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Agricultural Innovation: The Challenges to Education...

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Southeast Asia Development Advisory Group (SEADAG).

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ISBN 20120

PL660

Agricultural Innovation: The Challenges to Education and Manpower Development. Nongyao Karnchanachari. 1969.

22 p.

Bibliography: 1 p.

1. Agricultural education - FEA. 2. Innovations - Agriculture - FEA. 3. Manpower - Agriculture - FEA. I. Title. II. Nongyao Karnchanachari.

A.I.D. HISTORICAL AND TECHNICAL REFERENCE ROOM 1006 NS

AGRICULTURAL INNOVATION: THE CHALLENGES TO EDUCATION AND MANPOWER DEVELOPMENT

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~~VIETNAM RESEARCH AND EVALUATION~~
~~INSTITUTION CENTER~~
~~OF SOUTH ASIA~~

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Presented for discussion at a meeting of the SEADAG International Research Conference, held at Asia House, New York, on June 24-27, 1969.

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AGRICULTURAL INNOVATION: THE CHALLENGES TO
EDUCATION AND MANPOWER DEVELOPMENT

By Nongyao Karnchanachari

I. INTRODUCTION

Southeast Asian countries have repeatedly stated their determination to improve the economic and social development of their countries. Each country has set up a plan--short- or long-term--to achieve this, and indeed development in different sectors of the economy *has* been vigorously accelerated. Yet in spite of these efforts large numbers of people still suffer from great poverty, hunger, and poor living conditions. The present higher-than-average population growth indicates that even greater tasks await all countries in this part of the world. It is clear that resultant political and social tensions will not be lessened until the conditions which cause them are eliminated.

To solve these serious problems, the Southeast Asian countries, being predominantly agrarian, have given first priority to agricultural development. In Thailand, for example, it is clearly perceived that the agricultural sector is the foundation upon which the country's economic development must be based, since about 80 per cent of the country's population is engaged in agricultural employment.

Similar ideas were expressed in the Fourth Southeast Asia Ministerial Conference on Economic Development held in Bangkok last April, when all countries in this region, with one exception, emphasized their resolve to accelerate rice production and promote agricultural endeavors and activities of all kinds to the best of their ability and potentiality. This aspect of development

undoubtedly calls for agricultural innovation and the replacement of traditional methods of farming by modern ones, with the main purpose of increasing the yield for the peoples of the region and enabling the farmers to enjoy the maximum income (and the resulting improvement in their standard of living).

Nature of Agricultural Innovation and Human Resource Problems

Skimming through a number of agricultural documents and survey reports of national as well as international agencies directly involved or interested in agricultural development (Thailand Ministry of Agriculture, the FAO, the Asian Development Bank), one becomes convinced that there exists in this part of the world great opportunity to expand the productivity of the land, that "it needs only the purposive activities of man to mold and contain the regions' rich potential to bring forth a vast abundance to satisfy human wants."¹

Policy objectives are clearly made towards agricultural innovation by most Southeast Asian countries. Those for agricultural development in the Thailand Second National Economic and Social Development Plan (1967-1971) read:

The primary policy objective in the development of the Agriculture Sector is to accelerate and diversify production, to assure that the benefits of higher productivity accrue to the farmers and to promote the security and dignity of agricultural occupations. The following objectives are designed to realize the general sector policy objective:

- (i) To improve and expand the government infrastructure projects, such as irrigation and transportation in the rural areas.
- (ii) To develop the natural agricultural resources and to utilize them efficiently to obtain the maximum long-term economic benefits.

- (iii) To improve and strengthen research and experimentation so as to modernize farming techniques and increase productivity.
- (iv) To improve the quality and grading of agricultural products to satisfy domestic and foreign demands.
- (v) To improve the land tenure systems in order to promote commercialization of agriculture while maintaining the equities of the contracting parties.
- (vi) To promote agricultural institutions, such as farmers' associations, cooperatives, people's irrigation associations, and young farmers' associations, so that these institutions can represent the farmers and express their interests.
- (vii) To improve the marketing system of agricultural products and to strengthen the bargaining of the farmers so that they will receive an equitable share of the final retail price of the commodities they produce.
- (viii) To extend increased government services to the farmers, especially in the field of agricultural credit, price support for the principal crops, and various extension services.²

The objectives stated above have seemingly covered all the essential factors for agricultural innovation. And, I believe, all or most of them are what the other countries have set up or are presently working towards. Consequently, it seems justifiable to conclude that the concern is there and the requirements for agricultural innovation are well known. But the degree of success of the projects in reaching the developmental goals is a matter for consideration.

From the recent survey of Asian agriculture sponsored by the Asian Development Bank in 1967-1968, one learns of major constraints on agricultural development. These include organization, human capital, and infrastructure problems. In the detailed discussion explaining the causes of those constraints, however, there is a constant grave note from the Survey Team that in whatever area they have investigated, the non-availability of a suitable number of agriculturally trained personnel in almost all countries of Asia needs serious attention. The lack of skilled personnel in the research and experiment stations, in the extension agencies, in the cooperative units, and even in the administrative departments dealing with agriculture and allied subjects, has pivotally deterred the implementation of agricultural development programs. There is definitely a growing need for agricultural education and manpower development, the planning of which should definitely be made in such a way that there is logical correlation between the education and training process in agriculture and the changing manpower needs for agricultural progress and attainment.

This concept is undoubtedly and universally accepted; yet in spite of the fact that progress has been made along the lines planned, actual achievement, particularly in terms of the number of qualified agricultural personnel, seems to be far from what was anticipated. One pertinent example can be seen in the report of the past performance in Thai agriculture during the First National Economic and Social Development Plan (1961-1966), which recorded that the three main categories of activity for the production of agricultural crops, research and experimentation, pest and disease control, and agricultural services, have suffered from insufficient personnel, in addition to equipment, for national coverage to be realized.

The same complaint was reaffirmed by a forceful statement in a survey report on Asian Agriculture:

Measures to correct the situation with regard to the availability of an adequate number of trained agricultural personnel are among the significant neglects in the development planning of most regional countries. The investment in the development of human resources has a long gestation period, but to neglect or to pay half-hearted attention to such a vital factor will be self defeating. A positive policy for training manpower must be undertaken without any loss of time since time is the vital factor in the whole process. It should be sufficiently clear to the planners and policy-makers that it is futile to proceed on a program of institutional innovation without ensuring beforehand the availability of trained manpower.³

Personally, one totally supports the point of view that in developing countries there is an acute need for trained agricultural manpower. Yet one is also certain that this is not because of neglect on the part of planners and policy-makers of any Southeast Asian governments. Policy statements and significantly increasing national budget allocation for both agricultural and educational development have well proved this. One is inclined, however, to think that inefficiency in formulating sound manpower forecasts and potentially planned projects may account for the serious deficiency in education and manpower development.

II. PROBLEMS OF MANPOWER PLANNING

Conceptually the national agricultural development plan, as part of the overall national development plan, must be the primary basis for the manpower required to attain the production targets set both over the shorter period of the immediate plan and over the longer period as projected. Various types of personnel directly engaged in crops, livestock, fisheries production, etc., as well as

in infrastructure or any supporting agricultural services such as irrigation, transportation, land reform, market assistance, credit, farm supplies, processing, and storage, have to be taken into account in manpower planning if output expansion and productivity improvement in agriculture, particularly in food production, are to be achieved. Equally important is the comprehensive plan for agricultural education and training as the essential means to produce manpower quantitatively and qualitatively to meet the requirements stated.

In reviewing the agricultural development projects and those of agricultural manpower development under the present context of the Thailand National Economic and Social Development Plan (1967-1971), so as to ascertain the extent of their correlation, one comes to the conclusion that perhaps there is no comprehensive plan to correlate those undertakings. This conclusion is further reinforced by the complaint about the inadequacy of nation-wide statistics and the recent proposal to set up a Manpower Advisory Council:

It is very difficult to measure the nature and extent of underemployment and disguised unemployment in agriculture. This is because there are no adequate, nation-wide statistics on the seasonal fluctuation in agricultural employment, on labour productivity, or on the production effects of withdrawing labour from agriculture. However, it is generally agreed that labour productivity in the rural areas is quite low, even though Thai farmers spend long hours working in the fields during the planting and harvesting seasons as well as during the off-seasons. The persons are not unemployed but are employed at relatively low levels of productivity.⁴

Proper planning for manpower development, to be consistent with changing circumstances, requires a continuous survey and assessment of needs. In

this connection relevant statistical data and information concerning population growth, the size and composition of the labour force, and productivity trends must be taken into consideration. It is proposed to set up a Manpower Advisory Council consisting of representatives of the government regarding such matters as employment creation, manpower development and utilization, and organization of vocational training in relation to the manpower requirements of the country.⁵

A similar situation was discovered regarding the relationship between education development and agricultural manpower projects. Certainly there are development projects for all levels of education starting from kindergarten and lower primary education up to those of university level. One senses, however, that they are mostly oriented to broad general education: inadequate effort was made to outline agricultural education and training programs; there was little attempt at careful study and analysis of personnel requirements, such as in which agricultural subjects training should be given, the number of students that should be produced, distribution capacity, or appropriate levels of training.

To be sure, the findings make one uneasy. The question that directly follows is whether we have made an arbitrary manpower prediction. Five different manpower forecasts⁶ in Thailand since 1963 assure me that the prediction was not entirely guesswork, as each of those forecasts was based on quite an extensive study requiring much time and the participation of both Thai and foreign expert technical advisors. With this in mind one feels, with relief, that the verdict may be unjustified. But, about six months ago, the state of education planning in Thailand was exhaustively reviewed. Several remarks were made--with seemingly impressive

reasoning, too--after the author had had an extensive study of the forecasts made. The final words which concluded his findings were straightforward. They had a shocking effect, particularly on those who were involved in the past planning performances. At the same time a tone of sincerity exists:

The weaknesses of manpower forecasting in Thailand are not essentially a function of inadequate data but of an inadequate conceptual apparatus. The key to the difficulty is the arbitrary view that is always taken by manpower forecasters of the relationship between education and occupation.⁷

Having reviewed this report one is left disturbed and almost disheartened. However, the author's encouraging eloquence has a meaningful effect:

What is needed is a composite approach: none of the current approaches now practiced in educational planning around the world is entirely satisfactory by itself but each contributes something to the general picture. What we should be doing now is to concentrate our efforts on reconciling them. Even when we have accomplished that, we have only succeeded in integrating education with *economic* development.⁸

It may be worthwhile to add that as a result a new approach, the cost-benefit or rate-of-return analysis, which has never before been tried in the history of education and manpower planning in Thailand was suggested.

There are undoubtedly difficulties in planning particularly for manpower and education. In the meantime while each country is seeking the best technical advice and assistance, the Ministries engaged in Agriculture, offices or departments dealing with national manpower projection and education planning, the Ministry of Education, and any other educational institutions, should exchange

points of view and combine their efforts in order to upgrade agricultural human resources. And here again is essentially the place for foreign assistance to Southeast Asian countries. One might add a note of significant warning--that is, in order to make technical assistance worthwhile it is necessary to have two things: genuine experts from abroad and full-time, high-calibre counterparts from the host country. Without these it is futile to make new efforts in education and manpower planning. The following note from the ADB Survey Team on Asian Agriculture is, for this reason, still viewed with earnest interest:

No regional government had a comprehensive program for manpower development. Indeed, in most regional countries, there are no inventories of the trained personnel presently available, and little effort has been made to formulate a national education policy that is responsive to anything more than a broad assessment of future needs for skilled manpower. Technical assistance in manpower planning, the assessment of future manpower needs, and the development of educational facilities to meet these needs could be an important factor in accelerating the closing of the gaps between the demand and supply of skilled people.⁹

III. PROBLEMS OF EDUCATION AND TRAINING IN AGRICULTURE

Assuming that each country has prepared sound overall estimates of manpower requirements and has specified their categories in both the fields of agriculture and related agricultural service fields, let us focus our attention on the present general undertakings at different levels of education to produce trained personnel for agricultural activities, and the problems confronting these undertakings.

If increase in agricultural production through agricultural innovation is to take place, the personnel involved are of three categories: the farmers--those

directly engaged in agricultural production; the changing agents--those extension workers and field technicians; and the suppliers of specialized knowledge and modern techniques in agriculture--the senior supervisory and specialist personnel responsible for research service and formulation of agricultural development programs. The proper agricultural education and training given to these people will provide a vital force for agricultural innovation.

Primary Rural Education

It is perceived that in an agrarian country, the percentage of employed labor force engaged in agriculture is generally the highest, and it is also evident that in rural areas most pupils leave school at the end of their primary studies, having had approximately four years of schooling. An example may be given from the existing situation in Thailand where roughly 80 per cent of the labor force, engaged in agriculture attends school for only four years. The enrollment pyramid for Thailand--a cause for great concern--shows that by the fifth grade, only 17 out of an initial 100 pupils survive to continue their schooling. Lower primary education, therefore, should have played a vital role in inculcating in this army of farmers-to-be a consciousness of the importance of agriculture, and simultaneously the foundations of good citizenship through general education, with preparation applicable, once they quit school, to their former agricultural setting.

This raises the issue of whether this concept has ever been taken into real consideration. The review made from the curriculum designed for the lower primary education level of Thailand suggest that it has been, but to a very small degree. From a typical provincial agricultural extension officer who has had nearly 40 years of experience working closely in his field with the farmers, one hears

strong criticism of the present primary education curriculum to the effect that it may be appropriate for the minority of city-bred children but not for those in the rural areas who constitute the majority since there is little indication that provision is made in such a way to relate and orient the pupils' academic studies towards rural activities. In justice to education planners, the answer one has from one leading educator responsible for planning is that orientation to the pupils' immediate environment is strongly recommended in social studies and science course requirements. The failure to create enough consciousness of the importance of agriculture is not due to the curriculum but to two major problems. One is the misconception of the pupils' parents who view schools as the place to equip their children with the basic academic attainments of reading, writing, and arithmetic, and, for this reason, discontent arises on the part of the parents who learn that a number of hours per week are arranged for their children to do practical work in school gardens or on small farms. Another problem is the absence of teachers who understand this concept, or who may understand but lack appreciation of it, or who may possess both the understanding and appreciation of this concept but who unfortunately, for lack of both time and agricultural background (and most of them fall into this category) do not put adequate effort into inculcating in their pupils this conceptual consciousness. Complete absence of this consciousness occurs particularly in the case of one-teacher schools still prevailing in the rural areas of agrarian developing countries.

Whatever the problems, the revision of the existing curriculum for primary education is strongly recommended. As for teaching personnel, an agricultural orientation to the teaching of rural science for primary school teachers is a possibility likely to bring good results. Here is an area in which cooperation between the Ministry of Agriculture and the Ministry of Education will be essential.

Farmers' Education

The concept of agricultural innovation which leads from subsistence to commercial farming should be made clear to the standing farmers, since equipped with the notion of modern farming, the farmers are likely to change negative attitudes based on individual and traditional background. There are proved incidents that the farmers will be interested in new ideas, will understand the economic advantages of changes recommended to them, and will be willing to risk their money if they understand what is involved. They should be enriched with the techniques of modern farming through vocational training and local leadership development that are provided for both youth about to enter farming and adults already practicing it. The training programs should be practically oriented, the principles taught should be adapted to local farming practices and concerned with the farmers' current interests and needs. Time allotted to each training program may vary with the suitability of the program's objective. Young farmers, however, should have the opportunity to attend regular courses which may last in succession for a period of time, long enough to cultivate in them the practical methods of farming. This type of training should be considered as a form of out-of-school education with curricula to be developed accordingly. In the case of adults, courses applied to some specific farming problems should be short yet intensive, e.g., the increase of yield with improved seeds or the application of chemical fertilizer, the different methods to ensure better irrigation, the improved system of marketing to maximize income benefit, etc. If it is not possible to introduce such courses in the near future, demonstration plots are likely to prove educational and interesting to the farmers. Centers for this kind of training should be established and their location decided, after taking into account ecological patterns and farming system of each locality. It is desirable to have at least

one such center for each area identified as typical.

In Thailand certain efforts have been made for some time towards educating the farmers essentially through farmers' organizations such as the Rice Farmers' Groups, Agriculturists' Groups, People's Irrigation Groups, Young Farmers' Association etc. So far, a certain degree of success has been attained but not to the degree anticipated and there is still a lot to be done. As for the formal training of young farmers, very little still has been done. Major problems prevailing that have retarded the programs are perhaps common to all countries: the high rate of illiteracy among the farmers, the lack of competent extension workers, imbalance of the farmer-extension worker ratio, inaccessibility of areas due to the lack of transportation and communication facilities, and inadequate funds to launch the programs.

Vocational and Technical Agricultural Education and Training

Education and training at this level is seen by many as the most important, for it produces middle-level trained personnel urgently required in a large number in this early phase of agricultural development. It is the graduates from this level who will be working most closely with the farmers. Planning as to levels of instruction, curriculum design, etc., should be carefully decided upon to prepare these young people for a changing agricultural and industrial economy. Generally admission into schools providing this type of education and training follows the last year of upper elementary education, the seventh grade. Levels of instruction provided in the vocational and technical schools may vary from country to country. In Thailand there are three levels, namely, the lower vocational level (grades 8-10); the upper vocational level (grades 11-13); and the technical institutes or junior college level (grades 14-15). Since the

graduates from these three levels are expected to be able to deal and associate closely with the farmers so as to bring about agricultural innovation, they should be educated and trained in such a way to ensure that they, at each level, are equipped with considerable practical ability to demonstrate or extend to the farmers in the villages where they are going to render service improved agricultural practices. For this reason curricular offerings for vocational and technical training in agriculture at all levels should give first priority to practical training.

In Thailand, although it is stated in the policy objective that the vocational and academic secondary schools are intended to serve distinctly different functions and purposes; in practice, one questions if there is not a marked attempt to combine general secondary education and agricultural training. Consequently, a big argument is presently raised as to whether the curriculum designed for vocational and technical training is unsuitable and has defeated the main objective of producing vocational students, because there is a great similarity in course offerings in both academic and vocational stream curricula. This similarity confronts the students with a dilemma: to choose the vocational or the academic line. It is hard to train well for both purposes at the same time. One often hears remarks made by vocational students showing their dissatisfaction and astonishment, for they chose vocational studies because of their preference for a practical kind of education and their realization of their inability to cope with formal academic subjects; it is worse since, according to the curriculum, they have to take, besides their vocational subjects and field work, the same or almost the same academic subjects as students in the academic stream. As a result, both public and private organizations and agencies often complain about the inefficiency and lack of practical ability of these vocational students.

A strong recommendation has already been made to the government of Thailand to urgently look into this matter.¹⁰

As for the location of the agricultural vocation schools, it is helpful where possible to locate these institutions close to farms and experiment stations. Close cooperation with the existing agricultural extension service and other branches related to farm practices such as cooperatives, farm machinery centers, etc., is also beneficial. The advantages are that the students will be familiar with the environment in which they will later work and at the same time will be acquainted with the functions of experiment stations with which they will need to keep in regular contact in order to keep abreast with advanced technical knowledge later on.

Whether this level of agricultural education and training in Thailand is effective has now become a major topic of discussion. Some are wondering if the three levels of instruction set up a long time ago for agricultural vocational education pattern are now outmoded in view of present technological advancement e.g., whether lower secondary vocational education should be given up. Others are worrying about the prevailing deficiencies of the present teaching personnel as well as the lack of facilities which cause the schools to rely heavily on lecture instruction, and afford little practice. Many others think that a large number of these schools are located in unsuitable areas. There is, in conclusion, a great deal of dissatisfaction concerning this aspect of national education, and it seems inevitable that the whole structure of this level of vocational education and training must be reconsidered without any delay.

Higher Agricultural Education

To reach a higher stage of agricultural development, graduates of higher agricultural institutions are essential both in quality and in quantity to cope with the task of planning, administering, and supervising public agricultural programs and services, managing public and private bodies, and, most important of all, doing research and teaching and extension work. Developing agricultural countries are becoming increasingly aware of this need and give as much support as possible to the establishment of colleges of agriculture in both the old and the new universities and more attention is being given to the preparation of graduates in various fields of agriculture.

That a university must have the three functions of research, instruction, and extension is universally agreed and it is even more true in the case of education in agriculture. It may be worthwhile, in this connection, to quote an impressive summary statement from an unidentified source on the integration of these three functions. It reads:

The mutual stimulation of research, teaching, and extension is essential to the best progress of colleges of agriculture. Teachers need contact with research in order to keep abreast of their profession; research workers need the stimulation of students and of farm problems which they can help solve; and extension specialists have nothing to extend unless they have research results.

In fulfilling the desired functions, universities need to have one major requirement which is the most important issue of any institutions of higher learning: autonomous status. Without this, the university is forever doomed since adjustments to meet the changing need can hardly be made under the

usual government red tape. This may fortunately not be the case of the universities in the other countries of this region, but, unfortunately, it is the case in Thailand. Some of the reasons why Thai universities are engaged mostly in teaching, why good professional abilities are not attracted and retained, why research activities have not been supported as strongly as they should be, have been explained in the discussion in the SEADAG Conference at East-West Center last year.¹¹ One has nothing to add but only to emphasize that if universities should be operated as part of the civil service, it is a peculiar organizational structure and academic atmosphere will be hard to foster. However, it is a pleasure to announce that this matter is under the serious consideration of the Board of the National Education Council and it is envisioned that a great change in the system of higher education in Thailand may take place in the near future.

It is worthwhile, however, to consider certain existing problems in Thai universities and perhaps in many agricultural colleges or universities in this region. Colleges face many obstacles in their attempts to produce competent graduates. One which creates a great deal of concern among university teaching personnel is the in-coming students' lack of preparation for higher academic studies.

Secondary education in the academic stream has a significant share in the preparation of the students for higher education attainment. Complaints are frequently made not only about the students' inadequate general education background in such subjects as natural sciences, mathematics, social sciences, and humanities--all of which are prerequisites for university studies and training--but also their lack of competence and potentiality to undertake independent studies that would

enrich the community they would later be living in or associating with. It is to compensate for the lack of adequate education that the universities equip students with these prerequisites within a limited time, thus loading them with too many class hours and leaving very little time for independent study. Secondary school teaching should therefore be improved without delay.

As for curricula offerings, it is generally observed that for the most part they are fashioned after those in countries already very advanced in science and technology, particularly highly industrialized Western countries. One explanation is that those in the position to issue curricula are mostly Western oriented. Although there are certainly adaptations and modifications one still questions whether real efforts have been made to fit Western curricula requirements and students' suitability.

Another point for consideration is: many curricula are still very rigid, leaving little room for electives which are desirable in curricula planning to enable adjustments to meet changing needs. Besides, there seems to be insufficient study of and concern about the requirements of the various consumer sectors, including that of agricultural industry, that change quite rapidly. Programs of studies with the concern for this sort of requirements should be developed. Evaluation of the productivity of the graduates would shed light on the suitability of the curriculum too. Curriculum revision or changes should also be made at intervals for academic progress and for the advantage of the graduates the universities produce.

That research in Southeast Asian countries is not as progressive as it should be has long been a topic of criticism. It is perhaps even more true in the case of

specialized areas such as that of agricultural research which plays a vital role for agricultural development. A critical comment was made to indicate how the absence of resource inventories has retarded the course of agricultural development in this region:

In most regional countries there is a significant dearth of knowledge about national resources maps and inventories for land use, soils, mineral deposits and geologic informations, surface and ground water hydrology, ocean resources and in-shore fishing areas, forest resources, even good photographic and cadastral maps and basic meteorological data beyond temperature and rainfall are often lacking. Deficiencies in national resource inventories place a significant constraint on the alternatives that can be opened for agricultural development investments irrigation projects are difficult, even dangerous, to design and execute without sufficient hydrologic, geologic and meteorologic information, land settlement programs are almost impossible without detailed soil, topographic and land-use studies, on-shore fisheries and forestry programs depend on accurate maps of coastal waters and land cover and until basic resources studies are made, many regional countries cannot make the best use of their national heritage and properly exploit their full potential for development.¹²

It is difficult to say whether, at the present stage, there is a significant lack of research in agriculture within the countries in this region. In Thailand during the past few years, efforts have been made in the University of Agriculture, Ministries, and departments engaged in agriculture with the cooperation of several foundations and foreign universities; to conduct quite a number of important and advantageous studies and research in agriculture.

The increasing number of projects is substantial proof. If there is still a dearth of knowledge about national resources in Thailand, the deficiency may be traced to management in setting priorities of research projects or lack of understanding which results in inadequate support for research projects by the Budget Bureau or both. This kind of comment is valuable, and if there is still a great lack of resource inventories, such basic studies should be undertaken immediately to ensure the success of agricultural development programs.

The best place to develop such studies should be in the agricultural colleges or universities. Not only will research studies provide institutions of higher learning with opportunities to participate in the nation's programs of development but they will also fortify the institutions themselves since the teaching staff will be enriched with the knowledge of their own country, resulting in more effective teaching extension. In this way the frequent accusation of how little teaching is given about agriculture and rural conditions in various parts of their own countries may be eliminated.

At this juncture, one begins to wonder if a definite policy should be formulated to concentrate agricultural research work in agriculture colleges or universities. In line with this the question arises as to whether the universities in the region should, for the time being, consider research as the most important of the three university functions to upgrade university standards and serve the country's urgent needs at the same time.

If the questions above suggest logical steps for implementation, all possible efforts should be made to solve problems related to research activities. The

well-known problems common to most universities in this region are: lack of research funds, low incentives to draw research attention, scarcity of library facilities and research laboratory equipment, the absence of a comprehensive plan for university research projects, non-availability of time for research due to heavy teaching load, and so on. When all or most of these problems have been solved, it is likely that a chain reaction will lead to the kind of instruction and extension that has long been wished for.

Problems confronting the undertakings in higher education seem insurmountable and are likely to accumulate as time goes by. Perhaps one significant defect is the absence of university master plans commonly available in Western universities. This is particularly the case in Thailand where the universities (nine altogether), with the exception of one in process of completion, do not as yet have plans which embrace academic and physical planning of colleges in the universities. It is not clear what each university is aiming toward in the next five or ten years. Plans, programs, or projects concerning the enrollment target, expansion of fields of study, staff requirements, facilities acquisition, space utilization, research, budget required, and the like, are dimly comprehended or sometimes non-existent. The explanation is simple; institutional research, its process and advantage, is still new to university administrators in Thailand. Until its objective is well understood and appreciated and its techniques are learned, it is hard to say when effective guidelines for all Thai universities can be issued. This should also explain the absence of a comprehensive national higher education plan.

Whatever one thinks of the problems challenging education and manpower development for agricultural innovation, one is increasingly certain that, despite

many factors which account for the failure of a number of development plans and projects, there are two significant problems which need urgent and serious consideration. The first is the inadequate knowledge of many existing situations, which results in ineffective planning. The second is the insufficient effort or ability or both to plan, coordinate and/or formulate projects and programs for all levels of education and training in agriculture in such a way that they correlate with the national policy objectives. To tackle the first, research should be urgently strengthened. For the second, it seems essential to review the agricultural manpower requirement plan and reconsider the entire structure of agricultural pattern of education and training as well as the related present development projects and programs. Following this, it seems desirable to adjust some existing projects and programs or formulate the new ones with profundity of knowledge and great care. The suggestions made should not, in any way, be misunderstood to mean that the present attempts and efforts in the area of education and manpower development should be given up. One is merely suggesting that the re-examination of both the objective and the activity of each program or project should prove beneficial.

To achieve such highly important undertakings, it will definitely require time, financial support, and human resources. But whatever the investment, is it not better for us to start or turn in the right direction rather than to keep moving without knowing why? It is in this area that assistance from developed countries is wholeheartedly welcome. And should there be any further assistance in any future undertakings, it is the author's sincere hope that it will be given by experts with a thorough understanding of the situation in the recipient country—experts of high calibre with the breadth of vision necessary to lead realistically in the planning process.

NOTES

1. *Asian Agricultural Survey*, Volume I, Regional Report (submitted to Asian Development Bank, Manila, Philippines, March 1968), p. 33.
2. "The Second National Economic and Social Development Plan 1967-1971" (Bangkok: The National Economic Development Board, Office of the Prime Minister, printed at Government House Printing Office, 1968), pp. 84-85.
3. P.K. Mukherjee, "Role of Rural Institutions in Asian Agricultural Development" *Asian Agricultural Survey*, Volume II, Sectional Reports (submitted to Asian Development Bank, Manila, Philippines, March 1968) p. 756.
4. "The Second National Economic and Social Development Plan 1967-1971", *op. cit.*, p. 54.
5. *Ibid*, p. 60.
6. They are (1) The Joint Thai-USOM Human Resources Study, "Preliminary Assessment of Education and Human Resources in Thailand" (Bangkok: AID-USOM Thailand, 1963, 2 vols., the first of which has also been published separately in 1967 by the Ministry of Education); (2) "Current and Projected Secondary Education Programs for Thailand: A Manpower and Educational Development Planning Project" (Bangkok: Educational Planning Office, Ministry of Education, Publication 9, 1966); (3) "Methodology on Manpower and Employment Projection in the Second Plan in Thailand" (Bangkok: N.E.D.B., Office of the Prime Minister, 1967); (4) G. Hunter, "Higher Education and Development in Southeast Asia," Vol. III, Pt. 1, High-Level Manpower" (Paris: UNESCO-IAU, 1967); (5) I.L.O.'s, "Asian Employment and Training Projections, Report on Case Study in Thailand" (Bangkok: cyclostyled, 1968).
7. Mark Blaug, "The State of Educational Planning in Thailand" (A report submitted to the National Education Council, October 31, 1968). p. 42.
8. *Ibid.*, pp. 23-24.
9. *Asian Agricultural Survey*, Volume I, Regional Report, *op. cit.*, p. 109.
10. See "Current and Projected Secondary Education Programs for Thailand: A Manpower and Educational Planning Project" (Bangkok: Educational Planning Office, Ministry of Education, Publication 9, 1966), pp. 169-170.
11. Patya Saihoc, "Discussion," *SEADAG/ASIA: A Special Report by the Asia Society on Social Science Research in Southeast Asia*, 1968. pp. 17-18.
12. *Asian Agricultural Survey*, Volume I. Regional Report, *op. cit.*, p. 95.