REDEFINING AREA:
THE PHOTO DATABASE FOR INTEGRATED AREA STUDIES

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Abstract

Data for the Photo Database for Integrated Area Studies (PDIAS) were collected at field stations in Asia and Africa as part of 21st Century Centers of Excellence (21COE) for Integrated Area Studies projects. Researchers and students collected photographs and data that provide first-hand information on daily human uses of natural resources and the environment. Such observations and materials meet the overall program objective of examining "Human–Nature Coexistence in a Glocalizing World."

The PDIAS data are both geo-referenced and referenced to various thematic maps (e.g., topographic, land-cover, and soil maps) in specific areas. Users of the PDIAS can locate data by choosing a map location or by conducting a descriptive word search. These features enable users to more readily find information and also facilitate understanding of the concept of "area." Furthermore, various standardized thematic maps covering Asia and Africa provide common platforms for quantitatively comparing human–nature relationships in different areas, allowing redefinitions of area.

An area can be viewed as a place where the Earth's physical histories and human histories meet in a specified context. The results of global-scale scientific studies should be accumulated and re-evaluated in local area contexts. In this way, integrated area studies can play an important role in synthesizing knowledge and actions related to future sustainable uses of natural resources.

Keywords: Database, GIS, Integrated area studies

BACKGROUND AND OBJECTIVE

The 21st Century Centers of Excellence (21COE) for Integrated Area Studies program initiated projects from 2002 to 2006 to promote long-term, on-site research at several field stations in Asia and Africa. These studies have provided insights into daily human activities as related to natural resources and the environment. The field projects also met the overall program objective of examining "Human–Nature Coexistence in a Glocalizing World." Another key aim of the program was the establishment of a National Center for Integrated Area Studies. This center has been designed to store a wide range of information in various forms and to provide this information in a more functional

manner to the public. To this aim, the Area Info Division has developed an Internet site and has networked with other organizations to publicize the newest project results.

Careful consideration was given to the construction of the photograph database. Photograph archives can be constructed in various forms, and many are now available via the Internet, with searching available through indices [CSEAS: http://soils.usda.gov/use/worldsoils/mapindex/order.html/; Utah State University: http://digital.lib.usu.edu/bear.php/; Library of Virginia: http://www.lva.lib.va.us/whatwehave/photo/index.htm/]. Several photo-sharing resources also accumulate enormous amounts of mutually indexed data from individuals [Flickr: http://www.flickr.com/]. Also, various map-based information resources are available through the Internet such as at sites associated with tourism and real estate. Further, Google Earth recently began providing geo-referenced information at a global scale [Google Earth: http://earth.google.com/]. However, such geo-referencing systems are mostly based on simple index maps from which scientifically valuable information is not extractable. Providing geographic information systems (GIS) on Internet sites, such as through an Internet map server, is another option for handling multi-layered maps that can be changed interactively. At present, however, such systems require much computer memory, which can lead to slower computer responses.

When setting up the photograph database, the various features of the above methods were carefully considered and critiqued. The goal for the project was to provide an archive that the public could use to find various types of area information contained in the photographs. Thus, the photographs were geo-referenced and referenced to various types of thematic maps (e.g., topographic maps or soil maps) to allow for interactive information retrieval.

DATABASE CONSTRUCTION

Structure

The Photo Database for Integrated Area Studies (PDIAS) has three components: the data, the main program, and the user interface (Figure 1). Photographs and various index maps constitute the data component. The main program is written in the Perl language and receives orders from the user interface. For example, the program allows users to select index maps, link to photographs, and search through the photographs based on attributes. The results of these “jobs” are transferred to the user interface. The user interface is written in HTML and accepts commands from users and transfers them to the main program component. The user interface contains a clickable map function that allows users to select points. The job outputs in HTML format are transferred to the user interface and are shown to users. This system has a number of advantages. Mainly, it has a simple structure that results in quick responses. The system is also flexible and can handle additional functions.

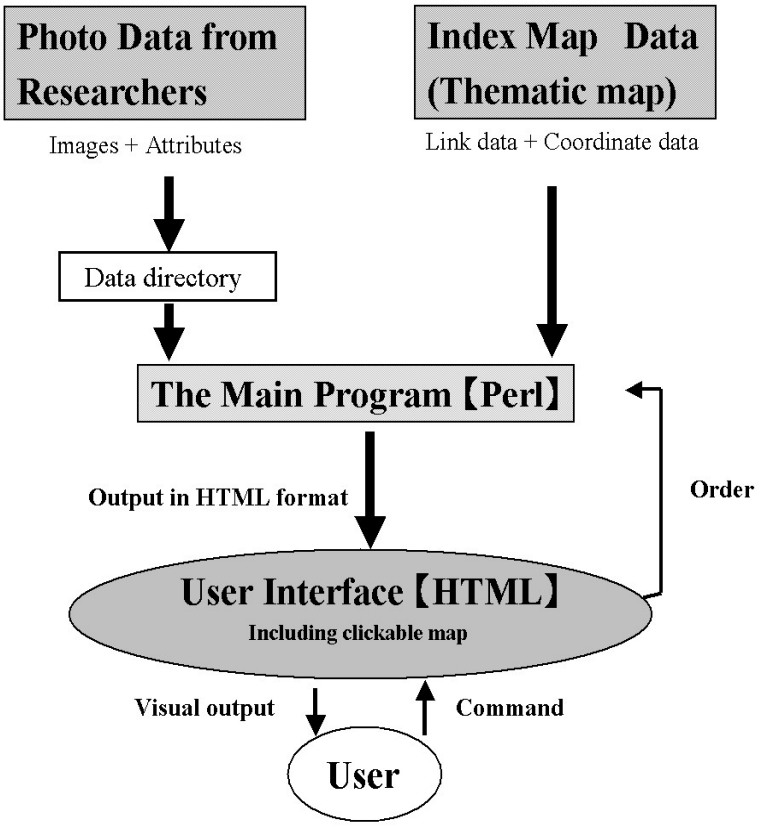

Figure 1 – Structure of the Photo Database for Integrated Area Studies (PDIAS)

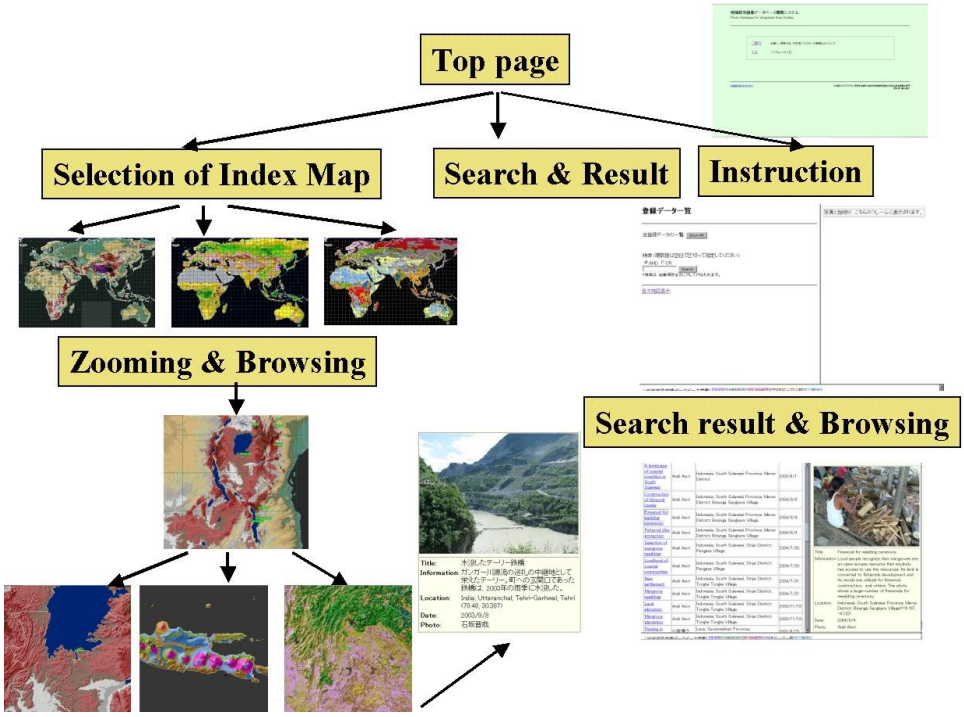

Figure 2 – An outline of the Photo Database for Integrated Area Studies (PDIAS) browsing features

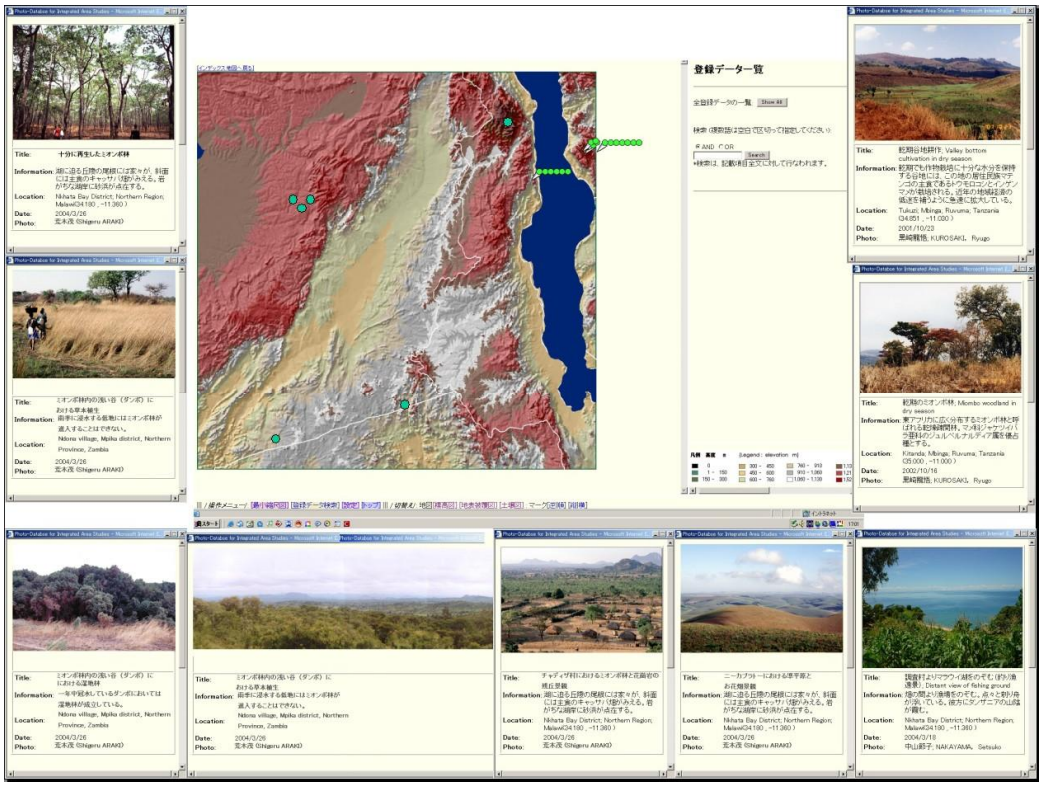

Figure 3 – An example of browsing in the Photo Database for Integrated Area Studies (PDIAS)

Data

The photograph data include jpg images and attributes concerning latitude and longitude, file name, title, information, date, place, and owner's name. Several thematic maps (index maps) were prepared as background information for the photo points. Digital elevation maps were prepared using SRTM30 [NASA: http://www2.jpl.nasa.gov/srtm/] data provided by National Aeroautics and Space Adiminstration (NASA), land cover maps from the University of Maryland [http://glcf.umiacs.umd.edu/data/landcover/], and soil maps from the US Department of Agriculture [http://soils.usda.gov/use/worldsoils/mapindex/order.html].

Function

Figurer 2 outlines the browsing features of the database. The top page introduces users to the browsing page; then, every command can be operated from the menu bars at the bottom of the screen. Users are asked to either search for a photograph or select an area from the index map. Users can "zoom in" twice, up to five square degrees, which is equivalent to 550 × 550 km. Users can also change index maps without disrupting their chosen area of interest; this feature allows users to better understand the relationships among topography, soils, and vegetation in the specified area. By clicking points, photos and their attributes appear on the screen. Users can add as many photos as they want on the screen, or alternatively, can view one photo window at a time. Figurer 3 shows an example of browsing; landscape and vegetation are referenced in relation to their geographical positions and elevations in northeastern Zambia, Malawi, and southern Tanzania where miombo woodlands dominate plateau areas between 1000 and 1500 m above sea level.

DEFINITION OF AREAS AND AREA STUDIES

In area studies, "area" can be defined variously according to the research objective and geographic scale considered. As part of the special COE research promotion program "Making Regions" (1998–2002), area was defined as a multi-layered entity consisting of, in order of increasing spatial coverage, i) ecology and everyday life, ii) provincial society and economy, and iii) nations and world regions [Shiraishi 2003: 1]. In contrast, Takaya [2001: 10] defined four categories of "world units" based on the criterion of shared human world views; these categories consisted of i) ecologically adapted unit, ii) networking unit, iii) world civilization unit, and iv) modernity created unit. Whatever the definition, these categorization methods share the idea that ecology plays an important role in characterizing various facets of human lives and should be accounted for in area studies. Although the field of area studies is characterized by interdisciplinary research, area studies in Japan have placed more emphasis on the ecological aspects of area than has area studies research in North America, which emphasizes socio-cultural approaches.

In constructing the PDIAS, the definition of "area" was a key concern. Kawada [2000: 3] proposed that the history of an area is created through human–environment interactions. Likewise, an area can be defined as the place where the Earth's physical histories and human histories meet in a specified context. However, this is not a definition in a real sense because geographical dimensions are not included. Defining "area" is complex and controversial, especially if key information is lacking. Various standardized thematic maps provide common platforms for comparing human–environment relationships in a quantitative manner, which makes redefining areas possible.

THE AGE OF SCIENTIFIC GLOBALISM

Today, various scientific fields examine global research questions. Remote sensing technology provides high-resolution data at a global scale pertaining to subjects such as global warming, desertification and deforestation, and natural disasters. At the same time, however, research targets have become so focused that research results largely become known to only those interested in limited scientific paradigms. Likewise, interdisciplinary research needed to create a GIS-based compilation of global datasets is lacking.

From the viewpoint of area studies, such limited or discipline-specific flows of information hinder the understanding of current conditions in certain areas. The results of global-scale scientific studies should be accumulated and re-evaluated in local contexts. In this way, integrated area studies will play an important role in synthesizing information and developing strategies for the sustainable future use of our natural resources. The PDIAS will assist with such synthesis and provide common platforms for promoting comparative area studies.

REFERENCES

CSEAS. http://soils.usda.gov/use/worldsoils/mapindex/order.html (July 20, 2006)

Flickr. http://www.flickr.com/ (July 25, 2006)

Google Earth. http://earth.google.com/ (July 20, 2006)

Kawada, J. 2000. *Seitai no Chi-ikishi (Regional History of Ecology)*. Tokyo: Yamakawa Co. Ltd.

Library of Virginia. http://www.lva.lib.va.us/whatwehave/photo/index.htm (July 20, 2006)

NASA. http://www2.jpl.nasa.gov/srtm/ (July 25, 2006)

Photo Collection, CSEAS. http://aris.cseas.kyoto-u.ac.jp/photolib/perl/photolib_welcome (July 20, 2006)

Shiraishi, T. ed. 2003. *Asia Africa niokeru Chi-iki Hensei (Making Regions*), *A Report for Grant-in-Aid for Special Research Promotion Program, of Japanese Ministry of Education, Science and Culture* (#10CE2001), Center for Southeast Asian Studies, Kyoto University.

Takaya, Y. 2001. *Shinpen "Sekaitani"kara Sekai wo miru* (Viewing the World from "World Unit", Revised Edition). Kyoto: Kyoto University Press.

University of Maryland. http://glcf.umiacs.umd.edu/data/landcover/ (July 25, 2006)

USDA. http://soils.usda.gov/use/worldsoils/mapindex/order.html (July 20, 2006)

Utah State University. http://digital.lib.usu.edu/bear.php (July 20, 2006)