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<td>MBAH, B. N.</td>
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PERSPECTIVES IN ORNAMENTAL-HORTICULTURE
APPROPRIATE FOR A QUALITY
NIGERIAN ENVIRONMENT

By

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RESEARCH MONOGRAPH 1984
In 1983 the Department of Crop Science, University of Nigeria, Nsukka hosted the VIth Annual Conference of the Horticultural Society of Nigeria (HORTSON). The L.O.C. under the chairmanship of Dr. C. Oyolu asked me to give an invited lead paper in the area of quality environment which should be consistent with the Conference theme: "Horticulture for National Fresh Food and Environmental Quality". Being fresh from graduate school in the United States and having majored in the area of Ornamental horticulture and landscape, a new area as far as Nigerian University education was concerned, I presented a paper titled "Perspectives in ornamental Horticulture Appropriate for Our National Fresh Food and Environmental Quality".

After the conference and no publication was forthcoming, and in spite of a letter of acceptance of the paper by the Editor-in-Chief, the idea of a monograph was born to document my finding.

This monograph is a version of that paper and it should be helpful to Horticulturists, students, urban and regional planners, architects and all who care about a quality environment in Nigeria.
ACKNOWLEDGEMENT

The author expresses appreciation to colleagues who helped to make this work possible. I thank the staff of Anambra State Open spaces Development Commission (O.S.D.C.), and the Forestry Commission both in Enugu for giving me access to their records and for their help in this study.

I thank Dr. C. Oyolu for his editorial contributions and Emma Onah for initial typing.
INTRODUCTION

This work looked at environment as our physical surrounding, and started by assessing the quality of the Nigerian environment.

Then it considered the perceptions we have as to what constitutes a good environment based on actions being taken by governments and other institutions to improve the environment.

A brief overview of the disciplines of Ornamental Horticulture was then presented and finally the various way by which ornamental horticulture can enhance our environment was considered as the ornamental horticulture that is the appropriate for our environment.

THE QUALITY OF OUR ENVIRONMENT

The quality of our environment is dependent on all those factors, natural and man-made which interact to determine the state of our surrounding. It is dynamic, and a knowledge of the contributory factors can go a long way in affecting the direction of our efforts towards improvement.

On one hand the features of our Government Residential Area (GRA) are well known. These features include:

1. Remote from the township area
2. The buildings have spacious areas around them.
3. Buildings are well constructed
4. Well landscaped with a variety of beautiful shade trees, shrubs, hedges and lawns.
5. Proper drainage and adequate waste disposal systems etc.

However only a very small percentage of the people live here. In the capital city of Anambra State, Enugu only 7% of the people live in GRA.

On the other hand our township features include

1. Very high people density per land area.
2. Poorly sited, constructed and maintained houses.
3. Minimum or no provision for waste disposal.
4. Lack of extra space for other activities (except perhaps the road in front of the 'yard', often used for play by children, constituting a health hazard.
5. Air pollution due to lot of vehicles, generators, accumulated filth.
6. etc, etc.
The picture in the rural areas is not different in principles of environmental quality, from that of the township. Their general features included

1. Filthy surroundings and poor sanitation.
2. Inadequate provision for waste disposal
3. Erosion problems
4. Polluted sources of water, especially when many depend on surface running water,
5. Dust pollution which is aggravated by poor roads.
6. etc.

Extreme cases of very poor environment due to many kinds of pollution are typified in towns like Kano, Lagos (Inyang 1978).

The conclusion therefore is that our environment is characterized by poor sanitation, pollution (different types), improper waste disposal, soil erosion; polluted sources of water, overcrowding of buildings, very little or no landscaping, destruction of native vegetation, a lot of ignorance.

OUR PERCEPTION AND ACTION

An assessment of our perception of what constitutes a good environment can be achieved by considering actions or measures taken by government, schools, institutions and individuals towards the improvement of our environment.

Over the past few years we have seen the establishment by government of bodies that are concerned with improvement of environmental quality.

- The Federal and State Ministries of Housing and Environment
- The various housing projects including the low-cost housing scheme
- The Anambra State Open Spaces Development Commission
- Government action on menace of soil erosion.

A typical example of erosion control project by the government is the multi million naira Nanka/Agulu project. It is on record that erosion control measures were initiated as far back as 1946 on this site by the then Eastern Region Government (Okafor). Now the project is being tackled from different angles including engineering, agriculture, forestry and without knowing a environmental horticulture.

- The activities of Federal and State Departments of Forestry in Amenity Forestry and Forestation Programme which have contributed to the enhancement of our environment.
- The establishment of parks and gardens especially in urban areas
- Parks and play-grounds in schools and new housing estates.
The case of Open Spaces Development Commission, Enugu exemplifies the trend in the use of plant material, specifically its form, texture and colour in arrangement to enhance the landscape. The landscape is an outdoor area with man-made and natural characteristics.

The commission was established in 1963 and charged with the responsibility of developing parks among other things in the state (now Anambra and Imo). It is claimed to be the leader in the country in the area of open spaces development. Its plan also involves the planting of roadsides and road-islands, in fact, the message of plant a tree is the ultimate aim of the commission, to turn the entire landscape into something beautiful, peaceful, scenic, where people could feel the tranquillity of nature.

Since the inception and active development of the commission, it opened five parks in 1976 and by 1982, have completed and commissioned 12 parks in Enugu and Onitsha. It also has on-going projects in almost all the local government areas of the state. Their environmental activities have been extended to schools, hotels, various institutions, churches, hospitals and private people.

The trend in public demand for ornamentals is exemplified by the revenue collected by this commission from the sale of flowers and wreaths (See table 1 below).

### Table 1: Revenue from Sale of Flowers and Wreath.

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount collected</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979/80</td>
<td>3,981.15</td>
<td>Flowers</td>
</tr>
<tr>
<td>1981</td>
<td>595.00</td>
<td>Wreath</td>
</tr>
<tr>
<td>1982</td>
<td>11,606.95</td>
<td>Flowers</td>
</tr>
<tr>
<td>1983</td>
<td>1,045.00</td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td>33,260.20</td>
<td>Flowers</td>
</tr>
<tr>
<td>1983</td>
<td>4,595.00</td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>43,302.50</td>
<td>Flowers</td>
</tr>
<tr>
<td>1983</td>
<td>4,190.00</td>
<td></td>
</tr>
</tbody>
</table>


Observations suggest that more people are considering and going into the landscape business. According to Kessler (1992) landscape horticulture business will include the following:
1. Production nursery which is concerned with production of woody plants from seedlings or rooted cuttings.

2. Landscape nursery, concerned with preparation of sites for landscaping, purchases and planting of trees, shrubs.

3. Landscape maintenance.

4. Garden centre which retails various plant materials and other support supplies such as chemicals, containers, potting mixes.

5. The arboretum and botanical gardens.

During one of my visits to a substation of the Forestry commission in Enugu, we observed the following sales income (Table 2) in their annual reports on planting material for ornamental purpose.

<table>
<thead>
<tr>
<th>Year</th>
<th>Sales of Plant Material (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974/75</td>
<td>5.00</td>
</tr>
<tr>
<td>1975/76</td>
<td>629.25</td>
</tr>
<tr>
<td>1976/77</td>
<td>5,167.00</td>
</tr>
<tr>
<td>1977/78</td>
<td>1,460.60</td>
</tr>
</tbody>
</table>

In 1977/78 the remark was “no funds so no job done”.

Source: Anambra State Forestry Commission Enugu to poor environment.

CONTRIBUTING FACTORS

Natural:

Some natural factors which contribute to our environmental problems include high rainfall, soil, wind, topography.

The force of impact by large raindrops as is common here, cause considerable damage to bare soils. Compaction may result, leading to surface runoff. In friable soils, erosion of top soils may be the start of serious erosion problems. Velocity of surface runoff is high in natural slopes, and with time a lot of soil is washed off. The result is typified by gully problems.

Although as a nation, we do not experience such natural disasters as tornadoes, earthquakes and the like, yet high wind velocities as is common during the harmattan cause some considerable dust and air pollution and damage.
Technology:

In high industrial areas such as Lagos, environmental pollution in form of wastes, toxic fumes and spills are considerable, Iyanyang (1978). Urbanization and increase in population have generated a lot of waste which are not properly disposed. According to Iyanyang (1978), "Kano City is both ill ventilated and ill drained." Solid wastes and remains of slaughtered animals are left around, the net result is an environment that is awful and support growth of several disease causing agents.

Our extensive road development created many unstable slopes. Without adequate soil consolidation programme, more environmental degradation will follow. A good example is along Enugu-Onitsha express way, where sections of road banks are being eroded.

Land Use:

Our land misuse practices including shifting cultivation, deforestation for various development projects, bush burning, poor land use planning and the like have contributed to the degradation of our environment.

As already shown, there are some steps being taken especially by various governments, in the effort to solving our environmental problems yet there are problems. Many of the projects are hampered by inadequate finance, special interest, and lack of appreciation of the magnitude of our environmental problems.

ORNAMENTAL HORTICULTURE

This branch of horticulture deals with the production marketing and utilization of plants for the enhancement of our environment - includes the landscape and the interiorscape. The science of ornamental horticulture seeks to serve the industry by research, education and extension, while the industry in involved with the practice (as described above).

An overview of ornamental horticulture will include:

1. Landscape horticulture
2. Floriculture
3. Turf culture

Landscape Horticulture:

Landscape horticulture is concerned with outdoor, woody plants including trees, shrubs, climbers these are propagated for use in the surroundings of homes, offices, parks, highway, and other areas where they can be functional.
Design of the landscape is undertaken by a landscape architect who is highly educated, with a degree in that field. The training programme involves studies in architecture, design principles, use of plant materials, urban landuse planning etc. According to McDaniel (1979), the design work can also be done by a landscape designer who is not a certified landscape architect but is familiar with landscape design through experience and study in horticulture and plant material use in design.

Lanscaping involves use of both plant materials and land construction, hence preparation and installation require some skill in construction and engineering. Landscape maintenance deals with the subsequent handling and care of installed plants and other structures. A lot of knowledge and experience in maintenance is required if the quality of the design and installation of a landscape is to be realised. A well designed and executed landscape project will greatly reduce the quality of the environment if it is not well maintained.

Floriculture:

Floriculture is concerned with pot plants, foliage plants, cut flowers and bedding plants. The greenhouse is used extensively for production of floral crops. A sound knowledge of plant growth requirements is very essential for successful operation in greenhouses. Very precise environmental controls is achieved by various installations. Temperature, day length, watering and fertilization are often controlled automatically.

All these make it possible for scheduling of crops to meet market demands. In Europe and U.S.A. for example where floriculture is advanced production of particular crops is directed towards special holidays. Examples include:

- Lilies for Easter
- Poinsettia and mums for Christmas
- Mums for Mothers' day
- Roses for Valentines day

Floriculture therefore requires excellent horticultural knowledge and high investment, the good thing however is that the return is worth it.

There is also maintenance needs in floriculture especially in the area of care of indoor plants. Adequate watering, fertilization and pest management are necessary means for prolonged useful life of these plants. Floral design, that aspect of floriculture that utilizes plant parts especially leaves and flowers to make arrangements to enhance indoor environment. Anyone who has seen an elaborate wedding decoration will agree that floriculture indeed has a message for our interiorscape.
Turf Culture:

A very essential part in most landscapes is the grass area. In fact in English gardens the worth of the whole landscape can be determined by the quality of the lawn. Numerous grass species have been developed for outdoor leisure, recreational and competitive sport activities - picnics, golf, football, volley ball and others.

Turf have other uses and Beard (1977) identified seven areas where turfs make functional contribution to the quality of life. These include soil erosion control, dust stabilization, heat dissipation, noise abatement, glare and safety.

ORNAMENTAL HORTICULTURE THAT IS APPROPRIATE FOR OUR ENVIRONMENT

A purely ornamental notion of ornamental horticulture should be abandoned in favour of a broader one. It should be responsive to the environment on a long term basis; reduces dependence on non-renewable resources, is economically sound; is aesthetically pleasing and artistically satisfying; and is socially responsible Beatty (1981).

Environmental Planning:

The subject of the environment cuts across many fields including horticulture, Engineering, Ecology, Soil Science, Town planning and Architecture. There is therefore the need for any development to consider alternative use of resources. The cause of action should be that which enhances rather than degrade our environment. This requires the harnessing of the expertise of many by planners to achieve the greatest good in the environment.

The contribution of ornamental horticulture can be in the area of novel designs and resource use, pollution control, soil stabilization, climate modulation, education, awareness and appropriate land use.

Novel Designs and Resource Use:

The large quantities of solid wastes generated in our urban towns can be piled up into mounds, mixed with soil creating artificial hills. These can be planted up with shallow rooted plants and grasses forming a part of the landscape.

Landfills for reclamation purposes can handle more solid wastes. While composting of household organic matter will go a long way in reducing our disposal problem.

Recycling of materials that would litter the surroundings should be looked into as is common in some developed countries.

Beer cans and other metal junk can all be recycled. The use of various sizes and shapes of plastic buckets and cans, tins, as pots for growing house plants is common in our towns. These are good steps in recycling and environmental improvement.
Good landscaping should take full congruence of biological as well as socio-cultural systems (Naigzy and Obeng 1981). This is well illustrated by the use of "Inyi" in forestry (Okafor 1983 personal communication). The use of this tree in reforestation has been very successful because of the cultural significance of the plant to the people. The natives do not cut up the wood of this plant as they would when other plants are in use.

**Pollution Control:**

Tree banks can effectively be used to remove air borne dust and other gaseous pollutants. Many of our roads are untarred, or ill maintained such that during dry periods a lot of dust accumulate on near-by houses and other structures. A suitable tree bank as part of the landscape will reduce maintenance cost of such houses due to repainting and cleaning not to mention the disease organisms carried with dust.

Objectionable views such as the sites of bucket latrines in many of our urban and rural areas can be effectively screened with adequate planting around the site. Noise pollution can be reduced by effective use of landscape trees. The noise level in Nigerian cities is quite high and long exposure is devastating especially to children Inyang (1978).

**Soil Stabilization:**

A lot of our land has been rendered bare, and friable soil need to be stabilized with adequate planting schemes. Grass species have the ability to cover the soil surface quickly and help reduce the impact of raindrops and enhance soil stabilization, surface runoff is also reduced by adequate vegetation cover. Roadsides and slopes are sites requiring stabilization through proper landscaping. The use of plant rather than order materials such as concrete for stabilization has ecological and economic advantages.

**Wind Control and Climate Modulation:**

A gentle breeze on a hot day is very refreshing but high velocity winds can be quite damaging to soil, plants and structures. Hence effective wind control by adequate landscaping is required. A plant-wind-break in the landscape will protect objects on the leeward said. The extent of protection will depend on the height and length of the wind break. As wind passes over or around a wind break, turbulent eddy currents that are lower in velocity than the main windstream is created at the edges of the windbreak. A sucking action is generated at the protected side, if no air can penetrate the windbreak. This reduces the effectiveness of the windbreak. Plants are therefore excellent windbreakers since they allow some air penetration.

As moisture evaporates from the leaves of plants, a cooling effect is produced on the environment. Trees also provide shade in the landscape, reducing solar...
radiation and reflected light, and hence the heat load of the area. Such plantings therefore will reduce the use of air conditioners.

Education:
Development of sound environmental responsible horticulture courses in our institution of higher learning is needed. As educationist horticulturist, we must emphasize studies that are geared towards the solution of our environmental problems. Unless our graduates who will be practising horticulture are properly oriented the contribution of ornamental horticulture in the overall enhancement of our environment will be limited. Meeting specific local environmental needs should become part of the student's training.

Similar programme of study but of lesser rigour should be pursued in lower education ladder. It is most productive to start early in our educational system to inoculate principles.

Education should also be extended to the masses, so that they can identify with our environmental problems and the suggested solutions. The final result is the adoption of ideas and behaviour that enhances our environment.

Parks and Gardens:

Parks and gardens are already features of our environment especially in the urban towns. Hitherto they have performed such functions as conservation, amusement, relaxation and beautification. Good as these functions are appropriate ornamental horticulture requires that their functions need to be expanded to include, education and research.

Our clients to these parks and gardens should be studied. We note that few of the available parks have constant attendants and even fewer keep adequate records which can be used as a feedback for future planning and improvement. Observation suggests that children constitute the major users. The reasons for such limited patronage may include location, available services, limitation in the function of our parks.

Nigeria is fast becoming a rushing nation. Therefore the adult population should be reached with renewal and recreational opportunities of our parks. The value of horticulture in healing has been recognized in many advanced countries. In fact a new area of Horticulture - Horticultural therapy has taken off.

Park designs that emphasize natural setting rather than a compendium of unnaturally bright colours and displays should be preferred. Native species adapted to the area should be used liberally. The special needs of urban horticulture - a whole new branch of horticulture concerned with the functional uses of plants to enhance urban environment, Tukey (1982), must be tackled.

Research on the growth and environmental requirements of landscape plants should become part of our gardens and parks. The body of knowledge accumulated from such studies especially on local requirements of plants can be drawn by planners, home owners and general public to solve landscape problems.
Demonstration designs, plantings and plots in various localities will play a vital role in the process of bringing appropriate horticulture to the masses.

Awareness:

The more people are made aware of what constitutes environmental pollution, the more responsible and involved they can become. Protest in mid 60's in U.S.A. and some parts of Europe against industries that polluted the environment was possible only after many people (Students, housewives, teachers etc.) learnt by television and other mass media the effects of pollution on people. Akpati (1979). Before this time only few people knew what was going on and even fewer cared. Such local habits as urination on street sides, in open dumps, open sewer systems dilapidated buildings which abound, contribute to pollution. "A Nigerian market woman who has her stall (especially edibles) adjacent to these pollutants does not realise (nor her costumers) the health hazards" Akpati (1979). A television programme of this and other environmental polluting habits will help in educating the masses on environmental quality. A horticulturist might add plant a tree in that vacant lot.

A Note:

Most of the functional parks in Enugu were built on "reclaimed" lots from various squatters - Motor mechanics, unauthorized hawkers booths, dump sites unauthorized parking lots, etc.

APPROPRIATE LAND USE

Dual Purpose Planting:

We have already stressed that our ornamental horticulture must be appropriate. Okafor (1981), documented a list of indigenous woody plants, trees and shrubs, that are used as fruits, nuts, seed, and vegetables. Some of these plants were shown to have ornamental qualities, By the kind permission of the author I have reproduced the table 3. The significance of this dual purpose planting is that with judicious selection of plant materials both aesthetic and food functions can be met.

Native Plant:

The use of native plants that are adapted to the local environment should be encouraged. In highway landscape for instance native plants will save in establishment and maintenance cost when compared to the use of "Beautiful exotic plants".

New use of native plant should also be emphasized in all landscape establishment.
<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Common name if any</th>
<th>Family</th>
<th>Ornamental Parts and/or value (If any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adansonia digitata</td>
<td>Baobab</td>
<td>Bombacaceae</td>
<td>Shade tree</td>
</tr>
<tr>
<td>2. Afzelia africana</td>
<td>--</td>
<td>Caesalpinaceae</td>
<td>Shade tree</td>
</tr>
<tr>
<td>3. Bigelia sapida</td>
<td>Akee apple</td>
<td>Spindaceae</td>
<td>Shade tree</td>
</tr>
<tr>
<td>4. Brachystegia curvica</td>
<td>Achi (1)</td>
<td>Caesalpinaceae</td>
<td>Shade tree</td>
</tr>
<tr>
<td>5. C. lepidota</td>
<td>--</td>
<td>Caesalpinaceae</td>
<td>Purple leaf</td>
</tr>
<tr>
<td>6. Dacryodes edulis</td>
<td>African pea</td>
<td>Sterculiaceae</td>
<td>Leaves and cauliﬂory</td>
</tr>
<tr>
<td>7. Detarium microcarpa</td>
<td>Ofo (1)</td>
<td>Burseraceae</td>
<td>Shade tree golden brown flowers, pink fruits</td>
</tr>
<tr>
<td>8. Dialium guineense</td>
<td>Black velved tamarind</td>
<td>Caesalpinaceae</td>
<td>Shade tree</td>
</tr>
<tr>
<td>9. Garcinia kola</td>
<td>Africa pea</td>
<td>Caesalpinaceae</td>
<td>Shade tree</td>
</tr>
<tr>
<td>10. Hildegardia barteri</td>
<td>--</td>
<td>Guttiferae</td>
<td>Shade tree, red and fruits</td>
</tr>
<tr>
<td>11. Irvingia gabonensis</td>
<td>African mango ugeri (i)</td>
<td>Sterculiaceae</td>
<td>Shade tree scarlet flower</td>
</tr>
<tr>
<td>12. Monodora myristica</td>
<td>African nutmeg</td>
<td>Sterculiaceae</td>
<td>Shade tree</td>
</tr>
<tr>
<td>13. Parkia clappertoniana</td>
<td>Locust bean, dorowa (H)</td>
<td>Irvirgiaceae</td>
<td>Shade tree red and yellow flowers</td>
</tr>
<tr>
<td>14. Pentaclethra macrophylla</td>
<td>oil bean</td>
<td>Annonaceae</td>
<td>Shade tree, red capitate inflorescence</td>
</tr>
<tr>
<td>15. Spondias mombin</td>
<td>hog plum</td>
<td>Anacardiaceae</td>
<td>Shade tree</td>
</tr>
<tr>
<td>16. Ta arindus indica</td>
<td>Tamarind</td>
<td>Caesalpinaceae</td>
<td>Shade tree</td>
</tr>
<tr>
<td>17. Tetrapleura tetraperta</td>
<td>Ushakirisha</td>
<td>Mimosaceae</td>
<td>Shade tree</td>
</tr>
<tr>
<td>18. Treculicia africana</td>
<td>African breadfruit</td>
<td>Moraceae</td>
<td>dyrn vuyyinh fruiting at ground level</td>
</tr>
<tr>
<td>19. Vitex doniana</td>
<td>Mbenbe (i)</td>
<td>Verbenaceae</td>
<td>Shade tree</td>
</tr>
<tr>
<td>20. X quintasii</td>
<td>spice tree</td>
<td>Annonaceae</td>
<td>--</td>
</tr>
<tr>
<td>21. Glyphaea brevis</td>
<td>bitter leaf</td>
<td>Tiliaceae</td>
<td>hedge</td>
</tr>
<tr>
<td>22. Veronia amygdalina</td>
<td>--</td>
<td>Compositae</td>
<td>hedge</td>
</tr>
</tbody>
</table>

Source: Okafor 1981 (Ref 7)
Energy efficiency in use of plants in homes, parks and gardens, highways landscape must be considered. Selection of plants must consider water use. In the drier park of our countries (north), desert landscape should, for example be very natural and efficient. The cost of landscape maintenance must affect our choice of plant materials. Intricate designs though adequate in few situations should be the exception and not the rule (as it is in our landscape).

Lawn substitutes are being investigated in many parts of the world. One common substitute is wood chips. It is conceivable that someday the traditional lawn may become a luxury item. This is because of the cost of maintenance.

In summary therefore the Nigerian environment is very far from being good. This is due to natural, technological and behavioral causes. By redefining the scope of ornamental horticulture to make it more responsive to our needs, and by adequate use of our resources, we can as ornamental horticulturist contribute in a large measure to the improvement of our environmental quality.

REFERENCES


