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### UTILIZATION OF PLUG-IN AND CONTENT MANAGEMENT SYSTEM (CMS) AS TOOLS FOR DEVELOPING NATIONAL BIOSAFETY CLEARING HOUSE (BCH) APPLICATIONS: CASES IN ASIA AND LATIN AMERICAN COUNTRIES

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**ABSTRACT** The Cartagena Protocol on Biosafety (CPB) under Article 20 requires that countries enter and manage their own data in a Web-based Biosafety Clearing House (BCH) Central portal (<http://bch.cbd.int>). The Secretariat to the Convention on Biological Diversity (SCBD) has developed two application tools called BCH AJAX Plug-in and HERMES Content Management System (CMS) to help meet the diverse needs of different countries in fulfillment of their Biosafety Clearing House (BCH) obligations by allowing them to select options that are useful and relevant to their needs and situations. The BCH Ajax Plug-in, a lightweight JavaScript application is a ready-to-use national BCH application while “Hermes” is an online CMS based on the Central Portal of the Biosafety Clearing House (BCH-CP) that includes a very simple and easy to use CMS that allows for the customization and localization of national BCH application. Relative to the two applications, the UNEP-GEF Biosafety Clearing House (BCH) project has packaged the training modules that aim to provide a practical “how-to” guide for countries to assist them in learning, understanding, using, and setting-up a national BCH using either Hermes CMS or BCH Ajax Plug-in. This paper discusses the development and utilization of AJAX and HERMES as tools in developing and maintaining National BCH applications in selected Asia and Latin American countries. It also discusses the selected countries’ experience of both AJAX and HERMES towards increased utilization and build-up of country BCH data.

**Keywords:** Biosafety Clearing House, BCH, Ajax Plug-in, Hermes, CMS

**INTRODUCTION** The United Nations Environment Programme (UNEP) as one of the implementing agencies of the Global Environment Facilities (GEF) is implementing a project for Building Capacity for Effective Participation in the Biosafety Clearing House (BCH). The BCH is an information exchange mechanism established by the Cartagena Protocol on Biosafety (CPB) to assist Parties to implement its provisions and to facilitate sharing of information on, and experience with, living modified organisms (LMOs). The BCH is critical to the implementation of the protocol as it is intended to be a repository of up-to-date information on LMOs and biosafety in order to assist decision-making in countries around the world as well as civil society and the biotechnology industry.

The project assists countries to participate in the BCH by building human and institutional capacity and by providing countries with the minimum equipment required for the national participation in the BCH. Among others, countries are being offered and provided hands-on assistance by Regional Advisors in assessing and analyzing training needs and offering appropriate technical assistance in using and benefiting fully from the national BCH.

Article 20 of the Cartagena Protocol on Biosafety (CPB) established a Biosafety Clearing-House in order to: (a) facilitate the exchange of scientific, technical, environmental and legal information on, and experience with, living modified organisms; and (b) assist parties to implement the Protocol. The Protocol requires that countries enter and manage their own data in the Web-based BCH Central portal (<http://bch.cbd.int>).

To help meet the diverse needs of different countries in fulfillment of their BCH obligations by allowing them to select options that are useful and relevant to their needs and situations, the Secretariat to the Convention on Biological Diversity (SCBD) has developed two application tools called BCH AJAX Plug-in and HERMES Content Management System (CMS)

The BCH Ajax Plug-in which is ready to be used by the countries as a national BCH application is a lightweight JavaScript application based on AJAX technology that can be easily integrated to any website to allow dynamic display of information from the BCH Central Portal. The “Hermes” is also a national BCH application, hosted and maintained at the SCBD. It is an online CMS based on the Central Portal of the BCH. It is a subset or scaled-down version of the BCH CP, with a similar interface paradigm, but downsized to display and search country BCH records. It includes a very simple and easy to use CMS that allows for the creation and edition of additional web pages, sections and contents. Localization is not limited to the six UN languages. At this time, Hermes supports all Left-to-Right languages. Menus can also be customized and localized.

Relative to the two applications, the UNEP-GEF Project for Capacity Building for Effective Participation in the Biosafety Clearing House (BCH) has packaged the training modules that aim to provide a practical “how-to” guide for countries to assist them in learning, understanding, using, and setting-up a national BCH using either Hermes CMS or BCH Ajax Plug-in.

**OVERVIEW OF THE BIOSAFETY CLEARING HOUSE.** The Biosafety Clearing House (BCH) is an information exchange mechanism established by the Cartagena Protocol on Biosafety to assist Parties to implement its provisions and to facilitate sharing of information on, and experience with, living modified organisms (LMOs). Article 20, paragraph 1 of the Protocol established the BCH as part of the clearing-house mechanism of the Convention on Biological Diversity, in order to:

- Facilitate the exchange of scientific, technical, environment and legal information on and experience with, living modified organisms; and
- Assist Parties to implement the Protocol, taking into account the special needs of developing country Parties, in particular the least developed and small island developing States among them, and countries with economies in transition as well as centres of origin and centres of genetic diversity.

The BCH is essential for the successful implementation of the Protocol by way of assisting parties and other stakeholders in different ways. As an example, the BCH serves as a “one-stop-shop” where users can readily access or contribute biosafety related information. In effect, this could assist Government to make informed decisions regard the importation or release of LMOs. The timeliness and accuracy of information in the BCH are ensured since the users themselves are the ones who own and update them. (SCBD, 2004)

In particular, the following are some of the benefits that may be derived from using the BCH:

- access information about the national laws, regulations and guidelines of other Parties; and other countries decisions and assessments relating to specific LMOs;
- ensure that all potential exporters of LMOs to their country or those who wish to transport LMOs across their territory, are aware of national regulatory requirements;
- access information about capacity-building and other assistance available to support implementation of the Protocol;
- ensure that the relevant authorities in other countries can quickly find out who to inform in the event of an accidental movement of LMOs into their territory.

The BCH Central Portal (<http://bch.cbd.int>) serves as a gateway to all sections of the BCH, including the search pages, the Management Centre where information is entered or updated, link to other relevant websites, and the toolkit that help users to understand how to use the BCH. The BCH functions like a “central information marketplace” where the providers and users of biosafety information interact and exchange that information in a transparent manner. To facilitate this, the BCH has been designed to make “finding” and “providing information” as clear and intuitive as possible, like providing common formats and standardized terminology called “controlled vocabulary”. The BCH website is also available in six UN official languages. But participating countries can customized their data using their respective languages. The Secretariat of the Convention on Biological Diversity (SCBD) manages and hosts the central portal of the BCH. Figure 1 shows the screenshot of BCH homepage.

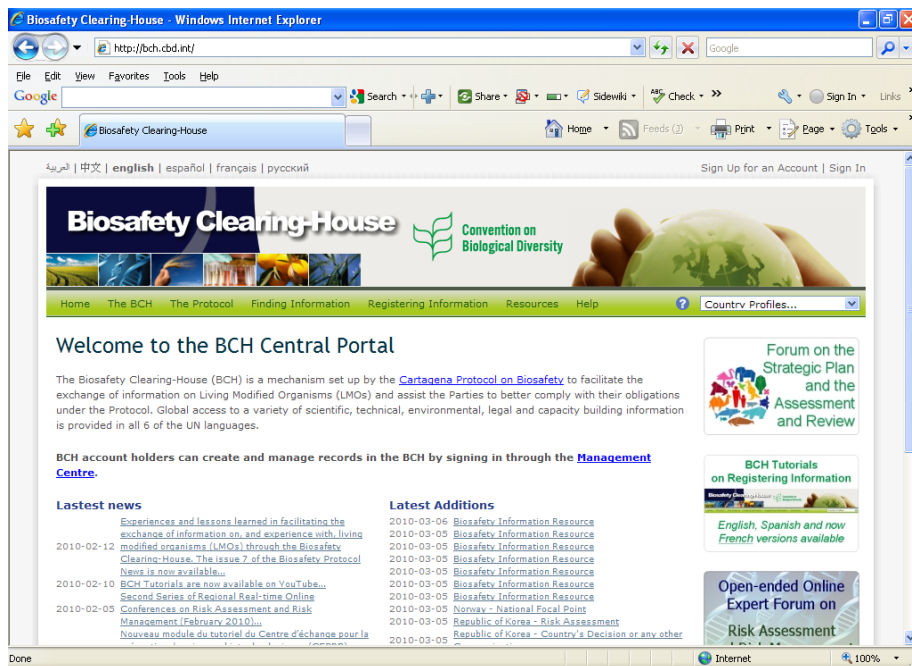


Figure 1. BCH Homepage, <http://bch.cbd.int>

**USING A CONTENT MANAGEMENT SYSTEM (CMS) CALLED HERMES TO DEVELOPMENT AND MAINTAIN A NATIONAL BCH APPLICATION.** The Secretariat to the Convention on Biological Diversity (SCBD) has developed an application tool called “Hermes” which is ready to be used by the countries as a national BCH application, hosted and maintained at the SCBD. Hermes is an online CMS based on the Central Portal of the BCH. It is a subset or scaled-down version of the BCH CP, with a similar interface paradigm, but downsized to display and search country BCH records.

It includes a very simple and easy to use CMS that allows for the creation and edition of additional web pages, sections and contents. Localization is not limited to the six UN languages. At this time, Hermes supports all Left-to-Right languages (i.e. most languages, but Arabic). Menus can also be customized and localized.

Hermes aims to provide the building blocks of a NBCH website. It provides:

- Interoperability with the Central Portal of the BCH
- Search functionalities
- Support for all common formats (national)
- Content Management (pages and text)
- File Management (images, documents, etc.)
- Menu Management
- Site Management (banner, robots.txt, etc.)

Additionally, hermes provides:

- Security (SSL authentication)
- Content Versioning (history, diff)
- *Localization (will be available shortly)*

Hermes is compatible with the following browser: Internet Explorer, Mozilla and Safari. But for administrative purposes such as the content editing, Hermes is currently available using Internet Explorer.

**Accessing the National BCH based on HERMES.** To access an example of a NBCH based on Hermes, type the URL: <http://la.biosafetyclearinghouse.net> (as an example for this module, but other country instances can be used also)



Figure 2. NBCH Welcome Page.

As viewed above, the Welcome Page of the NBCH website is composed by the following:

Sign In/Up links	The Sign in link will direct the admin/public users to another web page to log-in to the system using its appropriate log-in accounts. In addition, the Sign-up link will direct the public user to a different page to create a sign-in account for the system.
Left Side bar	Contains Quick search tool and content titles of the website.
Links to related sites	Link to related websites, such as CBD and BCH Central Portal
The web banner	Indicates the BCH National Node, the project implementors (SCBD, UNEP) and other brief information/icons about the country
Web content area.	Introductory/brief features of the page and other relevant information

Hermes instance names are by default <http://xx.biosafetyclearinghouse.net> where xx is the ISO-3166 2-letter country code. Countries who wish to have a different domain name can do so by registering it with the registrar of their choice and pointing it to IP 69.90.183.250 and notifying the Secretariat. Annex A shows the screenshots of some of the Asia-Pacific countries that adopted HERMES as their National BCH Application such as Lao People's Democratic Republic, Malaysia, Bhutan, Iran, and Tajikistan.

**USING AJAX PLUG-IN AS AN OPTION TO DEVELOP COUNTRY NATIONAL BCH SYSTEM.** The Secretariat to the Convention on Biological Diversity (SCBD) has developed an application tool called BCH AJAX Plug-in which is ready to be used by the countries as a national BCH application. It is a lightweight JavaScript application based on AJAX technology that can be easily integrated to any website to allow dynamic display of information from the BCH Central Portal. The use of the BCH AJAX Plug-In does not require any specific IT knowledge. The Plug-In works on all server platforms and does not require any software installation. All required files are located on the BCH Central Portal and maintained by the Secretariat. The BCH AJAX Plug-In is a client side application. The connection to the BCH Central Portal is made directly by the client (end-user).

**Compatibility.** Although the BCH AJAX Plug-In is actually compatible with Internet Explorer 6+ and Mozilla Firefox 1.2+, the Secretariat fully supports the following versions:

- Internet Explorer 7.0; 8.0
- Mozilla Firefox 2.0
- Apple Safari

It must be noted also that support for JavaScript must be enabled for the BCH AJAX Plug-In to work.

**Maintenance.** The BCH AJAX Plug-In is fully supported and maintained by the Secretariat. As all files are located on the BCH Central Portal, there is no need for maintenance at the local level.

**Integration.** The BCH AJAX Plug-In has been designed to make its integration to any website as simple as possible. It can be integrated to any webpage by simply adding the following lines of HTML.

```
<script type="text/javascript" charset="utf-8"  
  
  src="http://bch.biodiv.org/centralportal/ui/offsite/bch-  
offsite.js" ></script >  
  
<script type="text/javascript" charset="utf-8" >  
  
  GenerateRecords("focalPoint", "ca", "en"); </script >
```

Here is a very basic HTML page integrating the BCH AJAX Plug-In.

```
<html>

<body>

<h1>National Focal Points</div>

<script type="text/javascript" charset="utf-8"

src="http://bch.biodiv.org/centralportal/ui/offsite/bch-
offsite.js"></script>

<script type="text/javascript" charset="utf-8" >

GenerateRecords("focalPoint", "ca", "en"); </script>

</body>

</html>
```

**Customization.** The BCH AJAX Plug-In can be easily customized to show any specific type of BCH national information for any country. Support for languages is currently under development.

**Document Type.** The parameter specifies what type of BCH national information to display. The valid values are shown in Annex B.

**Country.** The parameter specifies what country for which the information is displayed. The BCH AJAX Plug-In uses 2-letter ISO 3166 country codes. The official list can be found at:

<http://www.iso.ch/iso/en/prods-services/iso3166ma/02iso-3166-code-lists/list-en1.html>

**Language.** The parameter specifies in which language the information should be displayed. The BCH AJAX Plug-In will not be limited to the 6 UN languages.

**Lessons and Decisions Made.** A report prepared by the BCH Project Team entitled ‘Learning from Experience: The UNEP-GEF-BCH Capacity Building Project’ published in 1998, accounted some of the decisions and experience of Asia and Latin American countries with regards to their BCH participation. **Peru**, which already had a national roster of biosafety experts and other basic information, initially assumed it would pursue option 3 or 4. After several months, it became clear, however, that its existing database was not suitable for the BCH Central Portal. Although Peru has the necessary software development skills, it decided instead to pursue option 1. Later, when the HERMES content management system became available, Peru chose to use it to create its national BCH website—a more comprehensive and sustainable solution.

**Costa Rica** initially started its negotiation with BCH Project assuming it would pursue option 4, but by the time the Memorandum of Understanding was finalized, it had decided on option 1. Since then, it, too, has used HERMES to create its own national BCH website. Ecuador had already completed its MOU, had selected option 3, and Regional Advisors were working with the country to implement that choice, when it made the change to option 1.

Another Latin American country, **Ecuador** also later used HERMES to create a national BCH website. Brazil, whose Ministry of Science is required by law to build and maintain the national BCH software, chose in its MOU to use option 4. Although the Ministry has an important software development unit that manages huge portals (more than 5,000 web pages, 120 editors, 5 million hits per month), it switched to option 1 to register information in the BCH. It became the first country to use the new SCBD-provided Ajax Plug-In to integrate national information into the BCH portal. Its experience has been very helpful to other countries making the same decision.

Attendees at the **Bangladesh** training workshop soon realized the high costs of sustaining the long-term IT assistance needed to support its choice for option 4. When the Hermes and Ajax Plug-In tools were introduced, those responsible for choosing Bangladesh’s level of BCH participation chose option 1 instead.

**CONCLUSION.** The Secretariat of the Convention on Biological Diversity (SCBD) developed and released two new tools, the Hermes and BCH Ajax Plugin as IT solutions that will help countries create national BCH nodes or networking data entry points. As an online content management system, Hermes enables a country to create its own national BCH database that is fully compatible with the BCH Central Portal.

As a client-side application, the BCH Ajax Plug-In, on the other hand, can be integrated with any existing website to provide BCH information. It characterizes interoperability between the BCH central portal and a country’s national BCH web site. The use of BCH Ajax Plugin, as an application need not require extensive knowledge of IT or software installation.

Through the BCH project, modular training manuals for learning how to operate HERMES and BCH Ajax Plugin have been developed and made available, initially on MOODLE (an open source knowledge management system), and now under the “Resources” of the BCH central portal. Active discussion forums in which experiences with these tools are shared, suggestions are made, and problems are identified are helping to improve the manuals. As a result of the intervention to optimize country participation into the BCH, these new tools significantly enhance countries’ ability to develop, build and implement their respective national BCH systems.

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# ANNEX A. Screen shots of NBCH in Hermes



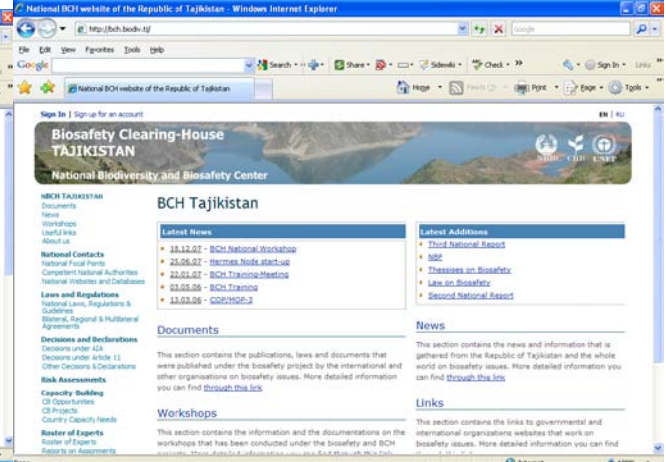
NBCH of Malaysia



NBCH of Lao



NBCH of Bhutan



NBCH of Tajikistan.



NBCH of Iran