

Developing Web-based Platforms to Promote Research and Communication about Tourism and Climate Change in Southern Africa

**By Prof. Helen Purkitt,
Dept. of Political Science, U.S. Naval Academy,
Annapolis, MD 21402**

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Abstract

The chapter describes the organization of a web-based project designed to promote collaborative research, learning, communication and action about Botswana tourism. Examples from this project are used in the final section of the paper to illustrate how data collection, research results, policy initiatives and communications about tourism and climate change in southern Africa can be organized on a dedicated web site. The Botswana project used freeware, i.e., Goggle Sites and Drupal, an html content-management system, to archive specialized research and knowledge and for online communication and collaborations. This web site was developed as a Fulbright Research Project for the International Tourism Research Center (ITRC) at the University of Botswana in Gaborone in 2010 and is available online at: www.BotswanaTourismResearch.org,

I. Introduction

The incredible growth of social-networking sites, instant text messaging, collaborative chat rooms, blogs, Facebook, MySpace, Twitter and increasingly powerful cell phones that serve as software and Internet platforms all underscore the fact that the way we communicate, store our knowledge and organize for action is undergoing remarkable

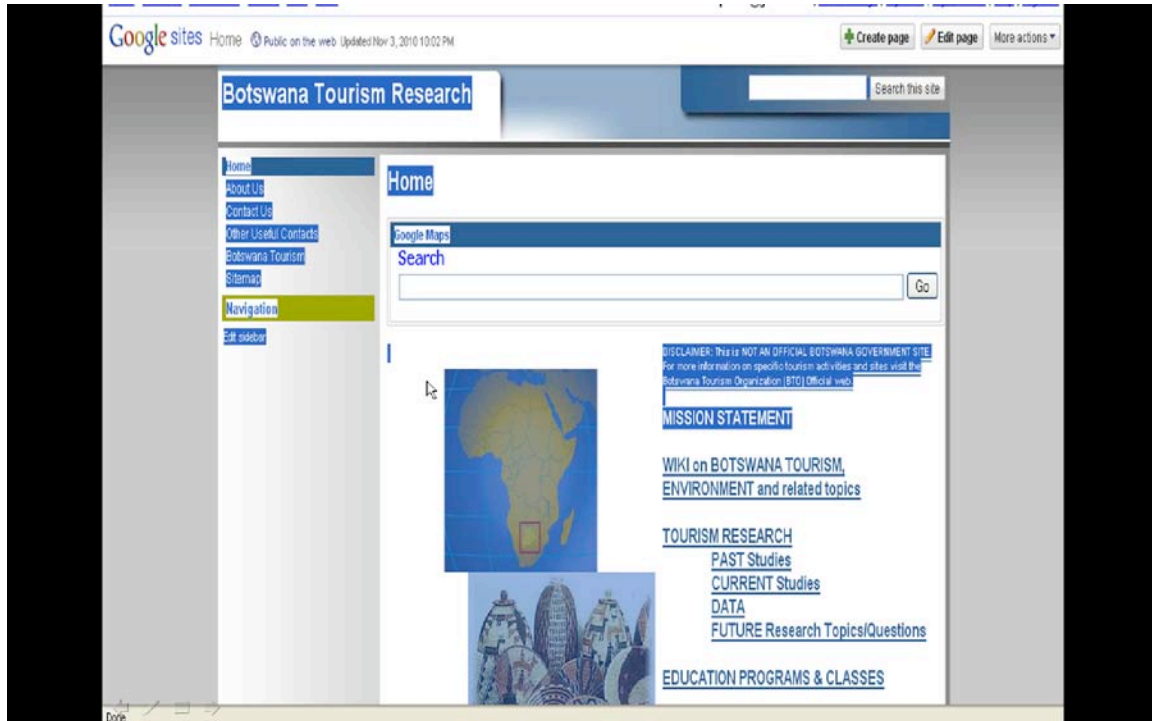
change. The extensive use of the Internet by President Obama's 2008 campaign for fundraising, communicating and getting-out-the-vote, as well as the central role played by web-based tools during the revolutions in several Arab countries during 2011, are timely reminders of the fact that the Internet is now a central tool in making, changing and implementing public policies. The irreversible and highly disruptive changes associated with climate change suggest that it is important to also harness the Internet to promote research, communication, policy changes and manage needed adaptations due to future disruptive effects of climate change and its impact on tourism as well. Nowhere are such systems needed more than in Africa where the disruptive effects of climate change are already being experienced.

This paper describes an ongoing project designed to harness some of the latest web-based freeware tools to facilitate collaborative learning, research and communication among geographically dispersed participants with common interests. The project offers examples that may be useful in future efforts to construct a web-based database to promote research, communication and actions to promote tourism and manage climate change in southern Africa. The next section describes a web-based site designed to facilitate tourism research for the International Tourism Research Centre (ITRC) at the University of Botswana in Gaborone. This content-management system, designed for use by students, researchers and serious eco-tourists, was developed as part of a Fulbright Research Project for the International Tourism Research Center (ITRC) at the University of Botswana in Gaborone during 2010. This project is available online at www.BotswanaTourismResearch.org (1). The final section discusses how the basic design of this database could be used to develop a web-based site geared towards the interests of tourism and climate-change researchers to promote research, communication and actions geared toward understanding, monitoring and mitigating the adverse effects of climate change on tourism in one or more regions of Africa.

II. Developing a Specialized Content-management System for Botswana Tourism

The database described in this section is designed for tourism researchers, students and serious eco-tourists interested in contributing to knowledge about Botswana's environmental and tourism sector. The initial prototype web site was developed using Goggle Sites freeware because it required no programming expertise. This prototype web site is available at: <http://www.purkitt.org/>. Exhibit 1 presents the front page of this initial web site.

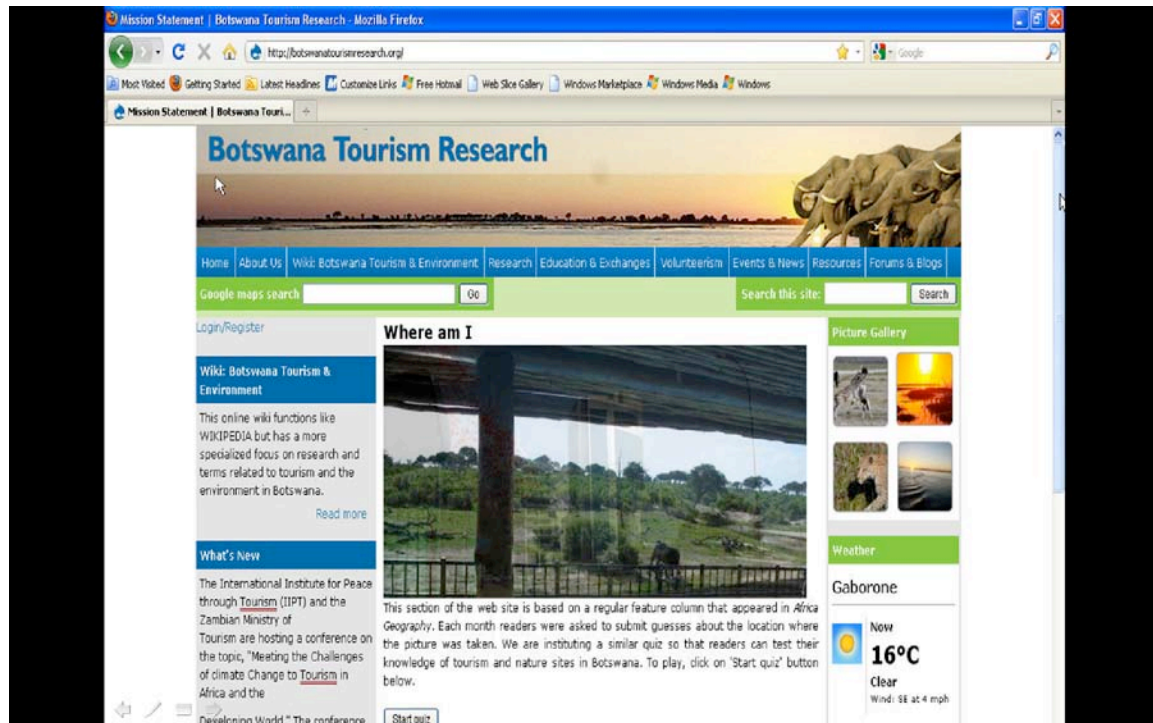
Exhibit 1. Goggle Sites prototype for Botswana Tourism Research.



The use of Goggle Sites was helpful for designing the preliminary front page because this freeware permits the importation of numerous apps such as Goggle Map, weather updates, etc. It is also possible to upload pictures and other non-textual materials without having to write specialized programs. Goggle Sites is very easy to use and one can quickly design and implement a specialized wiki. While easy-to-develop, Goggle Sites did not have all of the functionality needed to develop any embedded wiki data within the web site; therefore, another content-management system was written using Drupal freeware modules. A screenshot of the front page of the final web site, available at <http://www.Botswanaturismreserach.org>, is shown in Exhibit 2.

This specialized web site consists of a series of linked web pages including: 1) a specialized wiki on Botswana tourism and environmental research open to anyone interested in accessing or contributing to it online; 2) an archive of relevant research, news articles, reports, web sites, etc. 3) a “where am I” picture quiz of tourist sites in Botswana; and 4) communication tools, including a blog and forum. The picture quiz was based on a former column in Africa National Geographic. This feature was incorporated into the front page of this web site home page in order to capture the interest of potential users (2). Another reason for its inclusion is because too many citizens and long-time residents in Botswana have never visited many of the most famous tourist locations in their own country. Preliminary feedback from University of Botswana students at the end of 2010 during an all-university fair suggests that it will remain one of the most popular features of the web site.

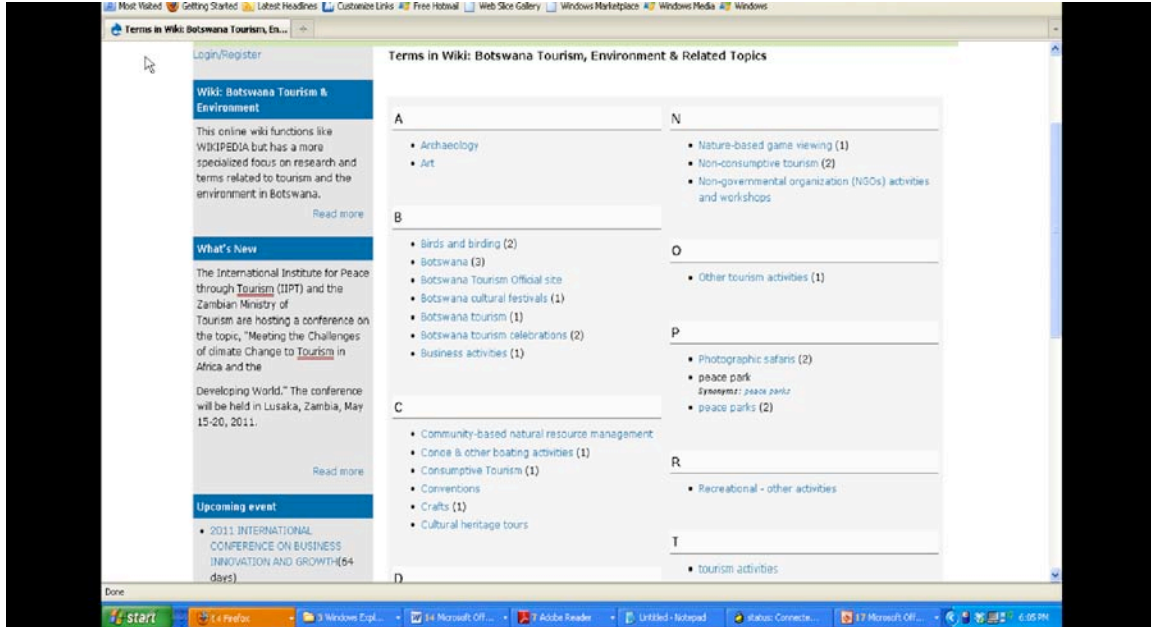
Exhibit 2. Final template for Botswana Tourism Research.



Additional information is accessible from the front page through drop-down menus. Current information contained in the drop-down menus include: 1) a list of relevant actors and web sites involved in tourism in Botswana; 2) archival space for past, relevant research, summaries of ongoing research and suggestions for future research; 3) a series of informative drop-down menus with information about in-country and international education programs related to tourism and the environmental programs and information about exchanges; 4) drop-down menus for relevant news stories; and 5) pages to support both forums on specific topics and a blog. Links to other social-networking sites (i.e., Facebook, Twitter, etc.) will be added as demand for these links arise.

The most unique feature of the content-management system is a specialized wiki embedded within the system. On the left-hand side of the front page (See Exhibit 2 or go to www.Botswanaturismresearch.org), a user can easily enter and view articles in the wiki or register and contribute to topics related to Botswana tourism and environmental topics. Exhibit 3 displays the current state of the wiki that one accesses from the front page. Midshipmen at the U.S. Naval Academy wrote additional articles on general topics displayed in the index. Students majoring in Environmental Science at the University of Botswana in Gaborone are going to be adding more specific information related to Botswana to the general articles. The goal is to spur cross-continental electronic collaborations among students as they collaborate to write additional articles in the future (3).

Exhibit 3. Keywords currently listed in the Botswana Tourism Wiki.



Unlike Wikipedia, the basic unit of this content management is the keyword rather than the article. One purpose in using this organizational logic was to see which keywords would be contributed to a bottom-up community-developed thesaurus. Time will tell if this was the best logic to use to link related content information in the wiki. Preliminary work suggests that it may have been best to stick with the article-based approach of Wikipedia. The outline template for articles currently being uploaded into the wiki is displayed in Exhibit 4. The exemplar article is about climate change. The organization of this specialized wiki outline is based on the categories similar to those used in Wikipedia articles. We felt this was best since many contributors would already be familiar with the organization of Wikipedia articles. Like Wikipedia, articles can be revised over time as additional users contribute to this specialized wiki.

Exhibit 4. Botswana Tourism Research Wiki article outline.

The image shows a screenshot of a Wiki article template outline. The title is "Template – outline for wiki articles". The main heading is "GLOBAL CLIMATE CHANGE – AFRICA". The outline is structured as follows:

- **Wiki Article**
 - **Task:** Select a topic from the attached list AND write an article about the topic as it pertains to southern Africa.
 - **Format:** Write a typed article (2-5 pages) using the same format the following format (taken from Wikipedia or a similar one). In addition to the 2-3 pages of typed text, your article MUST include Notes, a Bibliography, Other Key Terms, and Further reading and/or External links. Remember, all work must be your own. DO NOT COPY and past from other web sources or Wikipedia. When in doubt ask me and add footnote.
- **OUTLINE Format**
 - **1.0 Definition**
 - **2.0 Key statistics or Trends**
 - **2.1 History**
 - **2.2. Recent developments**
 - **3.0 Growth or key change**
 - **4.0 Other Key Topics**
 - **See also (insert other key terms)**
 - **5.0. Notes (End Notes)**
 - **6.0 Bibliography**
 - **Further reading & external links**
- **GLOBAL CLIMATE CHANGE – AFRICA**
 - **Definitions**
 - “Climate change” or Anthropogenic Climate Change
 - Anthropogenic- The Greenhouse Effect
 - **Africa**
 - Climate Change in Africa
 - Why is Africa so vulnerable to change in climate?
 - Sub-Saharan Africa
 - Southern Africa
 - **Evidence**
 - Anthropogenic Relations
 - Water Related Substances
 - CO2 gas emissions
 - Affected Wildlife/Plants
 - **Recent Developments – Fighting Climate Change**
 - **Other Key Topics**
 - **Key Terms**
 - **Notes (End Notes)**
 - **Bibliography**
 - **Further reading and external links**

III. A Wiki on Tourism and Climate Change in Southern Africa

Although the Botswana Tourism Research web site is geared toward the interests of tourism and environmental researchers in Botswana, the basic design could easily be modified to serve the needs of researchers, students, policy-makers and serious eco-tourism visitors concerned about climate change and its impact on tourism in southern Africa or the entire African continent. The Goggle Sites approach described in the prior section may be the most attractive option for individuals who want to launch their own web sites at no cost and have no prior programming experience (4). However, for those with some html programming knowledge or resources to pay a programmer, the Botswana Tourism Research site (www.Botswanaturismresearch.org) written in Drupal would be a better alternative since the module approach of this content-management system permits more applications and additional features to be added on as new needs arise. This section describes some ways that a web-based system could facilitate the synthesis of research, knowledge accumulation and communication among those interested in the impact of climate change on different areas of Africa and worldwide (5).

A specialized wiki would serve as a useful resource for both the novice and expert user. All that is required is a knowledgeable “Wiki Master” who has the time to manage and check the accuracy of wiki entries from volunteer contributors. Exhibit 5 contains excerpts from a wiki article written by an undergraduate student at the U.S. Naval Academy who was enrolled in an African Politics course during the spring of 2011. This student, and other class members, wrote wiki articles on assigned topics related to tourism and environmental issues in Africa. Student volunteers from the Department of Environmental Science at the University of Botswana will be adding more specialized

information to these general articles about how climate change is impacting tourism in Botswana in coming months (6). These excerpts illustrate how useful such articles can be for providing both general and very specific information in a single article. Exhibit 5 provides some preliminary definitions extracted from the article while Exhibit 6 contains charts from the same article. These charts illustrate how easily new information and summaries, in nearly any format (pictures, films, etc.) of recent trends can easily be added to update an exiting article.

There are several advantages for shifting knowledge and research studies online. One advantage is that it allows for new studies to be integrated into an existing wiki database quickly and made available to the widest possible audience. For example, a new study on Climate Change and Tourism Policy in OECD Countries that was published while this chapter was being revised is now integrated and linked to the above wiki article that will soon be uploaded to the Botswana Tourism Research site (7).

Exhibit 5. Excerpt from general article on climate change.

Climate change entry in Wiki

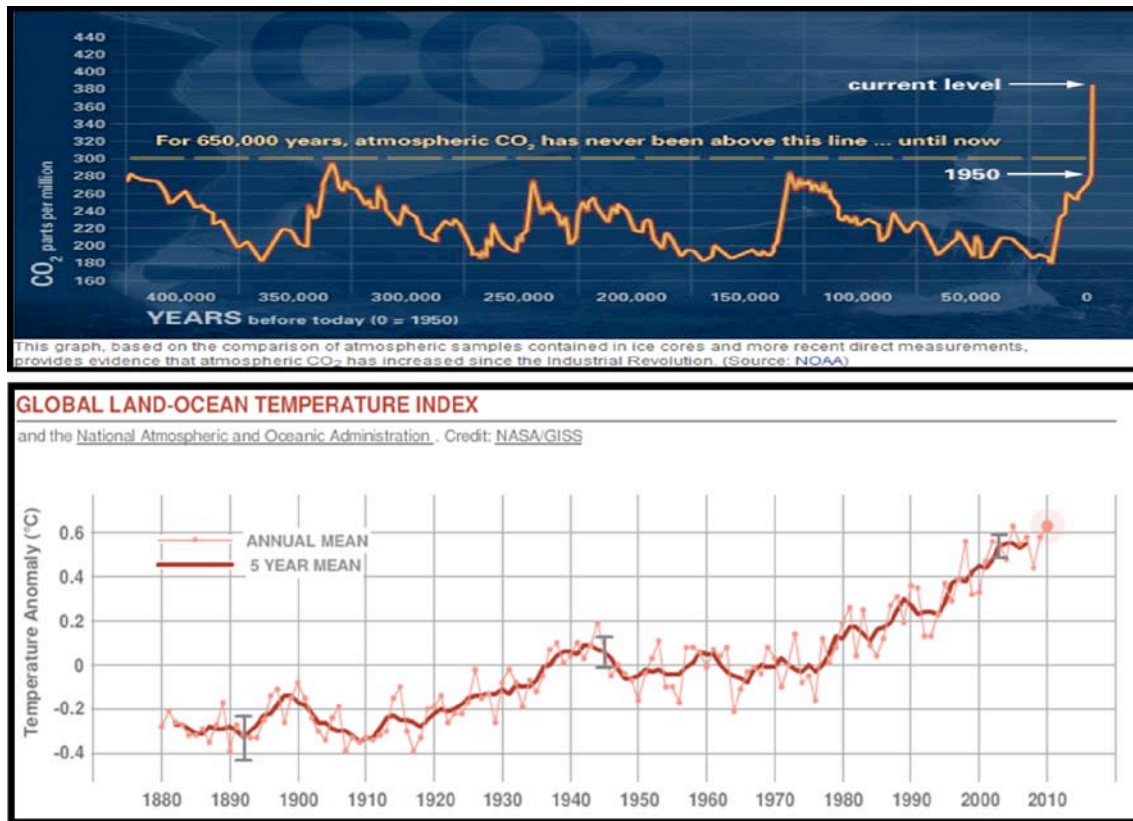
- GLOBAL CLIMATE CHANGE – AFRICA
- *“Climate is not a new factor in Africa’s history, but global warming is now deepening the region’s vulnerabilities.”* [1]
- Definitions
 - “Climate change” or Anthropogenic Climate Change
- May also be referred to as, global warming or anthropogenic global warming (AGW). These are the terms used to describe weather patterns and routines of a specified region that observed over a long period of time. Climate change is faced by the world today with efforts to decrease the amount of greenhouse gas emissions brought into the **greenhouse effect**. Gas emission levels depend on what types of energy sources and materials are used for consumption and operations.
-
- Climate Change in Africa *****
- The study of **climate change** has been gaining more interest in the past two decades as one of the leading challenges of the world today. Eleven of the last twelve years (1995-2006) rank among the 12 warmest years of global surface temperature since 1850. According to the recent report of the Intergovernmental

[1] International Energy Agency (2006), *World Energy Outlook 2006*, Paris, <http://www.worldenergyoutlook.org/>

[2] “Climate Change”, Chevron: Human Energy, accessed March 8, 2011, last modified May 2010 <http://www.chevron.com/globalissues/climatechange/?qclid=CKmtn66s3qcCFUGo4AodpVIT9w>.

[3] Ibid.

Exhibit 6. Graphs included in the general wiki article on climate change.



The ability of such sites to serve as free-access repositories for research that might otherwise not be available to users should also not be under-estimated. There are hundreds and possibly even thousands of research studies that are relevant to policy issues related to tourism and climate change in Africa that are likely not to be read because they are not in electronic form or are too expensive for African libraries or governments to purchase. These studies include not only scientific studies but also efforts to develop systematic methodologies that may help national policy-makers and others to better manage and prepare for the dislocating effects of climate change. It is important to find ways for decision-makers and others working in Africa to have quick access to these works given the fact that the continent is the most vulnerable to the adverse effects of climate change. An estimated 75 to 250 million Africans will be exposed to increased water stress due to climate change by 2020 and estimated yields in African states that are dependent on rain-fed agriculture could be reduced by up to 50 percent (8). These are only two of numerous statistics that can be cited to illustrate how urgent it is for African governments and their advisers to gain access to policy-relevant research about the key factors, risks and likely future scenarios that will be necessary to manage the dislocating effects from climate change.

Exhibit 7 illustrates the results from a recent effort to develop a comprehensive, policy-relevant system using six policy categories and ten performance indicators to measure the environmental burden of disease, water and air pollution; biodiversity and habitat;

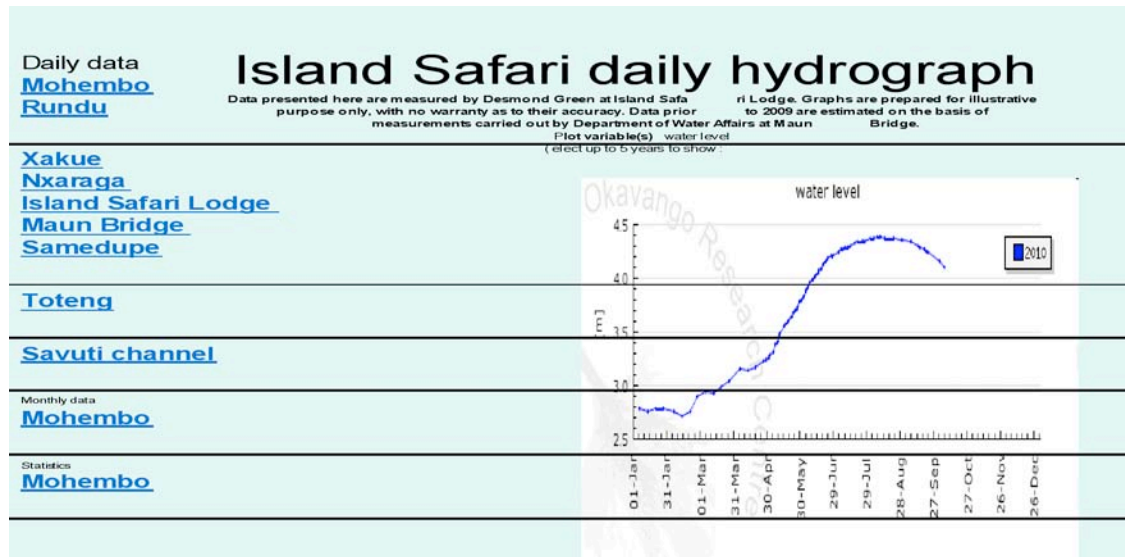
forestry; fisheries; agriculture; and climate change and country’s policies to maintain human and eco-system viability based on both quantitative and qualitative analytical techniques. While one may disagree with this researcher’s methodology, data sources, etc., few would quibble with the idea that this research should be more widely available. Currently, it is a book chapter in a very expensive edited volume that is accessible to only a few; however, if there was a non-profit site dedicated to compiling relevant research, the holders of the copyright would very likely allow this and many other studies to be uploaded and available to all for free (9).

Exhibit 7. Ackerman’s Environmental Policy Index scores for African states.

Rank	Country	Score	Rank	Country	Score
1/58	Mauritius	78.1	23/123	Ethiopia	58.8
2/59	Tunisia	78.1	24/126	Nigeria	56.2
3/64	Gabon	77.3	25/127	Benin	56.1
4/66	Algeria	77.0	26/128	C.A.P.	56.0
5/71	Egypt	76.3	27/129	Sudan	55.5
6/82	Morocco	72.1	28/130	Zambia	55.1
7/86	Ghana	70.2	29/131	Rwanda	54.9
8/88	Namibia	70.6	30/132	Burundi	54.7
9/93	Congo	69.7	31/133	Madagascar	54.6
10/95	Zimbabwe	69.3	32/134	Mozambiq.	53.9
11/96	Kenya	69.0	33/138	Guinea	51.3
12/97	S. Africa	69.0	34/139	Djibouti	50.5
13/98	Botswana	68.7	35/140	G. Bissau	49.7
14/103	Cote d’Iv.	65.2	36/142	D.R.C.	47.3
15/113	Tanzania	63.9	37/143	Chad	45.9
16/114	Cameroon	63.8	38/144	B. Faso	44.3
17/115	Senegal	62.8	39/145	Mali	44.3

Another advantage of an online web site dedicated to synthesizing and capturing up-to-date knowledge about climate change and tourism is that it can also serve as a repository for several different types of data. The Okavango Research Institute, formerly the Harry Oppenheimer Okavango Research Centre (HOORC), is a world-class research institute that has been studying various aspects of the Okavango and collecting and using different types of data for decades. In the area of flood research, Dr. Piotr Wolski collects near real-time data on a regular basis that allows him to make daily, monthly and annual forecasts based on a variety of data sets, including discharge and water levels, Delta flood in MODIS images, current meteorological conditions and daily rainfall in the Okavango region. Much of the daily data comes from volunteers, particularly those in Okavango safari camps, who send data to Dr. Wolski on a daily or near daily basis. Exhibit 8 displays an Island Safari Hydrograph using data from these sources. Such “bottom-up” strategies offer low-cost methods for collecting data needed for several research and forecasting tasks (10).

Exhibit 8.



One can easily imagine creative ways to collect relevant “bottom-up” data from volunteers, along with inputs from professionals, to start documenting and monitoring changes in precipitation, climate and movements of people that may be relevant to climate-related changes and locations where tourists are being affected. Such networks of data collection might also be enlisted to operate as “human sensors” in an effort to establish early-warning systems to reduce the vulnerability of certain groups, including tourists, in different areas of Africa. Such systems could also use the communication capabilities of a specialized online web site to help disseminate subsequent announcements and information during periods of extreme dislocation.

FOOTNOTES

(1) For further details about this project, contact Prof. Helen Purkitt, Department of Political Science, U.S. Naval Academy, Annapolis, MD 21402; purkitt@usna.edu; or Letlhogonolo Ralafala, Coordinator, International Tourism Research Center (ITRC), University of Botswana at letlhogonolo.ralafala@mopipi.ub.bw.

(2) Mr. Lenny Chavhunduka, Digital Treasure (Lenny@digitaltreasure.co.bw) programmed the Drupal content-management systems using the initial prototype and some of his own design concepts.

(3) For more information about the work of University of Botswana students, contact Dr. Naomi Moswete, Environmental Science at the University of Botswana, Gaborone. Her email is MOATSEN@mopipi.ub.bw.

(4) The initial Botswana Tourism Research web site developed using Goggle Sites offers one example of how to organize a customized database on African tourism or any specialized topic, <http://sites.google.com/site/botswanaecotourismdatabasebed/home>.

One large negative of using this freeware, however, is that all of the information is stored on a Goggle-owned server. Thus, Goggle has the right to use all the information stored on the site.

(5) An experienced computer scientist working at USNA on a related project developed an access page for the project using Drupal and concluded that it is probably one of the best freeware programs available to the public. As noted previously, the programmer who designed the Botswana Tourism Research in Drupal was Lenny Chavhunduka. Lenny is a Zimbabwean who lives in Gaborone, Botswana, and frequently travels throughout the region. Lenny Chavhunduka's contact information is Lenny@digitaltreasure.co.bw; Plot. 5266, Village, Gaborone; Tel/Fax: +267 3191451.

(6) This initial wiki article was written by 1/C A. Lagunzad. With her permission, we are uploading her article entitled, "Global Climate Change," into the Botswana Tourism Research wiki. Students working with Dr. Naomi Moswete, Environmental Science, University of Botswana (moatshen@mopipi.ub.bw) will be adding more specific information related to Botswana tourism to this and other articles currently being uploaded into the Botswana Tourism Research Wiki.

(7) Climate Change and Tourism Policy in OECD Countries. Organization for Economic Co-operation and Development/United Nations Environment Program. 2011. Available at no cost at <http://www.oecd.org/dataoecd/8/28/48681944.pdf>.

(8) Statistics taken from the Ackerman study cited in footnote 10.

(9) The study is by John Ackerman and his book chapter entitled, "The Most Vulnerable Continent: Africa and Global Climate Change," in Chapter 6 of Helen E. Purkitt, Ed., African Environmental and Human Security in the 21st Century. Amherst, NY: Cambria Press, 2009. This publisher, like many in the West, is likely to look favorably on such requests so long as the purpose is a non-profit one.

(10) Another ORI project that is likely to be relevant to those interested in climate change and tourism throughout southern Africa is the Climate, Land-use, Institutions and People or CLIP project. The CLIP project is a four-year study effort started in 2009 to understand and predict the impact of climate variability and climate change on land-use and land-cover change associated with socio-economic institutions as they seek to adapt to climate change in the areas surrounding the Okavango, Kwando-Linyanti and Zambezi river basins. Professor Jane Southworth, University of Florida, and Dr. Lin Cassidy, University of Botswana, are the co-principal investigators for this project.

For more information on research programs and publications sponsored by the Okavango Research Institute, go to www.orc.ub.bw/research.html. For details about the bottom-up flood-data project contact Dr. Wolski at pwolski@orc.ub.bw.

(11) For recommendations for a remarkably similar type of system for west Africa, see “Participants Want Early Warning Systems on Climate Established in West Africa,” Economic Community of West African States, <http://www.comm.ecowas.int/>.

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