Partnership Facility Final Report

Invasive Species Management Terminology Database Enhancement

1. Strategic Theme (Goal)

Invasive Species
Information for Development
To have a publicly accessible terminology resource serving the needs of researchers, managers and policy makers in, or interacting with, invasive species management.

UN Millennium Development Goals
Ensure environmental sustainability: Integrate the principles of sustainable development into country policies and programmes; reverse loss of environmental resources.
Develop a global partnership for development: In cooperation with the private sector, make available the benefits of new technologies— especially information and communications technologies.

2. Project Manager

James Brooks

3. Period of Project

November-December 2006

4. Budget Total

£12,283

5. Project Code

DF5X623

1. Executive Summary

The Invasive Alien Species Concepts, Terms and Context (IAS-CTC) database at www.cabi.org/ias_ctc.asp was developed through Partnership Funding in 2005 as an openly accessible database of terms and definitions associated with the science and management of 'invasive' and/or 'alien' species.

With Partnership Facility funding in 2006, the IAS-CTC database has now been enhanced to include content from legal texts and standards associated with the International Plant Protection Convention (IPPC) and the World Organisation for Animal Health (OIE), as well as other source material. Additionally, copyright statements and linkages to source documents have been made for existing content, including that from the Convention on Biological Diversity (CBD), the World Conservation Union (IUCN) and the World Trade Organization (WTO).

The IAS-CTC database now has a total of 605 terms and/or term variants, and a total of 784 definitions, from 40 source documents..

The IAS-CTC database now can serve its original intended purpose to facilitate shared understandings of language used by policymakers, legislators and practitioners dealing with invasive species. This resource thus addresses needs relating to the purpose of the CBD and the Global Invasive Species Programme (GISP).

Another deliverable of the present project is a specification of work to be done to improve the structure of the IAS-CTC database and functionality of the website for users. This addresses version management needs arising from the fact that the *International Standards for Phytosanitary Measures* (ISPMs), the *Aquatic Animal Health Code* and *Terrestrial Animal Health Code* are dynamic and multilingual standards.

2. Project Background

Following a study of terminology issues associated with Invasive Species Biology and Management, CABI produced a proof-of-concept Invasive Alien Species Concepts, Terms and Context (IAS-CTC) database, hosted on the CABI website at www.cabi.org/ias_ctc.asp, in October 2005. That work was done to facilitate both the work of CABI's Invasive Alien Species Network and that of CABI's partners in invasive species management, including CBD, GISP, IPPC, IUCN and others, as well as the larger community of those working in, or interacting with, invasive species management. The work involved an internal partnership between CABI's regional centers and bioscience capability and CABI's publishing business.

The basic model used is that a Term is a label for a Concept, that a Concept is represented by a definition, and that both Terms and Concepts are situated in particular Contexts, represented in documents.

'Invasive species' and allied terms have been used in different ways by different users, sometimes referring to very different conceptual entities. Moreover, the language itself has been problematic, with elements of medical and military metaphor. Similar arguments have been made about 'alien species'. Clarity of communication facilitates understanding.

The aim of the IAS-CTC web interface was to provide access to terms and their definitions in a variety of source documents, important to and representative of the scientific, management, regulatory and/or legislative literature, including that from national, regional and international processes.

The 2005 version of the IAS-CTC was produced as a proof of concept. Its success has been demonstrated by the fact that the Convention on Biological Diversity (CBD), National Biological Information Infrastructure Invasive Species Information Node (NBII ISIN) and USDA NAL National Invasive Species Information Center all link to it from their websites, and it was referred to in news articles from the Global Invasive Species Information Network (GISIN) and other sources.

Issues arising during the 2005 proof-of-concept website included the necessity to manage permissions to use definitions appearing in published articles. Legislation covering intellectual property rights tends to be ambiguous with respect to 'fair use', and/or tends to favour some publishers at the expense of other stakeholders such as researchers (acting as both creators and consumers of knowledge) and the public (who may have paid for the means to create or communicate that knowledge in the first place). It also became apparent that some content providers did not want to permit their content to be constrained by the formal distinction made between a term's definition and comments about that term

or definition, as originally envisaged in the IAS-CTC (with a view, then, towards a potential 'machine-readable definition'). The provision of hyperlinks to original source documents, and the need to be able to browse source documents and to consider 'collections' of terms (i.e. from the same source) indicated that the existing database and web interface were in need of reconfiguration.

Moreover, some types of content created their own particular management requirements. This is certainly the case with changing documents which are part of an evolving process, such as official instruments associated with the International Plant Protection Convention (IPPC) and the Aquatic and Terrestrial Animal Health Codes of the World Organisation for Animal Health (OIE). Also, these processes occur within a multilingual environment.

3. Project Purpose

To enhance the content and functionality of the Invasive Alien Species – Concepts, Terms and Context (IAS-CTC) database, enabling researchers, managers, policymakers and others to see how relevant terms are used in different scientific, management and legal contexts, as an aid to communication. This facilitates a shared understanding of the language used by different communities of interest and practice, and should contribute to the UN Millennium Development Goal to ensure environmental sustainability by assisting the reversal of loss of environmental resources caused by 'invasive species'.

4. Brief description/outline of the Project activities, and/or methodologies

Functional specification of development required for the IAS-CTC website and underlying database to enhance functionality, better meet the requirements of content providers and improve management efficiency. The methodology included a review of the IAS-CTC database and website, as well as of any feedback received, and consultation with colleagues. The specification includes screenshots showing how the new system should work and what the website would look like.

Addition of more content to the IAS-CTC database, especially from the IPPC *ISPM No. 5, Glossary of Phytosanitary Terms*, and OIE's *Aquatic Animal Health Code* and *Terrestrial Animal Health Code*.

Search via the Web to identify other important sources of terms and definitions for the IAS-CTC database.

Addition of more hyperlinks to source documents within the IAS-CTC database, including those from the CBD Secretariat, EU (CEC) and IUCN. This exercise included the use of Digital Object Identifiers (DOIs) within hyperlinks for articles from scientific journals, enabling a user to go via a resolver system to access the appropriate copy and/or metadata from publishers' websites.

Addition of more 'COPYRIGHT' statements, enabling a user to see who owns the copyright of source content.

5. Statement of the project outputs/achievements

The IAS-CTC database now has a total of 605 terms and/or term variants, and a total of 784 definitions, from 40 publications.

Terms and definitions (and hyperlinked metadata) have been newly added to IAS-CTC database from:

- Barthlott, W., Biedinger, N., Braun, G., Feig, F., Kier, G and Mutke, J. (1999) Terminological and methodological aspects of the mapping and analysis of the global biodiversity. *Acta Botanica Fennica* 162: 103–110
- CBD (2000) *Cartagena Protocol on Biosafety*
- Cohen, A. (1997) Have claw, will travel. *Aquatic Nuisance Species Digest* 2(2): 13, 16-17, 23
- IPPC (2006) *ISPM No. 5, Glossary of Phytosanitary Terms*
- Leppäkoski, E. and Olenin, S. (2000) Xenodiversity of the European brackish water seas: the North American contribution. In: Pederson, J. (ed.) *Marine Bioinvasions.* Proceedings of the First National Conference, January 24-27, 1999. Cambridge, Massachusetts, USA: MIT Sea Grant College Program, pp. 107-119
- OIE (2006) *Aquatic Animal Health Code*
- OIE (2006) *Terrestrial Animal Health Code*

Hyperlinks embedding DOIs have been added to metadata about source documents from the following publishers:
- Blackwell Publishing
- Elsevier Ltd.
- Springer
- Taylor & Francis

Hyperlinks have been newly added to existing source documents from:
- CBD
- CEC (EU)
- JNCC (UK)

COPYRIGHT statements have been added to most source document metadata.

Where publishers have withheld permission to cite definitions or have asked for payment to do so, the definitions have been withdrawn from public view, but DOIs have been included in hyperlinks to enable subscribing users to access the original documents.

Additional source material for the IAS-CTC database has been identified.

Online sources for the texts of national legal instruments have been collated.

The text of the IAS-CTC website 'landing page' has been simplified for clarity.

A full functional specification of changes needing to be made to the original IAS-CTC database structure and to the IAS-CTC website has been produced. The specification addressed the needs:

- To add additional functionality to the IAS-CTC database management system to enable more efficient update and management of the data;
- To add new fields and functionality to the IAS-CTC database to make this publicly accessible Web resource more useful to its intended audiences.

Specifically, the specification took into account:

- The fact that IPPC ISPMs and OIE Codes are part of on-going standardization processes, with annual updates. Thus, it addressed version management.

- The desirability of including multilingual term equivalents (at least of French and Spanish) and their definitions, from IPPC and OIE standards, and from other sources.
- The desirability of hyperlinking terms to their definitions from the same source document.
- The need for users to browse the system by source document, with access via authors, organizations, countries and/or legal instruments or standards.
- The way the search engine should work (including the need to index synonyms used in source documents) and the order in which results are returned.
- The need for editorial notes to clarify the status and/or version history of terms and definitions from documents or the applicability of the document itself.
- The desirability of including other resources (e.g. Further Reading, Links) on the IAS-CTC website.

Lessons learned:

Extracting terms and definitions from legal texts is not straightforward, because:

- It requires a basic knowledge of legislative frameworks for a given jurisdiction in order to comprehend the status and significance of particular legal texts;
- Terminology is not always explicitly defined as such, and/or relevant definitions may be 'buried' within the text;
- The legislation pertinent to 'invasive' and/or 'alien' species may be distributed among very specific to more general texts, the latter including animal health, human health, plant health, nature conservation, environmental protection, trade, transportation, water resources, and so on.

Finding definitions of terms long used in the scientific and management literature is not straightforward, because:

- Older material (not in electronic form) containing term definitions may be difficult to access and/or the intellectual property ownership may be difficult to ascertain;
- Terminology is not always explicitly or succinctly defined, and/or relevant definitions may be 'buried' within the text;
- The definitions of terms used in recent literature may be poorly referenced, or may be referenced to secondary literature;
- Many terms and their definitions have come from non-English languages, e.g. German, making it difficult to provide a 'definitive' definition in English within the constraints of the existing IAS-CTC database.

Permissions management is not straightforward because of:

- It is not always easy to determine who to contact within a large organization in order to obtain permissions to use content;
- The length of time it can take to get a response from a publisher or other organization to a request to use content;
- The unwillingness of some publishers and other organizations to grant permission for use of their content, even when it could be in their interests to do so (i.e. as promoting use of their own material).

The original intention was to have upgraded the underlying SQL Server database and Web functionality, but this conflicted with an upgrade to the presentation of CABI's existing website, within which the IAS-CTC database is hosted. (CABI will change the presentation of the IAS-CTC database in line with its own website, in 2007, as part of the overall upgrade).

6. Project Beneficiaries (immediate and longer term)

Beneficiaries include policymakers, researchers and managers world-wide, involved at local, national, regional and international levels. For instance, the IAS-CTC website will support both national capacity building as well as international standards setting and harmonization.

Among existing users are:

Convention on Biological Diversity (CBD) – Invasive Alien Species –
Glossary of Terms
http://www.biodiv.org/programmes/cross-cutting/alien/terms.shtml

Global Invasive Species Information Network (GISIN) –
New Tool Provides Context-Sensitive Definitions for Invasive Alien Species Terms
http://www.gisinetwork.org/news.html

National Biological Information Infrastructure (NBII) Invasive Species Information Node -
Q: Where can I find definitions for invasive species related terminology and acronyms?
http://invasivespecies.nbii.gov/faq.html#acronyms

USDA/NAL National Invasive Species Information Center (NISIC) –
http://www.invasivespeciesinfo.gov/whatis.shtml and
http://www.invasivespeciesinfo.gov/aquatics/main.shtml and
http://www.invasivespeciesinfo.gov/plants/main.shtml and
http://www.invasivespeciesinfo.gov/resources/orginter.shtml

The IAS-CTC website is picked up by search engines such as Google Scholar and Scirus.

The IAS-CTC database was used in the preparation of:

Vyjayanthi Lopez and Ulrike Krauss (2006) *National and Regional Capacities and Experiences on Marine Invasive Species, Including Ballast Waters, Management Programmes in the Wider Caribbean Region - a Compilation of Current Information*. Report. UNEP/CEP/CABI.
http://www.cep.unep.org/newsandevents/news/2006/report-on-marine-invasive-species

7. Contributions to CABI Partnership Facility Goals and subsequent Programmes/Actions

The IAS-CTC database is openly accessible via the Web, providing information to users worldwide. The project was cross-cutting thematically for CABI, addressing both 'Invasive Species' and 'Knowledge for Development'. The project addressed the UN Millennium Development Goals – 'Ensure environmental sustainability', by addressing the invasive species issue, and 'Develop a global partnership for development'. With respect to the latter, the IAS-CTC project has obtained the cooperation of a number of organizations to use their content. The IAS-CTC database has brought together in one place content from scientific journal articles, books, reports, guidelines, codes of practice, standards and legal instruments from a variety of individual authors/commercial publishers, government departments, regional bodies and international organizations.

CABI is a member of GISP, and thus has a forum in which to explore further funding initiatives. Strategic alliances and/or interactions with GISIN, the CBD and IPPC Secretariats, and the Global Environment Facility (GEF) may also be useful here.

More generally, engagement with CABI's Member Countries ("here is a website which you can access and use to assist your work with respect to agricultural production, environmental protection, 'biosecurity', trade …") can be used to leverage user-driven demand for a tool that meets user needs.

Impact of the IAS-CTC database can be measured in a year's time via an indication of which organizations have linked to it and/or provided feedback.

8. Dissemination of Results

Once CABI has upgraded the presentation of its website, on which the IAS-CTC database is hosted, then it would be appropriate to alert others that the IAS-CTC database has much enhanced content. This can be done via listservs (e.g. ALIENS-L, IAS Network) and flyer distribution at conferences.

Also, addition of appropriate subject keywords to the IAS-CTC website metadata will ensure better pick-up by Web search engines.

9. Follow Up

Ensure presentation is upgraded in line with new CABI website 'look' (January 2007).

Ensure appropriate subject keywords have been added to IAS-CTC website metadata.

Agree wording with CABI stakeholders for e-mail or press release about IAS-CTC database to go to external listservs and/or on CABI website.

Contact CBD, IPPC and OIE to alert them to new content in the IAS-CTC database.

Follow-up future development options for IAS-CTC database with CABI's Invasive Species and Knowledge for Development Theme Directors.