NEW HORIZONS IN AGRICULTURAL INFORMATION MANAGEMENT

PROCEEDINGS

OF AN INTERNATIONAL SYMPOSIUM

MARCH 13-16, 1991

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New Horizons in Agricultural Information Management

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Information as an Economic Resource in Agricultural Development

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Abstract
The most striking development in recent years has been the widespread acceptance of information as an economic resource in agriculture development just like land, labor, capital and entrepreneurial skill. This shift is bigger than any changes in politics, government or economics in many developed countries.

Information used to be looked upon as an ornament rather than a necessity. Malaysians, quick to recognize the power of information, are already beginning to pay special attention to it in its use for planning and decision making in agricultural development.

The increasing awareness of information as a resource in the development of agriculture is reflected by the commitment and investment directed at information generation, processing and packaging, and dissemination in Malaysia.

This paper examines the changing perception of the importance of information in the development of the agricultural sector in Malaysia. In the discussion of this issue in relation to information generation and management under the local environment, the emerging global trends on the same and their accompanying challenges are also addressed. The need to develop information into a strategic and economic resource for development, in general, and agricultural production, in particular, is highlighted.

Introduction
The agricultural and industrial revolutions which took place during the 18th century brought about tremendous progress in agricultural and industrial productivity and efficiency to the world. The world has not stopped changing and moving ahead since then. As a matter of fact, it is changing at a much faster pace than one can notice. The changes that have taken place were so rapid that we have already advanced into a new era without being noticed by many of us. The information revolution is already in our midst and is impacting every aspect of our lives. This shift, by itself, is envisaged to bring about more changes to the world compared with those caused by the agricultural and industrial revolutions put together.

The information revolution has brought with it an information explosion which has been referred to by some as information pollution. It has been estimated that the
world's information is doubling every three to four years, whether it is business, education or in the home (Poppel and Goldstein, 1987). This geometric progression in information generation is increasingly overwhelming to information managers in general and users in particular. These trends are posing new and mammoth challenges to information generators and managers under an environment of decreasing financial resources for their management. The new challenges arising from this development have been summarized by Minnick (1989) to be as follows:

- the need to transfer more information to more people in less time if we are to keep up with new ideas,
- the increasing complexity in information with advances in science and technology,
- the need to share information with cultures of different languages,
- the need to improve communication between people of different disciplines,
- the need to transfer complex information to a younger population to prepare them for a technological society, and
- to develop and provide appropriate information to retrain older adults in order to keep them abreast of new techniques.

**Quest for information**

The increasing demand for appropriate information for project planning and implementation, and decision making in agriculture development is becoming more evident in Malaysia. This has been brought about by the modernization of Malaysian agriculture and the increasing awareness of information power and its rapid transmission to users through improved media and communication. The new farming community in this country is also better educated and as such is more receptive and responsive to new and improved ways of doing things. The latter is basically information appropriately processed and packaged in a form and content relevant to the real needs of the farmers in terms of timeliness and locations and even size of their operation. This quest for information is real and having to respond to the challenge seriously is crucial to further improve the productivity of our farms and the efficiency of the farming operations.

The continuing quest for the right type of information is essential for any business to maintain its leading edge. Malaysians are aware of this and this has been fundamental for the country to remain a world leader in rubber and palm oil production. Making information work for us and merging it with our experiences and judgement has enabled us to stay ahead and continue to forge forward in a continually changing agricultural business environment. In this context, the need to harness the tons of information available and distill them into a strategic and economic resource is becoming even more pressing. Considering that we are living in a world of increasing competition and in the face of depleting natural resources, the development of information into an economic
resource for agricultural development must be aggressively pursued and the quest for this resource intensified.

**Awareness of information power**

In order to appreciate the power of information, one has to be aware that harnessed information provided at the right time and applied with a clear objective in mind is capable of increasing productivity and efficiency, relieving manpower pressure and sharpening the competitive edge.

The importance attached to information as an economic resource in agricultural development in Malaysia is reflected by the huge sum of money allocated for agricultural research and development. For example, 1,103.6 million ringgit (ca. US$408.7 million) have been allocated to the Malaysian Agricultural Research and Development Institute (MARDI) for the period 1970-1990 to conduct research and development in agriculture. MARDI's commitment to this national call for information generation and development is evident in one of its functions embodied in the MARDI ACT, 1969, i.e., "to serve as a centre for the collection and dissemination of information, and advise on scientific, technical, and economic matters concerning the agriculture industry including the publication of reports, periodicals and papers thereto."

**Information as a resource**

In approaching the development of information into an economic resource, the following aspects should be taken into consideration:

- information generation
- information development and dissemination
- information storage and retrieval

In addressing these, it is critical for us to pay special attention to the real information needs of the users. It is equally important for the information to be processed and packaged into a clear, and easy-to-use form that is consistent with users' needs in terms of content and timeliness. The challenges posed by Minnick (1989) are also pertinent to this topic under Malaysian conditions.

**Information generation**

The creation of information/knowledge, by itself, has no immediate economic impact. It only becomes a major component for economic progress when it can be turned into a source for innovative process or decision. For this to happen it is most important that the real information needs of the users are understood. In the generation of appropriate technology for a farming community, we must be guided by specific objectives formulated and based on its relevance to the problem(s) intended to be solved. Unfortunately this approach to information generation tends to be the exception rather than the norm. This is reflected by the reported publication of some seven thousand scientific articles every day. We appear to be building an information maze, one which our farmers enter
and get lost in the process. The more information we generate, the more complex the maze becomes and we are no better off than before.

In view of the above one wonders whether these publications have been produced for the sake of publishing, or they merely lack a focus on the intended results and/or they simply do not know how to reach their intended clientele. The other possible reason is the total lack of awareness that information can be an economic resource for agricultural development.

Whatever the reason, a developing country like Malaysia can ill-afford the luxury of generating and publishing information for its own sake. With increasing limitations on the resources allocated for research and development, the world at large must also awaken to this folly and take the necessary action to ensure that the information it produces is truly useful and beneficial for development purposes.

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity (000 t)</th>
<th>Value (000 M$*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984</td>
<td>15.13</td>
<td>3,430</td>
</tr>
<tr>
<td>1985</td>
<td>11.52</td>
<td>2,960</td>
</tr>
<tr>
<td>1986</td>
<td>11.21</td>
<td>3,370</td>
</tr>
<tr>
<td>1987**</td>
<td>21.84</td>
<td>6,130</td>
</tr>
<tr>
<td>1988</td>
<td>23.69</td>
<td>11,930</td>
</tr>
<tr>
<td>1989 ***</td>
<td>35.54</td>
<td>17,895</td>
</tr>
</tbody>
</table>

*M$ = Malaysian dollars or ringgit (US$1 = M$2.7)
**Technology for production of Eksotika papaya was released by MARDI.
***Provisional figures.

Table 1. Export of Malaysian Eksotika Papaya (Chan, 1990)

The Eksotika papaya project, carried out by MARDI, is a good example of how information generated with well-defined objectives at the onset can contribute to national development and bring in more foreign earnings for the country. The project which was initiated in 1972 had as its primary objective developing a technology for the production of papaya for the catering and export markets. When the technology was released in 1987 by MARDI, it was well received by the farming community and the produce by the terminal markets. This is reflected in the 5.2 fold increase in papaya export value in 1989 compared with that of 1984 (Table 1).

Another good example of the usefulness of information as one of the resources for agricultural development is evident in the progress of the Malaysian cocoa industry. The single mindedness directed at cocoa production research and the application of the latest technology especially in the plantation sector, to the growing of this crop has
made Malaysia the third largest producer of cocoa in the world after the Ivory Coast and Brazil. This has taken place during the last ten years with the dramatic run-up from 1985 (Table 2).

<table>
<thead>
<tr>
<th>Year</th>
<th>Production (000 t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>4.0</td>
</tr>
<tr>
<td>1972</td>
<td>5.0</td>
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<td>1973</td>
<td>9.0</td>
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</tr>
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<td>1975</td>
<td>13.0</td>
</tr>
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<td>1976</td>
<td>15.4</td>
</tr>
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<td>16.7</td>
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<td>17.7</td>
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<td>26.8</td>
</tr>
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<td>1980</td>
<td>36.5</td>
</tr>
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<td>45.2</td>
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<tr>
<td>1988</td>
<td>220.0</td>
</tr>
<tr>
<td>1989*</td>
<td>255.0</td>
</tr>
</tbody>
</table>

*Provisional figures.

Table 2. Cocoa Bean Production, Malaysia (1971-1990)

**Information development and dissemination**

The mechanism of information transmission in relation to the information generators or researchers would affect the usefulness of the technology produced. According to Havelock (1971), there are three models of information systems, viz., (a) research, development and diffusion, (b) social interaction, and (c) problem solving. The first two models are top-down approaches and only permit a one-way flow of information with no scope for interaction or dialogue. The information users’ needs and problems are normally not taken into consideration in the creation of information. These are still the primary models for agricultural systems in many developing countries.
The problem solver model begins with a felt need and the information generated is usually tailored for a specific purpose. The result always ends with a satisfaction of that need. The focus is on the users and their information needs for increasing agricultural productivity and efficiency. This process can produce the right information and have it developed into an economic resource because it involves collaboration, interaction and communication among researchers, extension specialists and farmers.

The flow of information to the farming communities, the nature and sources of information and the manner in which it is processed, packaged, targeted and disseminated would also affect the impact of it as a resource in agricultural development (Heong, 1989). Information must be presented in a clear, easy-to-use form consistent with the users' needs.

It is important to know and understand how information is received by the users in the knowledge system in order to close the reception gap. Information reception by the users may be impeded by its inappropriate transmission or it may be in a form too abstract to be understood by the farmers (Cabanilla and Hargrove, 1987; Escalada, 1987).

The tailoring of information to particular target groups will facilitate the narrowing of the knowledge gap (Adhikarya and Posamentier, 1987). Materials for transmission to the farming communities should be pre-tested and accordingly revised to ensure that the right message is conveyed. Messages can be easily misinterpreted because of gaps between the information processors and the targeted clienteles. For example, a poster of a farmer with a sprayer and bottle may convey the message that chemicals need to be applied rather than the intended message (Escalada, 1987).

**Information storage and retrieval**

Traditionally, libraries have been looked at as storehouses of books rather than vendors of information. With the increasing quantum of information generated, published and stored away, a scenario of the information explosion has occurred. As a result, the problem of accessing relevant information is growing in staggering proportion with time. The Malaysian Agricultural Research and Development Institute (MARDI) is embarking on a program, to transform information that it generates and acquires into an economic resource during the Sixth Malaysia Plan period (1991-1995). The library component of it is to ensure that the information it holds can be readily retrieved when one needs it and in the right format.

The challenge to develop a 'new library' is not to think of it as a physical but rather an electronic source of information (Lee, 1989) which can connect users with an international network. If it is to play a useful role as a provider of information, it should no longer be a physical depository of materials but a 'virtual gathering,' where the actual materials can be dispersed all over the world and accessed through an electromagnetic medium.
The future library would work as an information exchange where it will point to where information can be retrieved. In principle, it need not keep all the primary information media like books, journals, and microfilm. Rather it should be able to know the exact locations where specific items of information can be found (Lee, 1989). This approach to information storage will allow for an increasing quantum of it to be stored without physical library space becoming a constraint. This is most heartening in view of the decreasing funds available for construction of new and bigger library buildings and the harnessing of the information explosion which is occurring in geometric proportion. The storage of information in an electronic medium will also allow it to be systematically accepted or rejected, and shifted or transformed in order to have value added to it. Information in this form can be quickly reordered and distributed according to need and its optimal use. In the same way, it can be readily retrieved and in the form needed. The timeliness with which the information can be made available can thus make it a strategic resource which can play its role effectively in the economic development of a country.

Acknowledgements

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