Resource Allocation to Agricultural Research

Proceedings of a Workshop held in Singapore 8-10 June 1981

Editors: Douglas Daniels and Barry Nestel
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The untimely death of Dr. J.D. Drilon, who was to attend the workshop as a representative of IFARD, is a great loss to all concerned with improving the welfare of the rural poor. This publication is dedicated to his memory.
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Defining Research Priorities for Agriculture and Natural Resources in the Philippines

J.D. Drilon and Aida R. Librero

Basic to the attainment of agricultural development is increased productivity both in terms of farm yield and the optimum utilization of available resources. A primary consideration is the promotion and support of research — coordinated, intensified, relevant, and applied to the needs of the country.

To be effective, a research program must respond to the current needs of developing agriculture and be sensitive to the needs of the future. However, research needs vary from one commodity to another. Obviously, the urgency of research undertakings differs between commodities, and variations in research needs also occur within a commodity. For example, a commodity might have been given greater emphasis in the past resulting in the development and adoption of better technology; therefore less research may be required at present. Another commodity might have lagged behind in terms of research and current needs might now call for greater research efforts on this commodity. This is especially true when new government programs and policies are implemented that necessitate more information and new technology for a particular commodity. This underscores the necessity of defining research priorities not only for more efficient research management and more effective and relevant research results but also for more meaningful allocation of limited resources, including research funds and manpower.

The definition of research priorities will be discussed in the context of the experience of the Philippine Council for Agriculture and Resources Research (PCARR). PCARR is the national agency with a mandate from the Philippine government to plan and coordinate research in agriculture and natural resources. First, the tasks of PCARR and its organizational structure will be discussed in relation to defining priorities. The membership of the various bodies within the organization will be presented to provide the framework for understanding the role of scientists, academe, politicians, and the private sector in the process of defining research priorities. Second, the criteria for assigning priorities and the methods for making them operational are discussed. Third, the allocation of research funds and manpower is presented.

The Tasks of the Philippine Council for Agriculture and Resources Research

Up to the early 1970s an undesirable research situation existed in the Philippines that was characterized by: agricultural research that was not making a substantial impact on the economy despite the large sum of government funds that was being spent annually; uncoordinated activities with hardly any integrated planning among the various agencies; and fragmentary distribution and inefficient use of research resources.

This prompted the President to reorganize the national agricultural research system to make it a more effective tool for national development. Hence, the Philippine Council for Agricultural Research (PCAR) was established in November 1972 to provide for a systematic approach to the planning, coordination, direction, and conduct of the national research program in agriculture, forestry, and fisheries. Later, the functions of PCAR were expanded to include mines research resulting in the modification of its name to Philippine Council for Agriculture and Resources Research (PCARR).
Specifically, PCARR is entrusted with the following tasks: (1) define goals, purposes, and scope of research necessary to support progressive development in agriculture, forestry, fisheries, and mining for the nation on a continuing basis; (2) using the basic guidelines of relevance, excellence, and cooperation, develop the national agriculture and resources research program based on a multidisciplinary, interagency, and systems approach for the various component commodities; (3) establish a system of priorities for agriculture, forestry, fisheries, and mining research and provide meaningful mechanisms for updating these priorities; (4) develop and implement a fund-generating strategy for supporting agriculture and resources research; (5) program the allocation of all government revenues earmarked for agriculture and resources research to implement a dynamic national agriculture and resources research program; (6) provide the mechanism for assessment of progress and updating the national agriculture and resources research program; (7) establish, support, and manage the operation of a national network of centres of excellence for the various research programs in crops, livestock, forestry, fisheries, soil and water, mining resources, and socioeconomic research related to agriculture and natural resources; (8) establish a repository for research information in agriculture, forestry, fisheries, and mining; (9) develop a mechanism for full communication among workers in research, extension, and national development; (10) provide for a systematic program of agriculture and resources research, manpower development, and improvement; (11) provide for appropriate incentives to encourage top-notch research workers to remain working in their respective areas of agriculture and resources research; (12) enter into agreement or relationships with other similar institutions or organizations, both national and international, in the furtherance of the above purposes.

To effectively perform its designated tasks, PCARR was clothed with two vital powers: (1) the power to review all research proposals in agriculture and natural resources; and (2) the power to recommend research proposals to the Ministry of the Budget for funding. The second power was bolstered by a policy of the Ministry of the Budget that only research proposals recommended by PCARR would be eligible for government funding.

Complementing these powers is the mandate for PCARR to identify and coordinate the work programs of the network of research centres and stations throughout the country. To activate and strengthen the network, PCARR launched intensive infrastructure and manpower development programs that were aided in part by foreign institutions.

Organizational Structure of Research in the Philippines

To be able to carry out its functions effectively, the PCARR was organized into three main bodies: (1) the Governing Council (GC); (2) the Technical Program Planning and Review Board (TPPRB); and (3) the Secretariat.

Governing Council

The Governing Council (GC) formulates guidelines and policies for the national research program in agriculture and natural resources as well as for the operation of PCARR. It is composed of the following: Chairman — Chairman, National Science Development Board; Co-Vice-Chairmen — Minister, Ministry of Agriculture, and Minister, Ministry of Natural Resources; Members — Minister, Ministry of the Budget Representative, National Economic and Development Authority; President, Association of Colleges of Agriculture in the Philippines; Chancellor, University of the Philippines at Los Baños; Director General, PCARR; and two outstanding members of the private agricultural business sector.

Because of its composition, the Governing Council provides a stable link to the national science structure of the country. It assures responsiveness of PCARR to critical problems in agriculture and natural resources and provides for participation of virtually all sectors including education and the private sector. Above all, it provides for the participation of key government agencies and the private sector concerned with research and development to ensure relevance of policies to national development objectives.

Technical Program Planning and Review Board

The Technical Program Planning and Review Board (TPPRB) provides for the pooling of expertise and involvement of the technical sector, private sector, and top government policymakers in establishing a national program for research in agriculture and resources such as forestry, fisheries, and mines.

The TPPRB serves in an advisory capacity. Chaired by the PCARR Director General, it reviews the national research programs before they are referred to the GC for approval. The TPPRB directly links PCARR with the various agencies the members represent, or which are affected by PCARR's operations.

The TPPRB membership consists of: Director General, PCARR (Chairman); Executive Director,
The term "commodity" is used very broadly to include physical products such as corn and fruits; resources like soils and water; and disciplines like rural sociology and macroeconomics.
Defining Priorities

Defining priorities for research is done at two levels, among commodities and within commodities. To be able to effectively assign priorities to the commodities they are classified as: (1) agriculture and natural resources; and (2) macrocommodities, which includes those that do not belong to (1) but nevertheless cut across several commodities under (1). These include soil resources, water resources, farming systems, agricultural engineering, applied rural sociology, and macroeconomics.

Criteria for Assigning Priorities to Commodities

Two sets of criteria have been identified, namely: (1) basic criteria that apply to both major commodity groupings; and (2) specific criteria that apply only to individual groups.

Basic Criteria

(1) Actual/potential contribution to sectoral value added. The greater the percentage contribution of the commodity to the gross value added from the sector the higher the point score for that commodity.
(2) Relevance to the socioeconomic programs of the government. This means that the data and/or model for improving the socioeconomic programs of the government are enhanced by the relevant findings derived from research on a particular commodity. The use of this criteria takes into consideration not only the number of government programs but also the scope and magnitude of the programs.
(3) Contribution to improved policy formulation and implementation.
(4) Links/support to other commodities. These links will be inclusive, i.e., backward, forward, and/or a combination of these.
(5) Contribution to employment. In general, the greater the employment generated by a commodity, the higher the score for that commodity.
(6) Contribution to improvement in labour productivity. Aside from the employment generated by a particular commodity, due consideration is given to improvement in labour productivity.
(7) Availability of research manpower and facilities. Manpower and research facilities must be available for the commodity. However, the availability or lack of research manpower and facilities must not hinder the inclusion/creation of a commodity but rather must serve as a reminder of the need for improving manpower in that area.
(8) Availability of appropriate technology. The less available appropriate technology there is, the higher the score for that commodity.

Specific Criteria

(1) Agriculture and natural resources: (a) contribution to export earnings; and (b) import substitution.
(2) Macromodules: (a) contribution to database.

Each basic criterion carries a maximum of 10 points; each specific criterion carries 5 points of agriculture and natural resources and 10 points for macrocommodities.

A lot of statistical data is required to enable PCARR to assign priorities. The set of criteria includes both quantitative and qualitative variables. Data for some of the quantitative variables are available, e.g., value added, export earnings, etc. For some, projections have to be made based on available statistics from the findings of research projects.

For the qualitative variables, the individual member’s (of the TPPRB) basic knowledge, inclination, and/or opinion is his primary guide in addition to the data, justifications, and projections provided by the technical divisions of PCARR. This in effect provides the sociopolitical input in the decision-making process.

Process for Assigning Priorities

The PCARR secretariat makes the preliminary steps. Then the individual members of the TPPRB make their own scoring of the various commodities. The process, therefore, incorporates the inputs of the TPPRB membership, which includes scientists, academe, administrators, and the private sector.

From the TPPRB, commodities that are given priority are submitted to the governing council. The 34 commodities are classified into three groups: (1) priority I; (2) priority II; and (3) priority III. Because rural sociology and macroeconomics encompass all other commodities and are considered to be important in agriculture and natural resources development, they were classified as priority I but given a special group status. Hence, we have socioeconomic and special projects. It was recognized that special projects and urgent research may be needed at any time because of such things as: the discovery of a potentially important nontraditional commodity; new development programs to be implemented by the government; or unexpected natural catastrophes like typhoons or diseases. Some allowance was made for such projects.

As expected, when the commodity classification was submitted to the governing council, a movement from one group to another was made depending on the programs, interests, and other justifications of the members of the council. This is part of the “political input” in the process. In fact, even at the
TPPRB level, some political considerations have been taken into account.

**Commodity Priorities**

The 34 commodities are classified below according to the groupings made, that is: priority I; priority II; priority III; and socioeconomics and special projects.

Priority I: (1) coconut; (2) corn and sorghum; (3) fibre crops; (4) legumes; (5) root crops; (6) sugarcane; (7) vegetables; (8) aquaculture; (9) marine fisheries; (10) forage, pasture, and grasslands; (11) carabao beef; (12) nontimber products; (13) reforestation and forest watershed; (14) timber products; (15) metallic minerals; and (16) agricultural engineering.

Priority II: (1) fruit crops; (2) rice; (3) tobacco; (4) beef chevon; (5) inland water; (6) parks and wildlife; (7) farming systems; (8) soil resources; (9) water resources; and (10) nonmetallic minerals.

Priority III: (1) ornamental horticulture; (2) plantation crops; (3) dairy; (4) pork; (5) poultry; and (6) pulpwod, fibreboards, and paper products.

Socioeconomics and special projects: (1) applied rural sociology; and (2) macroeconomics.

**Resource Allocation**

With these priorities, the PCARR is able to allocate the limited funds available for research among the different commodities. As a guideline, the council has allocated 80% of the annual total research budget to priority I commodities, 10% to priority II, 3% to priority III, and 7% to socioeconomics and special projects.

**Priorities Within Commodities**

Because resources are limited and many problem areas must be studied for each commodity, PCARR defines the national commodity research program and identifies the priority research areas. Priorities are based on three major factors: (1) objectives of the national development plan; (2) status of knowledge/technology; (3) requirements of national development programs.

Among others, the objectives of the national development plan include self-sufficiency in food, increased income, improved income distribution, better employment opportunities, and improved nutrition. Such objectives are basic to the determination of priority research areas.

The state-of-the-art in a particular commodity defines what knowledge or what technology are presently available or adopted by the end-users and what gaps exist in the knowledge. End-users include producers, policymakers, and others. In general, the primary target of the research program is the small producer.

Various development programs are being implemented by the government. These programs have to be evaluated to provide guidelines for modification and improvement. Furthermore, problems must be identified so that solutions can be provided.

Refining the research program for each commodity is a major responsibility of the commodity research teams. These teams are multidisciplinary and multiagency in composition and thus provide a systems approach to the process.

Research priorities are further discussed with regional officials of the Ministries of Agriculture and Natural Resources and the National Economic and Development Authority to assure relevance and comprehensiveness of the research program.

All commodity research priorities are reviewed by the TPPRB before submission to the Governing Council. These priorities are updated every year to account for new developments and for new programs of the government.

**Manpower Resources**

Because of the need to develop scientific research manpower to effectively implement the national agriculture and natural resources research program, studies on the available manpower resources in agriculture, fisheries, forestry, and mines research have been conducted since 1971. The total available manpower resources increased from 2234 in 1974 to 3046 in 1978, an increase of about 36% in 4 years.

The distribution of researchers has remained virtually the same through the years, with the greatest number (1431 or 47% in 1978) found in colleges and universities. The Ministry (then Department) of Agriculture employed 24% and 17% in 1974 and 1978, respectively; whereas the Ministry of Natural Resources had 7% in 1974 and 13% in 1978. In 1978, the remainder were distributed among the National Science Development Board (4.5% in 1978), other government agencies (10%), international agencies (8%), and private agencies (0.49%) (Table 1).

The majority of the researchers hold a Bachelor of Science degree (67 and 72%, respectively, in 1974 and 1978) and in 1978 only 8% had a doctorate, which was a decline from 11% in 1974.

Researchers with specialization in crop sciences increased from 608 in 1974 to 1045 in 1978 and comprised the biggest group (31% of the total). Researchers with specialization in food and nutrition remained the smallest group both in 1974 and 1978 (3% and 2%, respectively). However, social science researchers decreased from 31% in 1974 to only 17% in 1978 (Table 2).

The current research manpower spends about half of its time doing actual research. The actual
The utilization of research manpower was measured in terms of scientist-man-year (SMY), which is the percentage of full-time equivalent devoted to actual research work. Hence, the 3046 researchers spent only roughly 50% of their time on research.

In 1974, researchers in universities and colleges registered the lowest SMY (34%). This could be explained by the inherent complimentarity of teaching, extension-education, and research in these institutions that results in less time being spent on research by faculty members. Likewise, some faculty members, especially those with advanced academic training, have been drafted to undertake part-time assignments in government planning bodies and action agencies and this further reduces the time available for research.

### Manpower Development Program

Development is people-centred. People are the target of development as well as its implementer and facilitator. Together with the material inputs, human resources are part and parcel of all development activities and concerns. The success of development efforts hinges on the provision and harnessing of an adequate number of people with appropriate skills, training, knowledge, and orientation. This requires a concerted, directed effort to continually educate and train the people who conduct and support development-related activities. PCARR therefore pursues a manpower development program for agriculture and resources research personnel in support of current national development thrusts.

Started in 1973, PCARR's manpower program is aimed at developing the agricultural and resources research capability of the Philippines. The goal is the effective implementation of a national agricultural and resources research program in the country through upgraded and improved research manpower, facilities, and streamlined research management and operations.

The program is of two kinds: (1) degree (includes courses at the B.S., M.S./M.A., and Ph.D. levels); and (2) nondegree, which includes training courses, study tours, observation trips, and participation in conferences, symposia, or similar development-oriented courses.

Because of limited financial resources, the primary target of the program is the identified national research network, including the PCARR Secretariat. However, since the national research system is not confined to this network, a modest percentage of the total resource is set aside for nonmember agencies and the private sector.

### Table 1. Distribution of researchers by agency and degree of training, 1974 and 1978.

<table>
<thead>
<tr>
<th></th>
<th>B.S.</th>
<th></th>
<th>M.S./M.A.</th>
<th></th>
<th>Ph.D.</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colleges and Universities</td>
<td>488</td>
<td>811</td>
<td>397</td>
<td>428</td>
<td>213</td>
<td>192</td>
<td>1098</td>
</tr>
<tr>
<td>Department of Agriculture</td>
<td>491</td>
<td>484</td>
<td>49</td>
<td>39</td>
<td>4</td>
<td>4</td>
<td>544</td>
</tr>
<tr>
<td>Department of Natural Resources</td>
<td>153</td>
<td>346</td>
<td>8</td>
<td>21</td>
<td>1</td>
<td>1</td>
<td>161</td>
</tr>
<tr>
<td>National Science Development Board</td>
<td>135</td>
<td>113</td>
<td>22</td>
<td>20</td>
<td>14</td>
<td>4</td>
<td>171</td>
</tr>
<tr>
<td>Other government agencies</td>
<td>76</td>
<td>277</td>
<td>24</td>
<td>18</td>
<td>2</td>
<td>4</td>
<td>102</td>
</tr>
<tr>
<td>International agencies</td>
<td>121</td>
<td>165</td>
<td>4</td>
<td>64</td>
<td>1</td>
<td>40</td>
<td>126</td>
</tr>
<tr>
<td>Privates agencies</td>
<td>24</td>
<td>11</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>32</td>
</tr>
<tr>
<td>Total</td>
<td>1488</td>
<td>2207</td>
<td>509</td>
<td>593</td>
<td>237</td>
<td>246</td>
<td>2234</td>
</tr>
</tbody>
</table>


More than the total number of researchers surveyed because of overlapping of field of specialization.

### Table 2. Distribution of researchers by area of specialization, 1974 and 1978.

<table>
<thead>
<tr>
<th>1974</th>
<th>1978</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Per-</td>
</tr>
<tr>
<td>cent</td>
<td>cent</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Crop sciences</td>
<td>608</td>
</tr>
<tr>
<td>Social sciences</td>
<td>681</td>
</tr>
<tr>
<td>Forestry sciences</td>
<td>223</td>
</tr>
<tr>
<td>Animal sciences</td>
<td>220</td>
</tr>
<tr>
<td>Soil and water sciences</td>
<td>164</td>
</tr>
<tr>
<td>Fishery and oceanic sciences</td>
<td>139</td>
</tr>
<tr>
<td>Physical and chemical sciences</td>
<td>123</td>
</tr>
<tr>
<td>Food and nutrition sciences</td>
<td>76</td>
</tr>
<tr>
<td>Biological sciences</td>
<td>—</td>
</tr>
<tr>
<td>Total</td>
<td>2234</td>
</tr>
</tbody>
</table>


More than the total number of researchers surveyed because of overlapping of field of specialization.
The awarding of scholarships for degree programs is based primarily on the commodity assignment and research program of the respective research stations. In addition, applicants for scholarships are evaluated on: (1) educational qualifications, (2) professional/work experiences; and (3) potential and future plans.

Progress of manpower development program as of 1980-81

From a start with nine scholars from the Southern and Central Luzon Regions in the second semester of 1973-74, the degree program has expanded to other regions. A total of 619 awards have been made as of the first semester of 1980-81. Of this number, 243 (39%) were from Southern Luzon; 28 (5%) from Central Luzon; 120 (19%) from Visayas; 100 (16%) from Mindanao; and 40 (7%) were unattached.

Table 3 lists the fields of study pursued by PCARR scholars. Crop sciences scholars comprised the biggest group, 192 (31%). Those with specialization in fishery and oceanic sciences numbered 143 (23%); social sciences 100 (16%); forestry sciences 68 (11%); animal sciences 30 (5%); and soil and water sciences 40 (6.32%). A mere 19 (3%) of the total number of scholars specialized in physical and chemical sciences.

Of the total number of degree-oriented local awards made by PCARR, almost all the scholars came from the National Research Network with cooperating stations having 241 (39%) and multicommodity agencies 135 (22%). Other government agencies had 9 (1.5%); unattached 40 (6%); and the PCARR Secretariat 32 (5%).

For short-term training PCARR either finances the participation of researchers and support staff for training abroad or sponsors the training itself locally. The 72 foreign nondegree training awardees were distributed as: 40 for short-term programs; 19 for conferences/seminars, and 13 for observation/study tours. These awards vary in topic and clientele level. Among others, topics included natural resources, economics and policy, management, education and human resource development; and production and technology. Administrators, researchers, and support staff used the program.