

IUCN Cycad Specialist Group
Subgroup for sustainable utilization of cycad populations through
development of nurseries linked to wild populations.

Scope of IUCN Specialist Group Involvement

The Cycad Specialist Group (CSG) of the IUCN exists for promoting conservation. It functions mainly in an advisory capacity by gathering, analyzing, and disseminating information and by recommending policies in management, trade, legislation, and enforcement. Its guiding focus is on preserving cycad populations in the wild; all other objectives or outcomes of its efforts are of secondary importance. The development of nursery programs as a method for sustainable use of wild cycad populations for the purpose of conserving wild populations is the topic of this discussion. The goals and participants in this subgroup of the CSG are below:

Objective	Responsibilities	Coordinator	Members
To promote conservation of wild cycad populations through sustainable use via the promotion and development of nurseries linked to wild populations	<ul style="list-style-type: none"> • Evaluate the potential of sustainable use nurseries • Facilitate development of nurseries 	Willie Tang	Chris Dalzell Anders Lindstrom Willie Tang Andrew Vovides Mario Vasquez Torres John Donaldson Bruce Ironmonger

Historical background

Many cycad researchers working in the field have come to the conclusion that for many species, particularly those located adjacent to human populations, effective conservation can only succeed if local peoples are persuaded to participate and believe that they can benefit from sustainable utilization and management of their cycad populations. Ecotourism is one such approach. Another is the development of nurseries linked to wild populations. Summarized below are recent efforts to develop this concept and their successes and shortcomings.

During the 1980's and 1990's the establishment of cycad nurseries linked to wild populations was pursued independently on three separate continents. In South Africa, Mexico, and China projects were designed and developed to suit particular local situations. These are summarized below:

South Africa:

- 1) *Encephalartos transvenosus* at Modjadji: This is perhaps the oldest of the nursery projects. This spectacular mountain top population of cycads is dense and contains many large plants. Designated as a national park in 1983, it attracts cycad enthusiasts as well as the general population. Soon afterward the local government authority established a nursery, with seeds collected from this wild population. Plants were sold in the local market and to visitors to the park as garden ornamentals. Local markets soon became saturated with seedlings from this nursery. Long term success can only be achieved if a broader market can be established

- 2) *E. lebomboensis* at Mananga: Established by the KaNgwane Parks Corporation this nursery program was developed for the benefit of the local people as well as for the conservation of the cycad. It follows the Modjadji model in many aspects. Seeds are collected yearly from the *E. lebomboensis* population at Mananga mountain and raised in the local nursery. In addition to creating several nursery jobs, plants sold from the nursery provide much needed revenue for the reserve and community development projects (Stalmans 1995). In addition to use as ornamentals the young plants produced by the Mananga nursery project are also used for medicinal and magical purposes by the local people.

Mexico

- 1) *Dioon edule* at Monte Oscuro, Veracruz: Initiated by Andrew Vovides, a British trained botanist working and living in Mexico, and his assistants in the late 80's, this project is village-based. Vovides personally persuaded and guided the campesinos living next to wild populations. By inviting campesinos to the local Botanic Garden at Jalapa, where Vovides works, for training and guidance, he persuaded them to patrol their local cycad population and report incidences of illegal poaching. A village-based nursery has produced more profit to the villagers than the lime crops the campesinos traditionally grow, offering them a viable alternative cash crop. Admittedly, some of these profits are derived from sales to conservation-minded botanic gardens and donations. Young plants produced in the nursery have also been planted back into the natural habitat, as an experiment in restocking the wild population. This model has spawned several more like it for other species of *Dioon*, *Zamia* and *Ceratozamia*, at La Sepultura Reserve and El Triunfo Reserve in Chiapas state (Vovides et al. 2002). The main impediment to success has been trade barriers, particularly CITES, which prevent the export of plants to the U.S. where willing buyers are located.

China

- 1) *Cycas debaoensis* at Debao, Guangxi: An international project developed by William Tang (initially at Fairchild Tropical Garden), Liu Nian (initially at South China Botanical Garden), and Anders Lindstrom (Nong Nooch Botanical Garden), this effort was conceived with knowledge of some of the shortcomings of those in Africa and Mexico. As an international project its initial goal was to ship seeds or seedlings produced by the village who own the land upon which this cycad is restricted, to markets in the U.S. Although key Chinese officials were told of the project at inception, it has bogged down due to red tape, the dominance of older, relatively ineffective conservation concepts, and competition from other Chinese botanic gardens. The reigning conservation approach in China is to declare a national reserve, with little consultation of local peoples and with little or no funding for rangers or guards. But for one exception, the *Cycas panzhihuaensis* reserve at Panzhihua which enjoys strong political support, this approach has yielded little success for cycad conservation in China. Heightened awareness of the value of cycads by the declaration of a reserve usually results in accelerated poaching by locals and eventual local extinction of the cycad, such as in the case of *C. multipinnata*. Thus, there is the need for an alternative approach.

Although asked to participate in the Debao project at its inception, one Chinese botanic garden chose not to contribute and actually adversely affected the project by buying 400 wild-collected plants from the Debao site, causing much damage to the wild population and project. Currently, an added layer of CITES regulation by the Chinese government restricts the export of seeds from the Debao site and is delaying its successful implementation. Donations to the project have scored successes in educating the villagers, building a local school, initiating patrols of the wild population, and in establishing a village nursery for the plants, but international legislation is needed to ease restrictions and barriers for export of plants and seeds from this project.

Evaluation of village-based nursery projects: assessment and potential

After some two decades of experience in village-based conservation projects recommendations can be made about what needs to be done to make them more effective and successful. As a conservation effort, the success of village nursery projects can only be measured by how long and effectively they contribute to the preservation of wild cycad populations. In this regard, these projects have been successful in slowing and perhaps even reversing the decline of populations during the time they have been in operation. To enable these short-term successes to be extended for generations, a long term plan for management needs to be formulated and implemented. Critical issues for this objective are discussed below:

Viewing nursery projects as a business

- 1) A severe limitation of these projects is that they are conceived and operated by biologists and social workers, whose expertise is in research or social work. These workers rely on grants and donations, but the reality is - no charitable group will support such projects indefinitely. A manager of such a project must eventually face the decision to switch their funding strategy from securing donations to self-sustainability – meaning they must manage for profit. The inevitable conclusion is that long term sustainability means that nursery projects must be viewed as commercial enterprises that can only succeed if they are run as businesses, with long term profitability in mind. While they require grants or other forms of donations to be initiated, these projects must eventually generate enough income to satisfy those villagers who commit themselves.
- 2) Viewing nursery projects in the framework of a business enterprise actually makes them easier to understand and manage. After all, the concepts and procedures for running a profit oriented business are well developed and widely understood. These skills may be acquired in many schools of higher education or on the job learning experience in other businesses. The constraints of businesses include: A) fixed costs – in the case of nurseries: rental of land, labor of workers, and costs of equipment, materials and transport. All of these are either paid in cash upfront or with a share of expected profits; B) marketing the product: this means finding countries and individuals where the product (seeds or seedlings) can be sold to meet operating costs; and C) dealing with government regulations. Recommendations for dealing with A, B, and C are discussed below.

- 3) Government regulations. Anyone who works in the arena of international trade soon realizes that favorable government legislation is essential for success. Without favorable government legislation to break down trade barriers and to overcome competition, even giant and powerful agricultural export industries, such as those for bananas, cannot survive. A lesson from cycad nursery projects of the last decades is that to make these nurseries profitable they must be able to export their seeds and seedlings to countries where high prices are paid for them. They face formidable trade barriers in the form of CITES, an international treaty which has been successful in stemming the trade in large wild collected plants, but has proved a severe challenge to the viability of village-based nurseries. A great deal of bureaucratic inertia must be overcome to adjust CITES regulations to allow trade in seeds and seedlings produced by these village-based nurseries. This is a difficult task that must be initiated from within the IUCN, the conservation body which advises on most CITES issues. The Cycad Specialist Group must adopt, as a priority, the task of amending CITES to facilitate trade associated with the village nurseries, if this concept is to truly become viable. Cynthia Giddy (1995), in her stint as an IUCN representative, was nearly successful in passing legislation for the certification of nurseries, that meet certain standards, to bypass certain CITES regulations. Perhaps another effort like this to tie nursery projects to other similar sustained yield projects for animals should be pursued.
- 4) Fostering the connection between business and conservation. Everyone involved in a village nursery project must understand from inception that its success is tied to the conservation of the mother population that provides a continuous source of seeds for the nursery. The buyers of their product are interested in obtaining a genuine specimen of the species and population of cycads they protect. Buyers and support for the project will continue as long as they are assured that these conditions are upheld. From inception this will foster a view of the cycad population as a sustainable resource belonging to the village. In time, if initial implementation is successful, a culture of protection will develop in the village or villages tied to the project.

Unifying nursery projects for long term viability

Long term success of a nursery project may be measured by the protection of a cycad population over decades or hundreds of years. Such projects cannot rely solely on the efforts or talents of a single person. Therefore, management must be envisioned to operate for generations. A support structure, in the form of an institution, must be established to guide, motivate, and assist. One choice for this role is the Montgomery Botanical Center (MBC). Here, knowledge, in the form of literature and experienced people, financial assistance, and international influence can be used to aid anyone wishing to initiate a village-based nursery project. The village-based concept should not live or die on the inspiration of one person; cycad populations require protection as long as there are human beings nearby and therefore projects such as the village nursery, must receive impetus from an institution that will last longer than the attention of a single individual.

A supporting institution can also function as an umbrella organization to link different nursery projects. The benefits include improved communication and cooperation between projects. By this link project managers can consult with one another and pool their knowledge and resources in finding start up funds and marketing support. An international cooperative of village nurseries assisted by the institution can consolidate shipments to lower shipment costs. With expanded influence a cooperative can negotiate prices and trade agreements with buyers or governments. The umbrella institution can help redistribute funds among projects, transferring funds from a successful one to offset temporary difficulties in another. The analogy in the business world is a parent company which applies uniform procedures among subsidiaries and distributes funds to help each franchise outride downturns in their business cycles. As a product, cycads are best viewed as luxury items and demand for them will rise and fall with business cycles. The guiding institution, with its broader perspective and contacts, can help in finding new buyers in new regions as markets change.

The big picture and the role of the CSG

In the broadest perspective, cycad nursery projects should not be viewed strictly as typical business enterprises. There are two more facets to consider in the environment where they operate.

- 1) **Biological constraints:** Cycad populations are living biological entities and certain principles must be adhered to, to preserve them while operating village based nurseries. These are rules that managers of village-based nurseries must apply rigorously to prevent the genetic and ecological degradation of the cycad populations they are designed to preserve:
 - a) Nurseries are sited near wild populations and essentially become extensions of the wild populations. For a population on the verge of extinction, this may be beneficial, since the nursery population becomes an adjacent genetic reservoir as well as a possible reservoir of the insect pollinators of the species. The nursery will act as a buffer to natural or human caused calamities to the wild population. If adult plants are located in both, genetic material will be exchanged between nursery and wild population via pollen.
 - b) No cycad of other species should be brought to these villages. Hybrid studies have shown that interbreeding occurs readily for most species within a cycad genus (Vorster 1995). The cultivation of other species in the vicinity will lead to the genetic erosion of the wild population targeted for preservation.
 - c) The introduction of cultivated cycads into the vicinity may bring in cycad parasites and pests than can threaten the natural cycad population. Cycad specific Lepidoptera come to mind as well as such devastating pests as the *Cycas aulacaspis* scale.
- 2) **Using the conservation factor:** In the real world, commercial nurseries operating at economies of scale with the latest nursery technology will in most cases easily outcompete the village based nursery. Often bypassing CITES regulation, something which village based nurseries operating under IUCN auspices cannot

do, they will bring their product to market much quicker and easier than the less efficient village based nursery. The only way for village based nurseries to overcome this disadvantage, is to use the conservation factor. Educated people, particularly in the developed world, are becoming increasingly conscious and selective of products that are environmentally friendly. For example, many chose to buy wood and wood products that are harvested in an ecologically sound manner. These may be certified by independent environmental organizations, such as the Rainforest Alliance. Village based cycad nurseries operating under the auspices of the IUCN CSG and given recognition by CITES could enjoy such a preference over commercial nurseries.

When viewed as a long-term business enterprise and from a biological and conservation perspective, the potential for village-based nurseries becomes clearer. Like any business, they can succeed if properly and wisely managed. Like any business, favorable government legislation is needed and loans and support are required to prevent bankruptcy during difficult times. The Cycad Specialist subgroup has within it the knowledge and experience to guide the development of the village nursery concept. It is in a position to nurture this concept within the international conservation community. It can help to raise funds, in the form of donations and research and conservation grants, through the clout of the IUCN name. The group should lobby national and international bodies about CITES, to enable these projects to bypass export/import regulations. Lastly and perhaps most importantly, these projects need to be promoted and advertised. A feature article in National Geographic would be ideal. These nurseries are experimental and ground breaking concepts and their viability, success, and potential must be made clear to the conservation community, who ironically exert the greatest barrier to their success. In many ways trade barriers to nursery projects are similar to those faced by the sustained use of elephants for sport hunting and ivory in Zimbabwe. The elephant issue is highly emotional and intertwined with animal rights concerns, and many conservation organizations are opposed to loosening CITES regulations to accommodate these programs. While the cycad nursery concept does not involve ethical and animal rights issues they nevertheless suffer from emotional and export barriers that are in place because of them.

With these points and issues in mind, the pursuit and management of nurseries linked to wild populations clearly becomes a long term process which requires patience and long term commitment. If the trade barriers described above can be overcome, the potential of the nursery concept as conservation tool is not limited to cycads and can be applied to other endangered plant and animal groups as well. The idea of a conservation project that benefits the local people and which empowers collectors (who are often unfairly villainized as the cause of species endangerment) as the supporters and driving force in conservation, is an idea that should bring applause from all quarters of society and should enjoy broad support and popularity.

Very few people are aware of cycads. Their appeal as ornamentals has barely been tapped. Properly nurtured, horticultural interest in cycads can be expanded with village based nurseries supplying a significant portion of the market. With proper controls the

expansion of the market can fund stable long term conservation to the benefit of villagers and collectors alike.

Literature Cited

- Giddy, C. (1995) Legislation: needs and implementation with special reference to CITES. Pp. 14-16 in J. Donaldson (ed.) *Cycad Conservation in South Africa: Issues, Priorities and Actions*. Cycad Society of South Africa, Stellenbosch
- Stalmans, M. (1995) Cycad conservation and cultivation in KaNgwane. Pp. 51 in P. Vorster (ed.) *Proceedings of the Third International Conference on Cycad Biology*. Cycad Society of South Africa, Stellenbosch.
- Vorster, P. (1995) Aspects of the reproduction of cycads. 2. An annotated review of known information. . Pp. 379-389 in P. Vorster (ed.) *Proceedings of the Third International Conference on Cycad Biology*. Cycad Society of South Africa, Stellenbosch.
- Vovides, A., C. Iglesias, M. Perez-Farrera, J. Astorga and U. Schippman. (2002) Peasant nurseries: an effort to conserve cycads in Mexico. *The Cycad Newsletter* 25(4): 3-6.