Landscape design on research stations

Alec C. Butler
Landscape design on research stations

Alec C. Butler

October 1996
IITA Research Guides

IITA Research Guides provide information and guidance to agricultural researchers, technicians, extension specialists, educators and students involved in research and training. The Research Guides are periodically updated to meet advances in scientific knowledge.

IITA permits reproduction of this Research Guide for non-profit purposes. For commercial reproduction, contact the IITA Publications Unit.
Landscape design on research stations

Objectives. This guide is intended to enable you to:

- describe the importance of landscape designs;
- construct and implement landscape designs;
- maintain landscapes of research stations.

Study materials

- Slides of landscape designs.
- Catalogues and illustrations of trees and shrubs.

Practicals

- Discuss the landscape design of a research station.
- Practice landscape maintenance
Questions

1. Give five reasons for landscape design on research stations.
2. What gives a visitor first impressions of a research station?
3. Whom should you ask for help when designing a new landscape?
4. At the initial stage, what plants should you use?
5. What are the advantages of "open-plan" layout of landscape?
6. What should you do with existing trees and shrubs?
7. Why should you avoid overcrowding of the landscape?
8. During which season should you construct and implement your landscape design?
9. When should you carry out planting?
10. Discuss "pop-up" irrigation systems.
11. What are the benefits of leaving lawns lying dormant during dry periods?
12. What is the advantage of maintenance on "task basis"?
13. What is the main maintenance task during the wet season?
14. What is the main maintenance task during the dry season?
15. How can you utilize grass cuttings, old leaves, and so on?
16. When should you mulch young plants?
17. What is the advantage of regular maintenance?
18. Why should you not apply too much fertilizer?
19. Why should you propagate plant material in a nursery?
Landscape design on research stations

Abstract. Landscaping of research stations is important for soil conservation, health of staff, privacy, security, and aesthetics. Landscape design gives the first impression of a research station. If the design is efficient and maintenance is regular, few problems arise.
Landscape design is the planning of landscape layout. Natural scenery may need arrangement and modification for several reasons:

- soil conservation,
- health,
- screening/privacy,
- security,
- aesthetic effect.

**Soil conservation.** Efficient landscaping can lead to improved soil condition and erosion control.

**Health.** A well maintained, clean environment benefits the health of all.

**Screening/privacy.** Trees and shrubs can be utilized to screen buildings for privacy.

**Security.** A well-planned, well-maintained landscape can assist with internal security.

**Aesthetic effect.** Aesthetics is an additional benefit of well-planned landscaping. A visitor receives important first impressions from landscape design.

Whenever possible, ask a landscape architect to design any new landscape. Work closely with the architect and involve your gardener or groundsman who has a good understanding of the problems of maintenance.

Ensure that trees and shrubs selected suit the purpose, considering the following points:

- Ensure that the growing characteristic of each plant suits the environment in which it is to be used.
• Preferably select species indigenous to the area.

• Consider growth habit, root structure, and so on before you recommend a plant.

• At the initial stage, use plants known to be successful in the area, then introduce 'foreign' plants later.

IITA favours an 'open plan' layout, using plants to provide the necessary boundaries and screening of buildings and areas (Figure 1). This makes maintenance easier. Tractors and large mowers can be used easily to maintain large open lawns.

Figure 1. IITA uses an 'open-plan' layout of landscape.
Ease of construction and implementation depends on efficient initial designs. Provide the contractor with drawings on levels, drainages and so on.

During design and construction, restrict earth movement to a minimum. Examine existing trees and shrubs carefully and leave them within the landscape design where convenient and suitable. Do not remove any plant unless absolutely necessary (Figure 2), but avoid overcrowding to make mechanization of maintenance easy.

Construct and implement your design at a time when adequate (but not excessive) rain is prevalent. Preferably plant at the beginning of the rains to allow plants a full rainy season for establishment.

Figure 2. Do not remove any tree unless absolutely necessary.
Make provision for an efficient irrigation system. Initially, IITA installed an underground 'pop-up' irrigation system. However, the system was expensive to operate and somewhat inefficient. Hose taps, hoses and sprinklers that can be moved are more suitable.

Young trees and shrubs, particularly in tropical climates, must be watered during the dry season. Lawns can survive without water, and some lawns in fact benefit from lying dormant. Drought eliminates most weeds. Watered lawns are easily weed infested, and are only necessary if the compound is to be kept green.
Two important principles of landscape maintenance are:

- mechanize maintenance procedures as much as possible,
- apply regular maintenance schedule.

**Maintenance procedures.** Tractor mounted gang mowers, ride-on triple mowers, and 36" cylinder mowers are most efficient on large open lawns. Use small mowers for small areas. Specialized equipment for cutting banks and edges of lawns are also vital for efficient maintenance.

**Maintenance schedule.** At IITA, lawns are mown every 10 working days. A maintenance schedule allocates maintenance crews to specific areas of responsibility. Crews work on a "task basis". This method is more popular and efficient. The crews responsible for grounds around staff quarters tend up to six houses per day. The superintendent examines the work, and ascertains that crews have completed a satisfactory job.

The wet and dry seasons present different maintenance problems.

In the wet season, the main task is to keep the grass down. Growth is rapid and it is necessary to maintain a short tidy lawn by cutting at regular intervals.

In the dry season, the main task is to keep young shrubs and trees watered, and to irrigate lawns that are to be kept green. You may use a tractor-towed tanker for watering trees and shrubs.
Another dry-season task is the removal of dead leaves from the lawn areas. Use leaf blowers to 'pile' leaves for transporting to the compost pits. Leaf blowers are also efficient for cleaning roads and foot paths. Grass cuttings, leaves and so on can quickly be blown back onto the lawns. Utilize all compostable materials, for example, grass cuttings and leaves, for compost.

Other seasonal and on-going maintenance tasks are:

- Mulch all young plants at the start of the dry season. Rice straw is usually available as mulch.

- Fertilize lawns twice a year, at the beginning and at the end of the rains. Apply N-P-K (15-15-15) at 30-60 g/m².

- Prune trees and shrubs as a continuous maintenance practice, removing dead wood as necessary.

- Apply herbicides and insecticides whenever necessary. Generally, when maintenance is regular and efficient, few pest problems arise. Train staff in the use of chemicals. Consider safety of persons and animals when applying chemicals.

- Replace trees and shrubs if soil conditions are poor. Dig a hole, fill it with top soil and compost so that the new plant has a good start.

- Apply fertilizer to young trees and shrubs from the second year of planting. Be careful; too much fertilizer may damage and kill young plants.
• Propagate plant material in a nursery. You can save time and money if plant material is available on site. Provision of water at the nursery is essential.
4 Bibliography


If you use this Research Guide in training ...

Generally:

- Distribute handouts (including this Research Guide) to trainees one or several days before your presentation, or distribute them at the end of the presentation.

- Do not distribute handouts at the beginning of a presentation, otherwise trainees will read instead of listen to you.

- Ask trainees not to take notes, but to pay full attention to the training activity. Assure them that your handouts (and this Research Guide) contain all relevant information.

- Keep your training activities practical. Reduce theory to the minimum that is necessary to understand the practical exercises.

- Use the questions on page 4 (or a selection of questions) for examinations (quizzes, periodical tests, and so on). Allow consultation of handouts and books during examinations.

- Promote interaction of trainees. Allow questions, but do not deviate from the subject.

- Respect the time allotted.
Specifically:

- Discuss with trainees experiences and importance of landscape design (10 minutes).

  Present and discuss the content of this Research Guide using the study materials on page 3 (45 minutes).

- Visit your research station or any other one and ask trainees (in groups) to elaborate and present suggestions for landscape improvement (~½ day).

- Demonstrate and practice procedures of landscape maintenance (~½ day). Make sure that each trainee has opportunity to practice.

- You may relate your subject with IITA's Research Guide 1 and 7 (see bibliography).
The International Institute of Tropical Agriculture (IITA) is an international agricultural research center in the Consultative Group on International Agricultural Research (CGIAR), which is an association of about 50 countries, international and regional organizations, and private foundations. IITA seeks to increase agricultural production in a sustainable way, in order to improve the nutritional status and well-being of people in tropical sub-Saharan Africa. To achieve this goal, IITA conducts research and training, provides information, collects and exchanges germplasm, and encourages transfer of technology, in partnership with African national agricultural research and development programs.

L'institut international d'agriculture tropicale (IITA) est un centre international de recherche agricole, membre du Groupe consultatif pour la recherche agricole internationale (CGAI), une association regroupant quelque 50 pays, organisations internationales et régionales et fondations privées. L'IITA a pour objectif d'accroître durablement la production agricole, afin d'améliorer l'alimentation et le bien-être des populations de l'Afrique tropicale subsaharienne. Pour atteindre cet objectif, l'IITA mène des activités de recherche et de formation, divulgue des informations, réunit et échange du matériel génétique et encourage le transfert de technologies en collaboration avec les programmes nationaux africains de recherche et développement.

O Instituto Internacional de Agricultura Tropical (IITA) é um centro internacional de investigação agrícola pertencendo ao Grupo Consultivo para Investigação Agrícola Internacional (GCIAI), uma associação de cerca de 50 países, organizações internacionais e regionais e fundações privadas. O IITA procura aumentar duravelmente a produção agrícola para melhorar a alimentação e o bem-estar das populações da África tropical ao sul do Saara. Para alcançar esse objetivo, o IITA conduz atividades de investigação e treinamento, fornece informações, reúne e troca material genético e favorece a transferência de tecnologias em colaboração com os programas nacionais africanos de investigação e desenvolvimento.