

Promoting Implementation of Crop Diversification in Rice-Based Irrigation Systems in Malaysia

C. C. Chan

*Director, Irrigation Branch, Department of Irrigation and Drainage (DID)
Jalan Sultan Salajuddin, Kuala Lumpur, Malaysia*

M. Y. Shahrin

*Deputy Director, Agricultural Engineering Research
Malaysian Agriculture Research and Development Institute
Kuala Lumpur, Malaysia*

M. N. Mohd Adnan

*Deputy Director III, Irrigation Branch,
Department of Irrigation and Drainage (DID)
Jalan Sultan Salajuddin, Kuala Lumpur, Malaysia*

INTRODUCTION

CROP DIVERSIFICATION (CD) IN Malaysia will be concentrated on the non-granary areas, which can be classified as either irrigated or rain-fed. To implement this program, the Ministry of Agriculture (MOA) adopted the following measures:

- a) Assess the location and extent of the areas involved.
- b) Identify the CD potentials of these areas.
- c) Monitor and evaluate changes in the rice areas.
- d) Increase awareness and knowledge on CD among farmers, project implementors and decision makers.
- e) Formulate appropriate implementation plans.

Considering the extensive hectarage of the non-granary areas, it was decided that initial efforts should be focused on the irrigation schemes since basic data are already available and investments have already been made for their development.

This paper outlines Malaysia's efforts to promote the implementation of crop diversification in the non-granary irrigated areas. Programs and activities as well as problems encountered and measures to overcome them are discussed. Although *irrigation management* is the main subject of the Research Network, promoting CD requires deliberations on nontechnical issues which are inter-related. Such issues, where appropriate, are included.

STATUS, PROGRAMS AND ACTIVITIES

In order to fully assess the magnitude of CD activities in the non-granary irrigated areas and subsequently identify their CD potentials, the study, Rationalization and Crop Diversification in the Non-Granary Irrigated Areas, was carried out under a Technical Cooperation Program between the governments of Japan and Malaysia. This 20-month study, completed in October 1990, managed to create an inventory of all the 924 irrigation schemes totalling 130,122 hectares. A computerized information system to monitor land use and changes in each scheme was also developed.

The study has identified 8 different categories of diversified land use. Of relevance to the Research Network are two categories, namely, (i) outright conversion to high-value annuals, and (ii) rice-nonrice rotation. The former has 144 schemes covering an area of 9,930 ha, while the latter has 46 schemes with 4,619 ha.

CD is not new in the country. In 1987, 6 percent of the total irrigated area was already diversified. In this area, appropriate adjustments were made by the farmers and systems operators to suit the cropping patterns (Wong, Shahrin and Mohd Adnan 1990).

Apart from the rationalization exercise, the study carried out feasibility studies in three regions. The procedure applied in the feasibility study can be adapted for similar studies in other areas.

To promote the implementation of CD, a National Seminar on Crop Diversification was held in August 1990. The main objectives of this seminar were to create awareness of the need to diversify, its problems and issues, and to disseminate the results of the crop diversification study to policymakers, program implementors and the private sector.

Following this, briefings were given to the top management of the MOA, senior federal and state government officers and to policymakers in the respective states.

Brochures explaining the background to the study were distributed to relevant departments/agencies and the public. A physical model representing diversified cropping in a rice irrigation scheme was displayed at various major exhibitions.

On training, the National Water Management Training Center (NWMTC) which was set up primarily for rice irrigation, is currently undertaking a joint project under a Technical Cooperation Program between Japan and Malaysia to develop training modules on irrigation and water management for diversified crops and the setting up of demonstration farms. The training program is expected to be ready by early 1992. The planning and design of a demonstration farm is in progress.

IMPLEMENTATION STRATEGIES AND PROGRAMS

In order to promote and facilitate CD program implementation, a national committee will be formed. This committee, to be chaired by the MOA, also intends to merge the idle Rice Land Rehabilitation Committee and the Fruit Industry Committee. At the project level, an integrated multidisciplinary team will be set up.

To implement the program during the Sixth Malaysia Development Plan (1991-95), a special fund has been created for infrastructure rehabilitation and adjustments. For a start, Ringgit 5 million (US\$ 1.7 million) has been allocated.

Initially, the strategy is to implement pilot projects in schemes where feasibility studies have already been carried out. Apart from providing knowledge and experience on the various aspects of a CD project, the pilot farms can also act as nucleus projects which can be expanded in the same locality or replicated elsewhere.

On Research and Development (R&D), the areas identified for implementation under the Sixth Plan include water management techniques, on-farm distribution methods, drainage techniques, soil management, cropping systems, mechanization, and varietal development. Admittedly, the field of irrigation management for crop diversification in rice-based systems (IMCD) is a new experience for both the Malaysian Agriculture Research and Development Institute (MARDI) and the Department of Irrigation and Drainage (DID). As a consequence, the two agencies have forged an understanding to collaborate in IMCD activities, particularly on the monitoring and evaluation of existing systems, and the pilot projects.

As a matter of strategy to improve the sustainability of CD projects, the government encourages the support of group farming rather than individual smallholders. The lead role in organizing the farmers is through the Area Farmers' Association (AFA). The project could then be managed by the AFA as a mini-estate. As an incentive, such projects are eligible to apply for loans under the Special Agricultural Loan Scheme managed by the MOA through the Agriculture Bank. To qualify, the projects must first be approved by the Farmers' Organization Authority (FOA) and then endorsed by the MOA. Infrastructure development will be undertaken by DID and financed by grants from MOA upon project approval. Technical backup services can be provided by MARDI upon request.

Other than the AFAs, the Department of Agriculture (DOA), the National Tobacco Board (NTB), and the Federal Land Consolidation and Rehabilitation Authority (FELCRA) are also involved in organizing farmers and managing projects as mini-estates. Currently, efforts are being undertaken to encourage the private sector to participate in CD projects.

CD activities should be based on a multidisciplinary approach similar to the implementation model of the Integrated Agriculture Development Projects (IADP). The strategy here is to implement nucleus or demonstration projects to serve as models for area development. Infrastructure and land clearing costs are totally provided for in the form of grants. When such projects are initiated by the government for demonstration purposes, funds may even be provided for mechanization services, seeds, fertilizers and chemicals during the initial stages of project operation.

The IADP is a successful model of a multidisciplinary and a total approach to the development and implementation of agriculture projects in Malaysia. It is an integrating/coordinating body for multiple agencies such as DID, MARDI, the Federal Agricultural Marketing Authority (FAMA), DOA and FOA, which are involved in the development process. The District Land Office is also involved in facilitating activities like land acquisition for the establishment of infrastructure.

The DOA conducts extension programs, but MARDI, although a research agency, is also involved through its Technology Promotion arm. Under the IADP, therefore, the linkage between research, extension and clientele is direct. As for projects implemented by the AFAs, technical services can be obtained direct from either MARDI or DOA upon request. Such direct linkages have proven to be effective so far.

FAMA provides the marketing services. However, the strategy employed is to acquire supply contracts before embarking on the enterprise. In the case of a rice-tobacco system, contract farming is well established. The tobacco curers, while fully committed to purchasing the leaves, also extend credit to the farmers.

PROBLEMS IN PROMOTING CD PROGRAMS

The present scale of CD is small and scattered such that the impact on irrigation system management is minimal (Wong, Shahrin and Mohd Adnan 1990). However, recent development suggests concerted, large-scale CD activities, beginning with pilot farms, on contiguous areas within irrigation service or command areas. Therefore it is recognized that there are complexities in system planning, design, implementation and operation. Appropriate design standards and criteria, and operational and management techniques are factors of utmost concern.

Production technology is also a matter of concern, particularly the management of heavy clay soils for rice cultivation, water management techniques (requirement, conservation, application, removal), and varietal development and mechanization. Fortunately, a lot of information and experience in these fields are available within this region. It will therefore be a matter of reviewing and selecting potentially suitable technologies for direct adoption or modifications.

The Malaysian agriculture sector is suffering from a labor shortage problem. As it stands, rice production has, through contract mechanization services and direct seeding, successfully reduced labor dependence to about 55 mandays/ha (Anon. 1990). Annual crops on the other hand are very labor-dependent. For example, cabbage, chili and asparagus would require 180, 326 and 5,750 manday/ha, respectively (Anon. 1990). This situation would demand that mechanization be a prerequisite to successful CD. The institutionalization of the concept of mechanized production in CD activities and cultural practices will be a serious challenge.

CD would require intensification of on-farm water management. The cost of a rice-vegetable system has been computed to be around M\$9,300/ha (US\$3,320/ha) (Anon. 1990). This development cost will be borne by the government. However, the production cost will have to be covered through bank loans. In order for the project to begin, applications for both financial provisions must be successfully completed, which sometimes may not be the case.

Rice is a traditional crop with a guaranteed market and a heavy subsidy. Moreover, the rice farmers are not familiar with annual crops, thus giving rise to apprehension or skepticism that is compounded by the uncertain market and the lack of subsidies. Resistance to CD is therefore anticipated, at least initially.

CONCLUSIONS AND RECOMMENDATIONS

Malaysia is ready for a full-scale implementation of CD. The development models will be based on, if not similar to, the existing approaches such as those for the idle rice land rehabilitation and fruit industry development models which have proven to be effective so far.

Malaysia lacks experience in IMCD technology. Expert services from IIMI would be appreciated in defining suitable methodologies for monitoring and evaluating existing systems as a basis for developing design criteria and standards. IIMI's cooperation is also useful in pilot projects from the design to the implementation stages with the focus on technology development and assessment.

Production technologies such as those for soil management and mechanization are already available, although local verification is still needed. Similarly, policy matters seem to be on a sound foundation. Nevertheless, a forum such as this workshop can effectively facilitate the introduction of new inputs and new perspectives through the sharing of experiences. This forum and the IMCD network must be sustained.

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