

roots

BOTANIC GARDENS

Education for Sustainability

- 5th International Congress on Education in Botanic Gardens
- The School Garden: Education for Sustainable Living
- Using Plants to Light Sparks!
- Los Jardineros del Futuro
- Partnering for Education and Conservation – China

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Review

23

December 2001

Sustainability
for the Future

An Invitation to Attend

BGCI's 5th International Congress on Education in Botanic Gardens

'Connecting with Plants – Lessons for Life'

29 September – 4 October 2002

The Royal Botanic Gardens Sydney, Australia invites you to participate and attend the BGCI 5th International Congress on Education in Botanic Gardens. The congress entitled *Connecting with Plants - Lessons for Life* will provide a forum for people working in plant-based education to discuss techniques, skills and knowledge used for engaging people with plants and raising awareness of the importance of sustainable living. The main focus of discussion will be relevant to the five congress themes: Evaluation and Research; Multiculturalism and Indigenous Issues in Interpretation, Linking Science and Sustainability; Novel Methods in Interpretation/Communication; and Forming Partnerships.

Keynote speakers have been selected to challenge our thinking in these areas and we are delighted to announce that Dr Elizabeth Beckmann, Mr John Lennis, Dr Daniella Tilbury from the host country will be joined by Ms Susan Strauss (USA) and Professor Heila Lotz Sisitka (South Africa).

The congress will be held in the heart of Sydney in the grounds of the Royal Botanic Gardens Sydney (RBGS). A highlight of the congress will be a visit to Mount Annan Botanic Garden, an annexe of RBGS and Australia's largest botanic garden. With over 400 hectares of garden beds, walking trails and natural bushland, Mount Annan displays an enormous diversity of Australian flora and fauna. A post-conference tour will enable delegates to visit the third site of RBGS, Mount Tomah Botanic Garden, in the middle of the Blue Mountains Heritage area.

The congress will promote environmentally friendly practices, for example we will endeavour to minimise the use of paper leading up to the congress by ensuring that all congress information is available by on the worldwide web. Please visit the Royal Botanic Garden Sydney's web site for regular congress updates and to obtain a copy of the Congress Registration Brochure and Programme:
www.rbg Syd.nsw.gov.au

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Contents

1

INTRO	Introduction Julia Willison, Botanic Gardens Conservation International, U.K.	2
UPDATE	News Botanic garden education news from around the world	4
ARTICLEONE	The School Garden: Education for Sustainable Living Dr Fritjof Capra, Center for Ecoliteracy, Berkeley California USA	21
ARTICLETWO	Biodiversity as a Bridge between Nature Conservation Education and EfS Associate Professor Arjen Wals, Wageningen University, The Netherlands	25
ARTICLETHREE	Using Plants to Light Sparks! Yvette van Wijk, Garden Route Botanical Trust, George South Africa	30
ARTICLEFOUR	The Importance of Community Involvement in Conservation James Sumelong Ewane, Limbe Botanic Garden, Cameroon	32
ARTICLEFIVE	Los Jardineros del Futuro Dolores Rodríguez Veiga, Real Jardín Botánico de Madrid, Spain	36
ARTICLESIX	Games and Festivals as a Way to Engage School Children Dr Alla Andreeva, Apothecaries Garden, Moscow Russia	38
ARTICLESEVEN	Nuevas Enfoques Para la Alimentación: La Experiencia del Eco-Restorán Madeline Vázquez, Jardín Botánico Nacional Cuba	41
ARTICLEEIGHT	Sowing and Harvesting Environmental Education Activity, Oxfam U.K.	42
RESOURCES	Resources Educational resources for botanic gardens	44

Subscriptions

Roots is published twice a year as a service to the BGCI education network. It is sent to member gardens as part of their annual subscription. For information on how to become a member please contact BGCI or refer to the back cover of this edition of Roots.

Forthcoming Issues

Roots 24 – Environmental Interpretation Last submission dates: Articles - February 15, 2002, News - March 15, 2002
Roots 25 – Networking and Partnership Programmes Last Submission dates: Articles - July 12, 2002 News – 9 August, 2002

Sustainability for the future

■ Editorial

Next September Johannesburg plays host to the Earth Summit 2002, a decade after the inaugural Summit in Rio de Janeiro. Predicting the outcome of such an event, especially in the aftermath of the terrorist atrocities in the United States, is inherently risky. Nevertheless, those of us working in the field have a responsibility to prepare for the Summit as best we can and engage in a constructive debate about its implications for botanic gardens and education. At the very least, Johannesburg should provide an opportunity to strengthen global commitments on sustainable development. Taking a more optimistic view, it should also set realistic targets for these commitments and direct substantial resources and support towards meeting them. After Rio, education was recognised, in Agenda 21 and the Convention on Biological Diversity, as fundamental to sustainable development. Keeping education on the agenda at Johannesburg is therefore essential. In an increasingly uncertain political climate we must not lose sight of the fact that the global questions that sustainable development attempts to address will not go away. Indeed they have never been more relevant.

In the current issue of *Roots*, therefore, we have attempted to provide a framework in which some of these important questions may be considered. Two of our contributors offer philosophical analyses that are drawn from beyond the boundaries of botanic garden education.

To Arjen Wals, biodiversity is an 'ill defined' concept because, he writes, it lacks a unifying perspective or definition. It is open, he adds, to many different interpretations. But far from being a weakness, Wals contends that this breadth of meaning is actually one of its strengths. In this article he explores some of these strengths and makes appropriate links to plant conservation and sustainable community development. In his keynote article, Fritjof Capra argues that we must first become 'ecologically

▲ Editorial

En septembre prochain Johannesburg abritera les Sommets de la Terre 2002, une décennie après le premier sommet de Rio de Janeiro. Prévoir les conséquences d'un tel événement, spécialement après les suites des atrocités terroristes commises aux Etats Unis, est évidemment risqué. Néanmoins ceux d'entre-nous qui travaillent dans ce domaine ont pour responsabilité de préparer ce sommet aussi bien qu'ils le peuvent et de s'engager dans un débat constructif sur les implications pour les jardins botaniques et l'éducation. A l'extrême, le sommet de Johannesburg pourrait même menacer les engagements globaux concernant le développement durable. Sur un plan plus optimiste, il fournirait des objectifs (cibles) réalistes pour de tels engagements ainsi que des ressources et des supports spécifiques et substantiels envers ceux-ci.

Après Rio, l'éducation a été reconnue, dans l'Agenda 21 et dans la Convention pour la Diversité Biologique, comme fondamentale dans une stratégie de développement durable. Conserver l'éducation dans le programme de Johannesburg est bien sûr essentiel. Dans un climat politique de plus en plus incertain, nous ne devons pas perdre de vue le fait que les questions générales qui concernent le développement durable ne doivent pas être éludées. En fait, elles n'ont jamais été aussi importantes.

En conséquence, dans le numéro actuel de *Roots*, nous avons tenté de dresser une trame générale dans laquelle quelques-unes de ces importantes questions peuvent être soulevées. Deux de nos contributeurs offrent des analyses philosophiques qui vont au-delà des frontières de l'éducation dans les jardins botaniques.

Pour Arjen Wals, la biodiversité est un concept 'mal délimité' parce qu'il manque à sa définition une perspective ou une signification unique et consensuelle. Il ajoute que ce concept est ouvert à de nombreuses et différentes interprétations. Mais loin d'être une faiblesse, Wals ajoute que cette largeur de vue est en réalité une de ses forces. Dans cet article, il explore

● Editorial

El próximo mes de septiembre Johannesburgo acogerá la Cumbre de la Tierra 2002, una década después de la Cumbre de Rio de Janeiro. Es muy arriesgado predecir sus resultados, especialmente tras las recientes atrocidades terroristas en Estados Unidos. Sin embargo, los que trabajamos en el campo de la educación tenemos la responsabilidad de preparar la Cumbre lo mejor que podamos, y comprometernos en un debate constructivo sobre sus implicaciones para los jardines botánicos y la educación. Johannesburgo proporcionará, al menos, la oportunidad de reforzar los compromisos globales sobre desarrollo sostenible. Desde un punto de vista más optimista, la Cumbre debería establecer objetivos realistas para estos compromisos, y asignar el apoyo y los recursos precisos para su consecución. Desde Rio se ha reconocido que la educación es un elemento esencial del desarrollo sostenible tanto en la Agenda 21 como en la Convención sobre Diversidad Biológica. Mantener la educación en la agenda del encuentro de Johannesburgo es fundamental. No debemos perder la perspectiva, a pesar del clima de incertidumbre política, de que los problemas globales que plantea el desarrollo sostenible siguen siendo altamente relevantes.

En este número de *Roots*, por lo tanto, hemos intentado proporcionar el marco en el que encajar algunas de estas importantes cuestiones. Dos de las contribuciones ofrecen análisis filosóficos elaborados más allá de los límites de la educación en los jardines botánicos.

Para Arjen Wals el concepto de biodiversidad está 'mal definido' porque carece de una definición o perspectiva unificadora, y está abierto a demasiadas interpretaciones. Sin embargo, esta amplitud de significados es uno de sus puntos fuertes, sostiene Wals. En su artículo, explora algunos de estos

■ Editorial

literate' by understanding the principles of organisation that ecosystems have developed to sustain the web of life. The next step, he contends, is to embody these principles in the daily life of human communities. This means adopting a systems approach to sustainability: in other words, thinking in terms of relationships, connectedness and context.

Elsewhere in this issues our writers reflect the rich global diversity of the sustainable education initiatives undertaken by botanic gardens. James Ewane, Education Officer at the Limbe Botanic Garden in Cameroon, explains how its education programme was instrumental in conserving 'eru' a local vegetable species under severe threat from overexploitation. From Cuba, Madelaine Vázquez of the National Botanic Garden outlines the philosophy behind their Eco-Restaurant, which uses organic produced to promulgate a strong message about the links between our health and the health of the planet. Yvette Wijk's article describes how The Audrey Moriarty Southern Cape Herbarium in South Africa launched a highly successful Educational Environmental Expo in an economically disadvantaged area. Teachers and pupils were introduced to the richness and complexities of their local biomes and the factors that influenced their conservation.

Preparations for Earth Summit 2002 are already well in hand (visit the Summit's web site at www.johannesburgsummit.org). It is therefore up to us to ensure that the voice of botanic gardens is heard loud and clear in Johannesburg. Working through our local, regional and national education networks we can influence the way governments address the education question and highlight the pivotal role of botanic gardens. We must emphasise the excellent work already being done by botanic gardens in biodiversity education and education for sustainability.

Julia Willison

Look for the following symbols...

- English
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- Español

▲ Editorial

plusieurs de ces atouts tout en établissant des liens pertinents en ce qui concerne la conservation végétale et le développement durable au sein des sociétés.

Dans ses notes et commentaires, Fritjof Carpa défend l'idée selon laquelle nous devons en priorité être 'éduqués en écologie' en y incluant les principes d'organisation que les écosystèmes ont développés tout en supportant un réseau d'êtres vivants. Il ajoute que la prochaine étape est celle d'intégrer ces principes dans la vie de tous les jours des sociétés humaines. Cela signifie l'adoption d'un système d'approche vers la durabilité; en d'autres mots, penser en termes d'interrelations, de connections et de contextes.

Ailleurs dans ce numéro, nos rédacteurs reflètent la richesse et la diversité générale des initiatives pour l'éducation au développement durable entreprise par les jardins botaniques. James Ewane, Education Officer du Limbe Botanic Garden au Cameroun, explique comment le programme d'éducation était un instrument pour conserver le 'eru' une espèce de légume local, sévèrement menacé par une surexploitation. Madelaine Valzquez, du Jardin Botanique National de Cuba, souligne la philosophie qui se trouve derrière leur Eco-restaurant et qui utilise des produits biologiques pour promouvoir un message fort sur les liens entre notre santé et la santé de la planète. L'article de Yvette Wijk décrit comment l'Herbarium du Cap Sud Audrey Moriarty en Afrique du Sud a lancé une exposition pleine de succès sur l'éducation environnementale dans une zone économiquement défavorisée. Les professeurs et les élèves ont été initiés à la richesse et la complexité de leurs biomes locaux et les facteurs qui influencent leur conservation.

Les préparatifs pour le Sommet de la Terre 2002 sont déjà bien avancés (visiter: www.johannesburgsummit.org). Cela dépend donc de nous d'assurer que la voix des jardins botaniques est clairement et fortement entendue à Johannesburg. Travaillant grâce à l'intermédiaire de nos réseaux d'éducation, locaux, régionaux et nationaux, nous pouvons influencer les lignes de conduite des gouvernements concernant les questions d'éducation et mettre en exergue le rôle essentiel des jardins botaniques. Nous devons insister sur l'excellent travail déjà réalisé par les jardins botaniques en ce qui concerne l'initiation aux questions de biodiversité et de développement durable.

● Editorial

puntos, y los enlaza con la conservación de las plantas y el desarrollo comunitario y sostenible. En su artículo de portada Fritjof Capra argumenta la necesidad de una 'alfabetización ecológica', mediante la comprensión de los principios de organización que los ecosistemas han desarrollado para mantener la trama de la vida. El siguiente paso que reclama es adecuar dichos principios a la vida cotidiana de las comunidades humanas. Esto significa la adopción de un enfoque sistemático de la sostenibilidad, pensando en términos de relaciones y contexto.

Nuestros articulistas hacen referencia a la rica diversidad de las iniciativas en educación para la sostenibilidad llevadas a cabo por los jardines botánicos. James Ewane, educador en el Jardín Botánico de Limbe en Camerún, explica cómo mediante un programa de educación se ha posibilitado la conservación de un vegetal, llamado 'eru', de importancia local, en peligro por sobreexplotación. Desde Cuba Madelaine Valzquez, del Jardín Botánico Nacional, subraya la filosofía que alienta al Eco-Restaurante, que usa cultivos orgánicos para reforzar el mensaje de unión que existe entre nuestra salud personal y la del planeta. Yvette Wijk describe cómo el Herbarium Audrey Moriarty Southern Cape de Sudáfrica ha impulsado con éxito una exposición sobre educación ambiental en una zona económicamente deprimida. Profesores y estudiantes han sido familiarizados con la riqueza y complejidades de los biomas locales y los factores que influyen en su conservación.

Los preparativos para la Cumbre de la Tierra 2002 ya están en marcha (se puede visitar la página web de la Cumbre en www.johannesburgsummit.org). Nos toca a nosotros asegurar que la voz de los jardines botánicos se escuche alta y clara en Johannesburg. Con nuestro trabajo en la redes educativas locales, regionales y nacionales, influiremos en la forma en que los gobiernos atienden la cuestión educativa y subrayaremos el papel crucial de los jardines botánicos. Debemos poner énfasis en el excelente trabajo ya realizado por los jardines botánicos en la educación sobre la biodiversidad y para la sostenibilidad.

News^{up date}

■ News



Above: Come to the 5th International Congress on Education in Botanic Gardens in 2002 and meet the Education Team from the Royal Botanic Gardens Sydney

5th International Congress on Education in Botanic Gardens Update

Organisation for the 5th International Congress on Education in Botanic Gardens is underway and interested persons can visit the web at <http://www.rbg Syd.nsw.gov.au> for a copy of the congress registration booklet and up to date congress details. If you do not have access to the worldwide web please contact Lucy Sutherland at BGCI who will arrange for a copy of the registration booklet to be printed and sent to you.

Shortly before the congress the 10 year review of the United Conference on Environment and Development will take place in South Africa and the outcomes from this meeting will contribute to our discussions in Sydney. In addition, the congress will focus on 5 themes: Evaluation and Research; Multiculturalism and Indigenous Issues in Interpretation; Linking Science and Sustainability;

▲ Nouvelles

Dernières Nouvelles au sujet du 5ème Congrès International sur l'Éducation dans les Jardins Botaniques

L'Organisation pour le 5ème Congrès International sur l'Éducation dans les Jardins Botaniques est en cours, et les personnes intéressées peuvent visiter le site web sur <http://www.rbg Syd.nsw.gov.au> pour obtenir une copie du livret d'inscription et les derniers détails sur le congrès. Si vous n'avez pas accès au web, vous pouvez prendre contact avec Lucy Sutherland au BGCI qui vous fera une sortie imprimante du livret d'inscription et vous la fera parvenir.

Peu avant le congrès, se déroulera en Afrique du Sud le bilan au bout de 10 ans de la Conférence des Nations Unies sur l'Environnement et le Développement Durable, et les conclusions de cette rencontre sera d'une très grande contribution pour nos discussions à Sydney. Le Congrès de Sydney abordera 5 thèmes principaux: Evaluation et Recherche; Les Problèmes Liés au Multiculturalisme et à la Culture Locale dans l'Interprétation et la Communication; Liaisons entre Science et Développement Durable; Nouvelles Méthodes dans l'Interprétation et la Communication; Créer des Partenariats. Les thèmes du Congrès seront introduits par des conférenciers qui feront part de leurs perspectives et souligneront les points pertinents afin d'alimenter les réflexions au cours du Congrès. Les membres du Comité d'Organisation du Congrès sont heureux de vous annoncer que les conférenciers seront: Dr Daniella Tilbury (Australie), Ms Susan Strauss

● Noticias

Novedades Sobre el 5º Congreso Internacional de Educación en Jardines Botánicos

La organización del 5º Congreso Internacional de educación en Jardines Botánicos va por buen camino. Las personas interesadas pueden visitar el sitio web <http://www.rbg Syd.nsw.gov.au> e imprimir una copia del formulario de registro y de los últimos detalles del Congreso. Si no tienes acceso a la página web por favor contacta a Lucy Sutherland en BGCI quien te podrá enviar un formulario de registro.

Poco antes del congreso, se llevará a cabo en Sudáfrica la revisión de los 10 años de la Conferencia de las Naciones Unidas por el Ambiente y el Desarrollo y los resultados de esta reunión contribuirán a nuestras discusiones en Sydney. Además, el congreso se centrará en 5 temas: Evaluación e Investigación; Multiculturalismo y Aspectos Indígenas en Interpretación; Relaciones Entre Ciencia y Sustentabilidad; Nuevos Métodos en Interpretación y Comunicación; Formación de Alianzas. Los temas del congreso serán introducidos por diversos ponentes quienes expresarán sus perspectivas y resaltarán aspectos de interés para las discusiones del Congreso. El Comité Organizador tiene el placer de anunciar que las conferencias magistrales serán impartidas por: Dra. Daniella Tilbury (Australia), Sra. Susan Strauss (EUA), Dra. Elizabeth Beckman (Australia), Heila Lotz Sisitka MSC (Sudáfrica) y el Sr. John Lennis (Australia). Para mayor información contacta a: Lucy Sutherland y Julia Willison, BGCI: o Janelle Hatherly,

■ News

Novel Methods in Interpretation and Communication; Forming Partnerships. The congress themes will be introduced by keynote speakers, who will share their perspectives and highlight relevant issues for discussion during the congress. The International Congress Planning Committee are pleased to announce that the keynote speakers will be: Dr Daniella Tilbury (Australia), Ms Susan Strauss (USA), Dr Elizabeth Beckmann (Australia), Professor Heila Lotz Sisitka (South Africa), and Mr John Lennis (Australia). For further information contact: Lucy Sutherland and Julia Willison BGCI or Janelle Hatherly, Royal Botanic Gardens Sydney Mrs Maquaries Road, Sydney 2000 NSW Australia. Email: Janelle.Hatherly@rbgsyd.nsw.gov.au

Education for Sustainability Guidelines Update

BGCI is delighted to announce that it is working with the IUCN Commission on Education and Communication to finalise the production and publication of the Efs guidelines. As a result of the collaboration between BGCI and IUCN-CEC, the guidelines will be edited to be more applicable to a wider range of sites. A draft copy of the guidelines was distributed to member gardens in electronic format and a request made for case studies. Comments are still welcome, as are case studies on Efs practice in botanic gardens. For further information on how to contribute please contact Julia Willison at BGCI.

Darwin Project Officer Appointed

As reported in Roots 22, BGCI and the Kodaikanal Botanic Garden, India have been awarded a U.K. Darwin Initiative grant to develop the capacity of teachers in India to deliver environmental education. In June of this year, Dr Seeni, Deputy Director of the Tropical Botanic Garden and Research Institute (TBGRI), Thiruvananthapuram, Kerala, was appointed as Project Officer. Since his appointment, Dr Seeni has been busy visiting schools in and around the Palni Hills to assess their needs for

▲ Nouvelles

(Etats Unis), Dr Elizabeth Beckmann (Australie), Professeur Heila Lotz Sisitka (Afrique du Sud), et Mr John Lennis (Australie). Pour plus d'information prendre contact avec: Lucy Sutherland et Julia Willison du BGCI ou Janelle Hatherly Royal Botanic Gardens Sydney, Mrs Maquaries Road, Sydney 2000 NSW Australie. Email: Janelle.Hatherly@rbgsyd.nsw.gov.au

Mise à Jour des Recommandations sur l'Éducation au Développement Soutenable

Le BGCI est heureux de vous annoncer qu'il travaille avec la Commission sur l'Éducation et la Communication de l'UICN pour finaliser et publier les recommandations sur l'Éducation au Développement Soutenable. Le résultat de cette collaboration entre le BGCI et l'UICN-CEC devrait faire en sorte que ces recommandations soient applicables dans un plus grand nombre de lieux. Une ébauche de ces recommandations sera distribuée aux membres des jardins par le web et ces derniers seront sollicités pour fournir des cas concrets. Tous commentaires seront les bienvenus ainsi que des exemples de cas concrets. Pour plus d'information, et pour savoir comment collaborer, veuillez prendre contact avec Julia Willison au BGCI.

Nomination du Responsable du Projet Darwin

Comme indiqué dans le n°22 de Roots, le BGCI et le Kodaikanal Botanic Garden en Inde ont attribué une subvention de l'Initiative Darwin Britannique afin de développer les moyens des enseignants en Inde pour faire de l'Éducation à l'Environnement. En juin de cette année, le Dr Seeni, le Directeur Adjoint du Tropical Botanic Garden and Research Institute (TBGRI), à Thiruvananthapuram, dans le Kerala, a été nommé comme responsable du projet. Depuis sa nomination, le Dr Seeni est très occupé en visitant les écoles de Palni Hills et des alentours pour évaluer les besoins nécessaires à la conduite de programmes d'Éducation à

● Noticias

Reales Jardines Botánicos de Sydney Mrs. Maquaries Road, Sydney 2000 NSW Australia. Email: Janelle.Hatherly@rbgsyd.nsw.gov.au

Novedades Sobre los Lineamientos de Educación Para la Sustentabilidad

BGCI se complace en anunciar que está trabajando con la Comisión de Educación y Comunicación de la Unión Internacional de Conservación de la Naturaleza (UICN) para finalizar la elaboración y publicación de los lineamientos de educación para la sustentabilidad. Como resultado de la colaboración entre BGCI y la Comisión de la UICN, los lineamientos se editarán para poder ser aplicados en un rango más amplio de sitios. Un borrador de los lineamientos se distribuyó por vía electrónica a todos los miembros de los jardines botánicos así como solicitudes para estudios-caso. Sus comentarios aun son bienvenidos así como estudios-caso de educación para la sustentabilidad en jardines botánicos. Para mayor información para tus contribuciones, contacta a Julia Willison en BGCI.



Left: Dr Seeni (2nd from left) meeting with teachers from Tamil Nadu to discuss their needs for environmental education

Nombramiento del Coordinador del Proyecto Darwin

Como informamos en Rotos 22, BGCI y el Jardín Botánico Kodaikanal, India, recibieron una beca de la Fundación Británica Darwin para dar entrenamiento para maestros en la India que enseñan educación ambiental. En Junio de este año, el Dr. Seeni, delegado del Director del Jardín Botánico Tropical e Instituto de investigación (TBGRI), Thiruvananthapuram, Kerala, fue nombrado Director del Proyecto.

■ News

environmental education. The results of the survey will be used to shape a series of training sessions planned for 2002. Dr Seeni has also produced a small leaflet about the project and is working with BGCI on the production of a training manual for teachers in environmental education. In October, Dr Seeni undertook a study trip of a number of U.K. botanic garden education programmes. His itinerary took in the Royal Botanic Gardens, Kew, Wakehurst Place, Birmingham Botanical Gardens and Glasshouses, Leicester Botanic Garden and Chelsea Physic Garden. His findings have been extremely useful in his professional development and that of the project. BGCI is very grateful to these gardens for their support of this important project.

Roots Questionnaire

At the end of the Year 2000 readers of Roots were asked to take part in a survey to help determine the themes for issues of Roots in 2002 and 2003. A big thank you to the readers that took part in the survey. We greatly appreciate your time and input. The themes that were highlighted as the most important for Roots readers were:

- networking and partnership programmes
- ecotourism
- botanic gardens as centres for community involvement
- environmental education for people with special needs
- environmental education and technology
- action research and botanic gardens
- planting for education
- using art in environmental education.

We will begin to incorporate these themes in Roots 25, which will focus on networking and partnership programmes. We look forward to your article contributions.

International Diploma Course in Botanic Gardens Education

The Royal Botanic Gardens Kew and Botanic Gardens Conservation International are working in partnership to conduct the International Diploma in

▲ Nouvelles

L'Environnement. Le résultat de cette enquête sera utilisé pour mettre sur pied une série de cours programmés en 2002. Le Dr Seeni a également réalisé un petit dépliant sur le projet, et il travaille avec le BGCI pour la réalisation d'un manuel destinés aux enseignants sur l'Education à l'Environnement. En octobre, le Dr Seeni a entrepris un voyage d'étude dans de nombreux Jardins Botaniques anglais conduisant des programmes éducatifs. Son itinéraire est passé par le Royal Botanic Gardens à Kew, le Wakehurst Place, le Birmingham Botanical Gardens and Glasshouses, le Leicester Botanic Gardens et le Chelsea Physic Garden. Ses résultats ont été très utiles pour sa propre formation professionnelle et pour ce projet. Le BGCI remercie très sincèrement tous les jardins qui ont apporté leur aide à ce projet important.

Questionnaire sur Roots

A la fin de l'année 2000, les lecteurs de Roots ont participé à une enquête afin de nous aider à déterminer les thèmes à traiter au cours des prochains numéros de Roots pour la période 2002/2003. Un très grand merci à tous ceux qui ont participé à cette enquête, pour le temps qu'ils y ont consacré et pour leurs contributions. Les thèmes qui ont été les plus souvent demandés à être traités par les lecteurs de Roots sont:

- les programmes éducatifs conduits en partenariat et en réseau
- l'éco-tourisme
- les jardins botaniques comme lieux d'implication pour le public
- l'éducation à l'environnement pour les personnes ayant des besoins spécifiques
- l'éducation à l'environnement et la technologie
- les jardins botaniques et les programmes de recherche
- planter pour éduquer
- utilisation de l'art dans l'éducation à l'environnement.

Nous incluons ces thèmes dans le n°25 de Roots, qui fera le point en particulier sur les programmes éducatifs en partenariat et en réseau.

● Noticias

Desde su nombramiento, el Dr. Seeni ha estado muy ocupado visitando escuelas en los alrededores de las Montañas Palni para conocer sus necesidades de educación ambiental. Los resultados de la investigación se utilizarán para estructurar una serie de sesiones de capacitación programadas para el 2002. El Dr. Seeni elaboró un pequeño folleto sobre dicho proyecto y está trabajando en colaboración con BGCI en la producción de un manual de capacitación de educación ambiental para maestros. En octubre el Dr. Seeni fue a conocer en un viaje de estudios los programas de educación de diversos jardines botánicos del Reino Unido. Estos incluyeron los reales Jardines Botánicos de Kew, Wakehurst Place, los Jardines Botánicos e invernaderos de Birmingham, el jardín Botánico de Leicester y el Jardín Físico de Chelsea.. Sus conocimientos han sido de gran utilidad para el desarrollo profesional de este proyecto. BGCI agradece a estos Jardines por el apoyo brindado a tan importante proyecto.

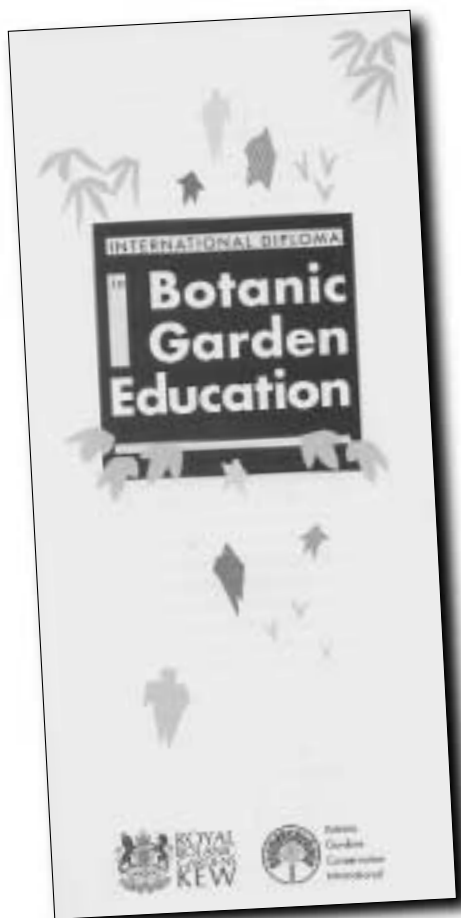
Cuestionario de Roots

A fines del 2000, a los lectores de Roots se le invitó a participar en una indagación para definir los próximos temas de los números de Roots del 2002 y 2003. Damos gracias a aquellos que participaron en la investigación. Apreciamos enormemente su tiempo y sugerencias. Los temas que nuestros lectores consideraron más importantes fueron:

- trabajos conjuntos y colaboraciones
- los jardines botánicos como centros para involucrar a la comunidad
- educación ambiental para personas con requerimientos especiales
- educación ambiental y tecnología
- investigación acción y jardines botánicos
- plantar para educar
- el uso del arte en educación ambiental.

Empezaremos a incluir estos temas a partir de Roots 25, el cual tratará de colaboraciones y trabajos conjuntos. Esperamos sus contribuciones.

■ News



Botanic Garden Education course from 15 April – 10 May 2002. This four-week course costs £2,100 which includes all tutorials, field trips and course materials. A few places are still available on the course. For further information contact: Mrs Liz de Keyser, Education Department, Royal Botanic Gardens, Kew Richmond Surrey TW9 3AE U.K. Tel: (44) 208 332 5634 Fax (44) 208 332 5640 Email: E.Keyser@rbgkew.org.uk

Teaching Interpretation in Peru

Lucy Sutherland, BGCI's Education Officer, has once again been invited to lecture on environmental interpretation to students undertaking their Masters degree in Ecotourism at the Universidad Nacional Agraria La Molina in Lima, Peru. During her visit, Lucy

▲ Nouvelles

Cours Pour un Diplôme International sur l'Éducation dans les Jardins Botaniques

Le Royal Botanic Gardens de Kew et le Botanic Gardens Conservation International travaillent en partenariat pour effectuer des cours dans le cadre d'un diplôme international sur l'Éducation dans les Jardins Botaniques du 15 avril au 10 mai 2002. Le prix pour ces 4 semaines de cours est de £2,100, et inclus tous les travaux dirigés, les voyages d'étude, et le matériel de cours. Quelques places sont encore disponibles pour suivre cette formation. Pour plus d'information, prendre contact avec: Mrs Liz de Keyser, Education Department, Royal Botanic Gardens Kew, Richmond Surrey TW9 3AE U.K. Tel: (44) 208 332 5634 Fax: (44) 208 332 5640 Email: E.Keyser@rbgkew.org.uk

Enseignement de l'Interprétation au Pérou

Lucy Sutherland, Responsable d'éducation au BGCI, a été de nouveau invitée à faire une conférence sur l'interprétation en Environnement devant des étudiants en maîtrise d'Écotourisme à l'Universidad Nacional Agraria La Molina de Lima au Pérou. Au cours de son séjour, Lucy en profitera pour effectuer une étude sur les techniques d'interprétation utilisées dans différents sites naturels et historiques du pays, et pour entreprendre des cours d'espagnol qui lui seront très utiles pour travailler avec les membres hispanophones du BGCI.

CHINE

Partenariat Pour l'Éducation et la Conservation

Le Programme de Conservation de la Biodiversité est un projet majeur de collaboration entre le Kadoori Farm and Botanic Garden et plusieurs organisations de biologie et de foresterie de Chine. Plusieurs thèmes de ce projet concernent l'Éducation: fournir l'occasion à des jeunes de suivre des formations spécialisées dans les domaines de la conservation et de la recherche en environnement en Chine; sensibiliser le public à la

● Noticias

Diplomado Internacional de Educación en Jardines Botánicos

Los Reales Jardines Botánicos de Kew y Conservación Internacional en Jardines Botánicos (BGCI) están trabajando conjuntamente en la organización del Diplomado Internacional de Educación en Jardines Botánicos que tendrá lugar del 15 de abril al 10 de mayo del 2002. El costo de este curso de 4 semanas es de 2,100 libras esterlinas e incluye todas las clases, viajes de campo y materiales del curso. Aún hay unos cuantos lugares disponibles para el curso. Para mayor información contactar a la Srta. Liz de Keyser, Departamento de Educación, Reales jardines botánicos de Kew, Richmond, Surrey, TW9 3 AE, U.K. Tel: (44) 208 332 5634 Fax (44) 208 332 5640 Email: E.Keyser@rbgkew.org.uk

Capacitando en Interpretación en Perú

Lucy Sutherland, coordinadora de educación de BGCI, nuevamente fue invitada para capacitar en interpretación ambiental a estudiantes que cursan la maestría en Ecoturismo en la Universidad Nacional Agraria La Molina en Lima, Perú. Durante su estadía, Lucy hará una investigación sobre las diferentes técnicas interpretativas utilizadas en sitios históricos y naturales e igualmente tomará un curso de español, el cual le ayudará en su trabajo con los miembros de BGCI de habla hispana.

CHINA

Convenios en Educación y Conservación

El Programa de Conservación de la Biodiversidad del Sur de China es un gran proyecto en colaboración entre la Granja y Jardín Botánico Kadoori y varios organismos relacionados con las ciencias biológicas y forestales de China. Varias de las metas del proyecto se centran en educación: proveer entrenamiento especializado en conservación y campos de la investigación ambiental dirigida a jóvenes; incrementar la concientización y aprecio de la naturaleza; identificar y

News

will also be investigating interpretive techniques used in various natural and historic sites and undertaking a Spanish language course, which will assist her in working with BGCI's Spanish speaking members.

CHINA

Partnering for Education and Conservation

The South China Biodiversity Conservation Programme is a major collaborative project between Kadoorie Farm and Botanic Garden and various biology and forestry organisations in China. Several of the aims of the project focus on education: the provision of specialist training opportunities for young people in the conservation and environmental research field in China; increasing public awareness and appreciation of nature; identifying and promoting alternatives to existing conflicts

Nouvelles

découverte et au respect de la nature; identifier et promouvoir des alternatives aux conflits entre l'homme et la nature; partager les connaissances et les expertises; et obtenir diffuser des informations à jour sur la distribution et le statut de la flore et de la faune en Chine du Sud.

Au fur et à mesure de la progression du programme, l'accent sera mis sur les solutions à apporter aux problèmes de conservation. Par exemple un projet porte sur la fourniture de fuel pour rendre plus efficace les fourneaux et réduire ainsi la collecte de bois. La grande expérience de l'équipe du Département d'Éducation est utilisée pour créer une dynamique dans la diffusion du message sur la conservation localement et autour de la région. Pour plus d'information, prendre contact avec Kadoorie Farm & Botanic Garden Corporation, Lam Kam Road, Tai PO, New Territories Hong Kong
Tel : 852 2488 6192 Fax : 852 2488 1877
Web: <http://www.kfbg.org.hk>

FRANCE

Réseau des Educateurs Français

Les Educateurs des Jardins Botaniques du réseau français des Jardins Botaniques (Jardins Botaniques de France et des Pays Francophones), se sont retrouvés récemment pour leurs 2èmes rencontres nationales sur l'Éducation dans les Jardins Botaniques. Les principaux objectifs de cette rencontre, organisée par le Jardin Botanique du Montet à Nancy en France, étaient:

- continuer le travail entrepris lors du premier congrès à la Gacilly en 1999
- maintenir actif le réseau des Educateurs des Jardins Botaniques
- intensifier les collaborations et les échanges entre les Educateurs des différentes institutions
- favoriser la mise en œuvre d'une stratégie globale en Éducation à l'Environnement et accentuer la sensibilisation du public.

Lucy Sutherland, responsable de l'Éducation au BGCI, a participé au congrès et a présenté une conférence

Noticias

promover alternativas para los conflictos existentes entre la gente y la naturaleza; compartir conocimiento y experiencia; obtención y difusión de información actualizada sobre la distribución y status de la fauna y flora del Sur de China.

Conforme el proyecto avanza, se hace hincapié en la manera de proporcionar soluciones a los problemas de conservación. Por ejemplo, un proyecto considera la donación de estufas de combustible eficientes con el fin de reducir la recolección de leña. La extensa experiencia del personal del Departamento de Educaciones ha usado como una fuerza dinámica para difundir los mensajes de conservación en la localidad y en la región. Para mayor información contactar a Corporación Granja y Jardín Botánico Kadoori, Lam Kam Road, Tai PO, New Territories Hong Kong.
Tel: 852 2488 6192 Fax: 852 2488 1877
Web <http://www.kfbg.org.hk>

FRANCIA

Enlace de Educadores Franceses

Educadores de jardines botánicos de la Red Francesa de Jardines Botánicos, Jardines Botánicos de Francia y de los Países Francófonos se reunieron en el 2º encuentro de educación en jardines botánicos. Los objetivos principales de dicha reunión realizada en el Jardín Botánico de Montet, Nancy, Francia, fueron:

- continuar con el trabajo iniciado en la primera reunión de La Gacilly en 1999
- mantener la existencia de la red de educación en jardines botánicos
- incrementar la colaboración e intercambio entre las diferentes instituciones
- contribuir en la elaboración de una estrategia general de educación ambiental e incrementar la concientización del público en general.

Lucy Sutherland, coordinadora de educación de BGCI asistió a la reunión y dio una conferencia sobre biodiversidad y educación en jardines



■ News

between people and nature; sharing knowledge and expertise; and obtaining and disseminating up-to-date information on the distribution and status of fauna and flora in South China.

As the programme progresses emphasis is being placed on providing solutions to conservation problems. For example one project involves the donation of fuel-efficient stoves to farmers to reduce wood collection. The extensive experience of the staff from the Education Department is used to provide a dynamic force in spreading conservation messages locally and across the region. For further information contact: Kadoorie Farm & Botanic Garden Corporation, Lam Kam Road, Tai PO, New Territories Hong Kong Tel: 852 2488 6192 Fax: 852 2488 1877 Web: <http://www.kfbg.org.hk>

FRANCE

Networking of French Educators

Botanic garden educators from the French Network of Botanic Gardens, Jardin Botaniques de France et des Pays Francophones, came together recently for their 2nd botanic gardens education meeting. The main objectives of the meeting, hosted by the Jardin Botanique du Montet, Nancy, France, were to:

- continue with the work from the first meeting in La Gacilly in 1999
- maintain the existence of the botanic garden education network
- increase collaboration and exchange between educators from different institutions
- help implement an overall strategy on environmental education and increase awareness of the general public.

BGCI's Education Officer, Lucy Sutherland, attended the congress and presented a paper on biodiversity education and botanic gardens. The paper highlighted the excellent work that botanic gardens throughout the world are doing in in biodiversity education and offered practical ways of

▲ Nouvelles

sur jardins botaniques et l'éducation à la biodiversité. Le texte de cette conférence soulignait l'excellent travail qu'effectuent les Jardins Botaniques du monde entier sur l'éducation à la biodiversité, et présentait des exemples concrets sur la manière dont le thème de la biodiversité est abordé dans les programmes éducatifs des Jardins Botaniques. Pour plus d'information, prendre contact avec: Jardins Botaniques de France et des Pays Francophones, 7 rue Victor Considérant 25000 Besançon, France. Email: jbfpf@club_internet.fr

INDE

Des Nouvelles de Gurukula

L'équipe du Gurukula Botanical Sanctuary au Kerala, a eu une année très chargée, car elle a pris part dans un grand nombre de projets. De novembre 2000 à juin 2001, plusieurs programmes éducatifs ont eu lieu simultanément, comportant des sorties à la journée, des activités en classe avec les scolaires, un programme de recherche et un camp de trois mois. Bien que l'équipe de Gurukula travaille avec de nombreux enfants provenant du Kerala, du Tamil Nadu, et d'autres états de l'Inde, certains enfants qui ont prit part à ces programmes venaient de beaucoup plus loin, puisqu'ils étaient originaires de Californie aux Etats Unis! Le centre de Gurukula offre aussi l'occasion à des étudiants



Left: Observation of plants and raising awareness of biodiversity forms an important part of the educational programmes at Gurukula Botanical Sanctuary

● Noticias

botánicos. Su charla destacó el excelente trabajo realizado por los jardines botánicos alrededor del mundo en lo que respecta a educación y biodiversidad y ofreció de manera práctica como los jardines botánicos pueden introducir el tema de la biodiversidad en sus programas educativos. Para más información contactar a: Jardines Botánicos de Francia y de Países Francófonos, 7 rue Victor Considérant Besançon, France 25000. Email: jbfpf@club_internet.fr

INDIA

Noticias de Gurukula

El personal del Santuario Botánico en Gurukula en Kerala, ha estado muy activo participando en diferentes proyectos. De noviembre 2000 a junio 2001 diversos programas educativos se han llevado a cabo simultáneamente incluyendo visitas guiadas, programas de residencia con estudiantes de colegio, un programa de investigación y un campamento de tres meses.

Aunque Gurukula trabaja fundamentalmente con los niños de Kerala, Tamil Nadu y otros estados de la India, algunos niños que han participado en sus programas han venido se tan lejos como California en los Estado Unidos! Gurukula también ofrece una oportunidad para los estudiantes universitarios que quieran poner en práctica sus conocimientos y

■ News

how gardens can introduce biodiversity education into their programmes.

For further information contact: Jardin Botaniques de France et des Pays Francophones, 7 rue Victor Considérant Besançon France 25000. Email: jbfpf@club_internet.fr

INDIA

News from Gurukula

Staff at Gurukula Botanical Sanctuary in Kerala have had a busy year taking part in a range of projects. From November 2000-June 2001 several educational programmes have been running simultaneously including daily tours, residential programmes with school children, a research programme and a three month camp.

Although Gurukula works a lot with children from Kerala, Tamil Nadu and other states of India, some children taking part in their programmes have come from as far away as California in the United States! Gurukula also provides an opportunity for university students to further their skills and knowledge while contributing to the work of the sanctuary. Sruti and Minti from Bangalore and Laura from Manchester (U.K.) have been developing their skills in plant identification, surveying and mapping skills. This has enabled them to then work as research assistants at Gurukula undertaking vegetation mapping.

Other news from the sanctuary is the installation of a solar system to run their lighting, aquarium pump and computer and the purchase of four acres of tea plantation. For further information contact: Suprabha Seshan, Gurukula Botanical Sanctuary Alattil P.O., North Wayanad, Kerala 670 644, India. Tel: (91) 493 560 426

Sharing Stories has a Profound Effect on Reducing Pollution

Sue Baughan, Education Officer at the Leicester Botanic Garden, U.K., was educated as a young child in Ootacamund, Southern India. Prior to the 4th International Congress on Education in Botanic Gardens, held in

▲ Nouvelles

de l'Université de mettre leurs connaissances et leurs compétences à contribution lors de travaux au sanctuaire. Sruti et Minti de Bangalore et Laura de Manchester (G.B.) ont amélioré leurs compétences dans la reconnaissance des plantes, les relevés de terrain et la cartographie. Cela leur a permis de travailler comme assistants de recherche à Gurukula pour effectuer des cartes de végétation. Les nouveautés au Sanctuaire sont d'une part l'installation d'un système de capteurs solaires pour fournir de l'électricité pour l'éclairage, une pompe d'aquarium, et un ordinateur, et d'autre part l'acquisition de quatre acres de plantation de thé. Pour plus d'information, prendre contact avec: Suprabha Seshan, Gurukula Botanical Sanctuary Alattil P.O., North Wayanad, Kerala 670 644, India. Tel: (91) 493 560 426

Des Histoires Racontées ont eu un Effet Positif sur la Réduction de la Pollution

Sue Baughan, du Service éducatif du Jardin Botanique de Leicester, au Royaume Uni, a passé son enfance à Ootacamund, dans le sud de l'Inde. Avant le 4ème Congrès International sur l'éducation dans les jardins botaniques à Thiruvananthapuram en 1999, Sue et son frère Pete, sont retournés à Ootacamund où ils ont remarqué une augmentation significative de la pollution, en particulier par les plastiques. En 1976, par exemple, les gobelets jetables dans les gares étaient en terre, maintenant ils sont en plastique. Une femme de la région, Geetha Srinivasen, s'est attaquée à ce problème en travaillant avec un groupe de personnes qui ont nettoyé les plastiques des dépôts d'ordures de la ville. En conséquence, des plantes ont commencé à pousser et des responsables de plantations de thé ont visité la décharge pour vérifier que le sol pouvait être un milieu de culture valable. Geethe travaille aussi avec les commerçants et les hôteliers de la région pour les sensibiliser au problème.

● Noticias

habilidades mientras contribuyen con el trabajo del Santuario. Sruti y Minti de Bangalore y Laura de Manchester (Reino Unido), han estado practicando sus conocimientos en la identificación de plantas, encuestas y mapeo. Esto les ha permitido trabajar como asistentes de investigación en el mapeo de la vegetación en Gurukula.

Otra novedad del santuario es la instalación de un sistema de energía solar para el alumbrado de la estación, la bomba del acuario y para la computadora, así como la compra de cuatro acres de una plantación de té. Para más información contacta a: Suprabha Seshan, Santuario Botánico Gurukula Alattil P.O., North Wayanad, Kerala 670 6444, India. Tel: (91) 493 560 426

Compartir Historias tiene éxito en la Reducción de la contaminación

Sue Baughan, Jefa de Educación del Jardín Botánico de Leicester en el Reino Unido, pasó su infancia en Ootacamund en el Sur de la India. Antes del 4º Congreso Internacional de Educación en Jardines Botánicos, celebrado en Thiruvananthapuram en 1999, Sue y su hermano, Peter, viajaron a su ciudad que llaman cariñosamente 'Ooty'. Vieron, con gran asombro, cómo había aumentado la contaminación en especial con plásticos. Antes, en 1976, los vasos de usar y tirar en las estaciones de tren eran de arcilla y ahora de plástico. Una lugareña, Geetha Srinivasen ha estado trabajando en favor de la eliminación de plásticos y, con un grupo de trabajo, hacer posible su almacenamiento. También convenciendo a los hoteleros y comerciantes acerca del problema de las bolsas de plásticos.

Sue y Peter impresionados por esta historia la compartieron con los representantes en el Congreso de Educación. Bob Stewart y Tanya Balcar, de Kodaikanal escucharon la historia con atención. Buscaron información acerca del proyecto y elaboraron carpetas informativas que se distribuyeron entre personas y organizaciones clave para elevar el

■ News

Thiruvananthapuram in 1999, Sue and her brother, Pete, re-visited Ootacamund (Ooty) where they noticed a significant increase in pollution, particularly from plastics. In 1976, for example, disposable cups at railway stations were made from clay, now they are made from plastic. A local woman, Geetha Srinavasan, has been addressing this issue by working with a team of people to clear the town rubbish dump of plastic. As a result, plants have begun to germinate and tea plantation managers have visited the dump to test the soil as a viable growing medium. Geetha is also working with local shopkeepers and hoteliers to make them aware of the problem.

Sue and Peter were so impressed with this story that they shared it with delegates at the Education Congress. Bob Stewart and Tanya Balcar, from Kodaikanal, were two people who heard this story. After finding out more about the project, Bob and Tanya worked with colleagues to produce information packs and distribute them to key individuals and organisations to raise awareness of the issue of plastics. On 24 April 2000 'Earthday' was celebrated with 'Ban on Plastics in Kodai' as its focus. This meeting provided the forum for action and a week later, a cleaning programme took place around Kodaikanal Lake. People lobbied for a pledge against using plastic bags and even the police booked people who dropped litter. Plastic bags were replaced with cheap cloth bags with the logo 'Plastic Kills Kodai Hills' and 'Say No to Plastics' and a ban on polythene bags and plastic disposable cups was included in local legislation following successful lobbying. For further information contact: Bob Stewart and Tanya Balcar, Vattakanal Organisation for Youth, Comm and Environment, P.O. Box 64 Kodaikanal, Tamil Nadu 624 101 India. Email: litsca@md4.vsnl.net.in

ITALY

Myristica

Myristica is a monthly online magazine for Italian readers. Using plain language, Myristica brings them the

▲ Nouvelles

Sue et Peter ont été si impressionnés par cette action qu'ils en ont fait part aux participants du Congrès sur l'éducation. Bob Stewart et Tanya Balcar, de Kodaikanal, ont entendu cette histoire. Après s'être renseignés sur le projet, ils ont produit des dossiers d'information qui ont été distribués aux personnes importantes et aux organisations pour faire prendre conscience du problème des plastiques. Le 24 avril 2000, le Jour de la Terre a été fêté avec comme thème central Plus de plastiques à Kodai. Cette manifestation a permis une concertation et une semaine plus tard, un programme de nettoyage a été mis en place autour du Lac Kodaikanal. Les habitants ont banni l'utilisation des sacs en plastique et les policiers ont dressé des contravention aux personnes qui en jettent aux ordures. Les sacs en plastique ont été remplacés par des sacs en toile bon marché avec le logo 'Le plastique tue les collines de Kodai' et 'Dites non aux plastiques' et une interdiction des sacs en polythène et des gobelets jetables en plastique a été mise en place dans la législation locale, suite à l'action réussie du groupe de pression. Pour plus d'information, prendre contact avec: Bob Stewart and Tanya Balcar, Vattakanal Organisation for Youth, Comm and Environment, P.O. Box 64 Kodaikanal, Tamil Nadu 624 101 India. Email: litsca@md4.vsnl.net.in



ITALIE

Myristica

Myristica est un magazine électronique mensuel destiné aux lecteurs italiens. Utilisant un langage courant, Myristica leur apportent des informations sur les plantes, leurs usages et leurs

● Noticias

nivel de concienciación acerca de la contaminación. El 24 de abril del 2000 se celebró el 'Día de la Tierra' enfocando la 'Prohibición de Plásticos en Kodai'. Este evento dió lugar una semana más tarde al programa de limpieza en los alrededores del Lago Kodaikanal. El público presionó por un compromiso contra el mal uso de las bolsas de plástico en la que participó incluso la policía. Los plásticos se sustituyeron por bolsas baratas de trapo con el logo 'Los plásticos matan Kodai Hills' y 'No a los plásticos' y, se aprobó una ley local de prohibición de vasos y bolsas de plástico de un solo uso. Un compromiso exitoso. Para más información: Bob Stewart y Tanya Balcar Vattakanal Organisation for Youth, Comm and Environment, P.O. Box 64 Kodaikanal, Tamil Nadu 624 101 India. Email: litsca@md4.vsnl.net.in

ITALIA

Myristica

Myristica es una revista electrónica para lectores italianos. A través de un lenguaje común, Myristica brinda información sobre las plantas, sus usos y su importancia para la sociedad. Se edita y publica por un pequeño grupo voluntario de botánicos apasionados, que forman el comité editorial permanente así como con colaboradores cuidadosamente seleccionados. La revista está dirigida a personas interesadas en las plantas ya sea por razones profesionales o personales, éstas últimas sin entrenamiento específico en la botánica como son maestros, diseñadores de jardines, arquitectos de paisaje, aficionados a las plantas, médicos, herbolarios y viveristas.

Además de los artículos, noticias y revistas los lectores pueden enviar sus preguntas sobre plantas y sus productos vía email. Próximamente se tendrá acceso a un índice de varios cientos de revistas en el campo de la botánica. El primer número de Myristica apareció en línea en febrero del 2001 y mensualmente aparece un nuevo número la primera semana de cada mes. La revista está disponible en el sitio

Left: By raising awareness of the issues of plastics Tanya Balcar and Bob Stewart, in conjunction with the local community, have managed to ban plastics in the Kodaikanal area

■ News

facts about plants, their uses, and their meaning to society. Its editing and publishing are carried out by a small team of passionate volunteer botanists (who form the permanent editorial committee) and carefully selected collaborators. The magazine is aimed at people interested in plants for professional or personal reasons who have little or no specific training in botany. These include school teachers, garden designers, landscape architects, plant amateurs, physicians, herbalists and nursery staff.

As well as looking at articles, news, and reviews, readers can send their questions about plants and plant products via the email. In addition, a botanical search engine, indexing a few hundred selected botanical web sites, will soon be available. The first issue of *Myristica* went on-line in February 2001, and monthly issues are released the first week of each month.

The magazine is available at <http://www.hyperborea.com/myristica> and no subscription is required. The editorial staff is currently considering a free subscription that entitles readers to receive an e-flyer as soon as a new issue goes on-line. For further information contact: Email: myristica@hyperborea.com

PORTUGAL

Plants in European Masterpieces

A new project between three botanical institutions and two artistic heritage institutions has been initiated to link art with plants within the frame of a common European history and to divulge this to a wide public. This collaborative project is between Leiden University Botanic Garden (The Netherlands), Royal Botanic Gardens Kew - Hanbury Gardens (U.K.), the Botanic Gardens of Ajuda (Portugal), Jeronimos Monastery of Lisbon and Genova Department of Communication Computer and System Sciences. Expertise within the institutions will be used to produce multimedia products on botany, history and the artistic expression of plants. A publication on plants in art and the

▲ Nouvelles

significations au sein des sociétés. Son édition et sa publication sont portées par une petite équipe de botanistes bénévoles passionnés (qui forme le comité de rédaction). Le magazine est adapté aux personnes intéressées par les plantes pour professionnels ou pour des raisons personnelles et qui n'ont pas ou peu de connaissances en botanique. Cela inclut des instituteurs, des jardiniers, des paysagistes, des amateurs de plantes, des herboristes et des pépiniéristes.

Cherchant aussi bien des articles, des nouvelles ou des comptes-rendus, les lecteurs peuvent envoyer leurs questions sur les plantes ou les productions végétales par courrier électronique. En plus, un moteur de recherche en botanique, indexant plusieurs centaines de sites botaniques sélectionnés sera bientôt disponible. Le premier numéro de *Myristica* a été mis sur le Web en février 2001, et ses numéros mensuels sont disponibles la première semaine de chaque mois. Le magazine est disponible sur le <http://www.hyperborea.com/myristica> et aucune souscription n'est requise. L'équipe éditoriale est en train d'étudier une souscription gratuite qui permettrait au lecteur de recevoir un «carton d'information électronique» dès qu'un nouveau numéro est disponible sur le Web. Contact pour plus d'information: myristica@hyperborea.com

PORTUGAL

Plantes dans les Lieux Prestigieux d'Europe

Un nouveau projet entre trois institutions botaniques et deux institutions à mouvance artistique a été conçu pour associer l'art et les plantes dans le cadre d'une aventure européenne commune tout en touchant un large public. Ce projet commun concerne le Jardin Botanique de l'Université Leiden (Pays-Bas), les Jardins Botaniques Royaux de Kew - les Jardins Hanbury (Grande-Bretagne), les Jardins Botaniques de Ajuda (Portugal), le monastère Jeronimos de Lisbonne et le Département de communication informatique de Genève. Les connaissances propres à chaque

● Noticias

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PORTUGAL

Las Plantas en Obras de Arte Europeas

Un nuevo proyecto entre 3 instituciones botánicas y 2 instituciones de patrimonio artístico se ha iniciado para relacionar a las plantas con el arte dentro del contexto de una historia europea común y difundirla a un público más amplio. El proyecto es una colaboración entre el jardín Botánico de la Universidad de Leiden (Holanda, Reales Jardines botánicos de Kew y Jardines Hanbury (Reino Unido), jardín Botánico de Ajuda (Portugal) el Monasterio Jerónimo de Lisboa y el Departamento de ciencias de la comunicación, computación y sistemas. Las experiencias de las diferentes instituciones se utilizarán para producir materiales multimedia en botánica, historia y expresión artística de las plantas. Se producirá una publicación sobre las plantas vivas en los jardines botánicos asociados. Para mayor información contactar a: Prof. Cristina Castel-Branco, Jardim Botánico da Ajuda, Calçada da Ajuda, Lisboa, Portugal. Tel/fax (351) 21 362 2503 Email ajuda@netc.pt

SUDÁFRICA

Continúa la Evaluación

En ROOTS 20 Alexis Symonds, del Instituto Nacional de Botánica de Sudáfrica, comentó acerca de un nuevo proyecto de colaboración del instituto y la UNESCO para crear capacidad y desarrollo de habilidades de maestros a través de talleres. Se ha iniciado un detallado proceso de evaluación para conocer el impacto de estos talleres en el proceso de enseñanza y aprendizaje de las escuelas participantes. Se utilizaron diversas técnicas de valoración tanto formales como informales para evaluar el contenido y presentación de los talleres realizados

■ News

history of gardens will be produced and live plant exhibitions will take place in the associated botanic gardens. For further information contact: Professor Cristina Castel-Branco, Jardim Botânico da Ajuda, Calçada da Ajuda, Lisbon Portugal. Tel/Fax: (351) 21 362 2503 Email: ajuda@netc.pt

SOUTH AFRICA

Ongoing Evaluation

In Roots 20 Alexis Symonds, from the National Botanical Institute in South Africa, told readers about a new project involving a partnership between the institute and UNESCO to build the capacity of teachers skills through workshops. A detailed evaluation process has been undertaken to establish the impacts of these workshops on teaching and learning in participating schools. A number of formal and informal assessment techniques were used to evaluate the content and presentation of the workshops, carried out by those teachers, colleagues, education department officials and outsiders who participated in the process. In addition, data was gathered by conducting personal interviews with teachers and principals, 10-18 months after the teachers had completed the course.

Results of the survey indicated that the attitude, interest and involvement of the principal greatly influenced the success and sustainability of environmental activities at schools. The survey also revealed that once schools had proven their commitment and were able to deliver, it became easier to generate funding and support for additional projects. From the perspective of the teachers they thought that the workshops had a dramatic impact on their own environmental awareness and competence.

For further information contact: Eugenie Novellie, Education Section, Pretoria National Botanical Garden Tel: (27) 12 804 3200 Fax: (27) 12 804 6200 Email education.nbi@intekom.co.za

▲ Nouvelles

institution conduiront à la divulgation multimedia de l'aspect botanique, historique et artistique des plantes. Une étude sur la place des plantes dans l'art ainsi qu'une histoire des jardins seront publiées et des expositions de plantes se tiendront dans les jardins botaniques concernés par le projet. Pour plus ample information, contacter: Professor Cristina Castel-Branco, Jardim Botânico da Ajuda, Calçada da Ajuda, Lisbon, Portugal. Tel/Fax: (351) 21 362 2503 Email: ajuda@netc.pt

AFRIQUE DU SUD

Evaluation Actuelle

Dans Roots 20, Alexis Symonds, de l'Institut Botanique National d'Afrique du Sud, informait les lecteurs d'un nouveau projet d'association entre l'Institut et l'UNESCO pour accroître la compétence des enseignants au sein des différents groupes de recherche. Une évaluation minutieuse a été effectuée pour établir l'impact de ces groupes sur l'enseignement et les études des classes participantes. Plusieurs méthodes d'estimation, conventionnelles ou non, furent utilisées pour évaluer le contenu et la présentation des différents groupes de travail dirigés par les professeurs, professionnels de l'enseignement et non-professionnels qui ont participé à cette opération. En résumé, des informations furent recueillies par le biais d'entretiens personnels avec les enseignants et directeurs 10 à 18 mois après la mise en route de leur tâche.

Les résultats de cette étude ont permis de démontrer que l'attitude, l'intérêt et l'implication du Directeur ont grandement contribué au succès et au maintien d'activités liées à l'environnement dans les écoles. Cette étude a également révélé que, dès l'engagement et la capacité de divulgation des écoles, il devint plus facile de convenir d'un financement et soutenir d'autres projets. De leur point de vue, les professeurs ont estimé que ces groupes de travail ont eu un impact dramatique sur leurs propres conscience et connaissance de tout ce qui touche l'environnement.

● Noticias

por aquellos maestros, colegas, personal de instancias educativas y demás participantes en el proceso. Además se incluyeron otros datos recabados a través de entrevistas personales con maestros y directores de escuelas, entre 10 y 18 meses después de que los maestros completaron el curso.

Los resultados de la encuesta mostraron que la actitud, interés e involucramiento de los directores influyen fuertemente en el éxito y sustentabilidad de las actividades ambientales de las escuelas. La investigación también reveló que en cuanto las escuelas pusieron a prueba su compromiso, se facilitó el trámite de financiamiento y apoyo para proyectos adicionales. Desde la perspectiva de los maestros, ellos opinan que los talleres tienen un impacto dramático en su propia formación y conciencia ambiental y capacidad. Para más información contactar a: Eugenie Novellie, Education Section, Pretoria National Botanical Garden. Tel: (27) 12 804 3200 Fax: (27) 12 804 6200 Email education.nbi@intekom.co.za

ESPAÑA

Colaboraciones y Compartiendo Recursos en Español

Un taller de educación ambiental se realizó recientemente en el Real Jardín Botánico Juan Carlos I. Educadores de jardines botánicos de Valencia, Córdoba, Madrid, Las Palmas de Gran Canaria y Alcalá de Henares, participaron durante una semana en dicho taller. Los objetivos del Taller fueron: incrementar la colaboración entre los educadores de diferentes jardines botánicos españoles, intercambiar materiales educativos desarrollados por los distintos jardines, y elaborar y publicar una guía de los diferentes jardines botánicos de España y sus programas educativos. Para más información contactar a: Blanca Olivé Campus de la Universidad de Alcalá, Residencias Universitarias 28801 Alcalá de Henares, Madrid, España. Tel (34) 91 881 9803 Fax: (34) 91 881 9803 Email: bolive@rjbcalcala.com

■ News

SPAIN

Networking and Sharing Resources in Spanish

A workshop on environmental education was recently hosted by the Real Jardín Botánico Juan Carlos I. Botanic garden educators from botanic gardens in Valencia, Córdoba, Madrid, Las Palmas de Gran Canaria and Alcalá de Henares spent a week taking part in the workshop. The aims of the workshop were to: improve collaboration between educators from different Spanish botanic gardens; exchange educational materials produced by the individual botanic gardens; and to develop and publish a guide featuring the Spanish botanic gardens and their education programmes. For further information contact: Blanca Olivé Campus de la Universidad de Alcalá, Residencias Universitarias 28801 Alcalá de Henares Madrid España Tel (34) 91 881 9803 Fax: (34) 91 881 9803 Email: bolive@rjbalcala.com

TUNISIA

From a Café to an Environmental Education Centre!

A recent grant from the Stanley Smith Trust has enabled the Jardin Botanique de Plantes Méditerranéennes to convert the cafétéria of the Institut National de la Recherche Agronomique de Tunisie into an environmental education centre. The centre will be used by the botanic garden as a meeting point for the commencement of guided tours. For further information contact: Madame Chatty, Botanic Garden, Institut National de la Recherche Agronomique de Tunisie INRAT, Rue Hédi Karray, 2049 Ariana, Tunisia. Tel: (216) 1 230024 Fax: (216) 1 752897 Email: chatty.yordanka@iresa.agrinet.tn

UNITED KINGDOM

Further down the Garden Path

Further Down the Garden Path is the second in a series of booklets exploring the many facets of plants in

▲ Nouvelles

Pour plus ample information, contacter: Eugenie Novellie, Education Section, Pretoria National Botanical Garden. Tel: (27) 12 804 3200 Fax: (27) 12 804 6200 Email: education.nbi@intekom.co.za

ESPAGNE

Echange et Participation des Ressources en Espagne

Un groupe de recherche sur l'enseignement de l'environnement a été récemment proposé par le Jardin Botanique Royal Juan Carlos. Les enseignants des jardins botaniques de villes comme Valence, Cordoue, Madrid, Las Palmas de Canaria et Alcalá de Henares ont pris part à un groupe de travail pendant une semaine. Le but de cette rencontre était: d'améliorer la collaboration entre les enseignants des différents jardins botaniques espagnols, d'échanger les méthodes d'éducation propres à chaque jardin botanique et de développer et publier un guide présentant les jardins botaniques espagnols et leurs programmes éducatifs. Pour plus ample information, contacter: Blanca Olivé, Campus de la Universidad de Alcalá, Residencias Universitarias 28801 Alcalá de Henares Madrid Espagne. Tel/Fax: (34) 91 881 9803 Email: bolive@rjbalcala.com

TUNISIE

De l'Art de Transformer un Café en Centre d'Enseignement sur l'Environnement!

Une subvention récente provenant de la Société Stanley Smith a permis au Jardin Botanique de Plantes méditerranéennes de transformer la cafétéria de l'Institut de la Recherche Agronomique en Centre d'Enseignement sur l'environnement. Le Centre sera utilisé par le Jardin Botanique comme point de départ de voyages organisés. Pour plus ample information, contacter: Madame Chatty, Jardin Botanique, Institut National de la Recherche Agronomique de Tunisie INRAT, rue Hédi Karray, 2049 Ariana Tunisie. Tel: (216) 1 230024 Fax: (216) 1 752897 Email: chatty.yourak@iresa.agrinet.tn

● Noticias

TÚNEZ

De un Café a un Centro de Educación Ambiental!

Una reciente beca otorgada por el fideicomiso Stanley Smith permitió al jardín Botánico de Plantes Mediterráneas convertir la cafetería del Instituto Nacional de Investigación Agronómica de Túnez en un centro de educación ambiental. El centro será utilizado por el jardín botánico como punto de reunión para comenzar las visitas guiadas. Para más información contactar a : Mme Chatty, Jardin Botánico, Instituto Nacional de Investigación Agronómica de Túnez INRAT, Rue Hédi Karray, 2049 Ariana, Túnez. Tel: (216) 1 230024 Fax: (216) 1 752897 Email: chatty.yordanka@iresa.agrinet.tn

REINO UNIDO

Más Allá del Sendero del Jardín

Más allá del sendero del Jardín es el segundo de una serie de folletos que exploran las diferentes facetas de las plantas de los Jardines Botánicos e invernaderos de Birmingham. escritos por el cuentista profesional, Guy Hutchins en colaboración con el Centro de estudios y, financiado por el Ministerio de Educación de Birmingham, el folleto es una verdadera inspiración y ofrece ideas llenas de imaginación para los pequeños, incluyendo Historia y Leyenda, Folklore y Literatura y Nuevos cuentos a partir de antiguos cuentos, demostrando cómo pueden crearse cuentos para satisfacer las mentes curiosas.

La exitosa publicación de folletos en julio, les dio a los maestros la oportunidad, no sólo para escuchar sino también de contribuir las la creación de las historias fatasiosas con Guy Hutchins. Para mayor información contactar a: Sue Bird, Birmingham Botanical Gardens and Glasshouses, Westbourne Road, Edgbaston Birmingham B15 3TR, U.K. Tel: (44) 121 454 1860 Fax: (44) 121 454 7835 Email: sue@birminghambotanicalgardens.org.uk

■ News

the Birmingham Botanical Gardens and Glasshouses. Written by professional storyteller Guy Hutchins in collaboration with the Study Centre, and funded by Birmingham Educational Authority, the booklet is an inspiration, offering imaginative ideas for young people to make up their own stories using plants around the garden. Different approaches, including History and Legend, Folklore and Literature and New Stories from Old, demonstrate how stories can be created to satisfy enquiring minds.

The successful launch of the booklet in July gave teachers the opportunity not only to listen to, but also to contribute to, spinning stories with Guy Hutchins. For further information contact: Sue Bird, Birmingham Botanical Gardens and Glasshouses, Westbourne Road, Edgbaston Birmingham B15 3TR, U.K. Tel: (44) 121 454 1860 Fax: (44) 121 454 7835 Email: sue@birminghambotanicalgardens.org.uk

Funding Success for Promoting Plants

The University of Oxford Botanic Garden has recently received a grant of £18 000 from the Arts Lottery fund for a one year pilot Arts education programme. Events planned for the year ahead include 'Hot Art' (an arts/science rainforest programme), 'Tree Scape' (a five week programme to be held at the Arboretum), 'Knock on Wood' (a week long plants and music programme) and 'Green Fingers and Healing Hands', a specially commissioned theatre performance telling the story of Jacob Bobart, the garden's first curator, meeting a 21st century women scientist to look at how we use plants in our everyday lives. For further information contact: Louise Allen, University of Oxford Botanic Garden, Rose Lane, Oxford OX1 4AZ, U.K. Tel/Fax: (44) 1865 276920. Email: louise.allen@botanic-garden.ox.ac.uk

New Research in Botanic Garden Education

BGCI member Verity Jones is currently undertaking PhD research based on botanic gardens. Verity's research

▲ Nouvelles



ROYAUME-UNI

Further down the Garden Path

'Further down the Garden Path' est la seconde d'une série de brochures décrivant les nombreux aspects des plantes dans les jardins botaniques et les serres de Birmingham. Ecrite par un conteur professionnel, Guy Hutchins, avec la collaboration du Study Centre et financée par Birmingham Educational Authority, la brochure est une source d'inspiration, proposant des idées originales aux enfants pour construire leur propre histoire à partir de l'histoire des plantes du jardin. Différentes approches, comme par exemple Histoire et Légendes, Folklore et Littérature, et contes nouveaux inspirés d'anciens, démontrent comment on peut créer des histoires pour satisfaire les esprits curieux.

Le lancement, couronné de succès, de la brochure en Juillet, a donné aux enseignants l'opportunité, non seulement d'être intéressés, mais encore de participer, réinventant des histoires avec Guy Hutchins. Pour plus ample information, contacter: Sue Bird, Birmingham Botanical Gardens and Glasshouses, Westbourne Road, Edgbaston Birmingham B15 3TR, U.K. Tel: (44) 121 454 1860 Fax: (44) 121 454 7835 Email: sue@birminghambotanicalgardens.org.uk

Subvention Pour Promouvoir les Plantes

L'université du Jardin Botanique d'Oxford vient de recevoir récemment une subvention de 18 000 Lires du Arts Lottery Fund pour une année pilote sur

● Noticias

Financiamiento para Promover a las Plantas

El Jardín Botánico de la Universidad de Oxford recientemente obtuvo un apoyo de 18 000 libras esterlinas de la Lotería de arte para un programa piloto de Arte y Educación. Eventos programados para el próximo año incluyen 'Arte Torrido' (un programa de arte/ciencia de la selva) 'Cuadro con Arboles' (un programa de 5 semanas en el Arboretum), 'Golpeando en Madera' (programa de una semana de música y plantas) y 'Dedos Verdes y Manos Curativas' una obra de teatro especialmente realizada que cuenta la historia de Jacob Bobart, el primer curador del jardín botánico quien se encuentra con una científica del siglo XXI para conocer cómo utilizamos actualmente las plantas en nuestra vida diaria. Para más información contactar a: Louise Allen, University of Oxford Botanic Garden, Rose Lane, Oxford OX1 4AZ, U.K. Tel/Fax: (44) 1865 276920 Email: louise.allen@botanic-garden.ox.ac.uk

Nueva Investigación en Educación en Jardines Botánicos

Verity Jones, miembro de BGCI actualmente cursa un Doctorado y realiza una investigación en jardines botánicos. Su investigación trata de cómo más de 150 personas aprenden acerca del medio ambiente y cómo esto tiene sentido para los jardines botánicos. Ella piensa que sus datos serán esenciales para entender la importancia de la educación ambiental en la política contemporánea. Enfocando en cómo trabaja la educación ambiental y cual es su sentido en el jardín botánico, Verity espera que su investigación contribuya a una política ambiental que aumente la posibilidad de replantar prácticas de educación ambiental y futuros recursos educativos. Para más información contacta a: Verity Jones, University of Wales, Aberystwyth, Ceredigion SY23 3DB, U.K. Email: vmj98@aber.ac.uk

Interpretando la Evolución de la Taxonomía

El personal del Jardín médico de Chelsea, Londres, ha producido una

Left: Professional storyteller Guy Hutchins (right) has written *Further Down the Garden Path* which explores plants in the Birmingham Botanical Gardens and Glasshouses and is a useful teaching resource

■ News

involves an investigation into how over 150 people learn about the environment and how they make sense of botanic gardens. She believes that their accounts are central to understanding environmental education's role in contemporary politics. By focussing on how environmental education works and is made sense of in the botanic garden, Verity hopes that her research will contribute to an environmental politic that will raise the possibility of rethinking environmental education practices and educational resources in the future. For further information contact: Verity Jones, University of Wales, Aberystwyth, Ceredigion SY23 3DB, U.K. Email: vmj98@aber.ac.uk

Interpreting the Evolution of Taxonomy

Staff at Chelsea Physic Garden, London, have produced a series of eight interpretive anodised aluminium panels to explain the evolution of taxonomy. This follows an extensive survey of visitors, who were asked about the type and level of information they wanted. The signs tell the story of the evolution from Linnaeus through to recent DNA reclassifications and cartoons have been used to interpret part of the taxonomy evolution story. The signs have been so successful that visitors are requesting copies to take the information home with them. For further information contact: Ms Dawn Sanders, Chelsea Physic Garden, 66 Royal Hospital Road, London SW3 4HS, U.K. Tel: (44) 207352 5646. Fax: (44) 207 376 3910. Email: dawn@cpgharden.demon.co.uk

Long and Dangerous Journeys

The University of Birmingham Botanic Garden took part in Gardeners World Live in June this year. The botanic gardens developed an exhibition offering a fascinating glimpse into the origins of the English garden. The exhibition also focused on how plants have made their long and dangerous journeys, often from unexplored corners of the world, to become the garden favourites they are today. For further information contact:

▲ Nouvelles

un programme Arts et Éducation. Les événements prévus pour l'année prochaine incluent 'Hot Art' (un programme arts et science sur les forêts tropicales pluvieuses), 'Tree Scape' (un programme de 5 semaines se tiendra à l'arboretum), 'Knock on Wood' (Touchons du bois, un programme d'une semaine sur les plantes et la musique) et 'Green Fingers and Healing Hands' (Mains vertes et Mains de guérisseurs), une performance théâtrale spécialement conçue racontera l'histoire de Jacob Bobart, le premier Conservateur du Jardin Botanique, rencontrant une scientifique du 21^{ème} siècle pour regarder comment nous utilisons les plantes dans la vie de tous les jours. Contact pour plus d'informations: Louise Allen, University of Oxford Botanic Garden, Rose Lane, Oxford OX1 4AZ, U.K. Tel/Fax: (44) 1865 276920 Email: louise.allen@botanic-garden.ox.ac.uk

Nouvelle Recherche sur l'Éducation des Jardins Botaniques

Verity Jones, membre du BGCI, est actuellement en train de mener un PhD basé sur les jardins botaniques. Les recherches scientifiques de Verity impliquent une investigation sur la manière dont près de 150 personnes s'initient à l'environnement et perçoivent les jardins botaniques. Elle croit que cette prise en compte est capitale pour comprendre le rôle de l'éducation à l'environnement dans les politiques actuelles. En se concentrant sur le fonctionnement et la perception de l'éducation à l'environnement au sein des jardins botaniques, Verity espère que ses recherches contribueront à une politique environnementale qui augmentera dans le futur les possibilités de repenser les ressources et pratiques sur la pédagogie liée à l'environnement. Contact pour plus amples informations: Verity Jones, University of Wales, Aberystwuth, Ceredigion SY23 3 DB, U.K. Email: vmj98@aber.ac.uk

Interpréter l'Évolution de la Taxonomie

L'équipe du Chelsea Physic Garden, London, vient de produire une série de

● Noticias

serie de 8 letreros de aluminio anodizado para explicar la evolución de la taxonomía. Esto se realizó después de efectuar una extensa encuesta con los visitantes, a quienes se les preguntaba por el tipo y nivel de información que les gustaría conocer. Las señales relatan la historia de la evolución desde Lineo hasta las recientes reclasificaciones por los marcadores moleculares de DNA. Se han utilizado caricaturas para mostrar parte de la historia de la evolución de la taxonomía. Los letreros han tenido tanto éxito que los visitantes han solicitado esta información impresa para llevarla a casa. Para mayor información: Ms Dawn Sanders, Chelsea Physic Garden, 66 Royal Hospital Road, London SW3 4HS, U.K. Tel: (44) 207352 5646 Fax: (44) 207 376 3910 Email: dawn@cpgharden.demon.co.uk

Viajes Largos y Peligrosos

El Jardín Botánico de la Universidad de Birmingham, Reino Unido, participó en el mes de junio de este año en 'Gardeners World LIVE' (una exposición sobre jardinería). El jardín botánico desarrolló en ella un fascinante cuadro sobre los orígenes del jardín inglés.

La muestra también ilustró como las plantas han enfrentado extensos y peligrosos viajes a menudo desde rincones inexplorados del mundo, para transformarse en los favoritos en el jardín del presente. Para más información contacta a: Pamela Smith, University of Birmingham Botanic Gardens, School of Continuing Studies, Edgbaston, Birmingham B15 2TT, U.K. Tel: (44) 121 414 4944 Fax (44) 121 414 5612 Email: unibotanic@bham.ac.uk

ESTADOS UNIDOS

Examinando la Vida a través del ojo de un Artista

El Museo del Desierto está organizando un novedoso programa anual de Arte en Historia Natural. Cada mes el programa varía tanto

■ News

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Studies, Edgbaston, Birmingham
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USA

Examining Life Through an Artist's Eye

The Desert Museum hosts an annual innovative programme in Natural History Art. The actual month of this programme varies so as to capture the natural history of the desert during different seasons. Students spend time in the desert with Principal Instructor Katie Lee from the New York Botanical Garden and Sergio Allevato from Rio de Janeiro, who was the first artist in Residence.

The students learn about Sonoran Desert ecology by examining the life around them through the artist's eye.

The aim of the 5 day intensive programme is to create an educational environment in which artists, working in the field of natural science, can work, study and learn. In addition, the programme aims to expand students understanding and appreciation of desert ecology and conservation; provide the highest calibre instruction by professional artists and scientists; and educate children to draw what is accurately observed.

During a recent course twenty eight students from the US, Canada and Brazil learnt about desert flora and insects, and drew and painted the pollinators and plants. As a result of the art programme the students have become passionate conservationists. For further information contact: Susan Williams, Arizona-Sonora Desert Museum 2021 N. Kinney Road, Tucson 85716, Arizona, USA.
Tel: (1) 520 883 3021
Fax: (1)520 8830 2500
Email: swilliams@desertmuseum.org

Stroller Strut

Parents and guardians of infants, of about 3 years old, are the targets for this original programme set up by the

▲ Nouvelles

8 panneaux d'interprétation en aluminium anodisé pour expliquer l'évolution de la taxonomie. Ils ont mené une enquête étendue sur les visiteurs qui étaient interrogés à propos du type et du niveau d'informations recherchées. La signalétique raconte l'histoire de l'évolution de Linné aux récentes reclassifications génétiques, et des bandes dessinées ont été utilisées pour interpréter certaines parties de l'histoire de l'évolution de la taxonomie. La signalétique a obtenu un tel succès que les visiteurs ont demandé des copies à emporter chez eux. Pour plus d'information: Ms Dawn Sanders, Chelsea Physic Garden, 66 Royal Hospital Road, London SW3 4HS, U.K.
Tél: (44) 207 352 5646
Fax: (44) 207 376 3910
Email: dawn@xpgarden.demon.co.uk

Longs et Dangereux Voyages

L'université de Birmingham prend part à Gardeners World Live (la vie des jardiniers du monde) en juin de cette année. Le jardin botanique met en place une exposition offrant un fascinant coup d'œil sur les origines des jardins anglais. L'exposition présente également comment les plantes ont effectué leur long et périlleux voyage le plus souvent à partir des coins les plus inexplorés de la planète, pour devenir les plantes phares de nos jardins. Pour plus amples informations: Pamela Smith, University of Birmingham Botanic Garden, School of Continuing Studies, Edgbaston, Birmingham B15 2TT, U.K
Tél: (44) 121 414 4944
Fax: (44) 121 414 5612
Email: unibotanic@bham.ac.uk

USA

La Vie à Travers un Oeil d'Artiste

Le Désert Museum organise un programme annuel novateur dans l'Art à travers l'Histoire Naturelle. Le programme mensuel en cours offre une grande variété d'informations comme la manière de capturer la vie d'un désert à travers les différentes saisons. Les étudiants passent du temps dans le désert, accompagnés du principal

● Noticias

como para captar la historia natural del desierto durante las diferentes estaciones. Los estudiantes pasan tiempo en el desierto con el Instructor Principal Katie Lee del Jardín Botánico de Nueva York y Sergio Allevato de Rio de Janeiro, quien fue el primer artista en Residencia. Los estudiantes aprenden acerca de la ecología del Desierto de Sonora examinando la vida que los rodea a través del ojo de un artista.

El objetivo del programa intensivo de 5 días es crear un medio educativo en el cual los artistas, quienes trabajan en el campo de las ciencias naturales, pueden trabajar, estudiar y aprender. Además, el objetivo del programa es promover el entendimiento y apreciación de la ecología del desierto y su conservación, proporcionar instrucción de alto nivel por artistas profesionales y científicos, y enseñar a los niños a dibujar lo que están exactamente observando.

Durante el curso más reciente, 28 estudiantes de Estados Unidos, Canadá y Brasil, aprendieron acerca de la flora y los insectos del desierto, y dibujaron y pintaron a los polinizadores y sus plantas. Como resultado del programa de arte los estudiantes se convirtieron en apasionados conservacionistas. Para mayores informes contactar a: Susan Williams, Museo del Desierto de Sonora-Arizona 2021 N. Kinney Road, Tucson 85716, Arizona, USA.
Tel:(1) 520 883 3021
Fax: (1)520 8830 2500
Email: swilliams@desertmuseum.org

Recorrido en Carreola

Los padres y niñas de pequeños, de alrededor de 3 años de edad, son el grupo meta a quienes está dirigido este original programa organizado por el Cox Arboretum and Gardens Metropark. El recorrido en Carreola es de una hora de duración y sus objetivos son:

- crear una atmósfera relajada y agradable para los niños y sus padres para estar en contacto con la naturaleza

■ News

Cox Arboretum and Gardens Metropark. Stroller Strut involves an hour-long stroll through the gardens with the aims of:

- creating a joyful, relaxed atmosphere for parents and children to participate in nature
- teaching parents the importance of nature in the life of the young child and how it develops cognitive skills and creates a sense of security and well being
- teaching parents and children a repertoire of plants that are safe for children to touch, smell and eat
- facilitating social interaction and support between parents and children.

A unique aspect of the Stroller Strut is that it utilises the parent or primary caregiver as the primary teacher. Each strut is topic based i.e. colour, scent, flowers, music etc. The group is taken around the gardens exploring experiences that match the topic. Interpreters pick flowers and give leaves, pine cones, seeds etc. to the 'strutters' to take home, teaching them how to use the artefacts to stimulate their child's leaning and discovery. During extremely hot weather blankets are laid out under trees and the 'strutters' take their babies out of the strollers to explore natural items and look through picture books with natural themes. After a 45-60 minute walk the group returns to the Visitor Center for lemonade, evaluations, and socialising. The programme is run twice a month during the April-October. For further information contact: Katrina Arnold Education Supervisor Cox Arboretum and Gardens Metropark, 6733 Springboro Park, Dayton Ohio 45449 USA. Tel: (1) 937 434 9005 Fax: (1) 937 434 4361 Email: karnold@metroparks.org

Interactive Exhibits for Family Audiences

Staff at the Huntington Botanical Gardens have been developing Plant Discovery Carts which are mobile, interactive exhibits for family audiences. Currently there is a Discovery Cart in the Lily Pond Garden and one in the Desert Garden.

▲ Nouvelles

instructeur Katie Lee du New York Botanical Garden et Sergio Allevato de Rio de Janeiro, qui fut le premier artiste en Résidence. Les étudiants apprennent l'écologie du désert de Sonora en observant les espèces qui les entourent à travers un œil d'artiste.

Le but de ce programme intensif de 5 jours est de créer un environnement pédagogique au sein duquel chaque artiste travaillant dans le domaine des sciences naturelles peut travailler, apprendre et enseigner. En plus, ce programme vise à augmenter les connaissances et la sensibilité sur les questions d'écologie et de protection des déserts, à fournir un enseignement de très grande qualité par des artistes professionnels et des scientifiques et à éduquer les enfants à dessiner ce qu'ils observent avec précision.

Durant un des derniers cours, 28 élèves des USA, du Canada et du Brésil ont appris des éléments sur la flore et les insectes des déserts, ont peint et dessiné les plantes et leurs pollinisateurs. Comme résultat de ce programme artistique, les étudiants sont devenus de fervents protecteurs de la nature. Pour plus amples informations: Susan Williams, Arizona-Sonora Desert Museum 2021 N. Kinney Road, Tucson 85716, Arizona, USA. Tél : (1) 520 883 3021 Fax: (1) 520 8830 2500 Email: swilliams@desertmuseum.org

Stroller Strut 'Les Fiers Promeneurs'

Parents et tuteurs d'enfants d'environ 3 ans sont les cibles d'un programme original mis au point par les jardins. Stroller Strut a entrepris une promenade d'une durée d'une heure à travers le jardin avec comme objectifs:

- créer une ambiance apaisante et heureuse pour les parents et les enfants en leur permettant une osmose avec la nature
- apprendre aux parents l'importance de la place que prend la nature chez les tous petits et comment cela permet de développer leurs capacités cognitives et de créer une atmosphère de sécurité et de bien être

● Noticias

- transmitir a los padres la importancia del contacto con la naturaleza para los niños muy pequeños y como éste desarrolla herramientas cognoscitivas y como les crea un sentido de seguridad y bienestar
- enseñar a los padres y a los pequeños una serie de plantas que son seguras e inofensivas a los niños para tocar, oler y comer
- facilitar la interacción social y apoyo entre padres y niños.

Un aspecto único del Recorrido en Carreola es que utiliza a los padres o a las niñeras como maestro principal. Cada camino trata un tema, por ejemplo, color, olor, flores, musica, etc. El grupo es llevado alrededor de los jardines para explorar y tener vivencias relacionadas con el tópico. Los interpretadores recogen y les dan flores, hojas, conos, semillas, etc. para llevar a casa explicándoles de que manera pueden estimular los pequeños el aprendizaje y descubrimiento. En los meses de mucho calor, se colocan colchas sobre el pasto, a la sombra de los árboles y se les dan artículos elaborados con plantas y libros con ilustraciones de la naturaleza. Después de un recorrido de 45 a 60 min. el grupo regresa al centro de visitantes donde se les ofrece una limonada, se les invita a socializar y participar en la evaluación. Este programa se realiza dos veces al mes durante los meses de abril a octubre. Para información adicional comunicarse con: Katrina Arnold Education Supervisor Cox Arboretum and Gardens Metropark, 6733 Springboro Park, Dayton Ohio 45449 USA. Tel: (1) 937 434 9005 Fax: (1) 937 434 4361 Email: karnold@metroparks.org

Exhibiciones Interactivas para Familias

Personal del Jardín Botánico de Huntington han estado desarrollando paneles descubrimiento de plantas móviles e interactivos para familias. Normalmente, un cartel de descubrimiento está en el Jardín de Plantas Acuáticas y otro en el Jardín

■ News

Each cart has been developed to provide an engaging experience with real plants, objects and garden-related materials. For example, visitors to the Lily Pond Cart can gather pond water and look for organisms under the microscope, paint a garden scene, or go on a sensory treasure hunt in search of different aquatic plants. Visitors to the Desert Cart can create their own camouflaged animal, experiment with how water moves through different types of soil, or discuss plant adaptations to a desert climate.

All of the Discovery carts contain wide-ranging activities and are facilitated by education staff and a dedicated group of high school volunteers. For further information contact: Karina White, Education Department, Huntington Botanical Gardens, 1151 Oxford Road, San Marino, California 91108, USA. Tel: (1) 415 661 1316 Fax: (1) 415 661 7427

Linking Culture and Nature

A recent exhibition at the East-West Center in Hawaii on Bamboo in Japanese Culture was an excellent example of an educational exhibit that linked culture and nature. The exhibit interpreted how bamboo contributes to every aspect of Japanese life from entertainment to religion, from disposable goods to family treasures. As part of the exhibition a series of activities were offered, including a lecture from artist in residence Nancy Moore Bess, a concert of Japanese music, flute demonstrations for school children and a moon-viewing concert. For further information contact: Deanna Donovan, East-West Center, 1601 East-West Road, Honolulu, Hawaii 96848-1601, USA. Tel: (1) 808 944 7246 Fax: (1) 808 944 7298 Email: DonovanD@EastWestCenter.org

VIETNAM

CEN

A conservation education network (CEN) has been established in Vietnam. CEN is a worldwide forum for the exchange of scholarly and factual information on conservation education in Vietnam. The languages of this

▲ Nouvelles

- apprendre aux parents et aux enfants un répertoire de plantes, non toxiques et sans danger, pour qu'ils puissent toucher, sentir et manger
- faciliter les interactions sociales et le soutien entre parents et enfants.

L'aspect original du Stroller Strut est l'utilisation des parents comme vecteurs premiers de l'enseignement. Chaque sentier est basé sur la couleur, les odeurs, les fleurs, la musique, etc. Le groupe est emmené dans les jardins pour explorer les différents sujets qui concernent la thématique en question. Les animateurs prélèvent et donnent fleurs et feuilles, pommes de pin, graines, etc, aux 'strutters' (fiers promeneurs) pour les ramener chez eux, leur apprenant comment utiliser les objets pour stimuler la curiosité et les intérêts de leurs enfants. Lorsque le temps est particulièrement chaud, des couvertures sont disposées sous les arbres et les «strutters» emmènent les tous petits en dehors des sentiers pour explorer la nature et regarder dans un guide naturel illustré et thématique. Après 45-60 minutes de marche, le groupe retourne au Point d'Accueil pour une limonade, une évaluation et des échanges. Le programme est proposé deux fois par mois d'avril à octobre. Pour plus amples informations: Katrina Arnold Education Supervisor Cox Arboretum and Gardens Metropark, 6733 Springboro Park, Dayton Ohio 45449 USA. Tel: (1) 937 434 9005 Fax: (1) 937 434 4361 Email: karnold@metroparks.org

Lle lien Entre Culture et Nature

Une récente exposition au East-West Center a Hawaii sur les bambous dans la culture japonaise fut un excellent exemple sur un projet éducatif faisant le lien entre culture et nature. L'exposition explique comment les bambous contribuent à chaque aspect de la vie japonaise, des amusements et plaisirs à la religion, des biens de consommation aux patrimoines familiaux. Comme partie intégrante de l'exposition, une série d'activités fut proposée, incluant une conférence d'une artiste en Résidence, Nancy Moore Bess, un concert de musique

● Noticias

del Desierto. Cada cartel se ha desarrollado para proporcionar una vivencia con las plantas reales, objetos y materiales relacionados con el jardín. Por ejemplo, los visitantes de las Plantas Acuáticas pueden tomar una muestra de agua y observarla al microscopio, pintar una escena del jardín, o ir en busca de tesoros a través del tacto en diferentes plantas acuáticas. Visitantes del área del desierto, pueden crear su propio animal mimetizado, experimentar como se mueve el agua a través de distintos tipos de suelo, o discutir diferentes adaptaciones de las plantas del desierto. Todos los carteles Descubrimiento contienen un amplio rango de actividades apoyadas por el personal de educación y por un grupo muy dedicado de personas voluntarias con bachillerato. Más informaciones con: Karina White, Education Department, Huntington Botanical Gardens, 1151 Oxford Road, San Marino, California 91108, USA. Tel: (1)415 661 1316 Fax: (1)415 661 7427

Relacionando la Cultura con la Naturaleza

Una exhibición reciente en el Centro Este-Oeste de Hawai sobre el Bambú en la Cultura Japonesa fue un excelente ejemplo de cómo ligar en una exhibición la cultura con la naturaleza. La exhibición interpretó cómo el bambú contribuye en cada aspecto de la vida de los japoneses, desde la recreación hasta en la religión, desde objetos desechables de bambú hasta joyas familiares también de bambú. Como parte de la exhibición se ofrecieron una serie de actividades, incluyendo una conferencia del artista en Residencia Nancy Moore Bess, un concierto de música japonesa, demostraciones de flautas para niños y un concierto a la luz de la luna. Para más información contacta a: Deanna Donovan, East-West Center, 1601 East-West Road, Honolulu, Hawaii 96848-1601, USA. Tel: (1) 808 944 7246 Fax: (1) 808 944 7298 Email: DonovanD@EastWestCenter.org

■ News

group are Vietnamese and English. For further information contact: Conservation Education Network (CEN) 114 Hoang Quoc Viet, Cau Giay, Hanoi, Vietnam. Tel: (84) 756 0233 or subscribe by sending an email to: majordomo@vn-gw.net.vn

CONGRATULATIONS

Congratulations to Alexis Symonds (Assistant Director Education: Northern Gardens in South Africa), who was awarded the Year 2000 National Botanical Institute's Chairman's Award in the Management category. This award is made for excellent service to the Institute.

Congratulations also to Aboriginal Education Officer John Lennis who has been awarded a full scholarship to undertake the New South Wales Public Sector Management Course in 2001-2002. This has been put forward by the NSW Division of Institute of Public Administration Australia as part of their commitment towards reconciliation. John is delighted about his award, as he is keen to develop his skills in matters relating to Indigenous Affairs at a management level.

APOLOGIES

Apologies to Magdalena Vicens from Jardí Botànic de Sóller who provided translation services for the article summaries in Roots 22 and was not acknowledged on the back page. We greatly appreciate her contribution.

▲ Nouvelles

japonaise, une démonstration de flûte pour écoliers, et un concert sous la pleine lune. Pour plus amples informations: Deanna Donovan, East-West Center, 1601 East-West Road, Honolulu, Hawaii 96848-1601, USA. Tél: (1) 808 944 7246 Fax: (1) 808 944 7298 Email: DonovanD@EastWestCenter.or

VIETNAM

CEN

Un réseau d'éducation à la protection de la nature (CEN, Conservation Education Center) a été établi au Viêt-nam. Le CEN est un forum mondial pour échanger des informations scolaires et factuelles sur l'éducation à la préservation au Viêt-nam. Le langage du groupe est vietnamien et anglais. Pour plus amples informations: Conservation Education Network (CEN) 114 Hoang Quoc Viet, Cau Giay, Hanoi, Vietnam. Tél: (84) 756 0233 ou souscrivez en envoyant un Email à majordomo@vn-gw.net.vn

FELICITATIONS

Félicitations à Alexis Symonds (Assistant Directeur à l'Éducation du Jardin du Nord en Afrique du Sud) qui a été récompensé par le prix 2000 du National Institute's Chairman, dans la catégorie Organisation. Cette récompense a été mise en place pour service rendu à l'Institut.

Félicitations également au Aboriginal Education Officer John Lennis qui a été récompensé par une bourse pour suivre l'intégralité des cours du New South Wales Public Sector Management Course, pour l'année scolaire 2001-2002.

EXCUSES

Nos excuses à Magdalena Vicens du Jardin Botanique de Sóller qui nous a offert un service de traduction pour l'article-résumé dans le numéro 22 de Roots et qui n'a pas été remerciée en bas de page. Nous apprécions grandement sa contribution.

● Noticias

VIETNAM

CEN

La Red de Educación y Conservación (CEN) se ha establecido en Vietnam. CEN es un foro mundial para el intercambio de información escolar y de acciones de conservación y educación en Vietnam. Los idiomas de este grupo son el vietnamita y el inglés. Más información en: Conservation Education Network (CEN) 114 Hoang Quoc Viet, Cau Giay, Hanoi, Vietnam. Tel: (84) 756 0233 o manda un mail a majordomo@vn-gw.net.vn

FELICITACIONES

Felicitemos a Alexis Symonds (Asistente del Director de Educación de los Jardines Botánicos del Norte de Sudáfrica), quien ganó el Premio 2000 de la categoría de Manejo Gerencial del Instituto Nacional de Botánica. Este reconocimiento se otorga por el excelente servicio a dicho Instituto.

Felicitemos también al Coordinador de Educación Indígena John Lens quien ganó una beca completa para tomar un curso de Administración en el Sector Público de New South Wales durante 2001-2002. Esta beca se otorgó como parte de su compromiso de reconciliación entre la División NSW y el Instituto Público de Administración de Australia. John esta muy contento con su beca ya que podrá desarrollar sus conocimientos y habilidades relativas al manejo de aspectos indígenas a nivel gerencial.

DISCULPAS

Nuestras sinceras disculpas a Magdalena Vicens del Jardí Botànic de Sóller quien contribuyó en la traducción de los resúmenes de los artículos de ROOTS 22 y no fue mencionada en los agradecimientos de la contraportada. Apreciamos enormemente su contribución.

The School Garden:

Education for Sustainable Living

■ Summary

The great challenge of our time is to create sustainable communities; communities designed in such a way that their ways of life, businesses, economies, physical structures, and technologies do not interfere with nature's inherent ability to sustain life. The first step in this endeavor must be to become 'ecologically literate' i.e. to understand the principles of organization that ecosystems have developed to sustain the web of life. Being ecologically literate, or 'ecoliterate' means understanding the basic principles of ecology and being able to embody them in the daily life of human communities.

To understand the principles of ecology, we need a new way of thinking, known in science as 'systems thinking'. It means thinking in terms of relationships, connectedness, and context. In this article, the author shows how ecoliteracy can serve as a new framework for education in the twenty first century, and how growing a school garden is the ideal way for children to experience systems thinking and ecology in action. Gardening reconnects children to the fundamentals of food, indeed, to the fundamentals of life, while integrating and enlivening virtually every activity that takes place at a school.

As the new century unfolds, our great challenge is to build and nurture sustainable communities; social, cultural, and physical environments in which we can satisfy our needs and aspirations without diminishing the chances of future generations.

What is sustained in a sustainable community is not economic growth or development, but the entire web of life

on which our long-term survival depends. In other words, a sustainable community is designed in such a way that its ways of life, businesses, economy, physical structures, and technologies do not interfere with nature's inherent ability to sustain life.

The first step in this endeavor must be to become 'ecologically literate' i.e., to understand the principles of organization that nature has developed to sustain the web of life. The ecosystems of the natural world are sustainable communities of plants, animals, and microorganisms. There is no waste in these ecological communities, one species' waste being another species' food, so that matter cycles continually. The energy driving these ecological cycles flows from the sun, and the diversity and cooperation among its members is the source of the community's resilience.

The Center for Ecoliteracy in Berkeley (www.ecoliteracy.org) is dedicated to fostering the experience and understanding of the natural world in primary and secondary education. Being ecologically literate, or 'ecoliterate' means, in our view, understanding the basic principles of ecology and being able to embody them in the daily life of human communities. In particular, we believe that the principles of ecology should be the guiding principles for creating sustainable learning communities. In other words, ecoliteracy offers an ecological framework for educational reform.

To understand the principles of ecology, we need a new way of seeing the world and a new way of thinking; thinking in terms of relationships, connectedness, and context.

In science, this new way of thinking is known as systems thinking. It emerged during the first half of the century in several disciplines, in which scientists explored living systems, living organisms, ecosystems and social systems, and recognized that all these living systems are integrated wholes whose properties cannot be reduced to those of smaller parts.

Systems thinking was raised to a new level during the past twenty years with the development of a new science of

Below: Dr Fritjof Capra is the Founding Director of the Center for Ecoliteracy in Berkeley California (Photo: Zenobia Barlow, Learning in the Real World Images)





Right: Working and growing a school garden helps students to become aware of how they are part of the web of life (Photo: Tyler, Learning in the Real World Images)

complexity, including a whole new mathematical language and a new set of concepts to describe the complexity of living systems.

The emerging new theory of living systems is the theoretical foundation of ecoliteracy. Instead of seeing the universe as a machine composed of elementary building blocks, scientists have discovered that the material world, ultimately, is a network of inseparable patterns of relationships; that the planet as a whole is a living, self-regulating system. The view of the human body as a machine and of the mind as a separate entity is being replaced by one that sees not only the brain, but also the immune system, the bodily tissues, and even each cell, as a living, cognitive system. Evolution is no longer seen as a competitive struggle for existence, but rather as a cooperative dance in which creativity and the constant emergence of novelty are the driving forces (Capra 1996).

At the Center for Ecoliteracy, we have found that growing a school garden and using it as a resource for cooking school meals is an ideal project for experiencing systems thinking and the principles of ecology in action (Crabtree 1999). Gardening reconnects children to the fundamentals of food; indeed, to the fundamentals of life while integrating and enlivening virtually every activity that takes place at a school.

It is not a coincidence that gardening and preparing food from what grows in the garden have been integral parts of religious practice in many spiritual traditions, for example in the monastic traditions of Christianity and Buddhism. Gardening and cooking are examples of cyclical work, work that has to be done over and over again, work that does not leave any lasting traces. You cook a meal that is immediately eaten. You clean the dishes, but they will soon be dirty again. You plant, tend the garden, harvest, and then plant again.

This work is part of monastic practice, because it helps us recognize the natural order of growth and decay, of birth and death, and thus makes us aware of how we are all embedded in those cycles of nature.

Unfortunately, we have lost this wisdom to a large extent during the recent, relatively short period of the industrial era. There is a major clash today between ecology and the economies of the industrial world. It derives from the fact that nature is cyclical, whereas our industrial systems are linear. Our businesses take resources, transform them into products plus waste, and sell the products to consumers, who discard more waste when they have consumed the products. Sustainable patterns of production and consumption need to be cyclical, imitating the cyclical processes in nature. To achieve such cyclical patterns, we need to fundamentally redesign our businesses and our economy (Hawken 1993).

At the root of this problem lies our obsession with unrestricted economic growth. Growth is a key characteristic of all living things, but on a finite planet not all things can grow at the same time. To every thing there is a season. While some things grow, others have to diminish. Just as the decay of last year's fallen leaves provides nutrients for new growth this spring, some institutions must be allowed to decline and decay, so that their capital and human talents can be released and recycled to create new organizations.

This age-old wisdom can be experienced and understood directly through gardening. In the garden, we learn about food cycles and we integrate the natural food cycles into our cycles of planting, growing, harvesting, composting, and recycling. Through this practice, we also learn that the garden as a whole is embedded in larger systems that are again living networks with their own cycles. The food cycles intersect with these larger cycles, the water cycle, the cycle of the seasons, and so on all of which are links in the planetary web of life.

Through gardening, we also become aware how we ourselves are part of the web of life, and over time the experience of ecology in nature gives us a sense of place. We become aware of how we are embedded in an ecosystem; in a landscape with a particular flora and fauna; in a particular social system and culture.

For children, being in the garden is something magical. As a teacher in one of our Ecoliteracy schools put it, '...one of the most exciting things about the garden is that we are creating a magical childhood place for children who would not have such a place otherwise, who would not be in touch with the Earth and the things that grow. You can teach all you want, but being out there, growing and cooking and eating, that's an ecology that touches their heart and will make it important to them'.

In a school or botanic garden, we learn that a fertile soil is a living soil containing billions of living organisms in every cubic centimeter. These soil

bacteria carry out various chemical transformations that are essential to sustain life on Earth. Because of the basic nature of the living soil, we need to preserve the integrity of the great ecological cycles in our practice of gardening and agriculture. This principle is embodied in traditional farming methods, which are based on a profound respect for life. Farmers used to plant different crops every year, rotating them so that the balance in the soil was preserved. No pesticides were needed, since insects attracted to one crop would disappear with the next. Instead of using chemical fertilizers, farmers would enrich their fields with manure, thus returning organic matter to the soil to reenter the ecological cycle.

About four decades ago, this age-old practice of organic farming changed drastically with the massive introduction of chemical fertilizers and pesticides. Chemical farming has seriously disrupted the balance of our soil, and this has had a severe impact on human health, because any imbalance in the soil affects the food that grows in it and thus the health of the people who eat the food. Fortunately, a growing number of farmers have now become aware of the hazards of chemical farming and are turning back to organic, ecological methods. The school garden is the ideal place to teach the merits of organic farming to our children.

In the garden we can observe and experience growth and development on a daily basis; the cycle of birth, growth, maturation, decline, death, and new growth of the next generation. The understanding of growth and development is essential not only for gardening, but also for education. While the children learn that their work in the school garden changes with the development and maturing of the plants, the teachers' methods of instruction and the entire discourse in the classroom changes with the development and maturing of the students.

Since the pioneering work of Jean Piaget, Rudolf Steiner, and Maria Montessori, a broad consensus has emerged among scientists and educators about the unfolding of

cognitive functions in the growing child. Part of that consensus is the recognition that a rich, multi-sensory learning environment, the shapes and textures, the colors, smells, and sounds of the real world, is essential for the full cognitive and emotional development of the child. Learning in the school garden is learning in the real world at its very best. It is beneficial for the development of the individual student and the school community, and it is one of the best ways for children to become ecologically literate and thus able to contribute to building a sustainable future.

It is obvious that integrating the curriculum through gardening, or any other ecologically oriented project, is possible only if the school becomes a true learning community. The conceptual relationships among the various disciplines can be made explicit only if there are corresponding human relationships among the teachers and administrators.

In such a learning community, teachers, students, administrators, and parents are all interlinked in a network of relationships, working together to facilitate learning. The teaching does not flow from the top down, but there is a cyclical exchange of information. The focus is on learning and everyone in the system is both a teacher and a learner. Feedback loops are intrinsic to the learning process, and feedback becomes the key purpose of assessment. Systems thinking is crucial to understand the functioning of learning communities. Indeed, the principles of ecology can also be interpreted as principles of community.

As we move further into our new century, the survival of humanity will depend increasingly on our ability to become ecologically literate, to understand the principles of ecology and live accordingly. Thus, learning in the real world, in school and botanic gardens, will become ever more important. This is an enterprise that transcends all our differences of race, culture, or class. The Earth is our common home, and creating a sustainable world for our children and for future generations is our common task.

▲ Résumé

Le grand challenge aujourd'hui est de créer des communautés durables - communautés conçues de telle sorte que leurs styles de vie, les affaires, l'économie, les structures physiques et les technologies n'interfèrent pas avec la capacité inhérente à la nature de maintenir la vie de façon durable. La première étape dans cet effort est de devenir lettré en écologie c'est à dire de comprendre les principes d'organisation que les écosystèmes ont développé pour maintenir le cycle de la vie. Etre 'lettré en écologie' ou 'écolettré' veut dire comprendre les principes de base de l'écologie et être à même de les appliquer dans notre vie quotidienne. Pour comprendre les principes de l'écologie, nous devons penser différemment, en langage scientifique on appellerait cela adopter un nouveau système de pensée. Cela signifie penser en terme de relations, connexions et contexte. Dans cet article, l'auteur montre comment 'écoliteracy' peut servir de cadre à l'éducation du 21ème siècle et explique comment la création d'un jardin à l'école permet de façon idéale d'expérimenter de nouveaux systèmes de pensée et l'écologie en action. Le jardinage reconnecte les enfants aux valeurs fondamentales de la nourriture- et même à l'importance fondamentale

de la vie- tout en intégrant et mettant de la vie dans virtuellement chacune des activités de l'école.

● Resumen

El gran desafío de nuestros tiempos es la creación de comunidades sostenibles, comunidades diseñadas de tal manera que su forma de vida, negocios, economía, estructura física, y tecnología, no interfieran con la capacidad inherente de la naturaleza para sostener la vida. El primer paso en este camino tiene que ser el alcanzar un profundo conocimiento y comprensión de la ecología, o sea, comprender los principios que rigen los ecosistemas, los cuales se han desarrollado para sostener la red de la vida.

El tener tal conocimiento y comprensión ecológica, digamos el ser *eco-conocedores*, quiere decir comprender los principios básicos de la ecología y poder trasladarlos a la vida cotidiana de las comunidades humanas. Para comprender los principios de la ecología necesitamos nuevas maneras de pensar, conocidas en la ciencia como *systems thinking (pensar en sistema)*. Significa el pensar en términos de las relaciones, conexiones y contextos. En este artículo el autor demuestra como la eco-comprensión

puede servir de marco para la educación en el Siglo XXI, y como el cuidar un jardín escolar es el modo ideal para que los niños puedan tener la experiencia de *pensar en sistema* y de ver la ecología en acción. La jardinería conecta a los niños de nuevo con los fundamentos de los alimentos, y así con los fundamentos de la vida, a la vez que se entusiasman y se integran en prácticamente todas las actividades escolares.

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Fritjof Capra Ph.D., physicist and systems theorist, is a founding director of the Center for Ecoliteracy in Berkeley, California. He is the author of several international bestsellers, including *The Tao of Physics*, *The Turning Point*, and most recently *The Web of Life*. Center for Ecoliteracy , 22 San Pablo Avenue, Berkeley, California 94702 USA. Tel: (1) 510 845 4595 Fax: (1) 510 845 1439.

Right:
Gardening
reconnects
students to the
fundamentals of
food and life
(Photo:
Tyler, Learning
in the Real
World Images)



La Biodiversité: Un Pont Entre Éducation à la Conservation et Éducation à la Gestion Durable

La Biodiversidad Como Puente Entre la Educación Sobre la Conservación de la Naturaleza y la Educación para la Sostenibilidad

25

Biodiversity

as a Bridge Between Nature Conservation Education and EfS

■ Summary

Botanic gardens and glasshouses can play an important role in community based education for biodiversity. Education for biodiversity has the potential to link plant conservation to the development of sustainable communities.

Biodiversity can be considered an 'ill-defined' concept, in that there is no one single perspective or definition of biodiversity that accurately describes it in all situations or contexts. It can have different meanings depending on the user of the term and the context in which it is used. Although being ill-defined is considered a weakness by some, it offers some worthwhile advantages from an environmental education perspective. These advantages are explored and linked to plant conservation and sustainable community development.

Presented is a stepping stone procedure for turning biodiversity into a meaningful and existentially relevant issue for people with diverging interests, needs and cultural backgrounds (van Weelie and Wals 1999). The procedure is illustrated by the case of the Urban Rainforest Trail.

Introduction

Since the signing of the Convention on Biological Diversity, biodiversity seems to have become an important theme in science and society. Both the science education and the environmental education community are looking for ways to incorporate learning about (mostly science education) and learning for biodiversity (mostly environmental education) into their teaching and learning activities in both

formal (mostly science education) and non-formal (mostly environmental education) education.

This integration proves to be quite a challenge to many educators since the idea of biodiversity is rather fuzzy or ill-defined and refers to concepts that are equally fuzzy and open to a variety of interpretations (think of concepts like sustainable use and equitable distribution). For those who like crisp and clear concepts with the same meaning in all circumstances and that can be somehow observed and measured, biodiversity proves to be a rather slippery concept that does not transfer easily or meaningfully to the minds of the learner. For those who promote learning on the edges - that is dissonance driven learning on the interface between sometimes conflicting meanings, interests, values, perceptions and so on - biodiversity is an excellent vehicle for teaching and learning.

One's outlook on the role of education in essence determines whether biodiversity is a suitable theme for education. When education is viewed as the transfer of pre- and expert determined knowledge, insights, values and even prescriptions of the 'right' way of living, then concepts such as biodiversity and sustainability either are avoided or become narrowly defined doctrines and are essentially un-educational. However, when education is viewed as the process that guides learners in exploring new knowledge, insights and values and assisting them in determining their own pathways of living, concepts such as biodiversity and sustainability might be very educational. It is the latter view that emerged in a three year Dutch study on the environmental education



Above and Left: The Whole Cake Treasure Hunt activity helps students to look beyond the supermarket shelves to the origin of cake ingredients and the people involved in the production and marketing processes (University of Leicester Botanic Gardens U.K.).

potential of biodiversity (van Weelie and Wals 1999). Figure 1 outlines a continuum between more traditional environmental education that focussed on the change of individual behaviour and more emancipatory environmental education and education for sustainability that focuses on human development and self-determined lifestyles.

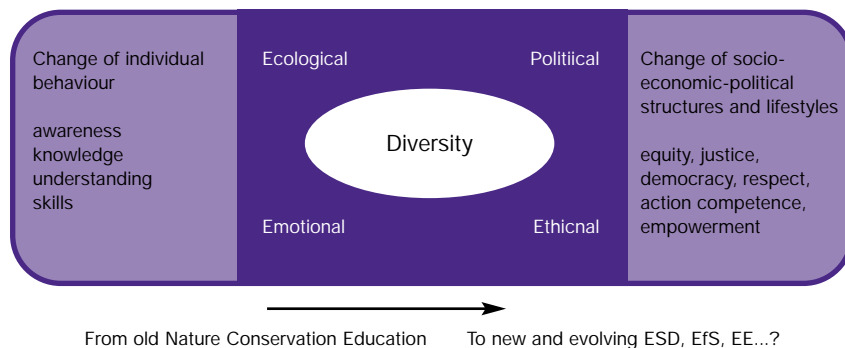


Figure 1: EE in transition? (Adapted from: Hesselink, van Kempen and Wals 2000)

Stepping Stones for Making Biodiversity Meaningful

The three year Dutch study which included policy-makers, environmental educators, NGO-representatives, youth representatives, curriculum developers and secondary school teachers, resulted in six stepping stones for biodiversity education within the context of environmental education. The six stepping stones are presented in no particular order and are based on the work of van Weelie and Wals (1999).

Determining perspective(s)

Determine pedagogical perspectives and translate them into general learning goals for the educational resource to be developed. Possible perspectives include: an ecological literacy perspective (focus ecological concepts, relationships, interdependencies for example) a 'nature and self perspective' (focus connecting with and discovering local biodiversity) and a 'politics of nature perspective' (focus on biodiversity far and near, equity issues, respect, international cooperation, treaties, action competence, etc).

Selecting specific themes and contexts

Select themes and contexts that are suitable for the intended ways of learning, and complementary to the general learning goals in the given educational setting. Exemplary themes include: Backyard Biodiversity (focus on diversity of species in the home, school, neighborhood and community), Design a Habitat (focus on the conditions and requirements for species to thrive, survive or take a dive), Biosphere not Biosfe~~ar~~ (focus on the wonders and importance of nature,

dynamic equilibrium, self healing capacity, interdependencies, etc.), the last dodo...so what? (focus on extinction, ethics and values) and shaping biodiversity (focus on people's capacities to positively shape biodiversity, action competence, consumerism, citizenship, etc.).

Analysing meanings of biodiversity

Analyse the meaning of biodiversity as it is used in authentic contexts (e.g. politics, science and the media) relevant to the educational resource to be developed using a simple working definition: *Biodiversity represents variability (v) in biological entities (b) in a specific space (s) at a specific moment in time (t)* (Van Weelie and Wals 1999). In this working definition 'v' refers to either species richness (number of different species/specific area) or relative abundance (number of individuals of species relative to the number of individuals of other species/specific area), 'b' refers to biological entity that is at stake (i.e. particular species or ecosystem or genes or the less commonly mentioned guilds, habitats or homogeneous plots), 's' refers to the geographical location under consideration and 't' refers to the change of a particular biodiversity over a specific time period.

Setting concrete learning objectives

Formulate specific learning objectives that are compatible with the general learning goals and the selected themes. The learning objectives can be derived from four pedagogical arguments: The *emotional argument*: (re)connecting with nature through discovery and sensitisation, and experiencing biodiversity to create personal meaning. The *ecological*

argument: understanding relationships, functions and (global) interdependencies. The *ethical argument*: dealing with values, taking a moral position, raising critical questions. And, finally, the *Political argument*: dealing with controversial issues, making choices, developing action competence.

Valuing of biodiversity

Design activities for each learning context to pay attention to interests and values of various stakeholders in the socio-scientific dispute about biodiversity. Even though we may be able to recognise specific forms of biodiversity within, for instance, our own environment, we also will need to address the underlying normative aspects. For this purpose we need to ask the following questions: What kind of biodiversity is referred to in this particular situation? What facts are known about this biodiversity; what remains uncertain? What values, claims and uses do the various interest groups attribute to this biodiversity? What values, claims and uses do individuals personally attribute to this biodiversity?

Contextualising the concept of biodiversity

Attach specific meanings to biodiversity which are useful in the chosen learning contexts and learning objectives and are logically consistent with a chosen working definition of biodiversity. This is where all the previous steps work together to arrive at a meaningful understanding and use of biodiversity. We will illustrate this in the case of the urban rainforest trail which is a composition of suggestions provided by the participants in the Dutch study and, for the purpose of this paper, has been adapted to include a botanic garden education perspective.

Urban Rainforest Trail

The educational staff members of a botanic garden would like to develop an activity that shows that the lives of the town's citizens are intricately linked to the well-being of people and species in other parts of the world. Up until now the centre has developed a variety of activities that purely focus on the local environment (i.e. interpretive hikes

to help people discover the vast amount of nature that can be found in their own botanic garden but also in unexpected places in the community at large. The garden's educational program traditionally took on a 'nature and self' and an ecological literacy perspective. Inspired by the Local Agenda 21 initiative and the ratification by the national government of the Convention on Biological Diversity, the garden wants to design an eye-opening activity that expands people's horizons by using biodiversity as a bridge to both the local and the global community. 'The trick is,' according to one staff member, 'to show that local environmental issues and decisions have an impact on the lives of others – including other species – elsewhere in the world and vice versa'. To achieve this goal, the focus of the programme would have to combine the two *pedagogical arguments* for focusing on biodiversity:

- *The ethical justification:* helping citizens in dealing with values, taking a moral position and raising critical questions.

- *The political justification:* helping citizens in dealing with controversial disputes, making choices and developing action competence.

The environmental educators stress the following affiliated *learning goals*:

- personal and emotional involvement in the environment as an issue in society and the community
- environmental literacy and skills
- intrinsically motivated change in environmental behaviour.

The *perspective* that the centre, perhaps somewhat unconventionally, would like to focus on is that of the politics of nature, particularly the relationship between local consumer decision making and the quality of life elsewhere in the world.

After brainstorming on a variety of activities they could explore, the staff members decide to create an urban rainforest trail with the help of a local pharmacist, a nearby supermarket, a building and construction company, the local *Body Shop* and a clothing store.

The idea is that six sites will be developed where people learn about aspects of biodiversity and the way their consumer behaviour is linked to biodiversity elsewhere. For instance, at the pharmacist the sources of a variety of well-known medicines can be traced back to tropical areas. Here the importance of preserving and documenting the gene pool for medical (and other) purposes is explored. At the same time, controversial issues with regards to, for instance, ownership and exploitation could be brought to the forefront. At the building and construction site the different building materials that are in storage have been provided with special labels referring to the materials, source of origin, impact on biodiversity, strengths and weaknesses from both an environmental point of view and a building and construction point of view. The trail hikers also are given a home assessment questionnaire that helps people analyse the materials used for building their own house or apartment. For each material that is damaging to global species richness or genetic variety, an alternative is provided. At the local supermarket people explore the biodiversity aspects of foods (i.e. the number of available apple species now and in the past, the biodiversity index of various meals etc.).

Many of the plants and trees that can be found in the glass houses and the gardens are integrated in the trail. Some have a link to the pharmacist, others to the Body Shop and again others to the grocery store. The trail hikers will discover, the staff members hope, that the rainforest is everywhere and an integral part of their everyday life. At the same time they might come to recognise that individual consumer decisions here have an impact elsewhere in the world.

The team decides on two versions of the trail: a one-hour trail that can be used by school groups, giving sufficient time for a proper introduction to the trail (15 minutes) and a good discussion afterwards (45 minutes). This school trail could be used as the kick-off a series of lessons on biodiversity, since it raises a variety of issues that could be explored further by small groups later on. The other trail version is intended for people



Left: Exploring biodiversity issues through storytelling and examining artefacts (Birmingham Botanical Gardens and Glasshouses, U.K.)

visiting the centre during the weekend and lasts anywhere between one and two hours (not all sites have to be visited, there are several possible combinations).

By using the working definition, the staff members discover that at each site the kind of biodiversity that is addressed needs to be made explicit, to ensure that genetic and species diversity are not used interchangeably, thus creating confusion. By applying the working definition at each site, they are able to assign a specific meaning to biodiversity. At the end of the tour the participants are confronted with the various meanings of biodiversity they encountered.

One of the strengths of the centre is its ability to design the trail in a hands-on fashion by creating a number of opportunities for the participants to

Below & Right:
Using pocket
books to gather
and record
information
about economic
crops to
examine issues
around
sustainability
and biodiversity
(Birmingham
Botanical
Gardens and
Glasshouses,
U.K.)



discover the biodiversity aspect of everyday consumption. At each site they have a specific activity that requires participants to make a value judgement. Specific questions lead participants into the socio-scientific dispute that surrounds biodiversity. The questions mimic the first three steps in defining the value of biodiversity as listed in the table below

1. *Identifying*
 - recognising values
 - labelling your own values and those of others without judging them
 2. *Analysing*
 - distinguishing the different components of values
 - recognising the relationships between values
 - sorting and prioritising values
 - tracking the source of values
 - studying the implications of values
 - exposing contradictions between values
 3. *Choosing*
 - weighing the consequences of different values
 - arguing the merits of alternatives
 - selecting and openly defending the selected alternative.
- It is hoped that the trail will plant enough seeds of dissonance in the minds of the hikers to eventually engage them in the remaining three steps (acting, evaluating and reconsidering).
4. *Acting*
 - putting your values to work (translating them into actions)
 - reflecting on the experience
 5. *Evaluating*
 - determining the value of the selected alternative
 - determining the value of the perceived consequences of putting the new value into practice
 - assessing the level of consistency between valuing and acting
 - 6. *Reconsidering* - confirming the choices one has made and accepting their consequences or reconsidering one's choices in view of one's reflections and evaluations. (adapted from Delhaas and Koekoek 1994).

Conclusions

Working with the stepping stones - analysing meanings of biodiversity, determining one or more perspective based on general learning goals for environmental education, setting concrete learning objectives, selecting specific (sub)themes for learning, contextualising biodiversity and valuing biodiversity - shows that it is crucial to learn about different meanings, interpretations and uses of biodiversity and to be able to observe biodiversity in action. Equally important, however, is the aspect of establishing the value of biodiversity. The normative character of biodiversity needs to be made explicit in the learning process for it to be called environmental education. To answer the question of whether biodiversity loss is a bad thing, and if so, for whom, one must formulate a personal, well-argued position and reflect on one's own values. In raising such a question we will inevitably have to address the issue of equitable distribution and sustainable use, which are core components of both contemporary environmental education and the Convention on Biological Diversity. Since realising all potential learning goals and paying respect to multiple perspectives in one learning activity would be overly ambitious and in all likelihood, counter-educational, choices will have to be made and learning activities will have to be part of a series of sequential activities.

Botanic gardens are well positioned to tap the educational potential of biodiversity: they house a large number of plant species, they possess large amounts of (scientific) knowledge and expertise on plant biodiversity, they tend to be located in urban areas and they often have educational staff members. Biodiversity makes it possible to link the gardens to the community as the urban rail forest trail idea illustrates. Sure, the urban rainforest trail is only one idea and there are different ways in which such a trail could be designed, but it is easy to imagine how such a concept might trigger new ideas and re-conceptualise the role of education within botanic gardens. The challenge will be to develop these ideas and learning activities not within the botanic centers



but develop them within the community of which the gardens are a part. This suggests that early on in the development process partners (e.g. store owners, teachers, pharmacists and relevant local NGO's) in the community are identified and brought into the process. It depends on the possibilities, mission and ambition of the botanical gardens whether they become one of the partners contributing to this process or whether they play an initiating and coordinating role.

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About the author

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▲ Resumé

Les jardins botaniques et les serres peuvent jouer un rôle important dans les programmes d'éducation à la biodiversité. L'éducation à la biodiversité permet de lier la conservation des espèces végétales au développement durable des communautés. On peut considérer que la Biodiversité est un concept mal défini car il n'existe pas une perspective ou une définition unique qui, de façon précise, la décrit dans tous les contextes et les situations. Elle peut avoir plusieurs sens selon l'utilisateur et le contexte dans lequel elle est utilisée. Bien que cette définition floue soit considéré par certains comme une faiblesse, pour d'autres, elle offre des avantages certains dans une perspective

d'éducation à l'environnement. Ces avantages sont explorés ici et liés à la conservation des espèces végétales et au développement durable des communautés.

Est présenté ici une méthode qui permet de donner à ce mot un sens et une utilité pour les personnes à intérêts divergents, besoins et environnements culturels différents (van Weelie et Wals 1999). La méthode est illustrée par l'exemple d'un circuit urbain en forêt tropicale.

● Resúmen

Los jardines botánicos y los invernaderos pueden jugar un importante papel en la educación de la comunidad sobre la biodiversidad. La educación para la biodiversidad tiene el potencial de conectar la conservación de las plantas con el desarrollo de las comunidades sostenibles.

La biodiversidad puede considerarse un concepto no bien definido, en que no hay una sola perspectiva o definición de la biodiversidad que cubra con exactitud todas sus situaciones o contextos. Puede tener diferentes significados dependiendo de quien usa el término y en que contexto lo utiliza. Aunque hay quien considera esta característica de no estar bien definida como un punto débil, también ofrece algunas ventajas convenientes desde la perspectiva de la educación medio ambiental. Estas ventajas se exploran y se relacionan a la conservación de las plantas y al desarrollo sostenible de las comunidades.

Se presenta un proceso de paso a paso para convertir la biodiversidad en un tema relevante y con sentido para la gente con diversos intereses, necesidades y ambientes culturales (van Weelie & Wals 1999). El proceso se demuestra en el caso del Recorrido del Bosque de Lluvia Urbano.

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Des Plantes Pour Allumer des Étincelles!

Usando Plantas Para Encender Chispas!

Light Sparks!

Using Plants to

Top Right:
Jenny of the
Dendrological
Society
presenting the
Forest Biome

Bottom Right:
Kethi of
Western Cape
Nature
Conservation
and Tommy
from the Garden
Route Botanical
Garden
presenting the
'Little Karoo'
biome

■ Summary

Each year the Audrey Moriarty Southern Cape Herbarium in South Africa, organises a Wildflower Show to encourage people to learn about the wonderful variety of plants that occur naturally in the southern Cape. Schools from disadvantaged suburbs, however find it difficult to attend because of the distance and unaffordable cost of transport. For this reason, Educational Environmental Expo was created. Organised by BEEP (Botanical & Environmental Education Project) which is coordinated by the Herbarium, the Expo was set up in a large hall within easy walking distance of a large number of schools. The aim of the Expo was to expose children and teachers to the importance of the richness and complexities of the local biomes and the factors influencing their conservation. Over 2 500 children from 15 schools attended. Every student was given a copy of the BEEP Environmental Game to take home and teachers received a worksheet to encourage follow-up activities in the classroom. It is hoped that this Expo will lead to a annual or biennial event.

The Audrey Moriarty Southern Cape Herbarium coordinates BEEP (Botanical & Environmental Education Project) which is part funded by The Green Trust (an offshoot of WWF supported by Nedcor). The herbarium organises a Wildflower Show in the George Museum each year in October, with the aim of encouraging people to learn about the wonderful variety of plants which occur naturally in the Southern Cape in South Africa. This show has become a highlight of the year for plant lovers of the region and every year more visitors and tourists are discovering it.

In October 2000 an entire day was devoted to schools; giving six 10 minute presentations to groups of about 25 so that each group spent an hour at the show, being exposed to a whole array of ideas rather than just wandering through haphazardly. This proved very successful with 300 children attending.

But, although BEEP has close contacts with schools in the previously disadvantaged suburbs, most of these could not attend because of the distance and unaffordable transport costs. At subsequent discussions with teachers, they suggested '...bring the show to our children' and the idea of an Educational Environmental Expo for 2001, to be held in the townships, was born. The large hall at the Conville Civic Centre was identified as being ideal for the purpose as so many schools are within walking distance of it.

The main objective was to expose a maximum number of children and teachers, most of whom have had little chance to experience the exciting Southern Cape flora at first hand, to the importance of the amazing richness and complexities of the local biomes and the factors influencing its conservation. Lighting a spark in one child out of 1000 is great, but by inspiring one teacher in 100 to include plants and the environment in a meaningful way in their teaching, thousands of children can be reached and sparks lit!

The initial impact was to be 'WOW', with education as the result! The plan was for groups from at least five local schools to attend over two days (about 1000 children) and funding was sought and granted from The Green Trust based on these numbers. HOWEVER



at the actual Expo held over three days from 9-11 May 2001, the actual statistics were 2720 pupils from 15 schools and 40 teachers! Each spent 1 hour 20 minutes in the Expo Hall. They were given ten minute presentations at each of seven displays or Biomes (coastal, forest, mountain fynbos, Little Karoo), by a total of 17 volunteer presenters, in their home language (English, Afrikaans or Xhosa) where possible or with teachers translating. They spent ten minutes at the end learning how to play the BEEP Environmental Game with dice they had made themselves from clay while they waited to come into the hall. Every pupil received a game of their own. Each teacher was able to browse through the teacher's resources display and received a worksheet to encourage follow-up activities in the classroom.

The exhibits were on a large scale as the hall covers at least 700 square metres. Four 10 metre x 2 metre dioramas of the main biomes of the



Southern Cape were painted by herbarium volunteers and fronted by typical live plant material relevant to the biome (children were encouraged to touch and smell). A similar sized urban diorama complete with litter, demonstrated the contrast where development has taken over completely and left not a single spot of green! There were also three very large posters each 3 metres by 2 metres which showed the water cycle, the carbon cycle, and a landscape with plants verses the devastation of one without. Five local schools erected attractive project displays, mostly around the theme of water and dangers of pollution, and the usefulness of plants to man.

Saasveld Technikon students erected and staffed a display on food chains and the interdependence of animals and plants. The many animal skeletons and live snakes, drew much attention and elicited the perception held by a surprising number of pupils that '...if it's a skeleton it's dinosaur!'

The success of this first-time Environmental Expo will hopefully lead to an annual or biennial event. The Garden

Route Botanical Garden Trust and the Herbarium will be seeking ongoing sponsorship, while work-shopping ideas and improvements to ensure that teachers and pupils as well as local communities are closely involved in planning, preparing and presenting the exhibition in future. The herbarium administration staff of one, the two part-time BEEP facilitators, and the huge of amount of time and effort invested so freely by the herbarium's regular band of volunteers, made the incredibly enriching experience of 2001 possible; but it could and should become a community driven source of great pride in the future. Once again the real value of The Green Trust's sponsorship and especially their faith in the idea, far exceeds the actual donation made.

▲ Resumé

Chaque année, l'Herbier Audrey Moriarty Southern Cape en Afrique du Sud organise une exposition de fleurs sauvages pour permettre aux visiteurs d'appréhender la magnifique variété de plantes qui poussent naturellement en Afrique du Sud. Les écoles des quartiers défavorisés ont cependant des difficultés pour accéder au site en raison de la distance et du prix prohibitif des transports. Pour cela, l'Exposition Education à l'Environnement a été créée.

Organisée par le BEEP (Projet d'Education Botanique et Environnementale) et coordonnée par l'Herbier, l'expo a été organisée dans un vaste hall à proximité d'un grand nombre d'écoles. Le but de l'expo était

de présenter aux enseignants et aux élèves la richesse et la complexité des biomes locaux et les facteurs influençant leur conservation. Plus de 2500 élèves de 15 écoles ont pu visiter l'exposition. Chaque élève a reçu une copie du jeu conçu par le Projet d'Education Botanique et Environnementale et les professeurs recevaient eux une fiche de travail pour les encourager à poursuivre le travail en classe. Il est à souhaiter que cette exposition devienne annuelle ou bi-annuelle.

● Resúmen

Cada año, el Audrey Moriarty Southern Cape Herbarium en Sudáfrica organiza un festival de flores silvestres para animar a la gente a aprender sobre la maravillosa variedad de plantas autóctonas del sur del Cabo. Sin embargo, para los colegios de los suburbios desaventajados es difícil asistir por causa de las largas distancias y el excesivo coste del transporte. Por esta razón se creó la Expo de Educación Medio-ambiental. Esta exposición está organizada por la BEEP (*Botanical & Environmental Education Project*: el Proyecto Botánico y de Educación Medio-Ambiental), co-ordinado por el Herbario, y se instaló en un gran salón a corta distancia a pie de un buen número de colegios. El objeto de la Expo era el presentar a los niños y a los profesores la importancia de la riqueza y la complejidad de los biotopos locales y los factores que influyen en su conservación. Mas de 2500 niños de 15 colegios asistieron. A cada estudiante se le presentó un ejemplar del juego medio-ambiental del BEEP para llevarse a casa y a los profesores se le entregó una hoja de trabajo para promover actividades consecuentes en la clase. Se espera que la celebración de esta Expo resulte en un evento anual o bienal.

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Left: Entranced by the Proteas of the Fynbos

Left: Children from Mzoxdo Primary School playing the BEEP game

L'importance de l'Implication des Communautés Locales Pour la Conservation Es Importante Involucrar a la Comunidad en la Conservacion

The Importance of Community Involvement in Conservation

■ Summary

Eru is one of the commonest vegetables eaten in Cameroon today. It provides an important source of protein and is used medicinally for a range of ailments, including sore throats, nausea and as an antidote to arrow poison. Yet eru is under severe threat from over exploitation. Vast amounts are exported each week to neighbouring Nigeria and from there to Europe and the USA. The Limbe Botanic Garden is interested in the conservation of this species and has been heavily involved in research and the involvement of local people in the cultivation of eru. This article details the importance of the eru species, its threats and outlines how the Limbe Botanic Garden is contributing to its conservation. This includes public awareness exhibitions and fairs, the use of local and national radio, the setting up of trial eru plots for visitors to consult, the training of farmers in the cultivation of eru and the development of an eru cultivation manual.

Background

Among the numerous things that are regularly exported from Cameroon to neighbouring Nigeria are food stuff. Among these food items is a local vegetable called eru. Three days every week, the patient observer in Limbe can count as many as 45-50 eru buses on their way to Idenau. These are sixteen-sitter buses, (with all the seats removed) filled, from bottom to top with the green vegetable. About the same quantity is tied onto the top of the bus. Each bus transports between 1-2 tonnes fresh weight of eru per trip, bringing the total quantity to 90-100 tonnes per week. This is only what goes out through the port of Idenau.

Other outlets of eru to Nigeria are Ekondo-Titi (by boat) and Mamfe (by road). Eru also leaves Cameroon through its southern and eastern borders to Gabon and the Republic of Central Africa.

All this is for export to Nigeria and further on to Europe and the USA. The eru trade is flourishing and there are all indications that it is going to stay this way, so long as the vegetable is available in the forest. But just as erosion moves top soil from one place to another, so do eru harvesters extract this vegetable from the wild to local and foreign markets. The consequence of such removal on eru populations in the wild is obvious. This threat has been signalled by different interested quarters for different reasons and with different degrees of intervention.

The Limbe Botanic Garden (LBG) is one of these institutions which is interested in the conservation of this species. Its intervention has been in the areas of research and the involvement of local people in the cultivation of eru. The rationale of this is that if people grow eru in their gardens or on their farms or on an even larger scale (plantations), pressure on the wild populations of the species will reduce.

Eru is a plant of the *Gnetaceae* family. It has two varieties and both occur in Cameroon: *Gnetum africanum* and *Gnetum buchholzianum*. It is native to West and Central Africa where it is variously called eru or kok in Cameroon, koko in the Republic of Central Africa, ntoumou in Gabon and afang or okasi in Nigeria.

Eru is a climbing rainforest vine which grows well in forest gaps and in fallow farms. Though it can survive in

volcanic, sandy and even clayey soils, it cannot grow in marshy areas. The plant needs shade to grow well; direct sunlight will scorch its leaves. In the wild, the support of stronger stems and branches is imperative for the climbing eru vines.

Eru is a very important plant, and in Cameroon, the recognition of its different qualities keeps spreading everyday. It is one of the commonest vegetables eaten in Cameroon today. Its protein content is high and can greatly reduce malnutrition in areas where meat (or other sources of protein) is scarce.

In the South West Province of Cameroon, eru was previously associated with a particular tribe (the Banyangs) as it was their staple meal. But in recent years, almost all ethnic groupings, especially those from the South West and North West Provinces have learnt to cook and eat eru in the Banyang fashion. Its popularity has spread to attain national dimensions. There are few parties at which this dish is not served. There is hardly a restaurant that does not have eru on its menu.

Mobile eru restaurants have provided employment for thousands of men and women who in turn support numerous households. In almost all traditional feasts or parties today, eru is sure to be one of the main dishes whether the people celebrating are Banyangs or not. The social, cultural and economic value of eru cannot be overstated.

Eru also has medicinal qualities; it can be used in the treatment of enlarged spleens, sore throats and nausea. It can also be used as an antidote to poison, especially arrow poison common with

the Pygmy. The leaves, used as dressing can accelerate the maturation of furuncles and the stem can be taken as a tisane to ease childbirth.

The most significant change in the fortunes of eru is the recognition of its economic value. Trade in this vegetable has become very big business. In Cameroon, local consumption, common as it is, is insignificant compared to the quantity that is exported, first to Nigeria and then to Europe and the USA.

The economic value of the vegetable is very high, increasing progressively as it goes further from the source (Bokwe and Ngatum 1994). In Cameroon, a kilogram of eru costs CFA 400F (about 40p) in the market. When it is exported to Nigeria, the price rises to CFA 4.000 F (about £4.00), in the U.K. and Europe to CFA 8.000 F (about £8.00) and in the USA up to CFA 30.000 F (about £30.00).

It is this economic use of eru that presents the greatest threat to the future of the species. In quest for rapid financial benefit, people harvest enormous quantities. The issue here is that there is no tradition, amongst the people in Cameroon and other parts of West and Central Africa, to cultivate this plant. It is not like banana or cocoa which is widely cultivated. So of all the eru that is harvested and eaten, nothing goes back in the form of planting to replace the harvested stock. It is important for conservation measures (such as increasing available stock or creating gene banks) to be taken now because if things continue at this rate, the existing stocks of the plant may be wiped out.

Added to this issue of quantities harvested, is the way in which the harvesting is done. Because the plant is a climber, the choicest leaves are often high up in the canopy, entwined with the leaves and branches of the trees which give it support. The harvester usually stands on the ground to pull on the vines. More than half the leaves (the part of the plant which is eaten) remain at the tree tops and only a small fraction comes down to the harvester; there is a lot of waste. So, if a harvester brings out two bus loads of eru from the forest, they have left about three bus loads to dry up in the forest.

If the harvester wants to collect all the leaves, then they have to cut down the supporting tree, and this tendency has been on the increase. Sometimes the eru plants are simply uprooted – another unsustainable harvesting method.

The facts stated above are the findings of a study carried out by LBG where the uncertain future of the species provoked research. The garden's Conservation Through Cultivation Programme is centred around a number of plant species that have been identified to be threatened and which have economic or socio-cultural value (*Prunus africana*, *Gnetum africanum*, *Rattan spp* for the moment). These are plants whose wild populations are threatened for different reasons (mainly economic) and which local people do not traditionally cultivate.

The applied research goal of the programme is to identify appropriate cultivation methods for these species and encourage local farmers to grow them. It is hoped that this will deviate pressure from wild populations. This programme constitutes a major contribution on the part of the Limbe Botanic Garden to the goal of the Mount Cameroon Project (MCP) which is to maintain the biological diversity of Mount Cameroon.

Community Involvement

LBG contribution to MCP's conservation goal necessitated a solid outreach programme. The people needed to be informed of research findings and be involved actively in the implementation of their recommendations. This has been the case with the Eru Project.

Public awareness

The findings and results of the Conservation Through Cultivation Programme (CTC) have been brought to the knowledge of the public both at the local and national level. At trade fairs and exhibitions in the South West Province and at a national level, live samples of eru, rattans and *Prunus africana* have been displayed. General information, the conservation status and the research going on in the garden about these species is provided visitors at the LBG stand.

Local and national radio have also been used to inform the public on the CTC Programme and the possibility of cultivating plants like eru. In the garden, an information panel has been set up for the eru trial plot for visitors to consult. There is a CTC poster at the Visitor Centre explaining the process and potential in cultivating *Prunus*, rattans and eru.

The public also benefit from the eru manual that was used at a training workshop organised by the garden. It will be updated with information to be contributed by farmers and published.

The garden set up two strategically located eru trial plots and one gene bank within its premises. The two plots illustrate different soil types and financial implications in cultivating eru with regard to the kind of material used to provide shade for the plant. Adequate interpretation has been provided by the Education Unit. For all people who come to the Limbe Botanic Garden, and who know eru, it is a great old myth that has been broken – its domestication.

The Eru Manual

For the benefit of some institutions and those farmers who can read, the Limbe Botanic Garden has produced the Eru Manual. The technical information received from the Conservation Through Cultivation Unit was transformed into an illustrated manual, easy enough to be used by anyone who can read. It provides all information and advice needed by anyone who wants to begin an eru farm. The manual was designed in such a way that the farmers can contribute to its evaluation and review.

Below:
Activities about eru have been incorporated into the Limbe Botanic Garden Education Programme



Farmer training

In addition to the displays in the garden and the manual, community participation was encouraged by a free training workshop on the cultivation of eru. The workshop held at the garden's Visitor Centre lasted 6 days. It involved farmers from the Bimbia-Bonadikombo area, one of the Mount Cameroon Project's field divisions where the eru farm extension scheme is limited to for now.

The training was both theory and practice. The practical part took the participants through the different steps involved in the cultivation of eru. Participants had the opportunity of visiting and even planting the crop on farms in the Bimbia-Bonadikombo farmland area. The entire workshop was facilitated by staff of the Mount Cameroon Project; technical information was provided by the Conservation Through Cultivation Unit. The participants went through the following necessary activities: preparing plant material, selecting the right site, digging the hole, planting, staking, taking care of the plant and harvesting.

During the practical part of the workshop, three eru farms were set up in the Bimbia Bonadikombo area. For the farmers who participated at the workshop, they each had to construct their own propagators in their villages and carry on with the propagation of their own eru cuttings. After this, they will plant on their farms. At the end of the workshop, participants agreed on roles and responsibilities for joint monitoring with feedback and consultation happening every month.

Below: Tending eru plants at the Limbe Botanic Garden trial plot

**The next step**

After this workshop and considering the results that the first trial will give, the Eru Programme will extend to train other farmers in the Mount Cameroon Project area, the South West Province and, hopefully, other parts of Cameroon. This will depend largely on the availability of funds for this activity. Already the programme has caught the attention of the Minister of the Environment and Forestry and he has requested the Limbe Botanic Garden to set up a demonstration farm in a village in the Centre Province, about 500km from Limbe. This might be the beginning of the spread of the Limbe Botanic Garden Eru Project to other parts of the country.

Some Lessons Learnt**Benefit**

LBG studies and experience indicate that it is profitable to grow eru on one's farm. Not only does it provide easy access to the vegetable and eliminates the difficulties of going far into the forest for it, but it also presents impressive economic benefit. For an eru farm of 100 square metres, yielding an average of one kilogram per plant with each plant harvested three times a year, the following estimates were made for the benefit of workshop participants:

- Total expenditure for the different items (plant material, digging of holes and planting, staking, weeding and harvesting) will be CFA 70.000 F.
- Selling at CFA 400 F per kilogram, the farm will give 300kg x 400 F = CFA 120.000 F.
- Income from water leaf (a complementary vegetable which can be planted with eru in mixed cropping) will be CFA 60.000 F.
- The net benefit in the first year will be 120.000 F + 60.000 F – 70.000 F = 110.000 F.
- In the second year, the expenditure will drop to CFA 20.000 F and the net profit will be 180.000 F – 20.000 F = 160.000 F.

The ideal situation

To get participants for the farmer training workshop, LBG staff conducted a farm survey of the Bimbia-Bonadikombo forest area. On one of the farms, a woman, Rose Teke, was

practising in-situ cultivation of eru. When the forested area was transformed into farmland, she came across some eru plants which she left to grow, in their natural habitat. She nurtured them and spread the seed some of which actually germinated and grew. Though it takes approximately nine months for the seed of eru to germinate, this presents the ideal situation; unfortunately, cases like hers are rare.

The farm is about three hectares large, one third of which is estimated to be eru. She harvests the vegetable from her farm but she has never kept any records of what she harvests or how much income she gets. With the training she received at the workshop, she can easily increase the quantity of eru on her farm and monitor the income.

Eru and agro-forestry

The cultivation of eru, both in-situ and ex-situ, promotes agro-forestry. Because the plant needs shade to grow well, farmers are likely to either leave trees standing in their farms or plant new ones to provide the shade. They will also benefit by providing live stakes for the vines because they will not need to change them every season. All these are environmentally positive practices.

Collaboration

It is certain that the Limbe Botanic Garden has done a lot of research on eru and has arrived at some impressive conclusions. But there are still some information gaps in the domestication of eru which can be filled by farmers, especially with regard to the results to be obtained on the farms away from the garden. For this and for the sake of its extension programme, LBG needs to maintain a strong link with the farmers who are involved in the cultivation of the crop.

LBG has been involved in institutional partnerships which has been important in the eru extension programme. The garden has had to work with staff from the Cameroon Ministry of Agriculture for support in extension and socio-economists from a local World Bank (GEF) surveys unit to provide a grounding to the on-farm extension support.

Implications for LBG

The Limbe Botanic Garden until recently, has been research dominated with little experience in extension work. The field work is done by the Mount Cameroon Project staff who are not part of the Limbe Botanic Garden, though the work they do might be a direct result of Limbe Botanic Garden research. Garden staff have not been involved in extension work with local farmers. The Eru Project is the first instance where the Limbe Botanic Garden staff have been directly involved with extension activities. This has necessitated the shift of staff from MCP to LBG. The need has now been identified to recruit an agricultural extension worker.

The role of the Garden's Education Unit has also broadened to support the effective delivery/communication of extension messages to local farmers. The target audience of the unit has now increased to include the people whom the Conservation through Cultivation Programme is trying to reach. The unit, working closely with the agricultural extension worker, will design appropriate methods to communicate messages to farmers. This will include visual aids like posters and illustrated manuals (the current eru manual being the first), workshops and even documentaries on video.

The role of education and communication is very important at this point because, though a good number of people have heard of, or shown interest in, the cultivation of eru, many local people still consider it a vegetable that can only be got from the forest; not grown on farms. Environmental education should not end with simple information or sensitisation but should go on to provide the learner with skills necessary to take positive action for the environment. The Eru Project is doing just this.

The fact that LBG is getting directly involved in extension work will greatly improve its status with regard to the conservation work going on in the Mount Cameroon Region. The mission of the garden is to provide facilities and services for long term collaborative research, education and training in support of the biodiversity conservation

in the Mount Cameroon Region and beyond. The Eru Project is a step towards the fulfilment of this mission.

In addition to playing the conservation role, the garden will be actively involved in providing direct tangible benefits to farmer livelihoods and alleviating poverty beyond the garden walls. If the Eru Project becomes fully operational and is accepted by the people, it will be contributing to the economic growth of the area. Considering the high economic value and the ever-increasing demand for the vegetable, local farmers would better their livelihoods if they engaged in eru cultivation and trade.

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▲ Resumé

Eru est l'un des légumes le plus communément consommé au Cameroun. Il est riche en protéines et est prescrit comme médicament dans toute une série de troubles: pour la gorge, les nausées et comme antidote dans les cas d'empoisonnement par fleches. Cependant l'Eru est sérieusement menacé en raison de sa sur-exploitation. De grandes quantités sont exportées chaque semaine au Nigeria voisin et transitent de là vers l'Europe et les USA. Le jardin botanique de Limbe s'intéresse à la conservation de cette espèce et a été largement impliqué dans des programmes de recherche et a incité les communautés locales à cultiver l'Eru. Cet article détaille l'importance de l'espèce, les menaces qui pèsent sur elle et explique comment le jardin botanique de Limbe contribue à sa conservation, ceci grâce expositions et foires, l'utilisation de la radio locale et nationale, la mise en place de cultures d'essai, la formation des fermiers à la culture de l'Eru et la mise au point d'un manuel sur l'Eru.

● Resumen

El Eru es la hortaliza mas comida hoy en el Camerun. Es una importante fuente de proteínas y se utiliza medicinalmente para una gran gama de dolencias, incluyendo el dolor de garganta, las náuseas, y como antídoto al veneno de las flechas. Pero aun asi el eru está en peligro por razón de su sobre-explotación. Grandes cantidades son exportadas semanalmente a la vecina Nigeria y de este país a Europa y a los Estados Unidos. El Jardín Botánico de Limbe se interesa en la conservación de esta especie y se ha dedicado energéticamente a la investigación y a involucrar a la población local en el cultivo del Eru. Este artículo detalla la importancia del Eru y los peligros que le afrontan, y explica como el Jardín Botánico de Limbe contribuye a su conservación. Entre otras cosas se celebran exposiciones y ferias para fomentar el conocimiento público, se hace uso de las emisoras de radio locales y nacionales, se establecen zonas piloto para cultivar el Eru para el interés de los visitantes, se desarrolla la enseñanza a los granjeros sobre su cultivo y se esta preparando un manual del Eru.

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Below: LBG staff sorting eru leaves for sale in the Limbe market



Los Jardineros del Futuro

● Resumen

Desde 1986 el Real Jardín Botánico de Madrid, España, organiza un programa público para los jóvenes desempleados menores de 25 años, para ayudarles a conseguir cualificaciones y orientarles hacia las profesiones relacionadas con la restauración del medio ambiente. El programa se centra en la enseñanza de la jardinería, orientada hacia la poda de los árboles ornamentales y el mantenimiento de jardines. El trabajo educativo se extiende durante seis meses. A los estudiantes que completan este período con éxito, el Real Jardín Botánico les ofrece un contrato y los sigue entrenando durante seis meses más. El número de

estudiantes por curso es de treinta, y durante el año aprenden la teoría y la práctica de la jardinería. Se incluyen las visitas a otros parques y viveros para extender la visión de los participantes. Una vez que hayan finalizado, los estudiantes ya son capaces de emprender una carrera en la jardinería. La prueba del éxito de este programa ha sido demostrada en que el jardín ha producido más de 300 jardineros los cuales comprenden que un jardín botánico es algo más que un lugar donde crecen plantas.

En el Real Jardín Botánico de Madrid (España) se lleva a cabo, desde 1986, el proyecto Casas de Oficios, unos programas públicos de empleo-formación dirigidos a cualificar a

desempleados preferentemente jóvenes menores de veinticinco años, en especialidades y oficios relacionados con la rehabilitación del medio ambiente.

El Real Jardín Botánico de Madrid, que al año recibe cerca de 400 000 visitantes, decidió emprender este proyecto continuando con una labor en la que no han faltado nunca las iniciativas científicas y educativas. Fundado el 17 de octubre de 1755 por el rey Fernando VI a orillas del río Manzanares, su primera vocación fue la de cultivar colecciones de plantas españolas y exóticas que se traían de los viajes científicos e impartir clases de Botánica. Su actual ubicación, en el madrileño Paseo del Prado, junto al Museo del mismo nombre, se debe al rey Carlos III en 1774.

Desde entonces hasta hoy, el R.J.B., que en 1942 fue declarado Jardín Histórico-Artístico, cumple las funciones de centro científico (cuenta con los servicios de Documentación que aportan los Herbarios, la Biblioteca, el Archivo, el Semillero y la Colección de Plantas Vivas), conservacionista, educativo y cultural-recreativo.

Escuela de Jardinería es el nombre de la Casa de Oficios del Real Jardín Botánico, y nace a partir de los acuerdos y convenios suscritos entre dicha entidad, el Instituto Nacional de Empleo y el Fondo Social Europeo. El Programa Educativo que se desarrolla está centrado en la enseñanza de la jardinería, orientada la misma a la Poda de Árboles Ornamentales y al Mantenimiento de Jardines. La formación se imparte a partir de una enseñanza-aprendizaje basado en el conocimiento directo, didáctico y

La formación se imparte a partir de una enseñanza-aprendizaje basado en el conocimiento directo, didáctico y vivencial del oficio.



vivencial del oficio. Esta labor educativa tiene una duración de seis meses y, posteriormente, aquellos alumnos que superan esta fase continúan su formación a la vez que son contratados, trabajando en el Real Jardín Botánico. La duración de esta segunda fase es también de seis meses.

El número de alumnos por curso es de 30 y la clases comienzan desde cero, ya que muchos de los que vienen desconocen totalmente este mundo. De hecho, estos jóvenes aprenderán, no sin protagonizar alguna que otra anécdota, a arrancar las malas hierbas en lugar de las plantas cultivadas, a regar sin inundar los terrenos y crear riachuelos, o a utilizar adecuadamente las maquinarias sin romperlas.

Durante el año que dura la Escuela, se enseñan de manera teórica-práctica una gran variedad de módulos como los siguientes: Nociones de Botánica, Plantas Ornamentales, Manejo de Herramientas y Maquinaria, Preparación y Mantenimiento del Terreno, Poda de Árboles, etc. Además se realizan visitas a otros parques, escuelas y viveros con el fin de que los alumnos tengan la visión más amplia posible sobre la jardinería y puedan elaborar y contrastar sus conocimientos.

Una vez finalizado el curso, los alumnos son capaces de ejercer esta profesión. Como el oficio de jardinero es variadísimo, es evidente que un año de formación no es suficiente para conocer todos los secretos de la jardinería. No obstante, con interés y capacidad emprendedora, todos están en condiciones de ponerse a trabajar. Prueba de ello es que desde que funciona la Casa de Oficios del Real Jardín Botánico de Madrid se han formado 372 jardineros, la mayoría de los cuales trabajan como autónomos, en empresas relacionadas con este sector, han montado una empresa o una cooperativa entre varios alumnos, han logrado un puesto en Ayuntamientos, en el Real Jardín Botánico superando las pertinentes oposiciones, etc.

Durante el curso 98-99 se formaron 30 alumnos (12 chicas y 18 chicos), 23 en el módulo de Mantenimiento de Jardines y 7 en el de Poda de Árboles

Ornamentales, de los cuales 19 están trabajando en la actualidad, 5 de ellos en el mismo Real Jardín Botánico.

Las instalaciones del Real Jardín Botánico son el marco idóneo para que los alumnos tengan un aprendizaje perfecto; están en contacto con una gran variedad de plantas, conviven con jardineros profesionales del Jardín, que con su ejemplo y apoyo enseñan, y al ser un espacio histórico exige un trabajo minucioso con múltiples quehaceres para su conservación. Permite que los futuros jardineros sientan que el jardín es algo más que un lugar donde hay plantas, o una obra de arte y de lujo. Lo considerarán una necesidad social con la que se consigue mantener el equilibrio medioambiental en las ciudades, creando un lugar para el disfrute y la tranquilidad.

La experiencia que vive el Real Jardín Botánico de Madrid con la "Escuela de Jardinería" es sumamente enriquecedora, al enseñar a los jóvenes a cuidar su entorno y trabajar por él.

■ Summary

Since 1986, The Royal Botanic Garden of Madrid, Spain has run a public programme for unemployed youth, younger than 25 years of age, to help qualify and direct them into professions related to the rehabilitation of the environment. The Programme centres on the teaching of gardening, orientated towards the pruning of ornamental trees and the maintenance of gardens. The educational work lasts six months and for those students that successfully complete this phase, the Royal Botanic Garden contracts and trains them for a further six months. The number of students on each course is 30 and during the year they learn about the theory and practice of gardening. This includes visits to other parks and nurseries in order to widen their vision. Once they have finished, the students are capable of taking up a gardening profession. The proof of this programme has been the fact that the Garden has turned out over 300 gardeners with an understanding that a botanic garden is something more than just a place to grow plants.



Uno de los módulos que enseñan durante el curso es como podar los árboles ornamentales

▲ Resumé

Depuis 1986, le jardin botanique royal de Madrid, en Espagne, a lancé un programme destiné aux jeunes de moins de 25 ans sans emploi pour les aider à acquérir une qualification et les diriger vers des professions liées à la réhabilitation de l'environnement. Le programme est basé sur des cours de jardinage, la taille des arbres ornementaux et l'entretien des jardins. Les cours durent 6 mois et les étudiants qui ont passé cette phase avec succès, ont un contrat et un stage de six mois supplémentaires au jardin botanique royal de Madrid. Le nombre d'étudiants est de 30 et pendant l'année ils apprennent la théorie et la pratique du jardinage. Cette formation inclue également des visites dans d'autres parcs et pépinières pour leur permettre de compléter leur apprentissage. A la fin de ce stage les étudiants sont capables de débiter un emploi de jardinier. Le résultat positif de ce programme est que le jardin botanique royal de Madrid a formé 300 jardiniers qui ont acquis la certitude qu'un jardin botanique est un peu plus qu'un lieu où l'on cultive des plantes.

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Des Jeux et Des Festivals Pour Impliquer les Enfants à l'Éducation à l'Environnement

Los Juegos y los Festivales Como Método Para Entusiasmar a los Escolares en la Educación Medio-ambiental

Games and Festivals

as a Way to Engage School Children in Environmental Education

Right: While engaging in the Robinson Island game children explore the world of plants

■ Summary

A few years ago a special education programme for enhanced school curricula was elaborated in the Moscow University Botanic Garden under the sponsorship of BP (British Petroleum). Part of this programme includes the Apothecaries' Garden Day Festival, which is organized annually in spring at the end of the school year, to broaden the public's and school awareness of the garden's educational potential, promote knowledge about the diversity of the plant kingdom and excite children to learn more about plants and nature. The latest of such festivals was held in May 2000 with more than 500 school children participating. The following article describes one of the environmental games played during the day, called the Robinson's Island, so called because for most schoolchildren this was their first visit to the garden. As a result, they found themselves in a situation similar to that of Robinson Crusoe (the hero of the Daniel Defoe's book) on an uninhabited island surrounded by unknown plants.

Below: Education Officer, Alla Andreeva, conducts games, festivals and activities that enhance the school curricula and promote biodiversity through the support of BP

Background

The Moscow University Botanic Garden, originally known as the Apothecary Garden, was founded in 1706 and is the country's oldest institution of its kind. The garden was first set up for raising medicinal plants and teaching plant science to doctors. Thus, from its earliest years the garden has been an important centre for education. From 1805 to date the garden has belonged to the Moscow University and from that time onwards, regular lectures and guided tours for the general public, and those curious about plants, have been organised in the garden.

Almost 300 years has passed since the foundation of the garden. The times have changed and every period of Russian and Moscow history has been followed by changes in the garden; not only in its appearance, but also in the aims and tasks, including education. Currently the garden is undergoing renovation and simultaneously its policies are being revised.

Environmental education is becoming one of the most important directions in the garden's renewed strategic development programme. A few years ago a special education programme for enhanced school curricula was elaborated in the garden under the sponsorship of BP.

Games and Festivals

In order to broaden public and school's awareness of the garden's education programme, involve schoolchildren in the environmental education activities, as well as enhance the garden's



educational potential, garden staff organise annual cognitive games and festivals. Once in a year there is an Apothecary Garden Day. The aims of this event are to:

- encourage a wide number of schools to visit the garden
- present the environmental education programme to schoolchildren and teachers and involve them in it
- present the garden and its plant collections
- promote knowledge about diversity of plant kingdom and the economic and cultural importance of plants in our lives
- excite children to learn more about plants and nature.

This event is rather significant in the garden's yearly calendar. The festival takes place at the end of the school year, in spring, when the garden collections are looking their best. Hundreds of schoolchildren, many scientists, journalists, the mass media (TV and radio), as well as the sponsor representatives, are invited to the event. State and city officials, and representatives of various NGOs also participate. This results in the popularisation of the garden,



its history and activities including the environmental education programme (EEP).

The most recent of such festivals was held in May 2000 in close cooperation with the members of the Young Ecologist Club (YEC), who work in the garden. During the festival the invited school children were engaged in an environmental game called *Robinson's Island*.

Why? Firstly, staff believe that the game is one of the best ways to involve many children in an active exploration of plants and the botanic garden. Secondly, because Robinson Crusoe is a fable that children can relate to because most of the school children have come to the garden for the first time and they find themselves in a similar situation to that of Robinson (the hero of the Daniel Defoe's book) on an uninhabited island, surrounded by unknown plants. The game Robinson's Island could be set up in any botanic garden and is described below:

Robinson's Island

The Moscow University Botanic Garden became Robinson's Island. According to this imaginative situation the regulations, aims, terms and principles of the game were developed and described in a special leaflet called The Plan of Robinson's Island (in fact it was the plan of the garden's arboretum, where the garden's botanical attractions and features, as well as ways to find them, were highlighted). Next to the plan a description of the game with its terms and regulations was included. For the game the garden was carefully prepared. How was this done?

Members of the Young Ecologist's Club (YEC) investigated the garden's arboretum to locate the most interesting plants. Involvement of the club members had the added value that the Young Ecologists learnt more about these plants themselves. Their choice of plants was based on several criteria including: it must have been interesting from different points of view; be of economical or medical significance; or to be useful to Robinson's life on the island.

The members of the YEC collected different information about trees, shrubs and perennials, growing in the garden and on the basis of this wrote the game's 'prompt messages'.

Two alternative itineraries were developed and clearly marked in the garden with arrows: the first route was called *Pathfinder's Way* and the second entitled *The Robinson's Way*. The 'prompt messages' included plant information which could help the

children during the game. The messages were laminated and put discreetly beside the plants. This made the game more interesting because initially the participants had to find the labels with prompt messages, then read them and record on the game leaflet the information which might be useful for Robinson if he was present.

The game leaflet contained the following information:

Dear Children!

We are happy, that you have come today to our botanic garden, and we invite you to participate in the game, which is called The Robinson's Island.

We hope that you have also read the famous book about Robinson Crusoe or have heard about him and his adventures.

Please imagine, that

- **Our botanic garden is a little island, where you may find different plants and, perhaps, many of them being unknown to you before.**
- **People have used some of these plants for ages, but maybe in the future we will know much more about their properties in medicine and in other aspects of life.**
- **Try to be attentive and observant and find on your way both familiar and unfamiliar trees, shrubs and perennials, which may be useful for Robinson in his life on the island.**
- **Learn about the plants, using the garden's information labels and our 'prompt messages', which you can find here and there.**
- **During your investigations of this island, please, fill in this leaflet and leave your messages for Robinson on the Island Plan. Indicate your itinerary and the sites of plants on your plan which could be used by Robinson during his life on the Island.**

Attention! Please keep only your itinerary and don't leave the tracks.

**Good luck.
Meet you at the finish!**

40

Right: The media supports the annual Apothecary Garden day where the economic and cultural importance of plants is promoted

More than 500 children from Moscow schools took part in the 2000 Festival and all left the gardens with a souvenir of their visit. The botanic garden staff had prepared a school timetable (with photos taken during the Young Ecologist Club lessons), a special calendar, a neckerchief (with the logos of the botanic garden and the sponsor) and a pocket of seeds for souvenirs and the children were happy to receive these.

To summarise, the necessary conditions for a successful game:

1. The most important thing is the organisation of the garden's space for the game.
2. The game must have special rules and regulations.
3. The game has to include the elements of imagination (a famous fable) and to be cognitive.
4. Don't forget about some nice souvenirs for the children!

This event was an effective way to advertise the garden's developing education programmes. Thanks to the event, in the new school year many school children were involved in

Right: While engaging in the Robinson Island game children explore the world of plants



different environmental educational activities in the garden. It also provided publicity for the sponsor, BP, which supports the garden's educational programmes. Another important outcome of the event was the increased understanding among the state and city officials, which is very helpful for the further development and promotion of the programme.

▲ Resumé

Il y a quelques années, un programme pédagogique spécifique pour les classes de niveau supérieur a été élaboré au jardin botanique de l'Université de Moscou sous le patronage de British Petroleum (BP). Une partie de ce programme englobait le Festival du Jardin des Apothicaires, une manifestation d'une journée organisée chaque année au printemps à la fin de l'année scolaire. Le but de ce festival est de sensibiliser le public et les scolaires au potentiel pédagogique du jardin, de promouvoir les connaissances sur la diversité du règne végétal et d'inciter les enfants à en savoir plus sur le monde des plantes et la nature. La dernière manifestation de ce festival a eu lieu en mai 2000 et plus de 500 élèves y ont participé. L'article décrit l'un des jeux utilisés, l'île de Robinson, ainsi nommé car beaucoup d'enfants découvraient le jardin pour la première fois. Ainsi les enfants se sont retrouvés dans la situation de Robinson Crusoe (le héros du livre de Daniel Defoe) sur un île déserte entourés de plantes inconnues.

● Resúmen

Algunos años atrás fue elaborado en el Jardín Botánico de la Universidad de Moscú bajo el patrocinio de la BP (British Petroleum) un programa educativo especial para los currículos escolares especializados. El programa incluye el *Apothecaries' Garden Day Festival* (el Día Festivo del Jardín del Apotecario), organizado cada fin de curso en la primavera para ampliar la concienciación del público y de los colegios sobre el potencial educativo del Jardín, promover el conocimiento de la diversidad del reino de las plantas y entusiasmar a los niños a



aprender más sobre las plantas y la naturaleza. El más reciente de estos festivales fue en mayo del 2000, en el cual participaron mas de 500 escolares. El artículo que sigue describe uno de los juegos medio-ambientales que se jugaron durante ese día, llamado *La Isla de Robinson*, nombre que fue dado porque para la mayoría de los niños era la primera visita al Jardín. Así que se encontraban en un a situación semejante a la de Robinson Crusoe (el héroe del libro de Daniel Defoe), en una isla deshabitada rodeados de plantas desconocidas.

If you decide to undertake something similar please do not hesitate to contact Alla.

Alla Andreeva is the Coordinator of Educational Programmes at the Moscow University Botanic Garden; Prospect Mira 26, 129090, Moscow, Russia. Tel/Fax: (7) 95 280 6765 / (7) 95 280 7222 E-mail: edu-bgmu@mtu-net.ru

Nuevos Enfoques Para La Alimentación: La Experiencia Del Eco-Restorán

Nouvelle Perspective: La Création d'un Eco-Restaurant

Este breve artículo plantea la filosofía detrás de la creación del Eco-restaurante en el Jardín Botánico Nacional de Cuba. Se propone utilizar solo productos orgánicos para mandar un fuerte mensaje al consumidor sobre la importancia de nuestra salud y de la salud del planeta. Las plantas utilizadas en el Eco-restaurante son cultivadas en los jardines culinarios del Jardín Botánico Nacional, compradas en los mercados locales, y recolectadas en el campo y en los bosques del Jardín. El restaurante también utiliza hornos solares y la miel de las colmenas del Jardín para demostrar el uso de la energía renovable y del ciclo de la energía. El resultado final es de una mesa que demuestra la diversidad botánica de Cuba y del mundo.

El cuidado de la naturaleza, la necesidad de utilizar óptimamente sus recursos y la constante preocupación de la sociedad cubana por sentar hábitos y estilos sanos de vida, han sido las principales motivaciones de la creación y funcionamiento del Restorán Ecológico del Jardín Botánico Nacional de Cuba.

Ubicado en el apacible entorno del Jardín Japonés, durante sus casi 10 años de vida, ha logrado mostrar a los visitantes un patrón de menú que promueve el uso de productos naturales de origen vegetal.

De esta forma, utilizando las plantas cultivadas en los huertos del propio Jardín Botánico Nacional, o adquiridas en el mercado, así como también las silvestres y las frutas pertenecientes a la amplia colección del bosque del Jardín, se ha diseñado una oferta atractiva, natural y con un fuerte mensaje de salud para los consumidores. Los cultivos orgánicos que aquí se desarrollan, la lombricultura para la obtención de un fertilizante biológico, la utilización de

hornos solares como ejemplo del empleo de fuentes renovables de energía y el uso de la miel de abeja de sus apiarios, constituyen elementos que se integran en un ciclo perfectamente armónico y sostenible.

El resultado final es una mesa que muestra la amplia diversidad botánica de Cuba y del Mundo, donde se combinan recetas tradicionales de la cocina cubana y de otras regiones del planeta, junto a platos poco comunes, como es el caso de las flores y de las plantas silvestres hoy día marginadas por la agroindustria.

El acercamiento respetuoso hacia las riquezas de la naturaleza y el afán de usar con sabiduría y sostenibilidad los innumerables recursos de nuestra tierra, ha propiciado que este proyecto se desarrolle de forma equilibrada y que sea cada vez más creciente la aceptación de esta propuesta, que ha incluido el uso de cientos de especies vegetales en su oferta.

En un recorrido por sus áreas, junto a la degustación de sus exquisitos platos, se percibe una comunión solidaria con el entorno, que deja una impronta valiosa y un modelo a seguir en el propósito de elevar la calidad de vida de nuestros ciudadanos. No vale violentar las leyes naturales, simplemente ser fieles defensores de una ética que está llamada a imponerse en este nuevo milenio y que debe establecerse en nuestro comportamiento individual y social, si queremos hacer perdurable la vida de nuestro querido planeta y de sus habitantes.

**Madelaine Vázquez, Ingeniera
Técnicóloga en Tecnología y
Organización de la Alimentación
Social y Manager Eco Restorán
Jardín Botánico Nacional Cuba
Carretera del Rocío, Km 3.5
Calabazar, Boyeros Havana
Cuba Email: hajb@ceniai.inf.c**



Left: Kitchen gardens for the Eco-Restaurant

■ Summary

This brief article outlines the philosophy behind the establishment of the Eco-Restaurant at the National Botanic Garden of Cuba. The aim is to use only organic produce in order to promote a strong message to the consumer about the importance of our health and the health of the planet. The plants used in the Eco-Restaurant are cultivated in the kitchen gardens of the National Botanic Garden, bought from local markets and collected from the wild and the garden's forests. The Restaurant also uses solar ovens and honey from the garden's beehives to demonstrate the use of renewable energy as well as the cycle of energy. The final result is a table that demonstrates the botanical diversity of Cuba and the World.

▲ Résumé

Ce court article présente la philosophie qui a présidé à l'installation d'un Eco-Restaurant au jardin botanique national de Cuba. Le but est d'utiliser des exclusivement des produits biologiques pour faire passer au consommateur un message fort concernant l'importance de la santé mais aussi de la santé de la planète. Les plantes utilisées dans l'Eco-Restaurant sont cultivées dans le jardin potager du jardin botanique national de Cuba, achetées sur les marchés locaux ou récoltées dans la nature ou dans les forêts du jardin botanique. Le restaurant utilise également des fours à énergie solaire et le miel du jardin pour démontrer l'utilisation des énergies renouvelables ainsi que le cycle de l'énergie. Le résultat final: une table qui démontre la diversité botanique de Cuba et du monde.



Sowing and Harvesting

■ Introduction

Here we present the second part of the simulation game Sowing and Harvesting that appeared in Roots

22. The game allows children, aged 7-11 years of age, to experience some of the challenges faced by farmers in many parts of the world. In the first part of the game a market is set up and children are divided into groups of farmers to produce cash and food crops which they then sell at the market. After 15

minutes the first year of farming and trading is over and groups are required to pay taxes for water, schooling, hospitals and other services. Children then assess the first year.

In the second part of the activity (Year 2) groups continue to produce crops. Price changes are introduced and these are found to have a significant effect on the amount of cash crops produced. Chance cards are introduced to provoke challenging situations. When year two finishes, taxes are collected and the children assess the year looking at issues such as whether food aid actually helps farmers in the long term.

Section D: Year Two

Time needed: 15 minutes

What to do

Display the enlarged 'Price list: year two', and explain the price changes. Scissors and pencils are imported from overseas. Inflation means that they are now more expensive for farmers. The government wants farmers to grow cash crops because it wants to

sell more to other countries (export). So it has provided money to subsidise the red squares and templates. They are now cheaper for farmers.

Using what resources they have left, groups embark on year two.

Control the market cash crop price strictly. After about five minutes, some cash crops could bring in very little money indeed or the market could even refuse to buy some. The reason for this would be that the crop is being bought more cheaply from another part of the world.

Select the 'chance' cards you want to use for year two, adding them to those you wish to repeat from year one. Introduce them to the groups as before.

After about fifteen minutes, announce that the year is over.

Note for teachers

With younger children you may want to repeat year one 'chance' cards only. If you want to introduce other factors, you can write your own 'chance' cards.

Variation on Year Two

Collect all the templates after year one, except from those who received food aid and are now engaged in enforced cash-crop production. Players then have to rent land back (i.e. buy fresh templates) in order to start year two.

Explanation

Land ownership is a major problem for many farmers around the world. In Bangladesh, for example, rich landlords own acres of land which are leased out to landless farmers annually at great profit.

Section E: Assessing the Second Year's Farming

Time needed: 20 minutes (or longer if you have time)

What to do

Throw away any unfinished crops.

Collect food cut-out shapes as in year one. Again, groups without enough food should trade with groups that have extra. Any groups still short will have to leave their land for refugee camps. Give them the required food shapes and collect any templates they may have, as they have lost all their land.

Deduct money for taxes and services as in year one, but allowing for inflation. This time take between eight and twelve units per group. Through discussion, take stock of the situation.

Who has done well and who hasn't? Why? Did those who worked harder do better? If you received food aid did it help in the long term? Could you have been helped to survive better? What do you think you would do in year three? Do you have any choice? How well did you work as groups? Was there a difference between what the girls and boys did?

Chance cards: year one

Your tractor has broken and you have no spare parts.

Lose a pair of scissors.

Your cousins lend you their scythe to help you with the harvest.

Collect an extra free pair of scissors.

The work has been completed on draining the swamp near the river. You now have an extra field for cash crops.
Collect a free red cash crop template.

Your plough has broken and you have no spare parts.
Lose a pencil.

Potato blight has hit your area.
Lose all your cut-out potato shapes.

The local schoolteacher's goats have got into one of your fields and eaten some of your food crops.
Lose two of your cut-out green food crops.

Your government demands that you produce more cash crops or have your land forcibly removed. (More exports are needed to pay debts).
Exchange one food crop template for a cash crop template.

Too much rain.
In order to make money you have been growing your cash crops on your best land, and your food on poor hillside. This year the extra heavy rains have washed away the extra heavy rains have washed away the dusty hillside topsoil.
Your cash crops are fine, but you lose half your entire food harvest.

Chance cards: year two

If these cards are too difficult for your group, just use the chance cards from year one.

Oil prices have risen sharply. You can't afford the petrol to get your cash crops to market.
Lose all the red cut-out crops you have at the moment.

Your neighbours have sprayed their root crops with a defoliant (to make the leaves die down so that they can use a mechanical harvester). Unfortunately, this has blown onto your corn.
Lose half your corn harvest.

Cash crops are not doing too well on your poor soil. You need extra fertilisers.
Pay five units of money to the market.

Your equipment has broken and you have no spare parts.
Lose a pair of scissors.

Too little rain.
In order to make money you have been growing your cash crops on your best irrigated land. Your food is growing on your less fertile marginal land. This year the rains haven't been too good.
Your cash crops are fine, but you lose half your entire food harvest.

A government official, wanting to encourage cash crop production, has visited and given you some free cash crop seeds
Collect four squares of red paper from the market.

▲ Resumé

Nous présentons ici la deuxième partie du jeu de simulation 'Semer et récolter' qui a été décrit dans Roots n°22. Le jeu permet à des enfants de 7 à 11 ans d'expérimenter quelques-uns des challenges que rencontrent les fermiers dans plusieurs régions du monde. Dans la première partie du jeu, un marché est installé et les enfants sont divisées en groupes de fermiers devant produire des denrées alimentaires qu'ils doivent ensuite vendre au marché. Au bout de 15 minutes, la première année de culture et de vente est terminée et les groupes doivent alors payer des taxes pour l'eau, les écoles, les hôpitaux et autres services publics. Les enfants évaluent alors cette première année.

Dans la seconde partie du jeu, (année 2) les groupes continuent à produire des denrées. Des changements de prix sont introduits et ceux-ci ont un effet significatif sur la quantité de cultures produites. Des cartes de chance sont alors introduites pour stimuler le jeu. A la fin de la deuxième année, les impôts sont collectés et les enfants évaluent l'année écoulée, en regardant certaines questions telle que de savoir si les aides à la production aident réellement les fermiers sur le long terme.

● Resúmen

Aquí presentamos la segunda parte del juego de simulación sembrando y cosechando que se publicó en Roots 22. El juego permite que los niños, de 7 a 11 años de edad, conozcan por sí mismos algunos de los problemas con que se enfrentan los granjeros en

muchas partes del mundo. El la primera parte del juego se monta un mercado y los niños se dividen en grupos de granjeros que producen cultivos comerciales y alimenticios que luego venden el el mercado. Después de 15 minutos ha pasado el primer año de cultivo y comercio y los grupos deben pagar impuestos por el agua, la educación, los hospitales y otros servicios. Los niños entonces valoran el primer año.

En la segunda parte de la actividad (el segundo año) los grupos siguen generando productos. Se introducen cambios en los precios y se ve que estos tienen un efecto significativo en la cantidad de productos comerciales que se cultivan. Se introducen cartas de azar para provocar situaciones estimulantes. Cuando finaliza el segundo año, se recogen los impuestos y los niños valoran el año discutiendo tales temas como si las subvenciones a los productos alimenticios en realidad le ayudan a los granjeros a largo plazo.

BGCI is very grateful to Oxfam GB for their permission to reproduce this simulation game. Oxfam GB is a development, relief, and campaigning organisation dedicated to finding lasting solutions to poverty and suffering around the world.

Oxfam produces an annual education catalogue which contains over 400 items (photo packs, video packs, books, posters, maps, CDRoMs, etc) selected on quality criteria to support teaching about development issues, global citizenship and sustainable development and livelihoods. It sets out to be a 'one stop shop' for teachers, curriculum advisers and others working in education and with young people, bringing together the best materials from ngos, Development Education Centres, intergovernmental and international organisations, and from commercial publishers.

Oxfam holds stock of all the items and can supply, on a single order, teaching materials from diverse sources. For a copy of the current Oxfam Education Resources for Schools Catalogue write to Oxfam Publishing, 274 Banbury Road, Oxford OX2 7DZ, U.K.
Tel: (44) 1865 311311
Email: publish@oxfam.org.uk
Web site: <http://www.oxfam.org.uk>

Resources

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■ Resources

The Chocolate Game

Leeds Development Education Centre, 153 Cardigan Road, Leeds LS6 1JL, U.K.

Tel: (44) 113 380 5655

Fax: (44) 113 2935444 Email: resources@leedsdec.demon.co.uk

Price: £4.25 plus £1.45 postage and packaging (U.K.)

The Chocolate Game is a role play activity based on the global cocoa trade. Aimed at 11 year olds to adults, the game and is suitable for a group of 18-50 players and takes between 60-90 minutes to run. The game involves nine groups representing families involved in the international chocolate industry from four countries; Ghana, Belize, Brazil and the UK. Each group is provided with information about themselves and their situation. Activities are designed to help them find out how their lives are interlinked through the economic systems governing the trade they depend on for their livelihoods. Issues dealt with include justice, inequality, wealth, poverty and power. The game looks at the fact that the global distribution of wealth does not operate simply as Rich = First World, Poor = Third World, but that there are rich and poor in North and South. It also looks at the opportunity that fair trade offers to consumers and producers alike to contribute to a fairer world system.

The Rainforest Supermarket Game
University of Oxford Botanic Garden, Rose Lane, Oxford OX1 4AZ, U.K.

Tel: (44) 1865 286690

Fax: (44) 1865 286693 Email: postmaster@botanic-garden.ox.ac.uk

The Rainforest Supermarket Game has been designed for families visiting the newly re-designed Palm House at the University of Oxford Botanic Garden. The game consists of an A4 sized card

▲ Disponibles

Le Jeu du Chocolat

Leeds Development Education Centre, 153 Cardigan Road, Leeds LS66 1JL, Royaume-Uni.

Tél: (44) 113 380 5655

Fax : (44) 113 2935444 Email: resources@leedsdec.demon.co.uk

Prix: 4.25£ + £1.25 p&p (pour R.U.)

Le Jeu du Chocolat est un jeu de rôle basé sur le marché mondial du cacao. Destiné aux plus de 11 ans et aux adultes, le jeu peut admettre 18 à 50 joueurs et une partie dure entre 60 et 90 minutes. Neuf groupes de joueurs représentent des familles de l'industrie du chocolat, appartenant à quatre pays: Ghana, Belize, Brésil et Royaume-Uni. Chaque groupe est informé sur sa situation. Des activités leurs sont assignées et leur permettent de comprendre comment leurs existences sont impliquées dans les systèmes économiques régissant le marché dont ils dépendent pour leur subsistance. Les problèmes proposés concernent la justice, les inégalités, la richesse, la pauvreté et le pouvoir. Le jeu montre en particulier que la répartition globale de la richesse dépasse la simple alternative: Riches = Monde développé, Pauvres = Tiers Monde et qu'il y a des pauvres et des riches au Nord et au Sud. Il donne aussi l'occasion de montrer que les marchés plus loyaux entre consommateurs aussi bien que producteurs contribuent à un système global plus honnête.

Le Jeu du Supermarché de la Forêt Pluviale

University of Oxford Botanic Garden, Rose Lane, Oxford OX1 4AZ, Royaume-Uni. Tél: (44) 1865 286690
Fax: (44) 1865 286693 Email : postmaster@botanic-garden.ox.ac.uk

Le Jeu du Supermarché de la Forêt Pluviale a été conçu pour les familles qui visitent à serre aux Palmiers nouvellement

● Recursos



El Juego del Chocolate
Leeds Development Education Centre, 153 Cardigan Road, Leeds LS6 1JL, U.K.

Tel: (44) 113 380 5655

Fax: (44) 113 2935444 Email: resources@leedsdec.demon.co.uk

Precio: £4.25 + £1.25 p&p (para U.K.)

El juego del chocolate es un juego basado en el comercio global de la cocoa. Destinado para niños desde 11 años de edad hasta adultos, el juego es adecuado para un grupo de 18-50 jugadores y toma entre 60-90 minutos. El juego involucra nueve grupos representando familias involucradas en la industria internacional del chocolate de cuatro países; Ghana, Belize, Brazil y Reino Unido. Cada grupo es provisto con la información acerca de ellos mismos y su situación. Las actividades

Resources

Disponibles

Recursos

45



folded into three, which contains information on how to play the game, clues, and a number of facts about rainforests. Accompanying the card are 12 self-adhesive pictures of products derived from the rainforest. The aim of the game is for players to walk through the glasshouse, read the clues and find the plant which produces each item drawn on the sticky labels. When players have found the plant they stick the label next to the corresponding clue. A simple yet effective way to entertain and educate the whole family!

Sterling, Stephen (2001)
Sustainable Education: Re-visioning Learning and Change. Schumacher Briefings No 6 Green Books for the Schumacher Society.
 ISBN 1 870098 99 4
 Green Books Ltd., Foxhole, Dartington, Totnes, Devon TQ9 6EB, U.K.
 Email: sales@greenbooks.co.uk
 Price: £5.00/copy

The Schumacher Briefings are booklets on key issues of our time. In this Briefing, Stephen Sterling points out that:

- Progress towards a more sustainable future critically depends on learning, yet most education and learning take no account of sustainability.

refaite, au jardin botanique de l'Université d'Oxford. Le jeu comprend un plateau, réplé en 3 parties au format A4, comprenant les règles, des indices et un certain nombre de données sur les forêts pluviales. Douze images adhésives représentant des produits de la forêt pluviale accompagnent le plateau de jeu. Le but du jeu est de lire les indices tout au long de la visite dans la serre et de trouver quelle plante produit ce qui est représenté sur les images. Lorsque les joueurs ont trouvé la bonne plante, ils posent l'image sur l'indice correspondant sur le plateau. Une manière simple mais efficace pour amuser en éduquant toute la famille!

Sterling, Stephen (2001)
L'Éducation Durable: Un Apprentissage à Revoir et à Changer. Schumacher Briefings N°6 Les Green Books de la Schumacher Society, 2001-10-02 ISBN 1 870098 99 4
 Green Books Ltd, Foxhole, Dartington, Totnes, Devon TQ9 6EB, Royaume-Uni
 Email : sales@greenbooks.co.uk
 Prix : 5.00£

Les Schumacher Briefings sont des livrets sur les problèmes majeurs de notre époque. Dans ce Briefing, Stephen Sterling souligne les points suivants:

son diseñadas para ayudarlos a encontrar como sus vidas estan entrelazadas a través de los sistemas económicos gobernando el comercio del que ellos dependen para su subsistencia. Entre los temas abordados se incluyen la justicia, desigualdad, salud, pobreza y poder. El juego busca en el hecho de que la distribución global del bienestar no opera simplemente como Ricos+Primer mundo, Pobres+Tercer mundo, sino que hay ricos y pobres en el Norte y en el Sur. Este además busca la oportunidad que el comercio justo ofrece igual forma a los consumidores y productores contribuyendo, a un sistema mundial mas justo.

El Juego del Supermercado del Bosque Tropical Lluvioso
 University of Oxford Botanic Garden,
 Rose Lane, Oxford OX1 4AZ, U.K.
 Tel: (44) 1865 286690
 Fax: (44) 1865 286693 Email:
postmaster@botanic-garden.ox.ac.uk

El juego del Supermercado del Bosque tropical lluvioso ha sido diseñado para familias que visitan la nueva rediseñada Casa de la Palma en el Jardín Botánico de la Universidad de Oxford. El juego consiste de una carpeta tamaño A4 doblado en tres, que contiene información sobre como jugar el juego, pistas y un número de hechos acerca del bosque tropical lluvioso. Acompañando las tarjetas hay 12 pinturas autoadhesivas de productos derivados del bosque tropical. El objetivo del juego es que los jugadores caminen a través del invernadero, lean las pistas y encuentren las plantas que producen cada artículo dibujado sobre etiquetas adheribles. Cuando el jugador ha encontrado las plantas pega la etiqueta cerca de la próxima pista. Una forma simple y efectiva para entretener y educar a toda la familia.

Sterling, Stephen (2001)
Educación Sustentable: Re-visionando su Aprendizaje y Cambio. Schumacher Briefings No 6 Green Books for the Schumacher Society.
 ISBN 1 870098 99 4
 Green Books Ltd., Foxhole, Dartington, Totnes, Devon TQ9 6EB, U.K.
 Email: greenbooks@gn.apc.org
 Precio: £5.00

■ Resources

- The reorientation of education towards sustainable development since the Agenda 21 agreement of 1992 has been very slow.
- Education is largely behind other fields in developing new thinking and practice in response to the challenge of sustainability.

The Briefing argues that an ecological view of educational theory, practice and policy is necessary to assist the sustainability transition. It then shows how 'sustainable education' can lead to transformative learning. It ends with a discussion of change strategies, and includes action suggestions for both policymakers and practitioners. An inspirational read for botanic garden educators concerned with education for sustainability.

Cape Flats Floral Treasures: A Teachers' Guide to Active Learning in Cape Town Schools
A project of the Botanical Society of South Africa and the Environmental Management Department, City of Cape Town: CMC Administration
Available from: The Botanical Society of South Africa, Private Bag X10, Claremont, 7735 South Africa.
Tel: (27) 21 762 1621 Email: kbranch@botanicalsociety.org.za
Price: Teachers' guide 20 Rand, poster 15 Rand

The Cape Flats Flora, South Africa, is rich, unique and highly threatened. As a result of a public awareness programme to draw attention to the Core Flora Conservation Sites, the above educational poster and teachers' guide have been developed. The aim of this resource is to inform schools about the issues facing the Cape Flats Flora. The guide provides comprehensive information, maps and project ideas to encourage teachers and learners to investigate the issues and take action to address them. It was developed with input from a large number of local teachers and as a result contains activities for a wide range of ages: role plays, puzzles, field trip ideas, interviews, newspaper articles and even a recipe. Garden design tips and lists of hardy indigenous plants are provided to encourage the development of water-wise school gardens that can function as 'mini

▲ Disponibles

- La marche vers un futur durable dépend fortement de l'éducation, qui ne tient pas encore suffisamment compte du développement durable.
- La réorientation de l'éducation vers le développement durable depuis l'Agenda 21 de 1992 est encore trop lente.
- L'éducation est encore largement à la remorque d'autres secteurs innovants en matière de conception et de mise en œuvre, par rapport aux enjeux du développement durable.

Les Briefings soutiennent qu'une vision écologique des théories éducatives et leur mise en pratique sont nécessaires à une évolution durable. Ils montrent ensuite comment «l'éducation durable» peut déboucher. Ils concluent enfin par un débat sur les stratégies de changement, notamment sur les suggestions à proposer aux législateurs et aux acteurs. Une lecture riche d'idées pour les éducateurs des jardins botaniques sensibles au développement durable.

Les Trésors Floristiques des Cape Flats: Un guide Pédagogique Actif Pour les écoles du Cap
Un Projet de la Botanical Society of South Africa et de l'Environmental Management Department, ville du Cap: CMC Administration
Commandes: The Botanical Society of South Africa, Private Bag X10, Claremont, 7735 South Africa
Tél: (27) 21 762 1621 Email: kbranch@botanicalsociety.org.za
Prix: 20 Rand pour le guide, 15 Rand pour le poster

La flore des Cape Flats en Afrique du Sud est riche, unique et très menacée. Le guide et le poster ont été élaborés à la suite d'un programme de sensibilisation aux sites botaniques importants à protéger (Core Flora Conservation Sites). L'objectif de cet outil est d'informer les écoliers sur les problèmes posés par la flore des Cape Flats. Le guide propose une information complète, des cartes et des idées de projets encourageant les éducateurs à se pencher sur les problèmes à les résoudre. De nombreux enseignants locaux ont contribué à ce travail qui propose ainsi des activités à différentes tranches d'âge: jeux de rôles, puzzles, des idées d'excursions,

● Recursos

Los Breviarios Schumacher son librillos sobre temas claves de nuestro tiempos. En este breviario, Stephen Sterling señala que:

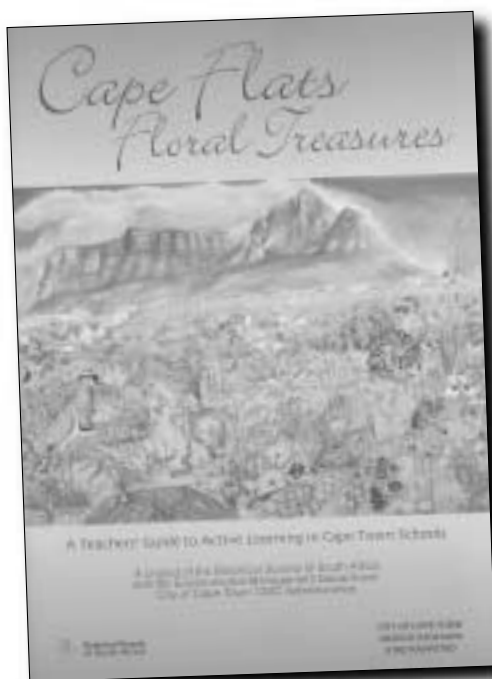
- Los progresos hacia un futuro sustentable depende críticamente del aprendizaje, a pesar de que la mayor parte de la educación y aprendizaje no toma en cuenta la sustentabilidad.
- La reorientación de la educación hacia el desarrollo sostenible desde la Agenda 21 acordada en 1992 ha sido muy lenta.
- La educación esta mucho más atrasada que otros campos en el desarrollo de nuevos pensamientos y prácticas en respuesta al cambio de la sustentabilidad.

Los Breviarios argumentan que una teoría educacional desde el punto de vista ecológico, práctica y política es necesaria para apoyar la transición sustentable. Muestra entonces como 'la educación sostenible' puede conducir a un aprendizaje transformativo. Este finaliza con la discusión de cambiar estrategias, e incluye sugerencia de acciones para los hacedores de la política y los practicantes de ella. Una lectura inspirativa para los educadores de Jardines botánicos preocupados por la educación para la sustentabilidad.

Los Tesoros de la Flora de las Planicies del Cabo: Una Guía Para el Aprendizaje Activo de los Maestros en las Escuelas de Ciudad del Cabo
Un Proyecto de la Sociedad Botánica de Africa del Sur y el Departamento de Manejo del Medioambiente, Ciudad del Villa del Cabo: CMC Su ministro disponible de: The Botanical Society of South Africa, Private Bag X10, Claremont, 7735 South Africa.
Tel: (27) 021 762 1621 Email: kbranch@botanicalsociety.org.za
Precio: Teachers' guide 20 Rand, poster 15 Rand

La flora de las planicies del Cabo en Sudáfrica, es rica, única y altamente amenazada. Como un resultado de un programa de alerta para llamar la atención hacia la conservación de los sitios principales de la Flora, un poster educativo y la guía de maestros han sido desarrollados. El objetivo de este recurso es informar a las escuelas acerca de los

■ Resources



nature reserves'. While clearly targeted at Cape Town Schools, the activities in this guide could easily be adapted and used by botanic gardens worldwide in their teacher training programmes.

Electronic Resources

www.bepa-online.org

Biodiversity Education and Public Awareness is the theme of a new website designed to create, stimulate and sustain a world wide exchange of information and views on Education and Public Awareness related to biodiversity conservation and use. Initiated by IUCN-Commission on Education and Communication, UNESCO, the Dutch Government and the Secretariat for the Convention on Biological Diversity, the website aims to help practitioners and other experts join existing or develop new communities of practice related to Education and Public Awareness. It also serves as a 'portal' to other sources of information on BEPA. If you are interested you can fill in your profile and join the network.

www.ibe.unesco.org

The International Bureau of Education (IBE) is an intergovernmental organisation working in the field of education. As well

▲ Disponibles

d'interviews, d'articles de journaux et même une recette de cuisine. Des conseils paysagers et des listes de plantes indigènes rustiques sont proposés pour favoriser le développement de jardins d'école économes en eau, pouvant fonctionner comme des «mini réserves naturelles». Bien que s'adressant aux scolaires de la ville du Cap, les activités proposées dans ce guide peuvent être tout à fait transposées par les jardins botaniques du monde entier au sein de leurs programmes éducatifs.

Sites Internet Utiles

www.bepa-online.org

Sensibilisation grand public et éducation à la biodiversité (Biodiversity Education and Public Awareness, BEPA) est le thème

d'un nouveau site destiné à créer, stimuler et soutenir des échanges mondiaux d'informations et de points de vue sur l'éducation et la sensibilisation du grand public à propos de la préservation et de l'utilisation de la biodiversité. Sur l'initiative de l'IUCN-Commission à l'Éducation et à la Communication, de l'UNESCO, du gouvernement néerlandais et du Secrétariat de la Convention sur la Diversité Biologique, le site vise à aider les personnes concernées et autres experts à rejoindre ou à créer de nouvelles communautés activistes concernées par l'éducation et la sensibilisation grand public. Ce site sert aussi de portail vers d'autres sources d'information sur le BEPA. Les personnes intéressées peuvent renseigner leur profil pour rejoindre le réseau.

www.ibe.unesco.org

Le Bureau International de l'Éducation (IBE) est une organisation intergouvernementale travaillant dans le domaine de l'éducation. Outre sa collaboration avec les ministres de l'éducation, l'IBE favorise l'implication des chercheurs, acteurs et représentants des organisations intergouvernementales et des ONG. Les activités de l'IBE comprennent:

● Recursos

problemas que enfrenta la Flora de las placinas del Cabo. La guía provee una información comprensiva, mapas e ideas de proyectos para animar a los maestros y estudiantes a investigar temas y las acciones necesarias para llevarlos a cabo. Esto fue desarrollado con la retroalimentación de un gran número de maestros locales y como un resultado que contiene actividades para un amplio rango de edades: roles de juego, rompecabezas, ideas de viajes de campo, entrevistas, artículos de periódico, y más aun recetas. Ideas de diseños de jardines y listas de plantas indígenas resistentes son provistas para motivar el desarrollo de jardines de escuela, como algunos en agua que pueden funcionar como 'reservas miniaturas'. Mientras que las actividades están claramente enfocadas a las escuelas de la ciudad del Cabo, éstas podrían ser fácilmente adaptadas y usadas por otros jardines botánicos a nivel mundial en sus programas de entrenamiento para maestros.

Recursos electrónicos

www.bepa-online.org

Educación en Biodiversidad y Alerta pública es el tema de un nuevo sitio web diseñado para crear, estimular y sostener un intercambio a nivel mundial de información y vistas sobre Educación y Alerta pública relativa a la conservación de la biodiversidad y su uso. Iniciada por la Comisión de Educación y Comunicación de la IUCN, UNESCO, el Gobierno Holandés y el Secretariado para la Convención sobre Diversidad Biológica, este sitio web pretende ayudar a los practicantes y otros expertos a unir comunidades existentes o a desarrollar nuevas comunidades en la práctica relacionada a la Educación y Alerta pública. Este también sirve como un 'portal' a otras fuentes de información sobre BEPA. Si tu estás interesado, puedes llenar la forma y unirte a la red de trabajo.

www.ibe.unesco.org

El Buró Internacional de educación (IBE) es una organización intergubernamental trabajando en el campo de la educación. Así también con Ministerios de Educación, IBE impulsa la participación

■ Resources

as working with ministries of education, IBE encourages involvement from researchers, practitioners and representatives of intergovernmental and non-governmental organisations. IBE's activities include:

- managing world data on education, a databank presenting on a comparative basis the profiles of national education systems
- collecting and disseminating through its databank INNODATA innovations and best practices on education
- co-ordinating the preparation of national reports on the development of education
- administering the Comenius Medal awarded to teachers and educational researchers for outstanding achievements
- maintaining an international educational information centre.

The IBE publications Prospects (available in Arabic, Chinese, English, French, Russian and Spanish) and Educational Innovations and Information (available in English, French and Spanish) can be accessed free on the IBE website.

www.greenbooks.co.uk

Green Books is a small independent publishing company, whose aim is to inform and inspire the general reader about ecological, spiritual and cultural issues of our time. Books can be ordered direct from the website, which also has links to other interesting environmental organisations.

www.gaiadistribution.com

Gaia Distribution offers a range of ecological and nature related games. Through constructive play, children and adults can learn about companion planting, trees, life cycles, etc. The games are ecologically made, beautifully illustrated and use co-operative rules.

▲ Disponibles

- la gestion mondiale des données sur l'éducation, une banque de données présentant et comparant les profils des systèmes éducatifs nationaux
- la collecte et la diffusion des innovations et des meilleures actions éducatives par le biais de sa banque de données INNODATA
- la coordination de la préparation des rapports nationaux sur l'avenir de l'éducation
- l'attribution de ma médaille Comenius distinguant les enseignants et les chercheurs en pédagogie pour des travaux remarquables
- l'animation d'un centre international d'information sur l'éducation.

La liste des publications de l'IBE (disponible en arabe, chinois, anglais, français, russe et espagnol) et les Informations et Innovations Educatives (disponibles en anglais, français et espagnol) sont libres d'accès sur le site de l'IBE.

www.greenbooks.co.uk

Green Books est une petite société d'édition indépendante dont le but est d'informer et inspirer le grand public sur les problèmes écologiques, spirituels et culturels de notre époque. Les livres peuvent être commandés directement sur le site, qui présente également des liens vers d'autres organismes intéressants liés à l'environnement.

www.gaiadistribution.com

Gaia distribution propose un vaste choix de jeux sur la nature et l'écologie. Par ces jeux constructifs, enfants et adultes peuvent apprendre à planter, à connaître les arbres, les cycles biologiques, etc. Les jeux sont fabriqués en respectant l'écologie, joliment illustrés et mettent en œuvre des règles de coopération.

● Recursos

de investigadores, practicantes y representantes de organizaciones intergubernamentales y no-gubernamentales. Las actividades de IBE incluyen:

- manejar los datos sobre educación en el mundo, un banco de datos presentando sobre bases comparativas los perfiles de los sistemas nacionales de educación
- coleccionar y diseminar a través de su banco de datos INNODATA las innovaciones y las mejores prácticas en educación
- coordinar la preparación de informes nacionales sobre el desarrollo de la educación
- administrar la premiación de la Medalla Comenius a los maestros e investigadores educativos que alcanzan logros sobresalientes
- mantenimiento de un centro de información educativa internacional

Los catálogos de publicaciones de IBE (disponibles en Árabe, Chino, Inglés, Francés y Español) y las innovaciones educativas e información (disponible en Inglés, Francés y Español) que es libremente accesible en el sitio web de IBE.

www.greenbooks.co.uk

Los Libros Verdes (Green Books) es una compañía editorial pequeña, independiente, cuyos objetivos son informar e inspirar al lector general acerca de los temas ecológicos, espirituales y culturales de nuestro tiempo. Los libros pueden ser ordenados directamente desde el sitio Web, el cual también está ligado a otras organizaciones ambientales interesantes.

www.gaiadistribution.com

Distribuciones Gaia ofrece un rango de juegos ecológicos y relacionados con la naturaleza. A través del juego constructivo, los niños y adultos pueden aprender acerca de plantas acompañantes, árboles, ciclos de vida, etc. Los juegos son ecológicamente hechos, bellamente ilustrados y usando reglas co-operativas.

Botanic Gardens Conservation International

Membership Application Form

Established in 1987, BGCI works with botanic gardens and the wider conservation community in support of plant conservation around the world. Advocacy, capacity building, networking, sharing information, training and education are all key activities in pursuit of this goal. We currently have over 500 member institutions in 110 countries, working together to implement the new *International Agenda for Botanic Gardens*.

Garden members receive our regular publications *BGCNews (Botanic Gardens Conservation News)* and *Roots (Education Review)* and a wide range of other publications, materials and services, such as *The Darwin Technical Manual for Botanic Gardens* and *BG-Recorder 2*, a computer software package for plant records. Corporate members receive *BGCNews* and *Roots*, have access to wider partnerships, advice on conservation issues and opportunities for collaboration in key projects. Associate members and Conservation donors receive *BGCNews* and *Roots*, while Individual members have a choice of *BGCNews* or *Roots*. Members are invited to *The International Botanic Gardens Conservation Congress* and *The International Congress on Education in Botanic Gardens*, held every three years.

If you support the mission of BGCI and would like to belong to this world network for plant conservation and sustainable living, please join BGCI using this form. With your support, we can make a difference.

BGCI Membership Category	£ Sterling	US Dollars	Euros
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Garden member (budget US\$ 1,500,000 - 2,250,000)	440	660	660
Garden member (budget US\$ 750,000 - 1,500,000)	300	440	440
Garden member (budget below US\$ 750,000)	160	220	220
Gardens member in developing country	75	110	110
Corporate Members: Gold Member	5000	7500	7500
Corporate Members: Silver Member	1000	1500	1500
Associated institution	75	110	110
Conservation Donor	160	220	220
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