NATIONAL AND INTERNATIONAL PERSPECTIVES IN NATURAL RESOURCES PLANNING

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INTRODUCTION

As the purpose of this congress is to show to the public the working of science, I shall dispense with the normal trappings of the scientific paper such as attempting to be infinitely objective in my statements and avoiding any reference to personal opinions. The topic with which I am dealing does not, in any case lend itself to normal scientific analysis. The events to which I am referring occur at such infrequent intervals and under such varying circumstances that there is no replicability and no opportunity for valid statistical analysis.

On the positive side it addresses itself to a problem which has been formerly lacking in scientific literature, yet which is very real, namely the failure to transfer scientific knowledge into practice. It is a topic that is being increasingly considered in scientific journals, as in a time of economic depression the flow of finance into scientific investigations dries up and scientists are required to justify expenditure on their projects.

THE PROCESS OF APPLYING KNOWLEDGE TO PRACTICE

There appear to be several variants or several schools of opinion as to how this happens. One extreme is represented by the opinion that a completed piece of scientific work, if soundly conceived and executed, will be guaranteed reception and application by people concerned with the applied aspects of the particular field of endeavour. This is the approach most frequently taken by people in academic institutions.

At the other end of the scale is the attitude that the research must supply the needs of the organisation financing it, that is

that the ultimate application determines the objectives and sometimes even the techniques of a research project. This is the attitude taken by industrial organisations concerned with development of new saleable products.

Between these two extremes there is a whole range of attitudes and techniques of transfer, perhaps the best known of which is the use of an extension service, that is a group of people with knowledge of both the theory and application, as well as communication skills, whose task it is to take the scientific findings, render them more readily understandable and take them to the potential users. One of the most successful tactics of recent times is the Japanese approach of acquiring largely theoretical knowledge with commercial potential, concentrating research on the commercial application of the idea, and beating the rest of the world to the markets.

The topic that we are dealing with, namely natural resources planning, does not fit into this highly competitive world, which is perhaps the explanation why it has such a dismal record of transferring theoretical knowledge into practice. It is something that I have been preoccupied with through most of my career, and it is this experience that I intend to recount here. As it has been an iterative process, in which my role has changed from that of a researcher to research administrator, some short cuts will be necessary in order to cover the topic in the time available. I wish to also state other limitations of the coverage, namely that it is primarily concerned with the use of vegetation as the basis for land classification.

THE BASIS OF THE ASSESSMENT

My first attempts at the review of world literature on this topic (Havel 1968, 1975 a and b) were motivated by the need to find appropriate methods for research and application in Western Australia. At that stage I was naturally preoccupied with techniques. My second attempt at reviewing the literature arose out of the pact that the product of my research, although

accepted in practice, was experiencing some difficulties and I wished to know whether this was unique, or whether it was common to land use planning in general.

At this stage I had the opportunity to visit several countries which were acknowledged leaders in this field. I also became involved in a highly complex joint land use planning exercise with several co-workers from the State Departments and the CSIRO Division of Land Management Research, the outcome of which was ultimately published nearly a decade later (Bennett & Thomas, Eds, 1982).

The next step on the learning curve was a major review of literature on the application of synecological knowledge to practical problems in forest management (Havel 1980 a & b), undertaken on request from an international forestry journal.

The final step was the participation in an international workshop on land evaluation for forestry, organised in 1982 in Rome by the United Nations Food and Agriculture Organisation. By then my views, which I will discuss subsequently, were setting, which is not a desirable feature in any scientist's attitude.

I was therefore glad to be handed a very recent review of the same type by Jahn (1982). It was made particularly valuable because Jahn and I view the topic from opposing ends of several continua. As a professor at a central European University she views the topic very much from an academic viewpoint. I am now basically an administrator and increasingly tend to view things from the applied angle. Her past work has been chiefly with mosaics of highly disturbed vegetation, and therefore she favours the detailed, subjective approach and hierarchical classification of Braun-Blanquet. My work has been chiefly with the relatively undisturbed vegetation of Australia and New Guinea, using mainly computer-based ordination techniques. Her review is centred on central and western Europe, with extension into Japan and Canada, my review is biassed towards eastern Europe and Australasia. Despite these divergencies we agree on one key point - the theoretical knowledge is not getting through adequately into practice.

OBSTACLES TO ADEQUATE TRANSFER OF THEORY TO PRACTICE

It is now my intention to examine some aspects of the problem.

a) UNBALANCE BETWEEN THEORETICAL AND APPLIED STUDIES

There is an almost unlimited range of methods that could be used in ecologically based land classification and land use planning (Havel 1980 a & b, Whittaker 1973, Dyrenkov and Chertov, 1975). Some systems, especially those of the Braun-Blanquet school, have been developed to an extremely high degree of refinement (Jahn 1982). They range from the most sophisticated to the most basic ones. They cover the entire ecological spectrum, that is from the view that a vegetation type is a virtually fully integrated organism to the one that looks on the vegetation of any area as virtually chance coming-together of individual plant species.

If one examines the hundreds of articles that have been written on the topic of ecological basis for land classification, it soon becomes obvious that by far the greatest proportion of them deal with the theory of classification. Those articles that go beyond and attempt to find a practical application of a given theory or a system of classification are far less common. Those that actually report a successful application in the field are virtually impossible to find.

This fact is virtually independent of the economic and social systems. The reasons for the failure may be different but the net result is generally the same. The same complaint is expressed both in the so-called western and eastern countries. The problems encountered in Canada (Krajina, 1972; Jurdant et al, 1974)are not all that different from those encountered in USSR (Pobedinskiĭ, 1976; Dyrenkov and Chertov, 1975). The view expressed tends to be more influenced by the position of the author, that is whether he is the originator or user of the classification system.

b) INADEQUATE EFFORT TO TRANSFER THEORY TO PRACTICE

In most studies reported, the theoretical information is too detailed and too complex to be applied by a forester who cannot afford the time to become a specialist in this field and who has got other factors, such as finance, administration and labour relations to consider. The scientists responsible for the initial work do not take sufficient time to reduce their complex findings to a level which is easy to comprehend and apply.

The area administrators cannot, or will not, take the trouble to take what is available in scientific literature and apply it to their individual problems. At the time when most training institutions are struggling to cover all facets of forestry within a course of reasonable duration, the very common demand by the researchers for more specialised training in a particular topic (Jahn 1982) is likely to fall on deaf ears.

The transfer cannot be left to chance, and a deliberate effort is required in order to realize the full potential of the research findings (Havel 1981). How best to achieve it has already been amply described (Twiss, 1974).

c) FAILURE TO MATCH THE DEGREE OF SOPHISTICATION IN RESEARCH WITH NEEDS AND CAPABILITIES OF USERS

Another important factor which has come into prominence in the past decade, is the use to which a classification system is put. Prior to World War II the accent was overwhelmingly on productivity. This meant that all that was required was equating a given vegetation or site type with a certain level of wood production, given the standard silvicultural techniques, which were generally of low intensity. In more recent times, what is required is the assessment of a particular type for a whole range of land uses, ranging from very intensive production forestry involving cultivation and use of fertilisers, to the preservation of the biota where any disturbance tends to be looked upon as undesirable. Any system that can cope with this range of requirements would obviously need to be

a highly complex one. The situation becomes even more difficult if the planning requires not merely the comparison of a range of sites for a number of alternative land uses, but also their interaction and economic evaluation. It is very rarely that this kind of information is available for the full range of combinations of site with land use, and the processes involved in carrying out such a comparison need to be very involved and very sophisticated, as both the volume of data and the calculations to which it is to be subject, are very demanding.

I was therefore staggered when this high degree of sophistication was proposed at the recent FAO Workshop for a forest evaluation system to be chiefly used in developing countries. Having been involved in such an exercise locally (Bennett and Thomas, 1982), and having been exposed to the problems of a developing country, I pointed out this mismatch and was supported by delegates from SE Asian and African countries.

d) MISMATCH BETWEEN METHOD AND ENVIRONMENT

There appears to be a relationship between the success of a given method and the physical and economic environment of the region in which it has been tried.

The older, better known classification systems such as that of Cajander and Braun-Blanquet have their respective regions where they failed or succeeded. The simpler system of Cajander, developed in Finland, has been relatively successful in areas with limiting environmental conditions, relatively undisturbed vegetation and low population density. When applied to regions with more favourable environmental conditions, which in turn means complex vegetation, higher population densities and hence greater disturbance of vegetation, it has generally failed. Under these circumstances, the highly sophisticated system of Braun-Blanquet has been better able to cope with the complexities. When the disturbance reaches a very high level, probably no vegetation-based system of classification is really workable.

e) LACK OF FLEXIBILITY WITH RESPECT TO SCALE OF APPLICATION

When land classification is applied, it is rarely applied merely at one level. It is normally applied on a more detailed scale in the field for boundary delineation and at the same time on a broad conceptual scale in the office for regional planning. If it cannot cope with both applications, it will generally fail. In this respect the Cajader system has generally been more successful because of its coarser, simpler and broader approach. With the Braun-Blanquet system the step from individual precise types to a nationwide application involving hundreds of types is too great and practical application founders. It is not due to inability to cover large areas, but rather to the fact that the number of units to be recognized by the field staff, and the complexity of hierarchical relationships to be grasped by regional planners, is excessive.

f) FAILURE TO RECOGNIZE CONSTRAINTS IMPOSED BY SOCIO-ECONOMIC FACTORS

There is a tendency among scientists dealing with biophysical aspects of the environment not to recognize the strong influence of socio-economic factors in the management of natural resources. To a certain extent this has already been covered under points c) and d). I now wish to refer to the more basic problem, namely to the failure to ask the potential users of a research finding what it is that they really want, and what is their capability to use it. This generally results in both scientific overkill and practical under use. This has perhaps been given best expression by Cocks (1978), who, after considerable experience with very sophisticated studies in southern New South Wales, considers that bio-physical inventory should only be undertaken when basic policies on land use have been formulated. In contrast to this Jahn (1982) strongly asserts that vegetation science cannot be solely oriented towards practical application.

Another variant of this failure to recognize socio-economic constraints has come up at two international meetings that I have attended, namely the First International Congress of Ecology in Hague in 1974 and the FAO Workshop already referred to. Basically it is caused by ignoring the differences in the stage of development. It finds expression in insistence by scientists from developed countries of western Europe that the resources of African, South American and South-east Asian countries should be used with the same care, after the same detailed surveys and evaluation, as the nearly exhausted resources of the Old World. Even if the skilled manpower were available, the demands for higher living standards, better health services and greater educational opportunities preclude such a leisurely, considered approach. This problem was recognized by Ovington (1974). Often much coarser, less refined, but more rapid approach is the only viable alternative for the time being.

g) FAILURE TO INTEGRATE TECHNOLOGICAL COMPONENTS

Every aspect of the continuum from initial survey to final resource management in the field is continually being influenced by technological developments such as remote sensing, automatic data processing and mechanisation of field operations. Under these circumstances it is easy for the components to get out of step, with the inevitable result of confusion and conflict. Detailed land classification that can only be done on the ground, no matter how elegant and precise, is unlikely to be preferred to a coarser classification based on remote sensing, except where high level of investment per unit area, or scarcity of resources, warrant the detailed, precise approach. To aim for increasingly detailed site maps when mechanisation of field operations and economic pressures push the forestry practice in exactly opposite direction of uniform treatment over large areas is noble but not very wise (Polák, 1968). A compromise of coarser maps and shorter machinery runs is much more realistic.

CONCLUSION

No doubt if I tried, I could find further causes of the failure to transfer theory to practice. If I could be sufficiently objective, I would probably also conclude that at some stage of my career I have committed every one of these errors. At this point I merely wish to reiterate that there is a great scope for improvement. Hopefully, what I have said may also suggest ways in which such improvement could be achieved.

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