds for man, if it continues unchecked"(Nche 2012, p.165). Hence, the countries of the world must go beyond the inconsequential debate on whether or not climate change is real and face up to the challenges of climate change and its consequences as evidences abound. Emissions of carbon dioxide and other greenhouse gases from industrial activities have been held to be the cause of this temperature change. Therefore, emission must be significantly reduced as moderation and modification in industrial processes become the key words, in the fight against climate change. More specifically, some parts of human industrial activities should be either fused or dropped entirely on the basis of their unfriendly eco-practices, to give room for more eco-friendly replacements. This is no other, than the production of newspapers and magazines.

3. Ecological Impact of Paper Production

Imagine a world without trees and a world without forests. Indeed, such a world would definitely be an incomplete world and seems unimaginable. This is because trees and forests are of inestimable values to man and the rest of other creatures. Without exaggeration, "there is no life without trees" (www.haryali.org). This is because trees provide man with oxygen, which is essential for the existence of life. According to the US Department of Agriculture, "One acre of forest absorbs six tons of carbon dioxide and puts out four tons of oxygen. This is enough to meet the annual need of 18 people". This is done during the process of photosynthesis, in which trees take in carbon dioxide and release oxygen which human breathes. Also this air man breathes is filtered by trees, shrubs and turf through the removal of dust and absorbing of other pollutants like carbon

monoxide, sulfur dioxide and nitrogen dioxide. Trees control climate by moderating the effects of the sun, rain and wind. They also lower the air temperature and reduce the heat intensity of the greenhouse effect by maintaining low levels of carbon dioxide. Trees conserve water, preserve soil and support wild life.

Yet, the same trees are cut down for several commercial purposes of which the industrial production of paper is outstanding. Hence, the industrial production of paper has had significant impact on the environment. Forest store 50% of the world's terrestrial carbon and maintains the world's abundant biodiversity, essential for life on earth. However, unfortunately, "half of the world's forest have already been cleared or burned, while 42% of the industrial wood harvest is used to make paper. (Shapley 2007). For instance, the remaining natural forests in Sumatra, Borneo, New Guinea, Russian Far East, Southern Chile and the Atlantic forest region in Brazil are currently endangered because of growing demand for paper wood among other threats. Hence, some rare species of animals like "Asian big cats (including tigers), Asian elephants, Asian rhinos, and orangutans have come under a big threat of extinction. (www.panda.org).

Also, the ecological impact of the industrial process of paper production is quite significant. Paper mills contribute to air, water and land pollution. During the manufacturing process, a significant amount of inimical gases (like nitrogen dioxide {NO²}, sulphur dioxide {SO²} and carbon monoxide {CO²}) are emitted into the atmosphere. For instance, in the US alone, the paper industry is ranked the 4th largest contributor to greenhouse gas emissions among the manufacturing industries and contributes 9% of the manufacturing sector's carbon emissions (Shapley 2007). Whereas, worldwide, the paper industry is ranked the 5th largest consumer of energy, accounting for 4% of all the world's energy use (www.wikipedia.org). Furthermore, the paper industry uses vast amount of water during production. In fact, it is estimated that the paper industry is the single largest consumer of water used in industrial activities (www.panda.org). Also, during this process, acidic waste water (containing organic and inorganic matters) flow into rivers and lakes leading to pollution and death of living organisms. The Tarawera River in New Zealand which subsequently became known as the "black drain" due to industrial pollution is a case in point.

Again, the post-consumer waste papers have significant ecological effects. The dumping of industrial waste and post-consumer waste papers, "like other wastes face the additional hazard of toxic inks, dyes and polymers that could be potentially carcinogenic when incinerated or co-mingled with ground water via traditional burial methods such as modern landfills" (www.wikipedia.org). It has been observed that paper accounts for 25% of landfill waste and that municipal landfills account for one third of human related methane emissions (methane is 23 times more potent a greenhouse gas than is carbon dioxide) (Shapley 2007). Although, paper recycling has been believed to mitigate some of these ecological impacts, it is not without some challenges as well.

Following from the above, therefore, some crucial questions need to be addressed: For how long shall we keep up with the luxury of daily paper production, especially news papers? For how long shall we continue in the prodigal pillage and depilation of nature-forests, ecosystems etc? And for how long will the world continue in colossal waste in the face of ecological threat?

4. The Obsolescence of Print Media

Newspapers are periodicals. They are publications that appear regularly and frequently, and carry news about a wide variety of current events. It carries news of general interest ranging from politics, economics, health, religion, sports, music, theatre, fine arts etc, to large portions of the public in a specific geographical area. The history of newspapers dates back to some five centuries ago in Europe when merchants were distributing hand written newsletters to selected group of people based on demand. These newsletters contained information about the weather, economic conditions, wars and human interest stories (www.library.thinkquest.org). Then, in the 17th century, especially in Germany, printed periodicals began rapidly to replace this practice of

handwriting newsheets. This is how newspaper eventually came to be, with the first one being *The Strasbourg Relation* in Germany (www.wikipedia.org). Although, the newspapers were started with the distribution of handwritten newsletters among small communities in Europe, they have become overwhelmingly rampant and part of daily life all over the world. Today, there are several newspaper houses and companies in several countries of the world. However, interestingly, the more the production of newspapers grew the more the ecological footprints and impacts.

Newspapers are printed on newsprint, an uncoated ground wood paper made by mechanically grinding wood pulp without first removing lignin and other wood pulp components. Due to the frequency and regularity in production and demand, the newspaper industry is said to have had great impact on the environment. Trees and forests serve as source of raw materials for the newspaper industry. It has been estimated that to produce each week US Sunday newspapers, up to 500,000 trees must be cut down. Also, everyday, Americans buy about 52 million newspapers and throw out around 44 million of them (EPA 2008). In fact, it was in consideration of this ecological impact that experts and stakeholders evolved a recycling program for the paper, especially the newspaper industry in order to mitigate the environmental effects. For instance, according to the Newspaper Association of America (NAA), members are mandated to change industrial operations for more sustainable practices through the reduction of waste, use of recycled content and avoidance of total reliance on virgin fiber (www.naa.org). This is also seriously encouraged among newspaper industries all over the world. However, achieving this seems to be a great challenge.

Beyond this, however, the fact is that newspapers are increasingly becoming unpopular. While this can be generally attributed to the advancement in science and technology which brought about the use of television and radio which serves as alternative source of news, it can specifically be attributed to the dramatic rise of the online news and information phenomenon that currently takes the stage in journalism across the globe. In fact, the pace with which this online news is becoming popular is indeed overwhelming. This is obviously due to its nature, accessibility and flexibility. All the news content of newspapers like politics, economics, health, sports, emotional issues, arts etc are currently being accessed through the web from comfort zones. And these are presented or brought to consumers "faster and in a more visual style than newspapers, which are constrained by their physical form and the need to be physically manufactured and distributed. Okoro and Diri (2010: 240) has observed that while newspapers involve a straight forward industrial process and series of transformation that constitute the physical production and distribution of the commodity, online newspaper on the other hand does not incur any of these costs. For them, it is true the online newspaper requires some space on the server, but this is not a comparable expense to the printing processes and trucks needed for the physical product. "The consumers themselves pay cost of distribution, buying the PCs and paying the telecommunications charges (p. 241). In the same vein, Sparks (1996) has reiterated that "the online newspapers offer the proprietors the prospect of substantial cost reductions". Furthermore, the geographical and terrestrial barriers that previously segmented the market have significantly been eliminated, as readers can now access news and information from anywhere, anytime. Thus, the erstwhile impossible, has become possible with the emergence of online news phenomenon. This no doubt, brings the obsolescence of newspapers and magazines to fore. This does not completely distort one's expectations, at least considering the overwhelming pace of technological breakthrough and digitalization. In 1980, the late Canadian professor of English, Marshal McLuhan reportedly said that "...we live in a unique revolutionary communication age, a balance point in history where the power of the printed word is over... the age of print had its obituary tapped out by the telegraph". (Griffin 199: 295). This seems to have taken place as "new media delivery systems, new information processing, storage and retrieval systems have irresistibly dominated the communication scene (Okoro and Diri 2010, p.240). Hence, today, several newspapers have either incorporated the internet services by providing an online version of a printed periodical, or got fused into providing online news or services only. *The Los Angeles Times, the Washington Post, USA Today, the Nigerian Tribune, the*

Nation, *Times of India*, *Indian Express* etc currently have online news edition. While the *Seattle Post-intelligencer* got fused into providing online news only in march 2009, after publishing for 149 years in United States. Yet, there are some that are established specifically to provide online news or services only. These include the *Southport Reporter* introduced in 2000 in the United Kingdom, the *Caledonian Mercury* in Scotland, and so on. In summary, the above analysis and comparison are aimed at appreciating the influence, affluence, flexibility and accessibility of online news phenomenon, while bringing to light the obsolescence of the traditional newsprint like the newspapers and magazines.

5. Ecological Assessment of Print and Online News Media

The Finland based Alma Media, in partnership with the Technical Research Centre of Finland and the Centre for Sustainable Communications (Sweden) carried out a study to determine the life cycle environmental impacts of printed newspapers and that of online news. The conclusion of the survey was that, while the printed newspaper is more eco-friendly, based on a comparison of the environmental impacts of one hour of consumption of each media channel, the annual environmental impacts of print media generally outweigh those of corresponding online service when taking into account actual usage volume. (www.globaleenvironmentalsociety.net). Also, in outlining the effects of the e-reader (electronic reader) on the environment, Matthew (2013) cited a report by the Cleantech Group which has it that "168 Kilograms of carbon dioxide are emitted in manufacturing a single kindle, which is more than 20 times the 7.5 to 8 kilograms used to produce the average book". Furthermore, in the comparison, he wrote, "unlike conventional books, e-readers also require electricity as do the computer servers that supply their content".

All these notwithstanding, the ecological impact of the online news phenomenon is highly negligible when compared to that of print media. According to Frank Locantore (Director of the Magazine Paper Project in the U.S) as cited in Glaser (2007);

With the web, we are talking about energy use more than anything else. When you talk about magazines and newspapers, you are talking about forests, as well as energy and water use and even social conflict from where the forest fiber is being sourced. I can't imagine magazine readership and production having less impact than the web.

Although, it is true that recycling programs have been afoot for the newspaper and magazine industry, the fact is that the dream of a 100% paper recovery is far from reality. However, while the newspaper industry especially in US are making laudable efforts towards the use of recycled content in its production, the magazine industry is seriously lagging in following the recycling program. For instance, the Newspaper Association of America found that "since early 1990, newspaper industries have increased the average amount of recycled fiber in newsprint used in the US from 9% to 35% (www.naa.org). Yet, the magazine industry has been "slower to embrace recycled paper in their publications, citing a higher cost and lower quality of the paper" (Glaser 2007).

Be that as it may, the recycling program is never meant to entirely eliminate the environmental impacts of print media; instead, it is meant to significantly reduce their ecological impacts. Conversely however, some environmental effects are still recorded during the industrial recycling process, like the sludge often produced during the process of deinking. Also, the energy needed to transport post-consumer waste to the mills and back to consumers. In fact, whichever way it is viewed, the ecological footprint and impact of print media still outweigh that of online news and information phenomenon. Yet, some persons like Minna Nors (the scientist in charge of the aforementioned Alma Media Research Project) encourage a complementary relationship between the print media and the online media. According to her:

The results of the study reflect the way different types of media complement each other. Comparing print and online media side by side is not necessarily what we should focus on.

Instead, we should examine them as complementary media channels... (www.globalenvironmentalsociety.net)

Indeed, the idea of a complementary relationship sounds fair and considerate but can only be reasonably applicable when there is nothing at stake. Of course, the environment and more importantly, the future of young generations is at stake. For decades, trees and forests have been indiscriminately harvested to make newspapers and magazines with no commensurate replacement. This is not to mention the tons of gases emitted into the atmosphere during manufacturing processes and the landfill-related toxics and gases. Whereas, apart from the electrical energy needed to power the online devices (which of course can be substituted with the use of solar energy), the online media, is more eco-friendly, accessible, flexible and less costly on the part of the proprietors. Its accessibility and flexibility is further projected by the fact that news and current information are now accessed with smart phones and wireless devices at anytime, anywhere. It also gives room for update of events/news as the day go by. Some online news providers even create platforms for readers to make comments on current events as the case may be. In fact, "the further we look to the future, the more likely the relationship between print and digital media is to evolve from that of a complementary preference, to that of substitute..." is what Lauri Hetemaki and Maiella Clarke of the Finnish Forest Reserve Institute wrote in their unpublished research paper, "The Impact of Environmental Issues and Information Technology on the Future of Paper Industry" (Glaser 2007). Hence, on September 2010, Arthur Sulzberger Jr. chairman and Publisher of the *New York Times*, reportedly told an International Newsroom Summit in London that "We will stop printing the *New York Times* sometime in the future, date TBD" (Shea 2010). On his part, Nick Bilton (a technologist for the *Times*) acknowledged thus: "Paper is dying, but it's just a device. Replacing it with pixels is better experience" (Singel 2009). There is no doubt, that the online media has relatively come of age to be a symmetrical substitute for the print media. And to the exponents of a complimentary relationship, one may ask: Which information will be lost? What point cannot be properly made? And which pictures cannot be properly displayed without the use of the Print Media?

6. The Inevitable Change

The world, not just the climate is substantially changing. Virtually everything is taking new forms, shapes and structures, while some are dropped entirely for new ones; ways or patterns of doing things. This change is largely occasioned by the endless breakthroughs in science, technology and arts. And it has influenced patterns of relationship, political focus, economic policies and religious affiliations all over the world. Yet, people are resistant to change. This is evident in the way people still hold the print media, despite the obvious ecological as well as economic advantage of the online media. It is however more evident in the stance of some quarters that encourage a complementary relationship between print and online media. However, considering the threat of ecological disaster that awaits the earth according to scientists, if nothing is done about the changing climate, the substitution of print with online media becomes an inevitable change.

Over the years, the issue of climate change has been at the front burner of global discourse and negotiations. And the principal focus has been on the reducing carbon dioxide and other greenhouse gas emissions. This is because the "emissions of greenhouse gases have a global impact unlike some other forms of pollutions; whether they are emitted in Asia, Africa, Europe, or the America, they rapidly disperse evenly across the globe" (www.world-nuclear.org). Hence, several international approaches have been put in place to achieve this greenhouse gas emission reduction. One of the major approaches is the Kyoto Protocol and one of the key decisions/agreement in the protocol is that countries who are signatories to the protocol shall reduce emissions by 5.2% from 1990 levels by 2012. However, following the more recent decisions from the UN COP 17 (Conference of Parties) held in Durban, South Africa in 2011, "it was agreed

that a more legal and universally binding agreement on climate change shall be adopted as soon as possible and not later than 2015" (Nche 2012,p.75). Apart from the Kyoto Protocol, there are other approaches like the Asia Pacific Partnership, the G8 Agreement etc that are put in place to tackle the climate change challenge. Again, at the National and state levels, there are several climate action plans like the Implementation of the Renewable Electricity Standards, Energy Efficiency Standards, etc that have been in progress.

All these efforts and many more, project the seriousness of the phenomenon of climate change as well as the readiness on the part of the world to deal with the challenge. In a speech at National Sierra Club Convention, September 9, 2005, Al Gore reiterated thus;

The good news is we know what to do. The good news is, we have everything we need now to respond to the challenge of climate change (global warming). We have all the technologies we need, more are being developed, and as they become available and become more affordable when produced in scale, they will make it easier to respond. But we should not wait, we cannot wait, we must not wait (www.notable-quotes.com).

Therefore, to meet up to the challenge, there must be changes in the human industrial activities as well as in the rate and patterns of consumptions across the globe. This is because it has been long established that anthropogenic (human) factors are largely responsible for the changing climate, through the years of industrial activities. There must be a change from less eco-friendly activities to more eco-friendly activities in order to save the earth's climate.

It is in this light that, it is hereby recommended that there should be a change from Print Media to Online Media on the basis of their ecological footprints and impacts. This change should be introduced by a policy, as part of the global policy response to climate change. The online media has irrefutably come of age to be a symmetrical substitute of print media. Of course, there are bound to be challenges in the process of achieving this change, but they are not uncommon with change. For instance, some may want to argue that this change should be gradual. However, it is only when a change is introduced and accepted in the first place, that adaptation becomes gradual. Lauri Hefemaki and Maiella Clarke have aptly observed that "the more consumers accept electronic media as a substitute for printed media, the easier it is for politicians and environmental authorities to regulate media that are environmentally more damaging" (Glaser 2007).

Furthermore, while it is expected that the platform on which this Policy shall be made is the United Nations; it is expected to have a global coverage. For the sake of clarity, the Policy should forbid countries of the world from further production of printed media (Newspapers and Magazines) and to completely adopt the online media as a replacement. Indeed, there are expected challenges of unequal development and access to technologies among countries that will be faced. But, if there are differences in the date of the policy implementation in several countries or continents based on levels of development, the challenge will be adequately dealt with. The fact is that, this change, when achieved, has significant ecological advantage and benefit to the world. For instance, if this change is eventually achieved, millions of trees and forests would be spared, and tones of greenhouse gases un-emitted. This is in addition to other environmental benefits that accrue when energy is spared and landfills decongested with post consumer newspapers and magazines.

In summary, it is indeed a luxury, at the expense of the environment, to be running both printed and online Media. Therefore, since the both media have ecological footprints, it will not be unreasonable to drop the less eco-friendly media for the more eco-friendly media.

7. Conclusion and Recommendations

This paper has highlighted the ecological impacts of print media as well as the reasons it should urgently be substituted with the online counterpart. We recall that it is a strong concern for the environment and the future generations that would necessitate actions such as this. The United Nations and stakeholder-environmentalists, therefore, should have their attention drawn to this very important issue; so that a decisive action will be taken on the issue in line with the above

recommendation.

In order to mitigate some initial difficulties that might ensue in some places from the implementation of the above major recommendation, this paper recommends the following:

- A gradual adaptation, acclimatization and acquisition of the primary internet knowledge and skills, especially where computer literacy is low, to enable one access online news with computers and smart phones.
- The use of electronic alternative sources of news and information such as radio, television and similar media in the absence of immediate internet or computer skills, sufficient internet services and adequate smart phones.
- Where electric power supply is epileptic and insufficient, battery or solar-powered radios are recommended.

References

- Beauty, W. A. (2012). The Religion of global warming. (www.americanthinker.com). Assessed on 4th May, 2013.
- Carter, R. M. (2009). Ten facts and ten myths on climate change. (www.rense.com) Assessed on 4th May, 2013.
- Climate change and health (www.who.int). Assessed on 1st June, 2013.
- Glaser, M. (2007). Web leads, print pubs improve environmental impact. (www.pbs.org). Assessed on 15th June, 2013.
- Global warming quotes. (www.notable-quotes.com). Assessed on 6th May, 2013.
- Griffin, E. A. (1991). A first look at communication theory. New York: McGraw-Hill Inc.
- Eilen, C. (2002). Climate change: Myths and realities. (www.czers.org). Assessed on 4th May, 2013.
- Environmental impact of paper. (www.en.m.wikipedia.org). Assessed on 12th June, 2013.
- Herper, M. (2013). Why republicans should embrace the reality of climate change (www.forbes.com). Assessed on 6th May, 2013.
- History of newspapers and magazines. (www.en.m.wikipedia.org). Assessed on 12th June, 2013.
- Importance of trees. (www.haryali.org). Assessed on 4th May, 2013.
- Importance and value of trees. (www.savatree.com). Assessed on 4th May, 2013.
- Matthew, M. (2013). Effects of the e-Reader on the environment. (www.greenliving.nationalgeographic.com). Assessed on 15th June 2013.
- Nche, G. C (2012) Challenges of climate change: The role of christian religious leaders. *Journal of Educational and Social Research* (vol. 2), No. 10. Mediterranean Centre of Social and Educational Research. 73-80.
- Nche, G. C (2012). Challenges of eco-sustainability campaign and environmentalism in nigeria: The way forward. *Mediterranean Journal of Social Sciences* (vol. 3), No. 13. Mediterranean Centre of Social and Educational Research. 165-173.
- Newspaper Association of America environmental policy: Towards sustainability in the newspaper industry. (www.naa.org). Assessed on 14th June, 2013.
- Newspaper: The history. (www.library.thinkquest.org). Assessed on 12th June, 2013.
- Okoro, N., and Diri, C. T. (2010). The challenge of online newspaper phenomenon to off-line newspaper paper patronage and revenue in Nigeria. *International Journal of Research in Arts and Social Sciences* (vol 2). Society for Research and Academic Excellence, University of Nigeria. 239-249.
- Policy responses to climate change. (www.world-nuclear.org). Assessed on 18th June, 2013.
- Prints vs. online media: The ecological showdown. (www.globalenvironmentalsociety.net). Assessed on 16th June, 2013.
- Shapely, D (2007) Facts about the paper industry, global warming and the environment (www.thedailygreen.com). Assessed on 2nd May 2013.
- Shea, D. (2010). "Arthur Sulzberger: 'We will stop printing the *New York Times* sometime in the future'". Huffington Post. Assessed on 23 June 2013.
- Singel, R. (2009). Times techie envisions the future of news. Wired Magazine, blog.wired.com. Assessed on 23 June 2013.

- Sparks, C. (2004). *From dead trees to live wires: The internet challenge to the traditional newspaper*. In Curan, J. and G. M (eds.) *Media and Society*. New York: Arnold Publishers.
- The future of newspaper. (www.en.m.wikipedia.org). Assessed on 15th June, 2013.
- WWF international: Towards sustainable pulp and paper production. (www.panda.org). Assessed on 6th May, 2013.

