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A case for a vegetation survey in a developing country based on Zimbabwe

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ABSTRACT

The need for a vegetation survey in Zimbabwe, a developing country, is discussed. It is proposed that such a survey should produce a classification which is based on floristic criteria, and in which the vegetation types relate as nearly as possible to homogeneous environmental units. The practical application of such a classification is outlined with reference to the management of natural vegetation resources, land use planning and the preservation of species diversity.

RÉSUMÉ

ETUDE DE LA VÉGÉTATION DANS UN PAYS EN VOIE DE DÉVELOPPEMENT: LE CAS DU ZIMBABWE

Le besoin d'une étude de la végétation au Zimbabwe, pays en voie de développement, est discuté. Il est proposé qu'un tel relevé produise une classification basée sur des critères floristiques et dans lequel les types de végétation s'apparentent aussi étroitement que possible aux unités homogènes du milieu. L'application pratique d'une telle classification est tracée avec référence a la gestion des ressources végétales naturelles, programme d'utilisation des terres et la protection de la diversité des espèces.

REASONS FOR A VEGETATION SURVEY

Vegetation survey usually has the aim of accurately describing vegetation in terms of plant associations and of identifying relationship between the environment and these associations or their constituent species. In Zimbabwe, where large areas of land are still covered by natural vegetation, sound and objective classification of vegetation would have important practical application for both management and planning.

There are three main reasons that would justify a vegetation survey aimed at providing a classification system which has ecologically reliable and readily identifiable types. Such a survey (1) would help towards a more efficient utilization of natural vegetation; (2) could assist in land use planning; (3) is the only objective way available for selecting nature reserves.

1. *Vegetation survey in non-arable-land*

About two-thirds of the land in Zimbabwe is non-arable and land use is based on the utilization of the natural vegetation. In these areas, the vegetation constitutes the main natural resource and a vegetation survey which thoroughly describes, delimits and classifies existing plant associations on floristic criteria into vegetation types is of particular importance. It would provide a better basis than is presently available for research and advisory programmes and for management. Until such a framework exists, valid comparisons between vegetation of different areas and extrapolation of research results will remain difficult or unsound. A reliable classification of vegetation would, for instance, allow for a more objective selection of trial sites for the various research projects that are carried out to improve natural pastures; it would also make the resulting recommendations more specific.

Vegetation types are made up of individual species; each type has its characteristic species assemblage and within a type the species occur in more or less constant proportions. Once a classification of vegetation types is worked out and the total area that each type occupies is known, accurate assessments of the abundance of a species can be made. A vegetation classification based on floristic criteria is therefore the basis for all resource assessment studies. For instance, carrying capacity for livestock or game can be worked out more easily and accurately if the vegetation types of the grazing areas concerned are properly defined and described.

Non-arable lands also contain the most fragile ecosystems of the country. Mismanagement such as excessive removal of timber or over-grazing can easily cause irreversible changes like soil erosion or the loss of desirable plant species. It is imperative that these natural ecosystems are managed so that stability is maintained under utilization. The knowledge gained from a vegetation survey of the climax vegetation and the various successional stages that can occur is essential for assessing land potential, gauging degradation and planning management systems.

In rural areas the natural vegetation provides for many needs essential to the life of the people. Edible wild plants are an important constituent of the nutrient diversity in the people's diet. The traditional healers use the plants of the bush in their various remedies. Wild plants provide the raw material for much that is used in everyday life and more recently also for numerous homecraft industries. Enormous demands are made on the natural woodland to provide fuel for heating and cooking. Contrary to what may be expected from advances in modern standards of living, the reliance on the vegetation is likely to increase with increasing population

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pressure. To avoid habitat degradation, which is already far advanced in some areas, and also to prevent over-exploitation of useful plants, it is essential that utilization of the vegetation proceeds on a sustained yield basis. Vegetation survey will locate, assess and enable the monitoring of the indigenous vegetation resources and is therefore an important pre-requisite for their sound management.

2. *Vegetation survey as an aid in land use planning*

All prevailing environmental factors that significantly affect plant life are expressed in an integrated form by the natural vegetation. Vegetation types can therefore be used to indicate and identify land classes.

For agricultural planning and advice it is essential to have a classification of land types. Conventionally, land types are obtained by classifying land according to the physical characteristics of the environment that determines agricultural potential. The Agro-Ecological Survey by Vincent & Thomas (1960) is an example of this approach. It divides the country into climatic regions. These are further subdivided into natural areas primarily on soil characteristics but also on relief and sometimes minor climatic variations. A more refined version of the same approach is outlined by Whitlow (1980). Both are intended for general planning and assessing land potential on a country-wide scale. As a basis for detailed planning or a sophisticated advisory service, the categories made are too broad and in need of subdivision. What is required for this purpose is a classification in which the ultimate units correspond as nearly as possible to one type of environment. The land type survey carried out by N.C. MacVicar and his teams (MacVicar *et al.* 1974;1977) in South Africa aims at such a classification. In this survey areas with markedly uniform climate, terrain form and soil pattern are grouped into land types. Using all the important physical factors that affect plant growth, these land types are subdivided into units termed ecotopes which are areas with, for practical purposes, a uniform environment. There is a significant difference between one ecotope and any other.

In this country environmental units similar to the ecotopes described above are defined by the soil survey team of the Department of Research and Specialist Services. These units, for which ecotope is a convenient name, constitute the most refined land classes needed for practical agriculture. In areas where natural vegetation still exists each of these land classes or ecotopes is characterized by its own vegetation type and can therefore be identified and delimited by the vegetation that is supported by it.

It follows that where there is a reasonable cover of natural vegetation a vegetation survey can produce a similar classification of land classes to that achieved with a survey based on physical characteristics of the environment. This obviously does not mean that a vegetation survey can replace a soil survey in defining land classes since knowledge of the soil characteristics is essential. It does, however, mean that in relatively undisturbed areas a vegetation survey can greatly assist in recognizing and delimiting land classes. If a reliable vegetation classification is available before a soil survey is undertaken it can make the latter survey considerably easier. It is unfortunate that there is at present, despite extensive development, no vegetation team involved in land use planning.

3. *Vegetation survey to locate nature reserves*

Development in a country is often accompanied by large scale destruction of natural vegetation. As this spreads, plant species are endangered and it will become necessary to preserve species diversity. This can only be achieved successfully by protecting natural ecosystems in a nature reserve. It is important that the most suitable areas are chosen for nature reserves where maximum conservation can be achieved in the smallest possible area. Vegetation survey is essential for locating and selecting such areas.

The establishment of nature reserves is not just an emotional issue; they have a bearing on the survival of mankind and providing for them should be part of land use planning.

Most of what Man needs to sustain life comes from the plant kingdom. All cultivated plants have their origin in the wild. Advances in genetic technique mean that the circle of plant species that can be used for gene transfer in the breeding of a specific crop plant is widening. Distant relatives of crop plants are beginning to have value. The loss of even a single species means the loss of irreplaceable genetic material that has taken millions of years to evolve. Chemical compounds new to Man, some of which have important pharmaceutical or industrial use, are continually being discovered in wild plants. If plants are allowed to become extinct something might be lost that future discovery could otherwise have made valuable.

What is required initially, and has already commenced, is a vegetation survey of all national parks. Such a survey will reveal which plant species are already adequately protected. Surveys outside the parks will then indicate where further protection is necessary.

During development of the country, areas that are eminently suitable for nature reserves, and which the nation could afford to maintain as such, are denuded of their vegetation because their value as reserves is not recognized. This is another reason why it is important that a vegetation team is involved in land use planning.

PRESENT STATE OF VEGETATION SURVEY IN ZIMBABWE

The system of classifying vegetation currently used in Zimbabwe is essentially semi-physiognomic based on the growth form and appearance of vegetation (e.g. woodland, savanna, grassland), with the physiognomic 'types' further defined by apparent dominant species (Wild, 1965), Within 'types', e.g. *Brachystegia spiciformis/Julbernardia globiflora* woodland, there could occur large

variations in species composition and quantity, and in environmental factors.

Existing classifications based on a subjective approach can be useful in country-wide mapping and approximate habitat descriptions but are not accurate enough for requirements in research, land management and land use planning as outlined above. Aware of these shortcomings, the National Herbarium has planned a vegetation survey which will satisfy these practical needs. To achieve this the following three points have been basic to the planning:

1. The vegetation classification obtained must be based on floristic criteria and each of the categories or 'types' produced must where possible correspond to one particular type of environment.

2. The need for a common approach to vegetation classification by all concerned with the management of natural vegetation has to be taken into account.

3. The methods used to sample and classify have to be objective so that results obtained by different people and in different places are comparable.

Although the eventual aim would be a classification which includes each type of vegetation found in Zimbabwe, initially one would work on areas where a vegetation survey has immediate benefits, thus gradually building up a complete coverage of the country. Once the natural vegetation units are delimited for a given area in a sound floristic classification, mapping of the types can take place on a scale consistent with the needs. However, even without a map the classification envisaged would allow anyone to recognize the different vegetation types merely by identifying the species that characterize each type.

Suitable sampling, measuring and analytical technique for a full-scale survey have been established in a pilot survey of woodlands around Salisbury (Robertson, 1979) and a survey of evergreen rainforest in the Eastern Districts of Zimbabwe. More recently these techniques have been applied, tested and perfected by the Department of National Parks and Wild Life Management in a vegetation survey of the Sengwa Research Area. Initial results are most encouraging and the same approach has now been adopted for vegetation classification in all major national parks.

To sum up: the need for a vegetation survey has become increasingly urgent and without it the following disadvantages will result:

1. Sound co-ordinated management of non-arable land and indigenous vegetation resources will be more difficult.

2. Accurate resource assessment of indigenous species will be impossible.

3. A valuable aid to land use planning will be made unavailable.

4. Adequate conservation of the species diversity cannot be achieved.

The costs involved for a national vegetation survey constitute a relatively small investment considering the long-term returns that would stem from it. The indigenous vegetation is diminishing rapidly; it is therefore important that a vegetation survey commences as soon as possible, especially since it is essential for a workable programme of flora conservation.

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