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Australian co-operation with the national agricultural research project Thailand Monitoring and Evaluation for the Thai Department of Agriculture

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AUSTRALIAN CO-OPERATION
WITH THE
NATIONAL AGRICULTURAL RESEARCH PROJECT
THAILAND

MONITORING AND EVALUATION
FOR THE THAI DEPARTMENT OF AGRICULTURE

Dr. Michael D. Carroll

Department of Agriculture
Western Australia

October 1983

MONITORING AND EVALUATION

M.D. Carroll

July 1983

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I wish to express my appreciation for the support of Dr Yookti Sarikaphuti, Director General of the Department of Agriculture and for the co-operation, assistance and patience of officers at all levels of the Department with whom I had discussions.

The assistance provided by Dr Vijai Nopamornbodi, NARP Project Manager and Mr Ron Parkin, ACNARP Project Leader was appropriate and first class.

I would particularly acknowledge the efficiency and friendship of Khun Kittinant Theeravanvilai in organising appointments, travel arrangements and assisting with interpretation and with my general education concerning Thai ways.

2. TERMS OF REFERENCE

The following terms of reference were provided for this consultancy through the ACNARP office, Bangkok:

1. To work in Thailand for a period of four weeks in May-June 1983 located in the NARP/ACNARP Office of the Department of Agriculture and subject to the general supervision of the NARP Manager, Dr Vijai Nopamornbodi, in carrying out an agreed working program. Direct responsibility while working in Thailand is to the ACNARP Director, Bangkok.
2. To achieve familiarity with the implementation schedule for NARP and to relate this to existing records, if any, in the DOA which would enable the recording of objective data in a time series measuring the development of both research resources and research activity.
3. To establish how such existing records can be accessed on a regular basis.
4. To identify the additional records required and to design a practical system for periodic collection of this data based on the NARP/ACNARP office.
5. To describe the overall monitoring system as a co-operative exercise with counterpart staff, leaving them with a clear perception of the data required, how it should be collected, verified and stored, and how it should be analysed and reported.
6. To prepare a draft report on the consultancy while in Thailand and to discuss the recommendations with the DOA leadership, the NARP Manager and the ACNARP Director before leaving Bangkok.
7. To present a final written report within two months of returning to Australia with recommendations formally presented to the Director General of the Thai DOA with transmission through the Director of Agriculture, Western Australia and the ACNARP Director Bangkok.

research specialists of national and international repute to assist in the conduct of periodic research program reviews."

In other Bank papers it is inferred that monitoring and evaluation of agricultural research would become a regular activity of the DOA².

3. BACKGROUND

Description of the Project

The National Agricultural Research Project (NARP) is the basis of a Loan Agreement between the Kingdom of Thailand and the International Bank for Reconstruction and Development (World Bank) of December 19, 1980.

The Project is described in Schedule 2 of the Loan Agreement¹. In summary it can be said that the Project is the first phase of a long term program to improve the management and quality of national agricultural research activities and to enhance their relevance to the needs of farmers, particularly those in rainfed areas in the North East and North. The Project consists of four parts.

A Organisation and Management

- . restructuring of the DOA and its reorganisation along multidisciplinary lines
- . decentralisation of DOA research activities and program management
- . rationalisation of all agricultural research conducted under the various agencies responsible to the Ministry of Agriculture and Co-operatives

B. Manpower Development

- . creation of 580 additional research positions
- . increase in administrative and support capabilities
- . upgrading qualifications of staff through training programs and fellowships
- . improvement of terms and conditions of service of agricultural scientists

C. Station Development

- . The construction, equipping, furnishing and operation of about 19 national research centres.

D. Program Co-ordination and Review

The introduction of arrangements to

- . co-ordinate agricultural research and extension
- . strengthen linkages between research workers, farmers and administrators on the provincial level
- . guide and review research policy, programs and projects

One of the requirements for NARP contained in the Loan Agreement is the establishment of a monitoring and evaluation system. Linked to this is a requirement to establish a program planning and budgeting system:

"Section 4.09. The Borrower shall establish a program planning and budgeting system, satisfactory to the Bank and the Fund, to enable to DOA to manage and control its research operation and staff by program and location.

Section 4.10. The Borrower shall, through consultants employed by the borrower for the purpose, formulate appropriate monitoring evaluation and research program review systems, and shall appoint agricultural

METHOD

The consultant spent one month in Thailand from June 30, to July 30. Discussions were held with senior staff in major echelons of the DOA and visits were made to a number of research centres in all parts of the country, to obtain an appreciation of existing research programs, research management procedures, planning and reporting linkages and some broad understanding of the nature and diversity of agriculture and agricultural environments in Thailand.

- June 29 Arrive Bangkok, met by Ron Parkin, ACNARP Director
- June 30 Preliminary discussion with Director General Yookti Sarikaphuti. Meeting with Deputy Director General Dr Riksh Syamananda, consultant counterpart Khun Kittinant Theeravanvilai, Mr Des Smith, ACNARP finance and administration adviser, and Mr Parkin for general discussion on approach that might be taken to M and E.
- Discussion with Dr Frank Roberts, ACNARP station development adviser concerning staff questionnaire. Meet Dr John Schiller, ACNARP staff development adviser.
- July 1 Visit Kamphaeng Saen Campus of Kasetsart University. Inspect ACNARP funded development with Dr Prasarn Yingchol, Dean of Faculty of Agriculture and other members of academic staff.
- July 4 Discussions at Bangkhen with:
Mr Pairoj Polprasid, Director of Horticulture Research Institute and Mr Sansern Piriyathamrong, Chief Flowers and Ornamental Branch.
- Dr Sermlarp Wasuwat, Director of Rubber Research Institute.
- Dr Praphas Weerapat, Rice Research Institute, Chief Breeding for Disease and Insect Resistance Branch.
- Dr Damkhong Chandrapanya, Director of Farming Systems Research Institute. Dr Amnart Chinchet, FSRI Monitoring and Evaluation Group.
- Dr Paitoon Kittipong, Chief Weed Science Institute, Botany and Weed Science Division. Mr Sakon, Herbarium.
- July 5 Mr Montri Rumakom, Director of Ethnomology and Zoology Division
- Dr Arwooth Na-Lampang, Director Field Crops Research Institute
- Dr Sanchai Tantiyaporn, Chief Mycology Branch of Plant Pathology and Microbiology Division.
- Mr Samrit Chaiwanakupt, Director, Soil Science Division.
- Mr Thanom Dao-Ngam, Soil and Water Testing Branch of Agricultural Chemistry Division.

July 6 Dr Prayoon Deema, Director of Agricultural Toxicology Division

Visit Rangsit Rice Research Centre, Mr Boonlert Glyprayong, Director, Mr Sumet, Farm Manager and Mr Songkran, Geneticist.

Visit Huntra Rice Research Station, Mr Tawee Kunkanchanakul - deep water rice breeding and agronomy.

To Chainat overnight.

July 7 Visit Nakorn Sawan Field Crops Research Centre, Dr Amnuay Thongdee. Return to Bangkok.

July 8 At Bangkhen, Mr Charoen Khaoparisuthi, monitoring and evaluation unit of the Research Planning Division

Dr Adisak Sreesunpagit, Chief Monitoring and Evaluation Unit Department of Agricultural Extension.

Dr Banterng Masang, Chief Agricultural Projects Monitoring and Evaluation, Office of Agricultural Economics.

July 11 By plane to Phitsanuloke, Mr Kampanart Mookdee, Director Rice Research Centre.

By plane to Phrae. Dr Boriboon Samrith, Director Phrae Rice Research Centre, Mr Suvit Busapavesa, Chief Lowland Rice Improvement Branch.

Drive to Chiang Rai

July 12 Visit Chiang Rai Horticultural Research Centre Mr Vudhisark Pornprompratan, assistant to Director (Discussion with Director Mr Somsak Chaisilpin in Phrae 11/7)

By car to Chiang Mai. Mr Sawing Nattriphob, Director Chiang Mai Field Crops Research Centre.

July 13 By plane - Chiang Mai - Bangkok - Ubon Ratchathani, Mr Preecha Surinyapan, Director Ubon Field Crops Research Centre.

Mr Prapart Chulark, Chief Sakorn Nakorn Station.

July 14 By car to Sri Saket.

Mr Prasert Anupunt, Director Sri Saket Horticultural Research Centre

By car to Khon Kaen Field Crops Research Centre.

July 15 Mr Panya Ekmahachai - Agronomist Kohn Kaen
Mr Chairat Dulyaphat - kenaf agronomist
Visit Phoenix Paper Pulp Factory
By plane to Bangkok

July 18 By plane Bangkok to Haad Yai
Visit Rubber Research Centre
Mr Sribo Chaiprasit, Director
Mr Charoen Siri-Udompas, Agricultural technologist
Visit Haad Yai campus Prince of Songkla University, Mr John Evenson

July 19 By car Haad Yai to Pattalung
Visit Pattalung Rice Research Centre
Mr Manoon Areekachai, Director
Dr Vichian, Rice Breeder
Return to Haad Yai

July 20 Visit agriculture research centre Songkla, visit rubber farm
Haad Yai to Bangkok by plane

July 21 To Rayong by car
Visit Rayong Field Crops Research Centre
Mr Charn Tivaporn, Director

July 22 By car to Bangkok (a.m.)
p.m. general discussion - Bangkhen

July 25 Report preparation

July 26 Mr Yves Wong, World Bank representative, Bangkok.
Report preparation

July 27 Further discussion at DOA, Dr Vijai, Mr Smith, Office of
Agricultural Economics, Personnel Division
Report preparation

July 28 Report preparation. Final Discussion with Dr Riksh, Dr Yookti,
Dr Vijai. Discussion with Mr Gershon Ben-David consultant to the
DOAE.

July 29 Summary report to ACNARP/DOA

July 30 Depart Bangkok to Perth.

In a short term consultancy of this nature, and given the consultants unfamiliarity with the Thai language, both written and spoken, it is not possible to become fully conversant with the research programs and management procedures of the DOA. In addition there may have been some errors in comprehension by the consultant.

The assumptions on which the subsequent discussion on monitoring and evaluation are based may not, therefore have been drawn with complete precision. However, every attempt has been made by consistent questioning and cross checking with other sources to confirm the basis for these assumptions.

There have been enough external observations^{3,4,5,6} already made about certain long recognised problems with agricultural research in Thailand, and which the various aspects of the NARP program are designed to improve:

- . fragmentation of research resources among many units,
- . separate commodity, and discipline orientation of research predominates over multi-disciplinary approach
- . research activity, and particularly planning, is heavily concentrated in the DOA headquarters at Bangkok
- . there is a need for additional staff training particularly in research methodology and research leadership
- . agricultural research in Thailand is to a significant degree isolated from the world body of such research
- . research planning, implementation, interpretation and reporting are largely fragmented
- . interaction between research workers and extension workers and farmers is not sufficiently comprehensive for an adequate two way communications - technology transfer out, problem feedback in
- . Civil Service Commission promotion guidelines have encouraged a skewing of program description to emphasise research above equally necessary service functions
- . these guidelines emphasised quantity of research rather than quality
- . research management information in the DOA is so dispersed that it is difficult for the Department to answer questions, posed internally or externally, as to the allocation of physical, financial or manpower resources to any sector of research or any service function, at any time.

Many of these issues are already being tackled in a positive way in the NARP program. However, to the extent that some have yet to be addressed and others remain in some degree, all become considerations for a monitoring and evaluation system for the Department.

The areas of possible risk under the Project, identified by the Bank², also have to be considered as bearing on this discussion:

- . the ability of the DOA to develop an effective organisation and management system.
- . the availability of sufficient qualified scientists
- . the acceptance of new technology by farmers

4. MONITORING AND EVALUATION

Introduction

Generally it is preferable to devise a monitoring and evaluation (M & E) procedure for relatively stable conditions. To the extent that dramatic changes are taking place within the DOA under the NARP program, and that these changes are not fully determined, and will not be completed for some years, the Department's structure in the immediate future can be considered to be relatively unstable.

A very useful feature of an M & E system is the ability to establish a time series of measurements which can give the organisation, and interested outside agencies, an assessment of trends in total resources, and in the distribution of resources between areas of research according to changes in perceived or imposed priorities.

For this reason, the system of data collection adopted initially should be maintained into the future, so that such time comparisons can be validly made. Continual changes to the system will invalidate time series comparisons.

This problem has already occurred within the M & E activities of the DOAE.

There are therefore some hazards in devising a baseline system which will stand the test of time in an organisation whose structure and functional lines have not yet stabilised.

The consideration of an M & E system at this stage may therefore appear premature. However, the monitoring system to be proposed is considered flexible enough to cope with changing structures, and the limited evaluation systems proposed will need considered judgement as to when it should be implemented.

The World Bank appears to refer to the M & E requirement in two ways. Firstly with respect to implementation of the NARP project, which was envisaged to be completed by 1989; and secondly to the ongoing activities of the DOA in perpetuity.

It is suggested that the M & E of NARP implementation is well covered by existing reporting arrangements within the ACNARP and NARP offices with respect to the four major parts of the project

- . organisation and management
- . manpower development
- . station development
- . program co-ordination and review.

The executive of the DOA is therefore well aware of the relationship between progress in NARP implementation and the proposed schedule and is taking action in accordance with that information.

Furthermore the consultant's terms of reference direct attention more to the ongoing exercise rather than to project implementation. However, a system for monitoring ongoing resource allocation should be of additional assistance to present methods for monitoring implementation.

It is customary to link monitoring and evaluation in the same context⁷, but essentially they are completely different processes.

Monitoring is usually considered as a recording of objective, quantifiable data in a form which can contribute to effective decision making - an essential part of good management practice.

The basic data is generally already generated and available within the organisation in a disaggregated form. A monitoring system brings this dispersed data together in a way which can readily and speedily be assessed by management.

Evaluation on the other hand, is a measure of the impact of an activity, an assessment of its worth and whether it meets the objectives set for it by national planners, the organisation, or research directors.

4.1 Monitoring

A monitoring system should be appropriate and useful for the organisation concerned, and not an unnecessary burden.

The need is for a straight forward means of assessing resource allocation to various industries, commodities, and areas of research within these, so that management is well informed about where the organisation's resources are going, and can make necessary adjustments according to changing priorities or circumstances.

It should also enable the Department to provide this same kind of information to meet external requests, whether from the MOAC, BOB, CSC, NESDB, DTEC, lending institutions or co-operating aid agencies.

The system must also be seen by all participants as being feasible and useful; otherwise comprehensive, accurate and current information will not be provided willingly to the system by the components of the organisation.

One of the problems experienced by the M & E unit of the DOAE is a lack of commitment by some field staff, and by farmers, in data collection. The activity can be seen either as a waste of time, or as a threat that it will be used to measure individual performances in a critical way⁸.

Full co-operation in this kind of system cannot be obtained by authoritative direction alone. Careful attention must be given to "selling" the system by explaining its usefulness, its aid to objectivity and national decision making, and in assisting the DOA to better argue its case with the CSC and the BOB. Monitoring of inputs is not an assessment of an individual's performance, nor is it a waste of time.

It is absolutely critical that there is a clear, unambiguous explanation of the information that is required from individuals, and that the instructions are uniformly interpreted.

Each officer supplying information to the system should receive a full explanation of what is required, a completed example to which he can relate, and be assisted by his immediate superior in the initial stages.

It is suggested that, under the present structure, Chiefs of Branches (Groups)

in head office Institutes/Divisions, and the Directors of Regional Research Centres become fully acquainted with the system so that they can assist personnel under their control in providing the base data.

Monitoring for research management has three major components:

- . financial resources allocation
- . deployment of personnel
- . inventory of research in progress

Financial Monitoring

The accurate estimation of financial resources according to research activity is perhaps the most important aspect, and is usually of most interest to external organisations providing funds, including the BOB. However, it remains the most difficult area to deal with, not only for the Thai DOA but for most other research organisations around the world.

It is premature to propose any more sophisticated system for monitoring the allocation of financial resources within the DOA in advance of the establishment of a simple form of planned program budgetting (PPB) as proposed by the ACNARP financial and administration advisor⁹.

The initiation of such a system in conjunction with the acquisition of a mini computer will be of great assistance to management.

The consultant appreciates the difficulties in the DOA moving to a system of PPB but can only give every encouragement that this system is appropriate and should be implemented as soon as possible.

A subsequent development might involve a research centre based resource inventory, similar to the SPRAC (System of Planning and Review of Research Activities and their Communication) adopted by the Department of Agriculture in the Australian State of New South Wales (NSW) in 1975. (A translation in Thai of this system is held by the M & E Unit in the DOA Research Planning Division). However, it should be noted that this system has been discontinued in NSW in its original form.

The goal is to relate expenditure of all types to activity units so that the real cost of providing research or services can be identified and related to the perceived priorities for that research or service.

Staff Monitoring

The monitoring of research staff allocation is not so difficult. A simple punch card system is recommended as a first step. It can readily be transferred to a computer when that facility is available, but manual operation should be quite satisfactory.

The information (Appendix 1) to be collected from each officer is:

1. Name
2. Qualifications
3. Title
4. P.C. Grade
5. Institute/Division

6. Location
7. Commodity
8. Discipline/area
9. Percentage time on each activity
10. Summary statement of officers project/s.

The amount of data within these categories which can be reasonably handled by a manual punch card system is limited. With computerisation, the range of information could be extended. Location could be widened to individual centres and stations; commodity and discipline/area groups could be further disaggregated; information retrieval combinations would be more manageable.

In practice, each officer would complete a personal data form requiring the above information. The information would be transferred to punch cards by the M and E Unit in the Planning Division. It may be convenient in the first instance to batch the cards according to Institute/Divisions, which would provide a useful first division. Whilst much of the information in sections 1-6 could be obtained from personnel records, sections 7-10 cannot. It seems preferable to collect all information at the same time, at the source - the individual officer assisted by his superior. Alternatively sections 1-5 could be obtained from the personnel data sheets proposed by the consultants from the International Service for National Agricultural Research (ISNAR minute of 8 July 1983).

Most difficulty will be experienced with sections 8-10.

Officers of the DOA have the impression that the CSC's criteria for assessment for promotion emphasise personal research over team work or service work, and quantity over quality. There will be a reluctance to allocate an appropriate percentage of time to those areas which are of a service nature and not strictly research - seed production, routine chemical analyses, statistics/biometrics, training and technology transfer, and management/administration.

There is a need for the DOA to take a case to the CSC for assessment of officers to be based on more subjective criteria, at the discretion of the DOA.

It is recommended that agreement be sought on broad guidelines on the rate at which officers should be promoted - delayed, normal and accelerated promotion for below average, good and exceptional officers respectively. The DOA should then seek the delegated authority to assess the quality and performance of each officer on more subjective criteria (see Evaluation Section).

The DOA can also take into account in this regard that non-research service functions are essential to the role of the Department and can be equally as demanding as research with respect to training, experience and skill.

The end point is that officers must feel that they will not be disadvantaged by accurately reporting the time they spend on research, service and administration.

The concern here is based on the fact that with the present documentation there is no objective record of how an officer spends his time. It will be very much an estimate derived by him and his superior. Under this system it is not reasonable to strive for any greater precision than ± 5 per cent. The general provision of job description, or duty statements, designating

approximate time allocation for all officers would be of some assistance in this regard.

In the absence of an adequate financial monitoring system, the personnel data provided by this system can be used to give an approximation of total resources devoted to a particular area of research activity.

The unit of measurement cannot be directly stated in monetary terms but is expressed in terms of the number of "scientist years" of effort allocated to a particular activity.

A "scientist year" is the equivalent of one full time scientist i.e. 100 per cent research for one year.

For example, the card system may show that there are 17 scientists working on soybean breeding. Adding up the percentage of their time devoted to this activity, as against other activities with which they may be sharing their total time, the total may come to 1350, i.e. the equivalent of 13.5 "scientist years" of effort on soybean breeding.

This figure can be compared in a time series between years, to see if there is a change in this activity with time, and it can be compared with other activities e.g. soybean agronomy, cassava breeding etc.

An approximate average monetary value can be given to the "scientist year" unit when it becomes possible to partition the DOA's total budget into 1) research and 2) other activities. For example if the DOA research budget was ₦400 m and the number of full time scientist equivalents was 1000, the cost of one "scientist year" would be ₦400 000. The cost of soybean breeding research in the example above would be $13.5 \times ₦400\ 000 = ₦5.4\ m$.

Appendix 2 gives an indication of the possible two way matrix of research information which can be derived from the punch card system.

It is also possible to:

- . locate the activity of any particular individual
- . estimate the total manpower resources within an institute/division or region
- . examine the distribution of resources between disciplines in any institute/division or region
- . assess the amount of service work or research work for any individual, institute/division or region
- . estimate the qualification and experience of the research staff in any institute/division, region or in any commodity/discipline field of research.

As indicated previously, the key to the reliability of this apparently simple monitoring system is the accuracy of the data supplied by the individual in association with his immediate superior, particularly in relation to time allocation between activities. The need for uniformity of approach and accuracy cannot be overemphasised.

A preliminary exercise of this nature initiated earlier this year by ACNARP adviser Frank Roberts, indicates the need for adequate explanation and assistance in completing such a form.

Current Research

An inventory of research in progress can assist management in avoiding unwarranted duplication of research, ensuring maximum effective utilisation of research funds, and in contributing to the co-ordination and planning of future research.

To meet the informational requirements of the principal users in the Department, the system should:

- . include a complete coverage of all DOA experiments
- . should not be expensive to establish and maintain
- . should not involve an undue amount of scientist's time
- . should be easily updated
- . should provide sufficient detail for users
- . information should be reliable and accurate
- . information should be available from the system without undue delay
- . information should be conveniently available in a form which is readily understood.

Whilst the over-riding consideration at present is for research management information for the Executive and other senior personnel, the system can be designed to provide a level of greater technical detail for use by other research workers in the organisation. It can help them locate related work in progress and thus provide scope for greater collaboration.

For example, a scientist in the DOA might like to know who is doing work which relates to his own interests, where is it being conducted, what are the objectives, what is the method adopted and what results have been achieved to date.

Thus a research inventory can be used at two levels - broad subject searches for managers (e.g. on commodity or area basis) and at a detailed technical level for the scientist. At the broad level it provides similar information to the personnel monitoring system and can serve as a cross reference.

The system proposed involves the central collation of a list and description of all research currently being carried out within the DOA.

The individual experiment is the base unit and is entered on individual punch cards. (Appendix 3).

These may be maintained in small batches comprising a "project" and there may be further batched under the heading of the major sponsoring Institute/Division/centre.

The individual experiment card will contain

- . title
- . registration number and reg. no's of related experiments
- . beginning date
- . terminating date - if known
- . key personnel
- . institute/division/(centre)
- . location
- . brief notes on background and importance

- . aim
- . treatments or methods
- . measurements or observations to be made
- . whether results have been reported, and where.

The punch cards can be notched so that experiments can be retrieved and collated on the basis of:

- . commodity
- . discipline
- . key words
- . location
- . personnel
- . results reported or not
- . combinations of the above.

With a manual system, the number of key words must be very limited e.g. nitrogen, phosphorus, pH, water, environment, plant population, plant spacing, time of planting, fungal, bacterial, insect pests, non insect pests etc.

When the system is computerised, this limit is removed and any experiment can be quickly located on key words. This is more useful to the scientist than the manager. The computerised system can also provide an automatic reminder that results have yet to be reported, and can accommodate a results summary.

The manual system has some drawbacks in maintaining historical records of research, the recall of which can be particularly valuable for work which was not published at the time of conclusion. Manual records are cumbersome to store as well as difficult to retrieve.

In this regard, it can be noted that UNISIST (U.N. Information Service in Science and Technology) guidelines in the conduct of national inventory of current research projects, suggests that data bases containing more than 1000 items should be computer processed for efficiency¹⁰.

At present information on research in progress is held within the Institutes/Divisions in a form which cannot be readily collated, interpreted and reviewed centrally. It only becomes available for wider distribution when incorporated in the Institute/Division Report, which may be some time after the work is completed, and has limited distribution.

4.2 Evaluation

The evaluation of research can be looked at in a number of ways. The evaluation may be attempted before the research is carried out (ex ante) or after it is completed (ex post).

The evaluation may be entirely subjective, or it may involve attempts at objectivity.

The evaluation may be on the basis of methodology, scientific merit, compliance with national or organisational goals, or it may be on wider effects in the economy.

It is obviously easier to evaluate past research in terms of benefits and costs, than it is to assess future research. However, the value of assessing

past research has been queried^{11,12,13}. From a funding point of view, the costs of past research are considered "sunk". They cannot be retrieved and used on a preferred alternative. In addition, the relative success, in benefit cost terms, of past research is not a good guide to the success of any particular future program. Although the successful scientist is considered a 'good bet' by funding organisations and will normally receive continued support on that basis, it is not a universal principle.

As the World Bank points out³ and other authors confirm^{14,15,19} most evaluations which have been conducted selectively on past agricultural research show a very high return on investment. On a world wide basis, it can be demonstrated that agricultural research is highly profitable and the conclusion can be drawn that there is almost universally an under-investment in agricultural research.

If this is true of countries such as the US, Canada and Australia, it is even more applicable in those developing countries where the research investment in relation to the size of the rural industries is much less¹⁶. Thailand may be considered in this category.

Nevertheless, despite the overall high return which can be demonstrated from past agricultural research, there is increasing pressure from governments and other funding sources for greater accountability of research expenditure, and this implies the use of some evaluating mechanism. Research organisations themselves are also interested in techniques of evaluating research for optimum resource allocation. There are however no easy solutions to evaluating future research.

It is suggested that the only advantage of evaluating past research in benefit cost terms is to demonstrate that an organisation is capable of profitable research. It can therefore establish a reputation for success which will attract continued or expanded funding.

In this case there is no purpose in attempting to evaluate all research across the board. Research of its nature, will always include many failures. The role of an evaluation unit in assessing past research is to select successful programs, preferably when they are current, and provide factual information and scenario projections which will attract media and government attention. A research organisation should never neglect public relations aspects. It can be a profitable investment for an organisation to devote a proportion of its resources to developing a skilled publicity group.

An obvious example is the release of a new variety which may be higher yielding than existing varieties. It can be noted that a 1 per cent increase in rice yield across the country would represent an increase in national income ten times the total budget of the DOA. Such gains from research are possible on a regular basis from an active and well directed research program. In practice, the application is likely to be more localised but can still be evaluated in these terms.

The real challenge however is in evaluating future research resource allocation. The questions to be asked of such ex ante assessments include:-

- . the probability of success - how can it be assessed?
- . the significance of the problem - does it have a high priority?
- . the research method - is it appropriate?

- . the time scale - how long will it take?
- . degree of adoption - to what extent will it be adopted by farmers and over what period?
- . objective - is it in accord with national and organisational goals?
- . duration - how long will any benefit from research last?
- . benefit - how big?

Many attempts have been made to introduce a degree of objectivity into this process with little success^{11,17}. These techniques include various comparative ranking procedures - one dimensional, multi-dimensional and group methods, scoring models, benefit - cost analyses, and network models. None are considered appropriate for the DOA. Research evaluation technique has been extensively reviewed by Shumway^{12,13}. His argument for subjective evaluation has three main points. First, considerable evidence exists (referred to earlier) that agricultural research conducted in the past under diffuse selection system has yielded extraordinarily high returns. Second, there is no convincing evidence that formalised, quantitative selection systems can produce higher returns than the informal system - and all ex ante evaluations are intrinsically subjective anyway. Third, the extreme uncertainty surrounding the research production function limits the potential for sophisticated selection procedures. these procedures also involve costs in terms of scientists' time and morale.

The evaluation of the NARP project, of research by the DOA in general, or of any research project in particular, with respect to regional or national productivity, or socio-economic parameters must remain an elusive goal which cannot be reasonably pursued at this time.

Attempted either ex post or ex ante, the available production statistics¹⁸ on commodity production, and yield per unit area, are too imprecise to measure subtle but nevertheless significant effects which may result from successful research - an attempt to collect more reliable data on a survey basis is expensive and not worth the effort.

Such surveys may still lack the precision to reveal significant effects. This can be counter productive to the DOA's total reputation as a research organisation if national planners are aware that evaluation procedures do not reveal benefits from research. In addition research may be successful, in line with set objectives, and yet may not be adopted, may be adopted in part, or may only be adopted over a long time period. The problem of low agricultural productivity is only partly concerned with choosing technology. It is a complex of convergent issues related to employment, income, land settlement, transport, markets, environment, quality of life and a general attitude to risk by farmers.

The World Bank recognises the difficulty of assessing the value of agricultural research projects because of :-

- . inherent uncertainties regarding the timing and value of research findings and their adoption by farmers
- . difficulty in ascribing benefits to research vis a vis complementary activities such as infrastructure e.g. irrigation, or support services, such as extension, credit
- . the problem of assessing the value of a particular project in isolation from the many other research activities which bear on

the same problem.

Justification by the Bank for increased research under the NARP program is based on the same general argument discussed earlier - there is considerable scope for improved productivity in Thai agriculture, the present level of investment in agricultural research is low by international standards, and experience with agricultural research in other developing countries indicates high expected rates of return (20-40%) on additional capital invested.

From the point of view of evaluation at the macro level, it is suggested here that this kind of general argument - although it lacks objectivity and is to some extent an "act of faith" - is sufficient justification for a well directed research program to be supported. The consultant is not aware of any other country or major research organisation which demands routine objective evaluation of research programs¹³. If for no one else, why for the DOA in Thailand? Even if the DOA did carry out formal evaluation procedures, and the results could be relied upon, the Department is still not free to move its resources into projects with the greatest theoretical pay-off. As a Government agency the DOA has responsibilities for all farmers, in all industries in all parts of the country. It has additional social goals placed on it, such as in the King's Projects.

Having argued against formal procedures for the evaluation of physical and socio-economic impacts of DOA research programs, the question remains as to what form of research evaluation measures the Department should adopt. In-house evaluation is a prudent and necessary part of good management.

It is suggested that evaluation should be continued, and extended, in the context of the ongoing practice of good research management.

The purpose of evaluation is to convince the executive of the DOA, and interested outside agencies, that research programs in the DOA are relevant, well directed, efficient and productive. The Department's management procedures should be sufficiently adequate to bring this about.

This is very much related to the management of the individual scientist - his ability and productivity¹².

It is difficult to lay down formal rules or procedures for the evaluation of a scientist and his work. It is a task which in most organisations falls initially on middle management - research leaders who have a day to day familiarity with the general nature of a scientist's research and the way he is going about it.

This general appreciation will be supplemented by occasions of more intensive discussion/counselling. Firstly at the time objectives are set - whether these are generated within the group, or handed down as national or organisational goals. The research leader/supervisor will assure himself that the experimental approach proposed is designed to meet those objectives, and is the best apparent way of meeting those objectives.

A further review may occur when the approach and method have been finalised, whether individually or by group activity.

Progress will be monitored during the experimental period, problems discussed, unforeseen difficulties rectified and the planned measurement program modified

if necessary. Further contact will be made when the raw data has been processed and the scientist has made a preliminary interpretation.

A final assessment is made when the experiment is written up either for internal reporting, or where appropriate, for transfer to extension officers or wider publication.

The role of the research/leader supervisor is one of continual subjective evaluation with transmission of a consolidated assessment to the head of the Institute/Division/Branch/Centre for consideration in the context of the officer's record of achievement, and consideration for promotion.

This information will also assist the higher level committees in their reviews on whether research is meeting objectives. At this level evaluation also must be largely subjective and very reliant on accurate reporting from below.

There are inherent problems in such a subjective system due to differences between people, lack of consistency, inter-personal relationships, possible antagonism's etc. No ready answer can be provided to these problems other than to ensure that the right people, with a reputation for ability and fairness, are appointed to leadership positions in the Department.

There is undoubtedly a shortage of qualified experienced mid-level research leaders/supervisors in the DOA at this time. Hopefully the fellowships program in time will lessen this problem, as will the deployment of staff in the regional research centres, so that coherent research groups of manageable size will develop.

The question needs to be posed here, and it applies equally to monitoring, as to who in the DOA is a "research scientist", and what is "research".

The problems of the present CSC promotion guidelines, as perceived, have already been referred to, in the way in which they encourage officers in the DOA to think of themselves as research scientists and to consider the work that they do as research.

A preliminary inspection of the questionnaires circulated by Dr Roberts (referred to earlier) graphically illustrates the tendency to describe service functions as research.

There are many activities in the DOA which are not research, or have a low research component.

- . administration
- . planning
- . training/technology transfer
- . statistics/biometrics
- . chemical analyses
- . routine pest and disease diagnoses
- . library/information/back up services
- . seed production
- . quarantine services

It would be desirable to identify all positions in the DOA with a "job description" or "statement of duties" which would indicate for the benefit of each individual, (and his superiors, the executive and the CSC) to whom he is responsible, what in broad terms are his responsibilities, and a title which

reflects those responsibilities.

The consultant has also gained the impression that BSc graduates, from the time of graduation and for some time afterwards are not able, and not permitted, to fulfill the role of a research scientist. In effect they assist more experienced staff in the implementation of research but have only a very limited role in planning, interpretation and reporting.

It is understood that the undergraduate course does not provide training and tuition in research methodology. This can only be acquired by an extended period as an "assistant", or by formal post graduate training at the MSc or PhD level. It seems inaccurate therefore, to designate BSc graduates at the lower PC levels in the same terms as those scientists capable of full participation in the research process - planning, implementation, interpretation and reporting.

This has implications for the monitoring system proposed earlier. Either this group of personnel should be excluded from the "scientist year" computations, or if they are included, the limitations of doing so must be appreciated. The consultant is not familiar enough with the actual position in the DOA to recommend either way, but attention is drawn to the problem.

It also has implications for the subjective, scientist-based evaluation process. Someone who is not able, or permitted, to be fully involved in the research process cannot be assessed on the same basis as someone who is.

The question is posed as to whether the DOA itself, or in association with the Universities, should provide some intensive, in-service training, in research methodology to bring the BSc graduate to a higher level of performance and participation in a shorter time. Acceptance for such training should be on the basis of assessed capacity to develop as a research scientist. Other graduates will be placed in service roles which may be equally necessary but in the long term less intellectually demanding and therefore attract different promotional criteria.

4.3 Implementation

As indicated earlier, the monitoring system is simple to introduce and to operate. However, full implementation may depend on clarification of discussions with the CSC on promotional criteria, on delineation within the DOA on what is research and what is not research, and on who is a research scientist and who is not. Linked to this is the possible introduction of "job descriptions" or "statements of duties".

Some of these aspects undoubtedly relate to the terms of reference of the consultants (ISNAR) examining terms and conditions of employment of agricultural scientists. The relevance at the stage is not clear but it is suggested that these comments be forwarded to ISNAR. (It should be noted that the personnel data requested by ISNAR for computerisation should be complementary to and compatible with the monitoring system recommended in this report.)

The monitoring format suggested earlier is put forward as a guide only. Further consideration within the DOA may suggest useful modifications to

classifications, grouping etc.

The relationship between personnel monitoring and the structure of the planned program budgeting proposal for financial management needs to be carefully considered for compatibility. The final details therefore need to be worked up in consultation with the ACNARP advisor administration and finance.

Full implementation will need to be preceded by a pilot study - possibly one Institute, Division or Centre so that any development problems, ambiguities etc can be confidently eliminated before the system is imposed on the whole Department.

The pilot study should probably entail test, feedback and retest before full implementation.

The same procedure would need to be followed for the compilation of the research inventory.

Some conceptual development of both staff monitoring and the research inventory should take place within the DOA prior to the arrival of the short term consultant on computer applications, so that the eventual conversion of both systems to computer can be considered during the consultancy.

Although the early emphasis is on monitoring, the group that will handle this function within the DOA should be designated as Monitoring and Evaluation. The group can serve as a collation centre for the staff oriented research evaluation. The group will also be responsible for the "evaluation" of monitoring data. In addition, although it is not recommended here, a requirement for more formal research evaluation may be imposed on the DOA at some time in the future. The M & E Unit should maintain familiarity with the techniques that have been put forward at various times for this purpose. (Mr Charoen Khaoparisuthi of the M & E Unit in the Planning Division has prepared what appears to be a comprehensive introductory discussion paper on this subject.)

It is noted that as well as the M & E Unit in the Research Planning Division, small M & E groups have been established in some Institutes/Divisions.

With the present limited availability of research management information in the DOA, this move is understandable. However, if the recommendation to establish a comprehensive central information system is adopted, this will be able to provide any monitoring which the Institutes/Divisions may require. They can also retain a duplicate set of records relating to staff data, and research in progress, in their own organisations if desired. In fact, this may assist prompt updating of the central register. With respect to monitoring therefore, the central M & E Unit now located in the Research Planning Division (which is considered appropriate) should be strengthened at the expense of Institutional/Divisional units.

With respect to evaluation, the need for Institutes/Divisions to perform any formal evaluation exercises is questioned on the same basis as it has been questioned for the Department as a whole. No real value is seen in such exercises and it is recommended that they should not be adopted by the Department.

The staff requirement to permanently man a central M & E Unit cannot be

accurately predicted but would not be more than the total staff presently allocated to this function within the DOA.

Good leadership of the M & E Unit, particularly in its development stages, will be crucial to its success. Ideally the leader should be someone with a perspective of the Department as a whole, and of the research function in particular, who will need flexible and innovative thinking and have some of the attributes of a "salesman" in having the system explained, accepted and supported within all echelons of the Department.

Such a person is not easy to find in any organisation. The person may be a research scientist who can be seconded for say a two year period to implement this system. It would be essential that the career prospects for a scientist seconded to short term administrative duties in this, or any similar instance, are protected.

It is suggested that the data base be maintained in English. As such it can be readily understood by the major users in the DOA, it can be understood by foreign staff working with the Department and it can be utilised by international agencies. The research inventory in particular can let interested researchers in other organisations know what is going on in the Thai DOA and can extend opportunities for international collaboration.

It is understood that at present, the final screening of projects in relation to Departmental objectives, priorities and methodology is left until the total program reaches the executive level.

It is extremely difficult for busy people at this level to give the necessary attention to detail, in such a massive program, to ensure that every project is relevant, constructive, well co-ordinated, adequately resourced and using proper methods.

This system could be improved by two simple procedures.

Each officer submitting a project for approval should have clear guidelines to assist him in the preparation of an acceptable proposal.

It is suggested that the guidelines contain:

- . A statement of national goals and priorities as they affect agricultural research in Thailand. There should be wide distribution in the Department of Chapter 2 of the "Fifth National Economic and Social Development Plan"²⁰ which deals with national problems and priorities in relation to agricultural restructuring, improvements in efficiency of national resource utilisation and conservation of the environment. This should be supplemented by any more recent statements of particular Government policy which might affect research.
- . An interpretation by the DOA of the overall role of the Department in meeting these national objectives, with the emphasis on relevance and practical application. A distinction should be drawn between the urgent need for applicable technology at the farm level, and the pursuit of more basic research which is usually the province of the Universities. DOA scientists should only operate in this area if there is a direct need, bearing on the solution of a current practical problem.

- . Scientists should be encouraged to read widely. Although nearly all international scientific publications are in English, there is now a significant proportion of DOA research staff who have achieved higher degrees by studying overseas and who should be conversant with the international literature relating to their subject, and who are competent in English.
- . Scientists who have received the benefit of higher education should be advised that more is expected of them in looking imaginatively for new ways of tackling old problems. The previous annual report should not be the blueprint for the next year's research program.
- . Direct encouragement should be given to group research within Institutes/Divisions/Centres, and for multi-disciplinary research between groups. The scientist's understanding of THE CSC criteria for promotion has encouraged the individual research program rather than co-operative or group programs. Research leaders should be identified to form teams where these are desirable.

Secondly, as far as possible, authority and responsibility for research management should be delegated from the top. At full development, the regional research centres could be given virtual autonomy in the programs carried out on the station, and the way in which they are carried out - the only over-riding supervision would be that centre programs are meeting national and Departmental objectives.

- . For the present, the responsibility should be placed clearly on the heads of Institutes/Divisions to rigorously ensure that programs within their organisation are meeting the stated objectives, are tackling high priority problems within those objectives and are well managed - including the formation of internal or external groups to meet particular requirements.

It is at this level that the supervisor should also be convinced that the scientist has researched the background to the problem, has considered alternative experimental approaches, has consulted a biometrician on any statistical problems, has organised any chemical or other analyses by arrangement with internal or external agencies, and has the resources to carry the work out.

The development of a central registry and inventory of current research recommended as part of the DOA monitoring system, would provide the capacity to scrutinise the DOA's total research program in relation to Department policy and objectives.

The appointment, or secondment, of competent people to the M & E Unit would enable this verification to take place. Experiments considered of doubtful value would not be registered and would be referred back to the proposing group for explanation or justification. This would need to be done as objectively as possible and without consideration of the rank, reputation or qualification of the proposer.

To enable this procedure to take place, scientists would need to plan their

strategic considerations such as whether the research is designed to meet the organisation's technical and social objectives, i.e. whether it is worth doing at all.

Readers are referred to the comprehensive paper by Ruttan¹⁴ on how a research system or organisation should be reviewed within the social context in which it functions.

In summary, in evaluating an agricultural research program, the external review team can raise questions under two headings, with a number of subsidiary questions:-

1. What is it feasible to accomplish?

- . how long will it take?
- . how much will it cost?
- . what other manpower or service resources are required?
- . does the quality of the staff and resources indicate that results will be achieved?
- . what alternative strategies could be followed?
- . what is the probability objectives will be achieved?

2. What research is worth doing?

- . how will the new knowledge contribute to national or regional priorities?
- . who will benefit? - scientists, farmers, workers, consumers?
- . will any sector be harmed by the research?

In the case of external reviews therefore, it is essential that the review team and the DOA management agree on the criteria against which each major activity in the Department's research program is to be evaluated. The review team will need to understand the DOA's technical and social goals and its extended responsibilities in training and technology transfer.

A constructive system of research evaluation therefore has many aspects. Most are subjective, but in total make up a comprehensive process which will give the executive of the DOA confidence that the work which is being done is appropriate for Thailand and is being done in the best possible way with the physical, financial and manpower resources available.

5. CONCLUSION

The Department of Agriculture would benefit by adopting an internal research management information system as outlined in this report.

The kind of information which the Directorate of the DOA requires for optimal decision making on the deployment of personnel and allocation of resources, in accordance with changing priorities, is not readily available from the existing record system.

This also causes delays and time consuming exercises in responding to requests for information from outside the Department, for example from the Bureau of the Budget.

The system recommended for recording resource allocation on a "scientist year" basis can be put in place quickly on a manual operation basis and can be further developed when computerised.

The personnel and the financial monitoring systems need to be compatible, and category definitions should be worked out to suit both systems.

A compendium, or index, of research in progress would usefully expand the monitoring activity to cover not only the resources distribution, but also the nature of the research being undertaken by the Department. Such a system would have benefits for both administrators and research scientists and for the DOA and for external organisations cooperating with the Department.

Data for the monitoring system is best generated at the individual scientist level, in conjunction with his immediate supervisor, and its accuracy will be influenced by the individual's perception of the weight given to quantity of research in his promotion prospects. This needs to be clarified with the Department.

For reasons discussed, it is premature to consider any procedures for evaluating the effects of the DOA's research programs on local, regional or national economies. Such exercises may be counter-productive.

However, internal evaluation of research personnel and research programs is essential. This is best achieved by a clear statement of Departmental objectives, by the appointment of fair and capable officers to mid-level management positions and the delegation of assessment to such research leaders.

Periodic use can be made of external review panels for particular aspects of the DOA research programs. Care must be taken to ensure a clear agreement on the terms of reference for such reviews.

Evaluation procedures must remain largely subjective but delegation should ensure a faster reaction time in the initiation of relevant research, the termination of low priority or less relevant work, the reporting of results and an accurate assessment of each scientist's performance.

Nevertheless, where an ex post benefit cost analysis can be carried out for a particular successful research program, such an evaluation should be carried out and publicised. Similarly, successful research that would be of international interest should be submitted to an appropriate international scientific journal. The long term prospects for any research organisation are largely determined by its reputation at home and abroad.

6. RECOMMENDATIONS

It is recommended that:

- . the DOA progressively adopt a centralised monitoring and evaluation process to provide essential internal management information and to provide a ready response to external requests for such information.
- . one Monitoring and Evaluation Unit be defined in the DOA to be headed by an experienced and competent officer with a background in successful research and an understanding of the DOA's developing structure and objectives.
- . the M and E Unit take as a suggested basis the processes outlined in this report, and by consultation within the Department and with the ACNARP management modify if necessary the categories to be recorded. This is to ensure compatibility with other financial and staff recording systems.
- . a pilot exercise be carried out in one section of the Department to overcome any problems before the system is universally adopted in the Department. One Institute, one Division and one or two Regional Research Centres could be considered for the pilot phase.
- . since much of the input data must be collected on a relatively subjective basis at the scientist level, an education campaign on the necessity and usefulness of the proposed system be directed at all staff to encourage accuracy and compliance with the principles of the process.
- . in order to maintain flexibility of access and to provide for compatibility of information exchange with other agencies, the data base should be maintained in English.
- . evaluation of the impact of DOA research programs on local, regional or national economies should not be systematically attempted.
- . opportunities should be taken to suitably publicise quantifiable successes in research which meet technical, economic or social objectives. This could be made a responsibility of the M and E Unit.
- . evaluation of research at the individual scientist and program level should be strengthened by the delegation of this procedure to middle research management levels in the Department.
- . in this regard there should be greater emphasis on initiative, methodology, relevances and the requirement to report and suitably publish the results of research.
- . selection of competent research leaders at the evaluation level is critical to the operation.
- . evaluation of research in relation to objectives would be assisted by a clear statement of Departmental objectives within the national economic and social goals set in the current five year plan.

- . limited use should be made at this stage of external review evaluations, and on clearly agreed terms of reference which make allowance for other research objectives as well as scientific competence.

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61	is widespread and increasing. Experiments with lime have given																																	10
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