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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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The Agricultural Research System in Malaysia: A Study of Resource Allocation

Mohd. Yusof Hashim[1]

Agricultural research is certainly not new to Malaysia, but its importance in the overall economic development of the country has only been fully appreciated in the last decade or so. During much of the colonial and postindependence period, research was largely concentrated on a single commodity, rubber. Because it was a major rubber producing country, it was logical for Malaysia to have given considerable emphasis to rubber research. Of the total cropped area of 3.85 million hectares, rubber occupies 54% of the area, oil palm 15%, rice 15.2%, coconut 8.3%, and other crops a total of 6.6%. Rubber contributes about a third of the gross national product and more than 50% of export earnings. The Rubber Research Institute of Malaysia (RRIM), established in 1925 to undertake rubber technology research, is one of the oldest and most widely recognized research organizations in the world.

Because of uncertain rubber prices on world markets and the realization that Malaysia needed to diversify her agricultural base to produce other agricultural products for local consumption and for export, research on other commodities was given more attention. In 1969, the Malaysian Agricultural Research and Development Institute (MARDI) was established and took over the research functions of agencies such as the Department of Agriculture, the Fisheries Department, the Veterinary Department, the Malaysian Pineapple Industries Board, the National Tobacco Board, and the Food Technology Division of the Ministry of Agriculture. MARDI thus became responsible for research on all crop commodities (except rubber), livestock, and freshwater fisheries. However, in September 1979, another agency, the Palm Oil Research Institute of Malaysia (PORIM) was established to undertake research on oil palm.

In addition to RRI, MARDI, and PORIM, there are a few other agencies that conduct research in agriculture and related fields: the Forest Research Institute (FRI); the Veterinary Research Institute (VRI, for research on animal health); the Fisheries Research Institute (FRI, for research on marine fish); and universities, in particular, University Pertanian, University Sains, and University Kebangsaan. Research is also conducted by the private sector, namely estates, to cater for its own research requirements.

Research for commodities other than rubber is crucial because Malaysia also produces rice, its staple food, vegetables, fruits, tobacco, and legumes mainly for domestic consumption and oil palm, cocoa, pineapple, and copra mainly for export. This realization of the importance of agriculture, not only as a source of foreign exchange but as a means of modernizing and improving the socioeconomic well-being of the rural masses, has made the government allocate higher proportions of its national development budget for agricultural development. In the Second Malaysia Plan (1971–75) about 26.5% of the budget was allocated to agricultural development. In the Third Malaysia Plan (1976–80) the allocation was 25.5%, whereas the percentage allocated in the Fourth Malaysia Plan is about 19%. The agricultural sector was expected to grow at the rate of 7.3% during the Third Malaysia Plan as compared with 5.6% during the period of the Second Malaysia Plan (Table 1).

In an effort to coordinate research and scientific activities within the country, a National Scientific and Development Council (NSDC) was established in 1976. The main function of NSDC is to promulgate basic policy guidelines on agricultural research and development. NSDC therefore has an influence on the directions of agricultural research programs and policies, but it has no authority or power to direct operational activities. Thus, NSDC has not been a major instrument to effect change in the

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Table 1. Growth of agricultural output in Malaysia, 1971–80 (1970 = 100). Source: Third Malaysian Plan.

	1971	1972	1973	1974	1975	1980 (Projected)	Average annual growth rate 1971–75	Average annual growth rate 1976–80
Rubber	104.4	104.3	123.5	122.0	155.6	208.2	3.1	6.0
Palm oil and kernel	136.7	167.7	187.0	237.1	296.8	634.2	24.3	16.4
Saw logs	103.4	117.9	132.1	132.9	108.2	149.6	1.6	6.7
Rice	108.6	110.4	118.0	126.1	120.2	143.5	3.7	3.6
Coconut and copra	99.8	101.6	103.2	105.4	106.5	114.7	1.3	1.5
Pineapple	95.2	90.9	86.3	87.9	81.7	92.4	-4.0	2.5
Pepper	109.7	105.4	92.2	113.1	124.0	174.7	4.4	7.1
Tea	120.0	87.5	80.0	77.5	72.5	59.1	-6.2	-4.0
Fish	107.9	104.4	131.8	152.2	159.5	192.2	9.8	3.8
Livestock[a]	103.9	112.0	109.0	116.8	125.1	164.3	4.6	5.6
Miscellaneous[b]	104.7	115.2	118.4	123.1	132.5	190.2	5.8	7.5
Aggregate production index	106.8	112.6	126.2	132.5	131.5	186.5	5.6	7.3

[a] Includes beef from buffalo and oxen, mutton, pork, and poultry meat and eggs.
[b] Includes sago, tapioca, cocoa, coffee, sugarcane, groundnuts, maize, fresh fruits, tobacco, spices, food crops, and other minor crops.

research operations of the various research institutions, although all research institutions should fall under its umbrella.

The Rubber Research Institute (RRI)

The Rubber Research Institute of Malaysia (RRIM) is one of the three major units operating under the authority of the Malaysian Rubber Research and Development Board (MRRDB). The two other operating units are the Malaysian Rubber Producers Research Association (MRPRA) and the Malaysian Rubber Bureau (MRB).

The MRPRA performs research into the compounding, processing, properties, and uses of natural rubber and provides technical service for Britain and laboratory support for technical services in America and Europe. The MRB handles mainly technical advisory services and publicity and has offices in Australia, Austria, Germany, India, Italy, Japan, Netherlands, Spain, the USA, and the United Kingdom.

The MRRDB functions under the Ministry of Primary Industries, a ministry with responsibility for industrial export crops such as rubber, oil palm, pepper, and canned pineapple. For operational purposes, MRRDB is funded through a cess (research cess of 2.2¢/kg) collected from the sale of rubber by the government. This cess is placed directly under the control of MRRDB. The fund was about $35 million ringgit annually in the 1960s and increased to about $40 million ringgit annually in the 1970s. The MRRDB has exclusive authority in utilizing these funds for its activities in both research and development.

Although the MRRDB is responsible for the overall administrative policies and procedures, the RRIM is directly responsible for undertaking research into the production, processing, and manufacturing and marketing of rubber. The RRI obtains its operating funds directly from the MRRDB and thus avoids the problem of having to request funds from central agencies of the government. The institute has a technical senior staff of 233, a junior staff of 1160, and a budget of approximately $30 million. Table 2 shows the budget allocations for recurrent and capital expenditures for 1976–80.

The Malaysian Agricultural Research and Development Institute (MARDI)

Although MARDI was founded in 1969, it only became operational in 1971. The main function of the institute is to conduct scientific, technical, economic, and sociological research with respect to the production, utilization, and processing of all crops (except rubber and oil palm), livestock, and freshwater fisheries. In the early years, it concentrated its efforts mainly on the development of physical infrastructure, the training of staff, and the determination of future strategies. MARDI has a total of 26 research stations strategically located

Table 2. Recurrent and capital expenditures for 1976–80 (M$). Source: RRIM.

	Recurrent	Capital expenditure
1976	21 840 825	16 238
1977	23 118 580	1 358 396
1978	26 515 990	2 085 934
1979	28 034 485	2 126 437
1980	27 813 336	2 127 615

throughout Peninsular Malaysia and employs 440 research scientists and about 1600 junior support staff.

MARDI is a statutory body under the Ministry of Agriculture. In total, there are seven statutory bodies and seven departments under the Ministry of Agriculture. Organizationally, MARDI is structured along commodity lines (Fig. 1). The institute is governed by a board that comprises representatives of various central government agencies, the private sector, and political organizations. The governing board is responsible for administrative, finance, personnel, and policy matters. The institute submits its requirements for development and operating activities to the board and subsequently these are submitted to the central government agencies for final scrutiny and approval.

The scientific council is responsible in providing research guidance or directions to the institute. Composed of leading scientists from local universities and both public and private research organizations, the scientific council scrutinizes, monitors, and evaluates the research programs and activities of the institute. A number of advisory committees under the chairmanship of the members of the scientific council undertake detailed examinations of the research activities under the various commodities to ensure that the institute is sensitive to the needs of the country.

The institute is dependent on the government for financial support, both for recurrent and capital expenditures. It submits its financial requests to the Treasury and the Economic Planning Unit for its operating and capital estimates, respectively. Similarly, requests for personnel are submitted to the Public Service Department for approval before recruitment. The governing board then verifies or endorses the approved budget and personnel allocations for a particular year. Budget and personnel defence is normally done on a program by program basis and approval is given according to the programs. The allocations for both development and recurrent expenditures for the last 5 years are indicated in Table 3.

The Palm Oil Research Institute of Malaysia (PORIM)

PORIM is a new organization established in September 1979. It took over research on palm oil that had been previously undertaken by MARDI. The primary objective of PORIM is to conduct and promote research on the production, extraction, processing, storage, transportation, marketing, consumption, and end uses of palm oil and oil palm products.

The institute is managed by a board that comprises representatives from the oil palm industry and government agencies that are appointed by the Minister of Primary Industries. The institute is financed by a research cess of $4/tonne of palm oil produced and is managed directly by the board, which is similar to the Governing Board of the Rubber Research Institute. Initially, the government provided a launching grant of $4.4 million to help the institute develop its infrastructure, i.e., research stations and laboratories. The private sector also provided support to help the institute become established. The institute currently has a total staff of 140 research scientists and technical subordinates. The estimated budget for the current year is about $12 million ringgit for both operating and development expenditures.

Universities

Universities, like other government statutory bodies, are semiautonomous institutions of higher learning under the Ministry of Education. They are governed by their respective University Councils in respect of all financial, personnel, and policy matters. However, as in the case of government statutory bodies, their requests for financial and personnel requirements must be submitted to the central government agencies for final approval because all universities are fully funded by the government.

Table 3. Recurrent and capital expenditures for 1976–1980 (M$). Source: MARDI.

	Operating	Development
1976	21 000 000	12 425 800
1977	29 425 500	15 579 000
1978	34 877 700	18 442 020
1979	40 271 000	16 313 050
1980	44 400 000	22 311 360

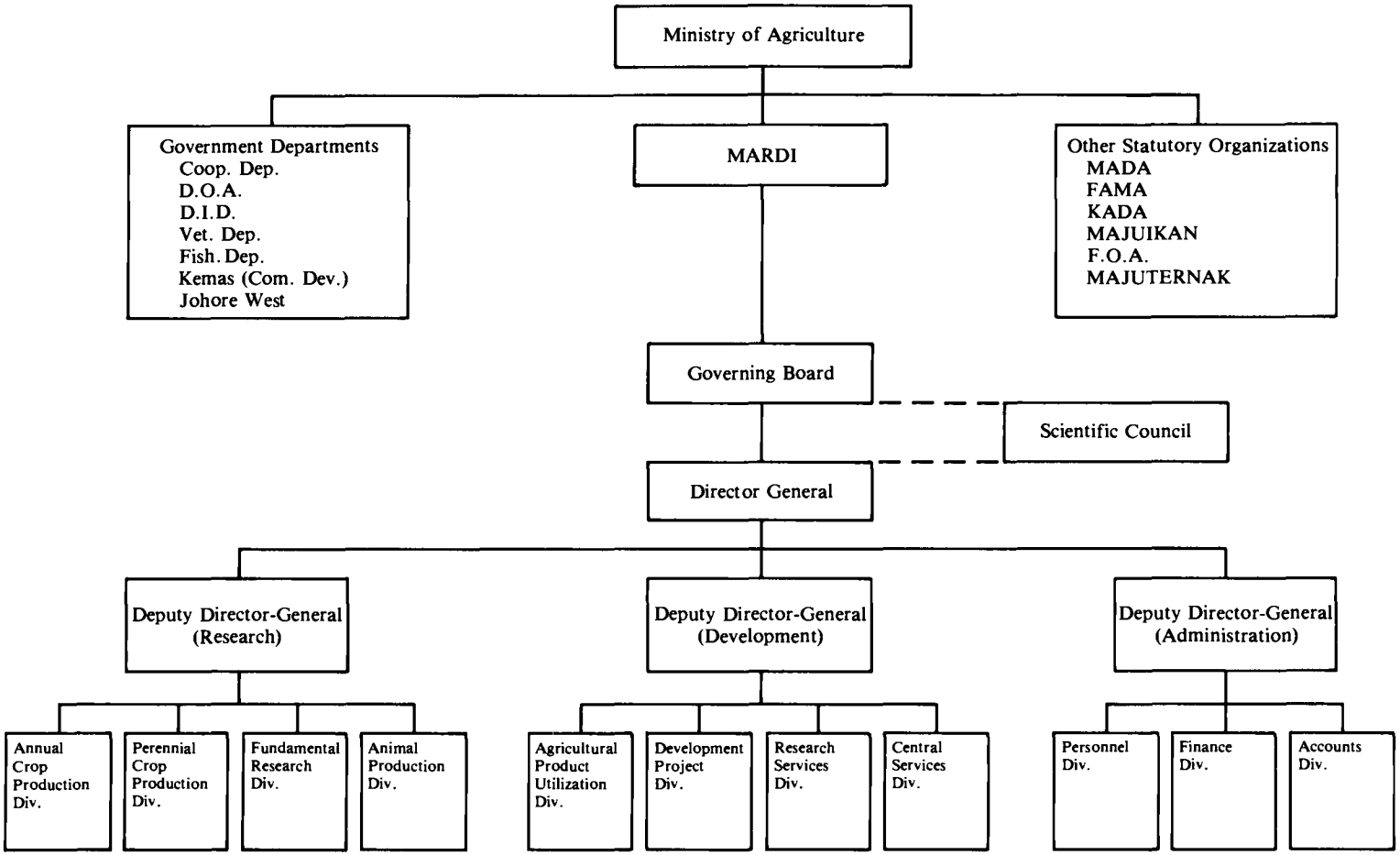

Fig. 1. The organizational structure of MARDI.

Other Government Agencies

Other government agencies/departments that conduct agricultural research include the Forest Research Institute (FRI), the Veterinary Research Institute (VRI), and the Fisheries Research Institute (FRI). These agencies operate like any other government department and are fully supported by the government in terms of financial and personnel requirements. Thus, they do not have any boards or councils to scrutinize their functions or activities. All requests for resources are submitted directly to the government's central agencies through their respective ministries.

Systems of Resource Allocation

From the discussion of the various research organizations, it is apparent that there are at least three different systems or models of operation prevailing in Malaysia. These can be described as:

(1) Research organizations that are autonomous and independent with regard to sources of funding. RRI and PORIM are in this group. They do not depend on the government directly for financial support. They obtain their funds from cesses levied by the government and these funds are directly controlled by their respective boards.

(2) Research organizations that are autonomous, controlled by their respective boards or councils, but must obtain financial support from the government treasury. MARDI and the universities are in this group. The boards or councils do not have the power to determine the amount of funds that can be made available to the organizations under them.

(3) Research organizations that depend directly on the government for their financial support without having to be scrutinized by other intermediary bodies such as a board or council. The FRI, VRI, and Fisheries Institutes are in this category.

Although Malaysia has a National Research and Development Council, it is only advisory in function and does not in any way have a direct influence on the operation of the research organizations, particularly in their efforts to secure financial and basic support. Therefore, there is no central body that coordinates or determines the resources to be allocated to research either on a commodity basis or as a composite of commodites for the country. The treasury, the central government agency, has the final authority to determine the amount of financial support to be given to research organizations (although not in the case of RRI and PORIM) based on annual requests. The allocation that is given is based on the merits of the requests made by each organization, not on a conscious effort to look at research needs as a whole.

The allocation of resources is an annual exercise in which estimates for financial support are prepared according to various codes of expenditure. The codes used in the estimates are: 1100 salary; 1200 allowance; 1300 overtime; 2100 travel and transport; 2200 transportation of materials; 2300 communication; 2400 utilities; 2500 rentals; 2600 printing; 2700 supplies and materials; 2800 maintenance and repairs; 2900 professional services; 3100 land; 3200 facilities; 3300 inventory; and 4100 training.

As an example, in the case of MARDI, the submission is made on a program by program basis. Table 4 indicates the categories and the amount asked for and finally allocated for 1981 after presentation to, and scrutiny by, the treasury. Normally, the heads of each division are asked to present their rationale/defence for the estimates based on the activiites envisaged for the year. Under normal circumstances, the increase in the budget estimates approved for each year should not increase more that 13% over the previous year's estimates.

A New Approach?

Is there a better approach or procedure that can improve resource allocation to agricultural research institutions in the country? Should there be a centralization of the decision-making process in resource allocation to all research organizations?

Because of current efforts of the government to develop the agricultural sector, particularly its emphasis on modernizing and increasing the socioeconomic status of the smallholder sector, it must be agreed that there is a need to increase allocations to research in the future. The present allocation

Table 4. MARDI's budget allocation for 1981.

Programs	Amount requested	Amount approved
Administration HQ	10 211 000	9 364 800
Station administration	20 739 900	14 245 600
Annual crops	5 697 200	5 972 400
Perennial crops	4 016 300	3 023 800
Livestock	4 147 900	6 112 300
Agricultural product utilization	4 351 300	4 649 500
Project development	2 920 000	2 507 200
Basic research	5 346 500	6 720 400
Research services	1 458 600	2 413 200
Central services	2 523 400	2 013 800
Subtotal	61 412 400	57 023 000
Increase in new salary structure	7 500 000	—
Total	68 912 400	57 023 000

to agricultural research is only about 0.2% of the GNP and this is far below the allocation made in many developed countries, which is normally between 2% and 4%. There is a need to build the research capabilities of the various research organizations in consonance with the need to develop the agricultural sector.

Due to the scarcity of resources, it would appear that their utilization would be more effective and efficient if they were centrally controlled, managed, and distributed. Such a measure would provide an opportunity for the government to study the research needs of the country in their proper perspective and to give priority to the areas that need immediate attention.

Centralization would also allow the government to monitor research inputs and outputs as a whole and enable it to distribute resources according to proper and rational demands. It would allow the government to build the research capabilities of the various institutes accordingly and in a systematic way rather than allowing the institutions to develop on their own, which can lead to disparity in the growth of different institutions. Centralization would also allow for coordination and sharing of resources, particularly expensive equipment and laboratory facilities, which would reduce the tendency for duplication and unhealthy competition. Centralization would also give the opportunity for the government to monitor and evaluate research in its contribution to the overall growth of the economy.

Concluding Remarks

The subject of resource allocation to agricultural research has become an important area of study in many countries. Malaysia is by no means an exception. In recent years, the subject has gained considerable attention because of the importance attached to the development of the agricultural sector.

On closer examination of the existing operations of the various research organizations, it can be discerned that there are at least three operational systems by which resources are allocated to research. In one system the organizations are rather independent in getting resources because the government has ensured that a certain amount of resources will be available by collecting a research cess for certain commodities. Another system allows autonomy in terms of policy and administrative actions but resources have to be sought from the government agencies. The other system does not allow any independence from the government in terms of administrative policy, and resource allocation and utilization.

There are, of course, some merits in allowing these systems to operate as they are. Organizations can make progress and develop themselves according to their own capabilities without having to worry about whether other organizations are well developed or whether research in other sectors of agriculture is given appropriate attention. In view of the scarcity of resources and the need to maximize productivity from the agricultural sector, it can be argued that if allocation were centrally coordinated, managed, and distributed it would be most efficient and effective. As well, the government would be in a better position to monitor and evaluate their impact if resources were allocated and utilized on a national basis rather than on the segmented basis presently practiced.