RESEARCH PRIORITIES IN THE JARRAH FOREST

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Research has been likened to "warfare against the unknown". Any military man will tell you - success in warfare is more likely if your forces can be focussed on the enemy's weak spots. It is there that greatest gains are possible with least wastage of resources.

In Research, as in battle, resources are rarely limitless. Concentration of effort is therefore essential. This is why all Research programmes are ruled by decisions on priorities and why there are priorities for research in the jarrah forest.

But - whose priorities and what jarrah forest? I could not possibly presume to deal with priorities in an overall sense - at least not formally and not here. Research managers in other organizations obviously make their own decisions. I want to talk about research priorities in the West Australian Forests Department. And in a philosophical way, rather than going into detail about specific projects. I also intend to concentrate on the main jarrah forest belt. The problems of "southern jarrah" (i.e., those stands which intermingle with karri and then shelve off into woodlands and plains on the south coast) are too specific to be easily included in the generalised picture I intend to paint.

Two points before I start. (i) A lot of research is carried out in the Forests Department into areas other than the jarrah forest. In our analysis of research needs and priorities, we usually look at issues, rather than forests. (ii) This will be a personal, rather than a technical presentation. Specific technicalities can be discussed through questions at the end if need be.

I will cover three broad topics today. Firstly: what are the major research needs in the jarrah forest as I see them? Secondly how do we distil these research needs into a research portfolio, and allocate priorities? Thirdly, what are the priorities which stand today?

I will conclude

I will conclude by touching on perhaps the most important research priority of all: transferring the knowledge gained from research into improved practise out in the forest itself.

RESEARCH NEEDS

If you are an avid reader of the General Working Plan or of Forest Focus you will know that the primary objective of the W.A.F.D. is "Conservation, through planned use and management of forest land and resources for the greatest long term social and economic benefit". In striving for this goal, the Department faces a number of problems. Many are specific to W.A. - for example the combination of long dry summers and highly inflammable vegetation; the need for production on soils of very low fertility; the problems of dieback and salinity in relation to catchment management; and the pressures of conflicting and expanding demands on a finite forest ecosystem.

The complexity of the ecosystem, and the extent of the demands made by man upon it, has resulted in the need for a long standing committment to forest research in W.A. There has been a Research Branch in the Forests Department almost as long as there has been a Forests Department. But this introduces an important point: the Forests Department itself is not a Research organization, in the sense that CSIRO or some academic institutions are. The fundamental responsibility of the Department is forest resource planning and management. Within the Department the role of research branch is to help foresters with their planning and management problems. This involves:

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(i) Constant survey of new ideas generated by others (interstate, international, interdisciplinary) through literature review, work on research committees and working groups and liaison with other research/forest management organizations.

(ii) Identifying and ranking research needs through frequent contact with planners, managers and users of the forest.

(iii) The application and testing of acquired ideas to needs.

(iv) The design and implementation of research to find solutions where none are available from elsewhere.

(v) Anticipation of future problems, future needs.

(vi) Demonstration of research findings in practice; training, review and modification to suit local situations.

(vii) Dissemination of findings, firstly to forest managers in their language and secondly to scientific colleagues in their's.

It is also necessary that we look after our own affairs properly. That is: attend to budgets, staff matters, industrial safety and welfare and other matters essential to having an efficient and contented human organization.

The point is that of all the roles/functions of the Research Branch of the Forests Department, the traditional one of doing scientific investigations is but one of many. We are there to help forest planners and managers with existing and anticipated problems. It is not our role to seek knowledge for its own sake or to chase off into those lanes and by-ways of science which open invitingly on all sides.

I had an excellent example of this recently (example of zinc and Radiata: empirical observation versus physiological understanding).

I have deliberately ~~treated~~ laboured the point about our role and function in some detail. It is essential that it be widely understood (both within and outside the branch) not only for the good of forestry, but for the survival of the branch. The need for research is not accepted automatically by those who hold the purse strings or decide on staff allocations. To think otherwise is to live in a world of fantasy. I believe that it essential for our research not only to be relevant but to be seen to be relevant to many' needs

Given that the function of forestry is planning and management, then Research needs in the Forests Department can be classified as either Planning Needs or Management Needs.

Firstly let's look at Planning Needs

The elements of good forest resource planning are skills in inventory and projection, and skills in planning methodology. In the first instance we need to know as much as possible about the present resource in terms of all the various forest products and values. What is the growing stock? What are the relative dimensions of growth and of mortality? What levels of future supply and demand can be expected?

There are some critical research needs in this area. In particular we need to develop the techniques of sensitivity analysis and cost-benefit study. This needs to be linked to the FMIS programme now developing within the Forests Department.

There has been some recent research into forest inventory, projection and analysis of multiple uses and their interaction and into economic options. But on the whole this is a neglected field and one in which research is hampered by strong sectional interests between Departments, agencies and companies.

There is also a need for research into Planning Methodology. The fact that the present system actually works quite well is irrelevant because it has so many influential critics. It also has the twin deficiencies of seeming to defer the most difficult problems and of being resident in the bureaucracy. There is an urgent need to develop a system which actually produces workable management plans but also allows for effective participation by those other than with vested commercial or political interests.

Research into forest resource planning is an important world-wide need. On the whole, traditional research people have shied away from it partly because of their concentration on Management issues but also, I suspect, due to reluctance to enter the inexact world of economics and social science. Within the W.A. Forests Department research in these fields is carried out by staff in the Inventory and Planning Branch, not Research Branch, an indication of the way traditional forces and values have operated.

Now turning to Management Needs

If we are to ensure long term conservation of the jarrah forest we must know:

Firstly: How is the jarrah forest ecosystem structured and how does it function?

Secondly: What are the effects of disturbance on this ecosystem? Can they be prevented, minimised or repaired?

These questions form an obvious basis for a research strategy for the jarrah forest (or any forest for that matter). They are fundamental to the business of forest use, irrespective of whether that use is preservation of the habitat of the banded anteater or digging the place up and carting it off to America.

The focus of research in W.A. began with the second question and only more recently has begun to encompass the first. Early research needs were channelled into the applied problems of the day - for example silviculture rather than silvics, fire control rather than fire ecology, how to fill reservoirs rather than probing the hydrological cycle. This is understandable. The more recent trend towards increased research into ecological systems and processes is not merely due to the ascendancy of scientific logic and rationale - it is a reflection of affluent times. I suspect there may well be a retreat from some of this work in the days ahead as funds and staff for research in general contract.

With respect to the immediate needs of jarrah forest managers there are four which dominate:

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- Can the jarrah forest be visited, harvested, regenerated and tended in the presence of P.c?
- What are the implications of manipulation of stand composition and density on water quality and quantity, on P.c. and on timber production?
- Can we preserve the ecosystem and at the same time ensure security from wildfire damage for man, his values and property?
- Can bauxite mining be controlled so as to minimise adverse out-of-pit effects and can we recreate a useful, attractive and functioning ecosystem in its wake?

It would be easy to subdivide each of these into a dozen individual research projects. It would be even easier to add a dozen more not covered in the list. But these four are the primary questions. It is these the research manager must take in hand, shuffle, support or reject and ultimately decide who gets the money to work on what. How are such decisions made?

HOW DO WE DECIDE R. Ps in The FD?

DECIDING RESEARCH PRIORITIES

Some research projects are conceived, some just evolve or are inherited and others are thrust upon you!

Research falling into the latter category does regrettably occur in W.A. forestry. I am referring to situations when the Department is backed into a corner by some external circumstances when it would rather be somewhere else doing something different. In these situations unforeseen management problems always arise. A good example is the Sunklands Pine Afforestation programme which absorbs some 15% of our total research effort. But these cases are not relevant to today's discussion on Research Priorities - and how they are determined within the Forests Department.

For those who are not familiar with the Branch:

Currently the Branch consists of 23 Research officers and 50 Technical officers (Publications, Library and clerical staff not included) located at 5 Research Stations. There is a well defined hierarchy (see diagram). The purpose of this is twofold: (i) Branch Administration and Management and (ii) Liaison with our counterparts in forest operations. This structure is our greatest strength. As you can see there is a deliberate structuring of liaison at four separate levels: Chief, Superintendent, Station O.I.C. and Research Officer. This is the major input channel to us on Research Needs and on Research Priorities. ⟶ MAJOR R. NEEDS IN J FOREST already shown

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Having determined research needs, the mechanics of the decision making on priorities are as follows:

The first step is for the Chief to prepare a statement on Research Priorities. This is put to the Chiefs for debate and endorsement. The priorities are actually published every 5 years in the General Working Plan, but in fact they are continually subject to review and modification. Priorities alter as

- projects are completed or abandoned;
- staff move into or out of the Branch;
- special problems or 'break-throughs' occur;
- funds are cut, or made available.

A systematic approach is taken in the evaluation of each new project, by reference to these questions:

1. Will the project benefit forestry in W.A. - is it relevant to management goals?
2. How will it affect work in progress - will it compete for funds or staff? Or will it complement them?
3. Can we do it? Are the necessary funds and facilities available or procurable? Do we have staff with the required skills or qualifications?
4. Will it provide a workable solution?

No interest in projects where only promise is for way-out solutions far beyond our Technology

With the exception of the projects "thrust upon us" for political rather than management reasons, all research proposals are subjected to this evaluation. If they pass this test, there are, of course all the subsequent requirements for submission of experimental design and analysis and provision of funds and equipment.

In the end, however, the most systematic approach to project evaluation really only helps to produce a short list. The final decision is a matter of experience and judgement. As a result, within the Department as a whole, as well as within the branch, there is rarely unanimous agreement. The dieback people think dieback is more important than anything else. Within the dieback people the "Host faction" despairs about effort "wasted" by the pathogen faction. The harvesting people want to see more research on utilization, the fire people on fire, the mining people more work on rehabilitation and so on.

As you are all aware, Research is a human endeavour and therefore is subject to human frailties. But within the Forests Department I believe we are quite fortunate. Research and operations people have close links and share problems; there is a regular interchange of staff; with only a few exceptions there is mutual respect. Above all we have a universally admired Chief whose wisdom and judgement in the matter of research direction is widely accepted.

CURRENT PRIORITIES

Which brings us to the current programme. Remember that we are talking about the jarrah forest and that the major research needs were listed as dieback, hydrology/silviculture, fire and mining.

Despite the recent and unreplaceable losses of two of our most senior research officers, dieback maintains its position as the major research effort in the Department. Dieback research absorbs approximately 30% of all research staff and 40% of the budget in 1982/3.

There has been a minor reappraisal of priorities within the dieback programme in recent months following the dramatic events of last year. This is not the time to go into details - I am sure you will hear these from Dr Shearer at a subsequent seminar in this series.

Suffice it to say that the major thrusts are four-fold: the prediction of impact, the nature of response to infection, hygiene techniques and disease monitoring.

The second priority is work into ecological and physiological processes. I include here the animal ecology work in the Perup, site-vegetation studies, the work on regeneration processes and stand dynamics and the evapotranspiration work. All of this "basic" work has strong operational links: the animal work with fire control; site-vegetation studies with dieback susceptibility and regeneration and growth potential; evapotranspiration studies with control of salinity on eastern catchments.

The next major priority is fire. Current research is focussed on fire behaviour and fire effects. Last summer's work was very exciting. We have now vastly increased our understanding of fire behaviour at the higher range of intensities and on the effects of these fires on other elements of the ecosystem such as banksia, legumes, timber values and ease of control. All of this work is currently at the write-up stage.

The fourth priority is hydrology and its interface with silviculture and timber production. I refer here to the work being done at Dwellingup and to a lesser extent north-east of Manjimup.

The final area is rehabilitation. The part of this work which is focussed on the bauxite pits is financed by Alcoa, but we are also involved in arboreta studies, provenance trials and a very minor input to rehabilitation studies at Collie and Ludlow. This work could easily be expanded. The level of progress with mining rehabilitation in the coal, mineral sands and tin operations in State forest has only just moved out of the 19th Century.

Considering the range of issues in multiple use management of the jarrah forest, the list above is depressingly slender. No research at present is being done in many crucial areas. I have already mentioned the need to develop inventory, economic and planning skills. To this can be added:

(i) Research to improve the utilization of small trees and residues;

(ii) Research into leaf eating and wood boring insects;

(iii) Research into recreation, particularly on catchments, and into landscape preferences;

(iv) The control of feral animals and noxious weeds.

Although some or parts of each of these are being dealt with at some level by other branches or other organizations, they are all "on the shelf" as far as our Research Branch is concerned at the present. Furthermore, they are unlikely to be suddenly elevated in priority, unless there is an unexpected influx of money, or our political masters decree otherwise.

I mention this last point in closing the subject of priorities to emphasise that even the Forests Department (let alone its Research Branch) is dependent in the final analysis. The wisest and most experienced research director in a Government Department can be over-ruled in 5 minutes if a Minister, or the powerful influences brought to bear upon him, decree otherwise.

THE MOST IMPORTANT PRIORITY OF ALL: TURNING RESEARCH FINDINGS INTO IMPROVED FORESTRY

To complete this ~~talk~~ paper I would like to turn to the major obligation of the forest research branch in the W.A. Forests Department: the transference of research findings into practice. Busy foresters do not read scientific papers in scientific journals. These are often couched in jargon or gobbledegook and aimed at an audience of hypercritical scientific colleagues. Or if they do read them, foresters rarely have the time or skills to turn scientific conclusions into prescriptions. There is no point in deploring this situation. The fact is it happens.

In my experience, the researcher who does his work, publishes it in a journal and then sits back hoping for managers to flock to his desk with cries of thanks, will be frustrated. He will also have wasted valuable time and funds. The planning and execution of research extension requires just as much skill, thought and effort as did the research project itself. We have to market our work - to show how it will benefit planners and managers, how it can be introduced and then help with the introduction.

In recognition of this need, a 5-Step systematic approach to research extension has been developed within the Forests Department. The steps are:

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1. Validation
2. Presentation
3. Demonstration
4. Prescription
5. Review

Time spent on research extension competes with time for preparing material for publication and starting new work. This, like the decisions over priorities, can be a source of discontent amongst research people. Again, the problem is minor in the Forests Department. I have found that most Research staff enjoy extension and derive satisfaction from seeing their work leading to improved forest practice. Those who don't have the option of moving into academia.

IN CONCLUSION

In this seminar I have outlined the major research needs in the jarrah forest, the way in which we try to resolve priorities and the current programme. I have emphasised that in the final analysis decisions are made on the basis of judgement and experience. A system of regular review and systematic project evaluation is employed to minimise human fallibility. I have also touched upon the most important priority of all: making most efficient use of research findings to improve forest management in W.A.

Thank you.

RESEARCH PRIORITIES IN THE JARRAH FOREST

1. Major research needs
2. Deciding on priorities
3. The priorities today

FUNCTIONS OF THE RESEARCH BRANCH IN THE FORESTS DEPT

1. Survey new ideas; acquire new skills.
2. Identify and rank research needs.
3. Apply new ideas/skills to needs.
4. Do research where no ideas/skills from elsewhere fit needs.
5. Anticipate future needs.
6. Demonstrate ideas/skills. Assist with initial implementation.
7. Publish findings.
8. Liaise with other organizations.

File No.

RESEARCH NEEDS

1. PLANNING NEEDS

- Inventory
- Projection
- Options Analysis
- Planning Methodology

2. MANAGEMENT NEEDS

- Ecosystem structure and function
- Ecosystem disturbance and repair

FOUR PRIMARY NEEDS

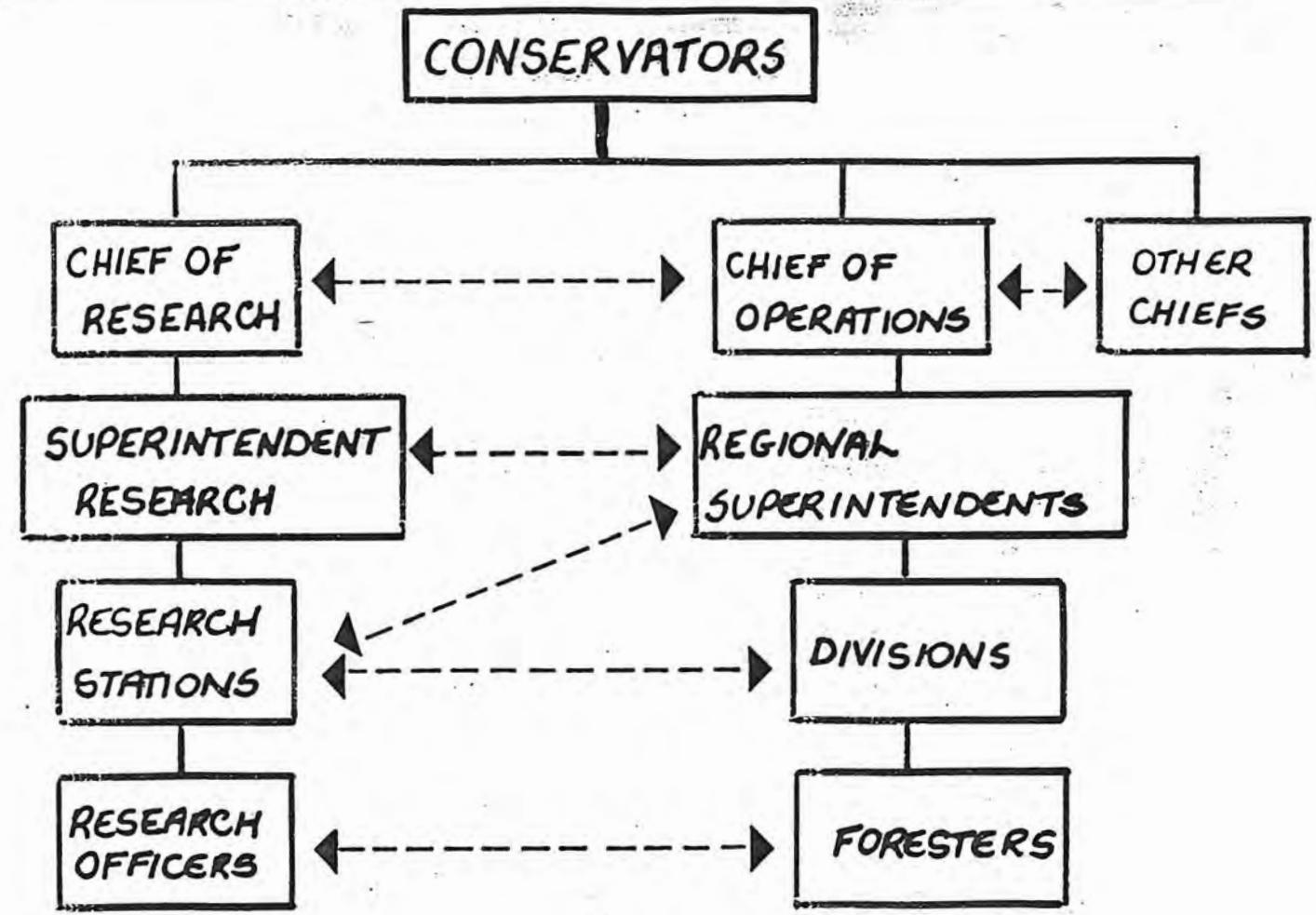
1. Management and use in the presence of P.c.

2. Interactions of water production, catchment protection and timber production

3. Fire Management

4. Mining

FORESTS DEPARTMENT STRUCTURE AND INTERACTIONS (Simplified)



PROJECT EVALUATION

1. Will the project benefit forestry in Western Australia?
2. How will it affect other work?
3. Can we do it?
4. Will it provide a workable solution?

CURRENT PRIORITIES

1. Dieback
2. Ecological processes
3. Fire
4. Hydrology/silviculture
5. Mining rehabilitation

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RESEARCH EXTENSION
- A 5 STEP SYSTEMATIC APPROACH

1. Research presentation
2. Operations presentation
3. Demonstration
4. Prescription
5. Training and Review

File No.