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Identification, Utilization, and Conservation of Medicinal Plants in Southeastern Nigeria

By Jonathan Okafor and Rebecca Ham

Introduction

An estimated 80 percent or more of the world's population depends primarily on traditional medicine for the treatment of ailments (Cunningham, 1993). Dependence on medicines derived from indigenous plants is especially predominant in developing countries, where modern Western medicine is often unavailable or is simply too expensive.

In many areas, knowledge of the plant species used and of the methods of preparing and administering the medication resides mainly with traditional healers. Secrecy and superstition surrounds the use of these medicines, with the healers often reluctant to hand on their knowledge to anyone other than trusted relatives. As the younger generation becomes more mobile and these potential trustees move on, there is a danger that this knowledge will disappear.

In many areas of Africa, the loss of biodiversity caused by rapid vegetation clearing for agricultural and livestock expansion has resulted in a drastic decline in the supply of traditional medicines. At the same time, demand for these medicines has increased as the population has risen. These two factors—growing demand and dwindling resources—together mean that many useful plant species are at risk of becoming extinct. Although sustainable use of some plant species for traditional medicine may be possible, some harvesting methods are detrimental.

In Nigeria, most of the original forests have been either completely lost or badly degraded, and there is an urgent need both to protect the remaining forests and to preserve the traditional knowledge of their use. This article reports a study conducted by Dr. Jonathan C. Okafor of the uses of indigenous plants for medicinal purposes in southeastern Nigeria. The main aims of the study were to:

- identify plant species used for medicinal purposes;
- document how they are used;
- investigate the importance of medicinal plants to the local people;
- examine ways to conserve medicinal plants and to record and preserve the knowledge of their use.

Aided by a grant from the Biodiversity Support Program, Dr. Okafor was able to gather and disseminate knowledge about the identity of medicinal plants, information about how to grow these plants successfully, and ideas for ways to conserve them in the wild. This article was written to showcase his work and hopefully to encourage similar activities elsewhere.

Study Area

The study was conducted in southeastern Nigeria, which comprises nine of the country's 36 states. The study concentrated on Enugu, Anambra, and Imo, the three states that

make up the low-lying Igbo heartland. The land does not rise more than 200 meters above sea-level. The area falls within the humid and subhumid tropics, and has a dry season of about three or four months. Annual rainfall is more than 1,200 millimeters, and the atmospheric humidity exceeds 80 percent during most of the year.

The population of this region is about 20 million, about 75 percent of whom live in rural areas, according to a 1991 census. The population density is generally high, with about 500 people per square kilometer. Population growth is also high, averaging about 3 percent annually.

The high population density has had a severe impact on the region's natural resources. Massive deforestation has taken place, mainly as a result of conversion of forest to agricultural land and unsustainable exploitation of non-timber forest products. Uncontrolled forest fires have also contributed to deforestation. These combined factors have resulted in soil erosion, loss of soil fertility, and a general loss of biodiversity in the region.

Identification and Utilization of Medicinal Plants in Southeastern Nigeria

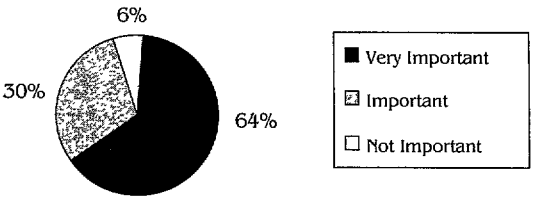
The study used written and oral interviews with a randomly selected group of 121 farmers and traditional healers to identify indigenous plants used for medicinal purposes and to document how they are used.

Who uses traditional medicines?

Interviews showed traditional medicine to be extremely popular in the study area, with 91 percent of respondents having used it at one time or another. Sixty-four percent said traditional medicine was very important to them, 30 percent rated it important, and 6 percent said that it was not important (Figure 1).

Most respondents said they had gained their knowledge of traditional medicines from their parents; only 16 percent had learned about it from traditional healers. More than half of those interviewed had been using traditional medicine for more than six years.

Figure 1. Importance of traditional medicine to respondents



In cases where traditional medicine was not used, reasons included lack of standardization in the preparation of dosages; lack of awareness of traditional medicine; a prejudice that traditional medicine practitioners are devilish; secrecy by practitioners; and difficulty obtaining materials.

Which plants are being used for traditional medicines?

These interviews identified 55 plants that are used in traditional medicine (Appendix 1). Only a few of these plants are not indigenous species, such as *Persea americana* and *Psidium guajava*.

What illnesses are these plants used to treat?

Indigenous plants were found to be used in the treatment of coughing, high blood pressure, rheumatism, joint pains, diarrhea, dysentery, stomach problems, diabetes, migraine headaches, piles, malaria, snake bite, bleeding, convulsions, worms, painful menstruation, filariasis, gonorrhea, infertility, ovulation, epilepsy, and even cancer. The maladies most frequently treated were stomachache, convulsions, venereal disease, and headaches. As many as 14 different species of plant were used to treat stomachache, and 13 species to treat malaria. Traditional medicines were least used for yellow fever, kidney problems, and asthma.

Carica papaya treated the greatest number of ailments (12 ailments), followed by *Ocimum gratissimum* (11 ailments), and *Citrus aurantifolia* and *Psidium guajava* (both seven ailments). The plant species mentioned most frequently was *Azadirachta indica*, which was listed by 40 percent of respondents for the treatment of malaria. Some ailments for which traditional medicines were said to be more effective than modern Western medicine included poisoning, venereal disease, and epilepsy.

The major side effects reported from traditional medicines were dizziness (21 percent of respondents), vomiting (20 percent) and stomachache (18 percent). These are similar to the common side effects reported from the use of modern Western medicines.

How are the treatments prepared?
The preparation of traditional medicines usually involves plant parts, which are gathered fresh from the forests. The plant parts most commonly used are the leaves, roots, bark, stem, fruit, seeds, flowers, and exudate. After they are harvested, the plants are usually dried in the sun to preserve them for future use. The preparations are usually extracted by boiling the plant material or by soaking or dissolving it in substances such as alcohol, palm wine, palm kernel oil, honey, potash, shea butter (*Vitellaria paradoxa*), or clay chalk.

The most widely used preparations are in the form of decoctions, infusions, gruel, or poultices. Decoction involves boiling bark, leaves, or roots, or a combination of these, and using the extract for the treatment. Infusion involves soaking the plant in liquid, and using the extract for treatment. Gruel is made by using the filtrate of an infusion with maize, sorghum, or millet flour to prepare a light porridge. A fine powder of the dry plant part is sometimes added to the gruel. Poultices are prepared by tying a macerated part of the fresh plant in a clean piece of cloth and squeezing out the juice.

How are the treatments administered?
Most of the medicines are administered orally, but a range of external applications is also used. Powdered plant material is sometimes rubbed into cuts made on the body with a sharp knife or blade, for example, and herbs are pounded with local soaps and used when bathing. Preparations can also be in the form of pastes, pomades, or ointments in a medium of either palm oil or shea butter. These are rubbed into the affected parts of the body. Patients may also inhale the vapors produced by boiling the plant part in a pot. This is especially common in treatments for malaria and jaundice.

Conservation of Medicinal Plants in Southeastern Nigeria

The commercialization of medicinal plants has been suggested as one means of encouraging their conservation, and it is argued that if local people can earn an income from these species, they will be encouraged to protect them. Examples of plant species that can be commercialized include *Garcinia kola, Hibiscus sabdariffa, Cymbopogon citratus, Morinda lucida*, and *Carica papaya*, which can be used for health drinks; *Cassia tora*, as a balm to treat arthritis; and *Aloe vera, Cassia alata, Azadirachta indica*, and *Lonchocarpus cynescens*, for herbal scalp soaps. Various species can also be used for antimalarial remedies.

Caution must be used, however, as past lessons have shown that the commercial consumptive use of a species can lead to overexploitation and eventual extinction, if the use is not managed wisely. The most vulnerable species are popular, slow-growing or slow-reproducing species with specific habitat requirements and a limited distribution (Cunningham, 1993).

One way of countering the threat of unsustainable use in the wild is to encourage *ex-situ* propagation of useful species in nurseries, home gardens, and farms.

Many people interviewed were excited about the prospects of growing medicinal plants in this manner, and cited many benefits that could be gained by doing this. These include:

- ready and inexpensive access to medicine;
- source of income if plants are sold commercially;
- employment opportunities.

This study investigated the conditions and techniques required to grow certain targeted species of medicinal plants in nurseries. The species were selected based on their overall importance as medicinal plants, as well as the degree to which they are threatened in the wild. Experiments were conducted using various horticultural techniques; for example, techniques of germination, budgrafting, and stem cutting; techniques to decrease the height a tree obtains before fruiting; and techniques to

reduce the amount of time before a tree gives fruit. Several major breakthroughs were made:

- success in germinating seeds of *Garcinia kola* by burying them in pseudostem of plantains;
- dwarfing of *Pterocarpus* spp.;
- bending tree seedlings so that they develop multiple shoots;
- germinating *Bryophyllum* by shallowly covering its leaves with sand;
- developing plants of *Morinda lucida* from root cuttings.

Once the optimum propagation techniques for growing certain medicinal species had been identified, attempts were made to integrate these species into the traditional farming systems—home gardens and homesteads—of the area. This was successfully achieved following two instructional workshops conducted in Ukpor, for 28 participants, and Ntueke, for 30 participants.

Many of the participants in the experiment were enthusiastic about the contribution they would make by growing these plants to the provision of medicines and, in some cases, food (e.g., *Vernonia amygdalina, Gongronema latifolium, Irvingia gabonensis*). Where the medicinal plants could be used for live fences, as shade trees, for alley cropping, or as climbers on existing trees, the farmers were further encouraged to plant them, as the plants were compatible with their arable crops. A follow-up study confirmed that most farmers found the plants useful, especially in making herbal soaps, antimalaria herbal tea, and arthritis balms.

Recommendations

Action is needed at various levels if medicinal plants and knowledge of their use are to be protected.

Individual and community level

At the individual and community level, training and information-sharing are crucial. This is necessary to preserve the traditional knowledge of the use of plants for medicine, as well as to promote knowledge of how to propagate and harvest the plants. This sharing of information may be achieved through workshops involving community leaders, traditional healers, and other villagers. It is also important that the traditional healers in each village be prepared to share information among themselves and among other interested members of the village.

Government level

One of the most important ways that government can contribute to the conservation of medicinal plants is by allocating funds to campaigns that will encourage interest in the use of medicinal plants, and that will generate awareness of the economic and ecological importance of these plants. Funds are also needed for local conservation initiatives, for research into medicinal plants, and to enable local and national herbaria to develop collections of medicinal plants. Other ways in which governments can play an important role in medicinal plant conservation are by enforcing legislation to prohibit brush burning, to protect the forests; by introducing special protection for medicinal plants; and by advocating the inclusion of conservation education in school curricula. Governments should also assert national sovereignty over medicinal plants as gene resources and regulate their exploitation and export.

International level

At the international level, personnel need to be trained to conduct taxonomic, ecological, and ethnobotanical studies of forests and woodlands to demonstrate their value to medicine and to assess how they may be conserved. Help is also needed to facilitate the exchange and development of technologies for the conservation and sustainable use of medicinal plants; this should also consider drug development and manufacturing. The establishment of a mechanism such as an international panel on biodiversity conservation is also necessary to provide guidelines for the protection, understanding, and sustainable and equitable use of medicinal plants. This could be affiliated to the United Nations University's Institute for Natural Resources in Africa

(UNU/INRA), for example, and should include scientists, nongovernmental organizations, and policy makers.

Lessons Learned

In the case of this study, a relatively small project grant enabled a motivated and dedicated individual to advance the local knowledge, understanding, and conservation of medicinal plants. Reasons for the success of the study are outlined below, and provide valuable lessons to practitioners and funding agencies.

First, Dr. Okafor is a dynamic leader who combined strong motivation with a well-planned mission. He realized the importance of tailoring his conservation efforts to the needs of a narrowly targeted community and environment. For example, because his project was based in a densely populated rural area, he researched and experimented with methods to grow medicinal plants effectively in kitchen gardens. He used a multidisciplinary approach that applied sociology and ethnobotany in interviewing farmers and traditional doctors; chemistry to identify the most valuable plant species to grow; horticulture to determine the best ways to grow these plants in a densely populated environment; and economics to develop markets for the plant products.

Dr. Okafor structured his plan to conserve biodiversity such that it would also provide livelihood support for local participants, and by so doing he created a strong incentive for conservation. He brought together different institutional sectors—farmers, NGOs, consumers, and academics—and promoted collaboration among them. His workshops were attended by people from various levels of society, and he encouraged such enthusiasm that they went away to share their newfound knowledge with their communities. Many workshop participants started their own nurseries, growing medicinal plants using the techniques demonstrated in the workshops. Dr. Okafor also created markets where these plants could be sold, further ensuring the commitment of the participants. By concentrating on building the interest, commitment, and capability of his participants in this way, he indirectly achieved his primary objective, of promoting the conservation of biodiversity.

Because Dr. Okafor had designed the project and identified potential problems and prepared solutions before BSP awarded him the grant, the results he achieved with the grant were substantial. The knowledge and results he gained supported his successful application for another grant from the competitive National Agricultural Research Project (NARP). Funded by this grant, he was able to follow up with workshop participants and determine that they were still planting and protecting medicinal plants in their fields and home gardens.

Summary

This study showed that the use of medicinal plants is extremely important to the people of southeastern Nigeria. Rapid deforestation means that many of the plant species used for traditional medicine in this region are in danger of disappearing. Dr. Okafor successfully encouraged the growing of medicinal plants on homesteads and farms to decrease the rate of their exploitation in the wild, and to enhance the ability of the local people to provide for their own medical needs.

The larger lesson learned from Dr. Okafor's work is that relatively small amounts of funding, provided to motivated local experts with well-thought-out plans, can have a far-reaching impact and produce significant results in biodiversity conservation.

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Appendix 1. List of medicinal plants and their uses identified through discussions and interactions with farmers and traditional healers in the study area

	Plant Species / Families	*Medicinal Uses*
1.	*Cnestis ferruginea* (Connaraceae)	Stem roots used as chewing stick to treat cough.
2.	*Sphenocentrum jollyanum* (Menispermaceae)	Roots chewed for aphrodisiac effect.
3.	*Microdesmis puberula* (Euphorbiaceae)	Boiled extract of roots used in treating rheumatism.
4.	*Cissus* sp. (Ampelidaceae)	Stem pounded and rubbed to treat rheumatism.
5.	*Mallotus oppositifolius* (Euphorbiaceae)	Leaves heated and sat on by newly delivered mothers to drain off impure blood; also antiseptic effects.
6.	*Cassia alata* (Caesalpiniaceae)	Boiled-leaves extract for treating high blood pressure.
7.	*Acanthus montanus* (Acanthaceae)	Rheumatism; also as a blood purifier. Boil with unripe plantain, salt, and pepper. Promotes pregnancy and can be taken for six to seven months after pregnancy.
8.	*Leea guineensis* (Ampelidaceae)	Rheumatism.
9.	*Gnetum africanum* (Gnetaceae)	Diarrhea and whitlow. (For latter, add potash and oil.)
10.	*Strophanthus gratus* (Apocynaceae)	Root bark soaked in water or for hot drink (local gin).
11.	*Enantia chlorantha* (Annonaceae)	Used as worm expeller. Stem bark soaked in water or hot drink for treating malaria.
12.	*Buchholzia coriaceae* (Capparidaceae)	Stomach problems and migraine headache.
13.	*Schumanniophytun magnificum* (Rubiaceae)	Snake bite and rheumatism.
14.	*Rauwolfia vomitoria* (Apocynaceae)	Malaria; ovulation.
15.	*Anchomanes difformis* (Araceae)	Stem heated, squeezed, and used as drop to clear cataract (after treatment with *Aspilia africana*).
16.	*Dalbergia saxatilis* (Papilionaceae)	Roots boiled with cray fish and yam without pepper and oil; taken to treat piles.
17.	*Moringa oleifera* (Moringaceae)	Leaves chewed raw for treating stomachache; leaves squeezed and rubbed on forehead to relieve migraine headache.
18.	*Sida acuta* (Malvaceae)	Leaves chewed for treating gonorrhea.
19.	*Talinum triangulare* (Potulaceae)	Laxative.
20.	*Euphorbia heterophylla* (Euphorbiaceae)	Laxative.
21.	*Hoslundia opposita* (Labiatae)	Leaves squeezed and dropped on the eye to treat filariasis.
22.	*Phyllanthus amarus* (Euphorbiaceae)	Roots soaked in gin for malaria.

23.	*Jatropha curcas* (Euphorbiaceae) and *Chromolaena odorata* (Compositae)	Squeezed leaves used as a poultice to stop bleeding.
24.	*Millettia thonningii* (Papilionaceae)	Bark used as flavor in palm wine; has tonic effect.
25.	*Ritchiea longepedunculata* (Capparidaceae)	Roots boiled and drunk to treat diabetes (one glass every morning). Also treats earache and migraine.
26.	*Ocimum gratissimum* (Labiatae)	Leaves squeezed and inserted in anus to treat piles.
27.	*Ricinus communis* (Euphorbiaceae)	Burn leaves and use ash to treat convulsion in children. (Add leaves of *Newbouldia laevis, Tetrapleura tetraptera,* and *Spondias mombin.*)
28.	*Dennettia tripetala* (Annonaceae)	Roots and barks soaked in gin to treat rheumatism.
29.	*Cassia tora* (Caesalpiniaceae)	Boil leaves together with leaves of paw-paw, pigeon pea, *Picralima nitida,* and *Costus afer,* and use in bath to treat convulsion.
30.	*Bryophyllum pinnatum* (Crassulaceae)	Pound leaves plus seven grains of alligator pepper (*Aframomum melegueta*), and apply/rub on the body of convulsive patient.
31.	*Vernonia amygdalina* (bitterleaf) (Comositae) plus *Bryophyllum pinnatum*	Squeeze leaves of both species and drink to treat diabetes. Bitterleaf and pepper useful in treating piles and worms.
32.	*Abrus praecatorius* (Papilionaceae)	Leaves chewed for cough and stomach problems. (Mix with honey or palm kernel oil for cough.)
33.	*Diodia scandens* (Rubiaceae)	Leaves and stem boiled, without oil, and taken as pepper soup to promote pregnancy. Dry stem and leaves, grind, and add one teaspoon to pap.
34.	*Psychotria psychotrioides* (Rubiaceae)	Grind roots and squeeze liquid into nostrils to treat migraine.
35.	*Draecena arborea* (Agavaceae) plus *Triclisia subcordata* (Menispermaceae) and *Rhaphiostylis beninensis* (Icacinaceae)	Boil roots of these, together with *Xylopia* fruits (without oil), and drink to treat dysentery and worms.
36.	*Peperomia pellucida* (Piperaceae)	Grind leaves and apply for skin infection. Also used for cough and dry throat.
37.	*Cyathula prostrata* (Amaranthaceae)	Pound leaves, mix with Raphia palm wine and wash breast to relieve breast pain. Also useful in treating whitlow and bleeding.
38.	*Ceiba pentandra* (Bombacaceae)	Use leaves as vegetable. Cook with unripe plantain (without oil) and eat two or three times to treat piles. Stem bark is also used for relieving piles and pains.
39.	*Piptadeniastrum africanum* (Mimosaceae)	Bark soaked in water, half glass taken twice daily to relieve painful menstruation.
40.	*Aubrevillea kerstingii* (Mimosaceae)	Bark soaked in water, half glass taken twice daily to treat abortion or miscarriage.
41.	*Acanthospermum hispidum* (Compositae)	Boil and drink extract of leaves to treat eczema and piles.
42.	*Emalia coccinea* (Compositae)	Leaves squeezed and applied to umbilicus to facilitate healing.
43.	*Ficus exasperata* (Moraceae)	Boil leaves and use extract for bathing epilepsy patient to reduce intensity of fits.
44.	*Combretum platypterum* (Combretaceae)	Roots used for malaria treatment.
45.	*Millettia zechiana* (Papilionaceae)	Roots for treatment of gonorrhea.
46.	*Persea americana* (Lauraceae)	Leaves dried and used as a tea (with milk) for lowering high blood pressure.
47.	*Costus afer* (Zingiberaceae)	Joint pains and piles.
48.	*Portulaca oleracea* (Portulacaceae)	Boil both leaves and stem with little water, add red oil, and eat plenty. Stops abdominal pain before or during pregnancy, or during menstruation. Add little potash.
49.	*Gomphrena globosa* (Amaranthaceae)	Cook leaves and stem with unripe plantain, fish, pepper, salt, and oil. Promotes pregnancy.
50.	*Lonchocarpus cyanescens* (Papilionaceae)	Boil roots, together with roots of *Anthoclesta djalonensis,* for 45 minutes. Take half tumbler thrice daily, to clear womb before pregnancy.
51.	*Combretum paniculatum* (Combretaceae)	Squeeze leaves with pinch of salt. Take one glass thrice daily to stop bleeding. Leaves of *Boerhavia diffusa* can also be added.
52.	*Thryallis glauca* (Malpighiaceae)	Flowers dried and taken as tea for treating joint pains.
53.	*Psidum guajava* (Myrtaceae)	Boil bark; drink half tumbler of extract twice daily.
54.	*Aloe vera* (Liliaceae)	Three leaves crushed and mixed with half glass of honey; one dessertspoon taken thrice daily. Useful in all forms of cancer.
55.	*Sansiviera liberica*	Leaves and roots boiled and one tumbler taken at night for epilepsy.

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Issues in African Biodiversity

Issues in African Biodiversity is a series of occasional papers that highlights key lessons African experts are learning about biodiversity conservation. These summaries aim to enhance the exchange of ideas and experiences among researchers, field practitioners, policy makers and donors to strengthen further study and on-the-ground conservation of biodiversity in Africa. We hope this series will engage the creative problem-solving of those interested in finding solutions that balance biodiversity conservation and sustainable development.

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- *African Biodiversity: Foundation for the Future.* Biodiversity Support Program. (149pp., 1993, English/French)
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- *What's Your Role?: Training for Organisational Impact.* Ralph Stone. (142 pp., 1997, English/French)

Forthcoming Publications

- *Principles in Practice: Project Staff Observations from Biodiversity Conservation Projects in Africa.* Yaa Ntiamoa-Baidu, Souleymane Zeba, and Deo-Gratias Mboje Gamassa, with contributions from Léonie Bonnéhin.
- *Southern Africa: Natural Resources, Landuse, and Conservation in relation to Transboundary Conservation Areas (TBCAs).* David Cumming.
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