

1. INTRODUCTION

1.1 O.R. AND DEVELOPMENT

The aim of these case exercises is to give the student practice in carrying out some aspects of an Operational Research (O.R.) project in a developing country. We see O.R. as:

a broad multi-disciplinary problem solving activity which is based on the scientific approach.

The reader is referred to a set of readings on O.R. in developing countries*, which demonstrates a full range of O.R. projects from broad systems approaches to complex mathematical models. However, these readings do not describe many important aspects of an O.R. project. They all give a view of the project written at the end. They do not give any idea of the process of search for relevant information and the continuous interaction with the client, which are important parts of O.R.

These exercises are not a substitute for real project experience but they are intended to give the student some experience in aspects of an O.R. project including:

- searching for information
- defining the problem and terms of reference
- interacting with the client(s)
- analysing the organisational context of the problem
- planning for implementation

We believe that there are some special features of doing O.R. in developing countries which need to be considered. Most O.R. teaching has been carried out in western countries on western problems. There are basic assumptions built into the teaching of O.R. which do not necessarily hold in developing countries. These case exercises are intended to represent at least some of the differences so that the student is more alert for them when he/she starts to do real O.R. Particular features of development which are relevant for O.R. include:

- dealing with multiple objectives, for example balancing effectiveness and efficiency with objectives such as the alleviation of poverty,

* Luck G.M. and Walsham G. (Eds) (1982), Selected readings in operational research for developing countries, Birmingham, The Operational Research Society

lack of reliable infrastructure, such as transport and communications, which must be taken into account when planning new systems,

lack of specialised management training, in areas such as computing and O.R., which must be taken into account when the O.R. person communicates with managers,

cultural attitudes to decision making and authority, which mean that managers are more accustomed to operate according to custom and practice and do not accept the rational framework put forward by O.R. Management will sometimes see O.R. as a threat, undermining their authority.

1.2 AIMS OF CASE EXERCISES

Case Exercises are slightly simplified descriptions of real problem situations used as simulated O.R. projects. Two of the exercises, Cases 1 and 2, are worked in stages which approximate to those in a real project. The teacher may represent the client and thus give practice in interaction, for example in agreeing terms of reference and revising them as the project develops, and presenting information in meetings and reports. The exercises may be used to give practice in working in groups which represents the teamwork which is a common feature of O.R.

None of the exercises has a single right answer. A number of approaches are possible. Usually quite a lot of progress can be made with basic logic before mathematical models need to be used. We feel that this is an important lesson. A Teacher's Guide will be made available to teachers on request to the Commonwealth Secretariat.

Teachers can expand the exercises and use them as the basis for seminar discussion. Cases can be adapted to a particular country. The development aspects of the problem can be studied in more depth with guidance from the teacher.

1.3 SKILLS REQUIRED FOR O.R.

Successful O.R. work requires a broad approach using a range of qualitative and quantitative skills. The case exercises will help the student to practise these skills which include the following:

Analysis of the system establishes the formal organisational relationships and the informal relationships between people concerned with the problem.

Analysis of the operations carried out by the organisation such as production or information processing requires detailed flow-charting, preliminary estimation of production rates, identification of bottlenecks, etc.

Analysis of the factors in the environment which may affect the system requires basic knowledge of political systems, competitive features, labour markets and customers.

Basic statistical skills are needed to make a preliminary analysis of the available information. This will include tabulating data, carrying out simple statistical tests and graphing.

Communication skills are required to present proposals to clients. These skills include giving oral presentations and writing reports, taking account of the clients' knowledge and motivation.

Knowledge of behavioural aspects of organisations is needed in preparing proposals for implementation of change.

The case exercises can all be tackled using the above skills and elementary mathematical techniques. They are therefore suitable for students on introductory courses. In addition, the analysis of several of the cases can be extended using computer-approaches, such as spreadsheets on microcomputers, and more advanced mathematical methods such as simulation.