CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH

TECHNICAL ADVISORY COMMITTEE

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REVIEW PROCEDURES: ASSESSMENT

OF RESEARCH PRODUCTIVITY

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Agenda Item 15

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REVIEW PROCEDURES: ASSESSMENT OF RESEARCH PRODUCTIVITY

1.0   Over the last several decades an increasingly useful set of tools have
      become available to research managers for the assessment of research
      productivity and for the allocation of research resources.

2.0   The basic conceptual advance on which essentially all research resource
      allocation methodology rests is that the demand for knowledge in science
      and technology is derived primarily from a demand for technical change
      in commodity production. The fundamental significance of technical
      change in commodity production is that it permits the substitution of
      knowledge for resources, or of less expensive and more abundant resources
      for more expensive resources, or it releases the constraints on produc-
      tion growth imposed by inelastic resource supplies. The effect is to
      lower unit costs and/or increase output thus generating growth dividends
      that become available to producers in the form of new income streams and
      that may be shared with consumers in the form of lower prices than would
      otherwise prevail.

3.0   Once the output of agricultural research was conceptualized in the above
      terms it became possible to model and measure the ex post returns to
      research. We have all become familiar with the calculations showing
      rates of return in the range of 25-50 percent per year to investments in
      the agricultural research systems of countries such as the United States
      and Japan and to even higher rates of return on individual commodities
      such as hybrid corn in the United States and wheat in Mexico. Some of
      the more sophisticated studies have attempted to identify the resource
      owners or population groups who gain and/or lose as a result of particular
      technical change (farm operators, migrant laborers, food processors,
      consumers).

      The next step was to attempt to adapt the same or similar methodology to
      ex ante evaluations of the potential productivity of research investment.
      Procedures have ranged from simple peer panel or more sophisticated
      "Delphi" type ranking schemes to experiments with computer based simula-
      tions.[1]

4.0   Regardless of the sophistication of the methodology almost all of the
      research resource allocation models that have been attempted draw on two
      types of knowledge: (a) what is it possible to invent (or discover, or

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1.   See the experiment reported by Walter C. Fishel, (ed.) Resource
     Allocation in Agricultural Research (Minneapolis: University of
     Minnesota Press, 1971), pp. 344-381, and the literature review by
     C. Richard Shumway, "Allocation of Scarce Resources to Agricultural
     Research: Review of Methodology", American Journal of Agricultural
     Economics, Vol. 55, No. 4 (Part I), November 1973, pp. 557-566.

design, or develop); and (b) what is it worth to society. It is generally conceded that only the leading scientists in any field -- or at least those characterized by superior scientific imagination -- can project the advances that are scientifically or technically feasible and associate these projections with the reasonable probability statements relating the use of scientific resources to potential objectives with any degree of precision. Similarly, precision in the evaluation of the value of specific advances in agricultural technology to a society, or to specific sectors of the economy (small farmers, consumers) requires the model-building skills of the economist or systems analyst.

5.0   There remain, at this time, serious reservations regarding the assumptions of the models on which the ex post estimates of research productivity rest. And there are even more serious reservations about the operational value for the ex ante research resource allocation models. A conference will be held at Airlie House, Virginia in January 1975 with the objective of making a professional assessment of both the ex post and ex ante methodology and results. The conference will be sponsored by the A/D/C with partial support from the IBRD. A report will be made to the TAC and the CG of the results of the conference, if desired.