F-05: The application of scoring and ranking for the selection of R & D projects for funding

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Agencies with the responsibility of allocating funds for research have to make a choice of the projects which could be supported with the limited funds at their disposal. The system of independent peer review is the accepted method of evaluating proposals for selection.

At NARESA the review and recommendation of proposals is done by specialist committees based on a qualitative assessment of certain criteria. No quantitative methods have been used in evaluating proposals at NARESA. It was therefore decided to study the applicability of a scoring and ranking procedure for evaluation and selection of projects for funding.

Four broad criteria were developed for the study:

(a) National/practical significance (b) Scientific merit
(c) Technical feasibility (d) Development of research capability of young scientists.

Each criterion was graded into 5 levels on scale of values ranging from 1 to 5. An alternative definition for criterion (d) was also used. The project score was computed as the Technical Rating (TR) divided by the Cost Rating (CR), where, TR = sum of the marks given for the 4 criteria, CR = ratio of the first year project budget to total funds available for allocation. Three alternative cost ratings were also used where total project budget was taken into consideration. Twenty four applications for research grants received by

NARESA in the field of agriculture in the years 1987 - 1990 were taken for the study. The research proposals were scored independently by a senior agricultural scientist and the writer according to the above scheme, and ranked on the basis of the project score. Project scores obtained with different cost ratings were compared using Spearman's rank correlation. The results of selection by scoring and ranking were compared with actual project approvals. The correlation between the ranks of the projects using the standard cost rating described above and the alternative cost ratings ranged from 0.8043 to 0.9104. The project scores computed using the standard cost rating ranged from 111.1 to 10.5 and therefore provided a wide range for selection.

Seven projects were selected according to the scheme. The highest technical rating among the 7 selected projects was 12.5. There were 6 projects with equal or higher technical rating not selected, and one of the selected projects had technical rating as low as 9. By deciding on a lower limit of TR that is acceptable it could be ensured that the projects selected are of a minimum standard.

The 2 highest rated projects were also not among 7 selected projects. Their budgets amounted to 78% of the available resources. In such cases a decision would have to be made whether the project is important enough to justify the allocation of such a large proportion of the available resources.

When the selection by this scheme was compared with actual project approvals in 2 groups, it was found that 3 out of 5 approved projects were selected in one group, while in the second group 4 out of 6 approved projects were selected.

The criteria and scale of values used are generally adequate for evaluation of research proposals. However, in applying the scheme, the agency concerned may use a weighted score depending on the relative importance assigned to the different criteria, based on its own priorities and other considerations e.g. whether it is under a programme of basic or applied research.

The scoring and ranking scheme would facilitate the decision making process in the selection of proposals, if applied with appropriate mechanisms to overcome the problem of projects rated low on scientific merit, significance and feasibility, ranking high because of a low budget, and projects with high technical rating ranking low due to a large budget.