



## The Integrated Web Portal (IWP)

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# The Integrated Web Portal (IWP)

A Virtual Platform for Collaborative Working and Knowledge Dissemination

The Hindu Kush–Karakoram–Himalayan (HKKH) Partnership Project involves implementation of various applied research and development activities that require integration of diverse data and information as well as interpretation of various forms of information and knowledge, such as system dynamics models, simulation results, historical databases, and technical reports. In order to bring these together and promote interdisciplinary collaboration, communication, and dissemination of information among concerned stakeholders and general public users, an Integrated Web Portal (IWP) with a customized Content Management System (CMS) was developed as part of the HKKH project. Several features that were incorporated as modules are discussed here.

## Background

The Hindu Kush–Karakoram–Himalayan (HKKH) Partnership Project aims to consolidate institutional capacity for systemic planning and management of protected area ecosystems over three national parks in the Hindu Kush–Karakoram–Himalayan region (Amatya et al 2010, in this issue). The project involves implementation of various applied research and development work, which requires integration of diverse data and information as well as interpretation of various forms of information and knowledge, such as system dynamic models, simulation results, historical databases, and technical reports.

In order to meet the above needs, the HKKH Project initiated an Integrated Web Portal (IWP) concept to promote interdisciplinary collaboration, communication, and dissemination of information among concerned stakeholders and general public users. The IWP adopted state-of-the-art web-based tools and technologies for improving access, interactive use

and exchange of data, and information and knowledge from a wide variety of sources. The IWP was built with the capability to integrate a wide variety of data and information resources, such as project documents, bibliographic information, geographical information, model data, interactive maps, satellite images, and research data. More importantly, all of these data and information are associated with their respective metadata. Access to these information resources—which are available at <http://www.hkkhpartnership.org> for multiple users such as the general public, technicians, researchers, scientists, and decision-makers—enhances collaborative learning and sharing culture among the stakeholders of all three national parks in Nepal, Pakistan, and China that are integrated in the HKKH Partnership Project (Figure 1).

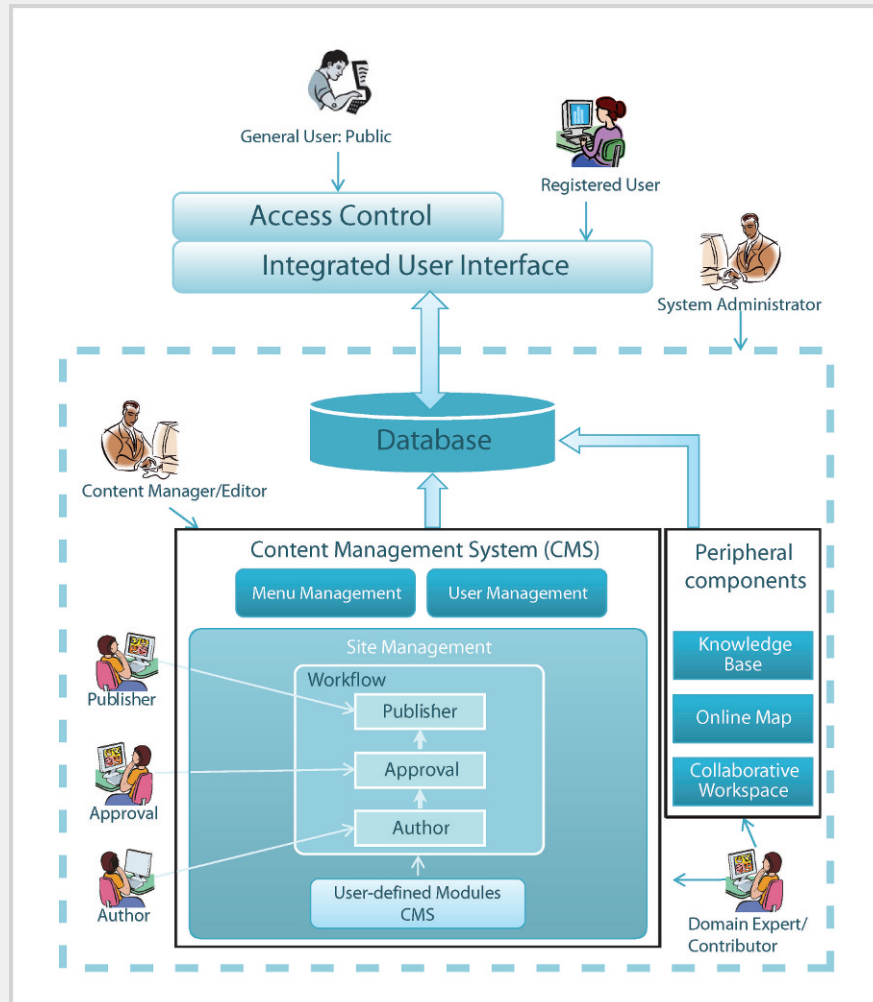
## Content development and main modules

The IWP has been designed and built with a customized *content management system* (CMS) focusing on the project contents by establishing simple and easy management of information resources through a workflow process and a common framework for information authoring, approving, publishing, and archiving. This framework provides techniques that assist in the development of ideal information environments (Batley 2007). In addition, the IWP system was designed keeping in mind that novice users with little or no technical background can use, operate, manage, and maintain the web portal involving a diverse user community and remote locations. Figure 2 outlines the architecture of the IWP, and the subsequent section describes its major modules.

FIGURE 1 Main page and user interface of the IWP.



**FIGURE 2** The IWP system architecture.



### Knowledge base module

The knowledge base of the IWP is a metadata management system adopted by the HKKH Project to promote access, use, and sharing of data and information resources. The knowledge base system allows systematic cataloging of metadata in a standardized format for information resource description focusing mainly on cataloging geospatial and bibliography metadata. The project modified Dublin Core standard metadata for bibliography records and ISO 19115 standards for spatial data. The system is based on GeoNetwork open source platform developed by the Food and Agriculture Organization of the

United Nations (FAO; see Jeroen 2008). The system has the ability to search, download, and customize data so that it can be operated in offline mode as well. This serves the needs of remote locations such as the Park Office sites that do not have access to the Internet.

The knowledge base system now holds more than 1500 records of metadata, along with associated data that can be easily downloaded online (Figure 3A). Besides bibliography and geospatial data, the knowledge base includes other categories in the navigation menu such as project working papers, system dynamics model data, monitoring, posters, and presentations. Metadata records in

these categories are associated with actual data such as documents, presentations, and images that are downloadable by different groups of users depending upon their user access rights. These user groups include partners, stakeholders, guests, public users, and administrators. Administrators are a set of dedicated users for managing the web portal.

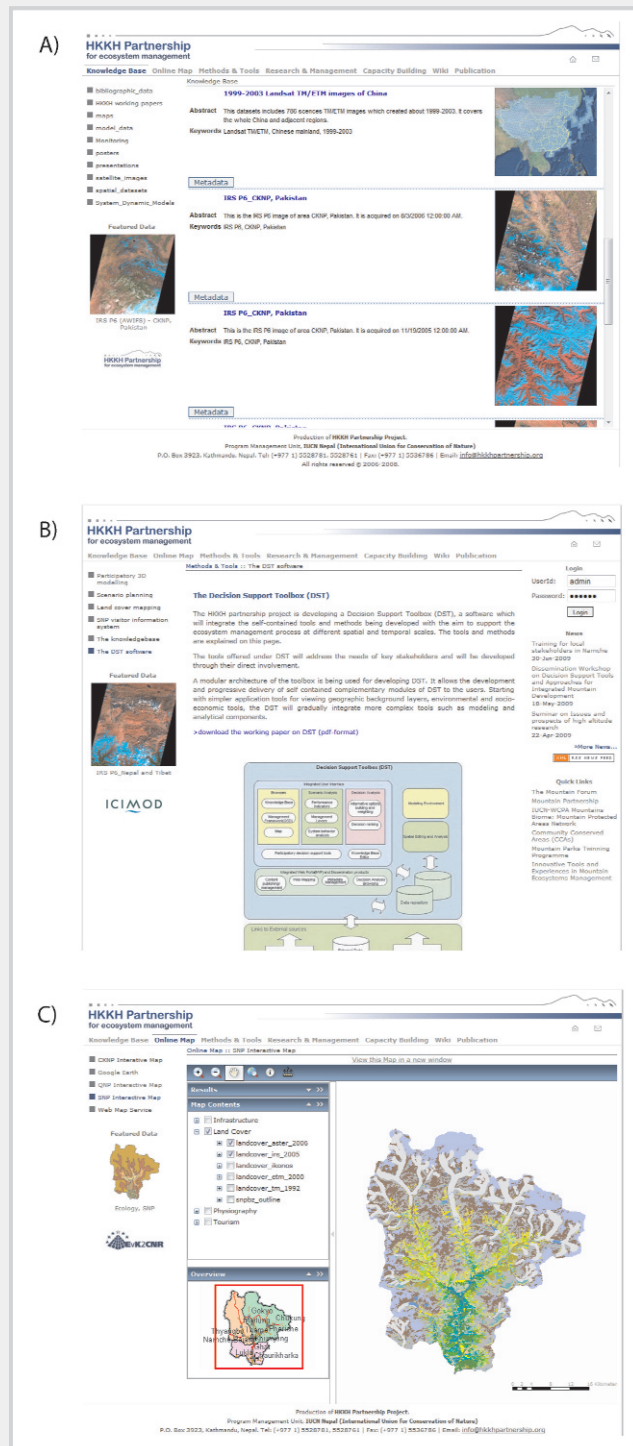
### Online mapping module

The IWP embeds a customized version of interactive online mapping of all project areas; thus, Sagarmatha National Park and Buffer Zone (SNPBZ) in Nepal, Central Karakoram National Park (CKNP) in Pakistan, and Qomolangma National Nature Preserve (QNNP) can be accessed by clicking the respective links in the "Online Map" section of the IWP (Figure 3B). This application was developed in ArcGIS Server 9.2 (ESRI 2004) and provides a broad spectrum of map contents with open access to valuable, ecologically relevant spatial information for the general user community. This module shows GIS data layers for different thematic groups such as Infrastructure, Land Cover, Physiography, and Tourism. All spatial data layers within these groups are stored and structured in the geodatabase data model. Users with special rights can access it for analysis purposes, using a freeware ArcGIS Explorer, Manifold, or any other GIS software that has the capability to connect to ESRI's ArcSDE geodatabase models.

### Wiki and discussion forum module

The Collaborative Workspace was created both as a wiki platform and customized forum with the aim of providing a virtual workspace built for different user groups aiming to collaborate, communicate, and coordinate project activities. The workspace provides a platform to work efficiently as a team with members from different project

**FIGURE 3** (A) Screen shot of the knowledge base system; (B) the online mapping feature; (C) screen shot of user-defined module: “method and tools.”



partners at different locations, together with the stakeholders and domain experts working toward a common objective and shared vision. Group modeling exercises, discussion sessions, peer reviews, and roundtable dialogues are examples of how the collaborative workspace can be used to encourage partnership and team building. This threaded workspace organizes postings under topic headings, discussion forums, or wiki.

**User-defined modules**

In addition to the above modules, the IWP system has been designed with the capability to create the user’s own module based on specific requirements. The modules “method and tools,” “research and management,” and “capacity building” are user-created modules in the IWP for the needs of the project.

For instance, “method and tools” is reserved for information about the tools and methods developed in the framework of the project. These modules provide up to 3 menu levels: the first two on the left-side menu and the other directly in the content window (Figure 3C). Project partners provide input to develop the structure of the menu and the content for the modules they are developing. For content development that involves more than one partner, workflow procedures are undertaken before publishing results in the IWP. The user can create more modules as needed and can tailor navigation to organize, share, and disseminate information resources.

**Conclusion**

The Integrated Web Portal for Ecosystem Management of the HKKH Partnership Project demands a variety of information, such as geospatial and nonspatial data, and requires choosing among many different technological options to meet project objectives. Integration

of such heterogeneous technologies is complex. The IWP has been successful in meeting these challenges and has proved useful in capturing all relevant information during the entire course of implementation of the HKKH Project; it will serve as the Project's legacy after completion. The IWP also provides a content workflow process that keeps information processes up to date regardless of time zones or geographical barriers, as project partners, stakeholders, and other user communities are working at different geographic locations.

The IWP is developed and deployed in accordance with the scope of the HKKH Partnership Project and its specific requirements.

Moreover, the innovative tools and technologies developed to realize the IWP can easily be upscaled to similar other initiatives in other mountainous regions. In the long run, the management of this portal will be handed over to its respective national partners and stakeholders, such as the Department of National Parks and Wildlife Conservation (DNPWC) in Nepal, and similar partner institutions in the other two countries.

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