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BANGLADESH AGRICULTURAL RESEARCH PROJECT PHASE-II

DATA BASE MANAGEMENT AT BARC

Applications for

Documentation and Administration

Jane S. Johnson

BANGLADESH AGRICULTURAL RESEARCH COUNCIL
INTERNATIONAL AGRICULTURAL DEVELOPMENT SERVICE
April 1985

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A Consultancy Report

by

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INTERPAKS, Office of International Agriculture
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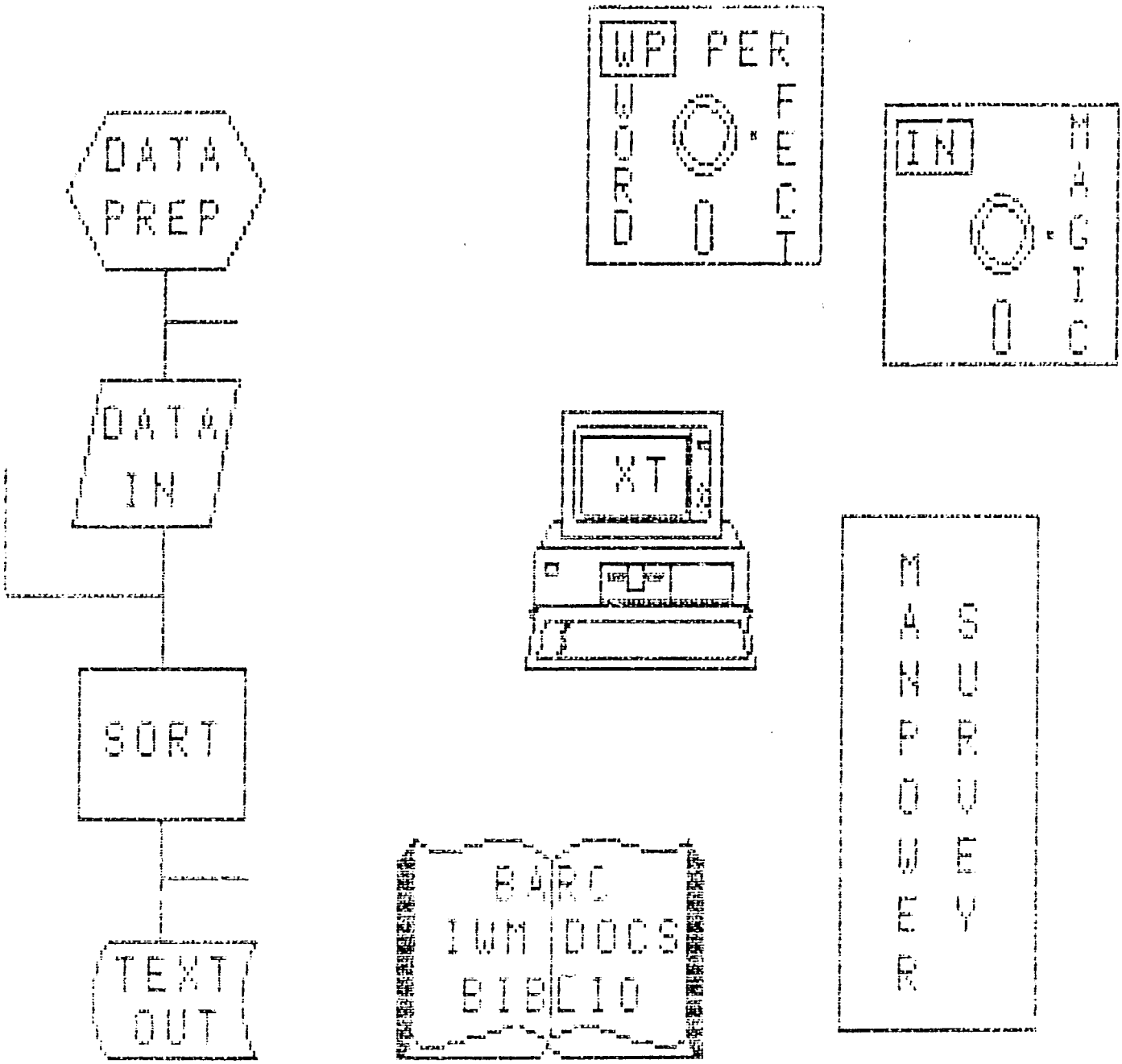

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DATA BASE MANAGEMENT AT BARC

APPLICATIONS FOR DOCUMENTATION AND ADMINISTRATION

by

Jane S.Johnson[1]

INTRODUCTION

Terms of Reference

At the request of the Bangladesh Agricultural Research Council (BARC) and the International Agricultural Development Service (IADS), I was invited to Dhaka to work with library personnel at the National Agricultural Library and Documentation Centre (NALDOC) on the development of a computerized bibliographic data base for irrigation water management materials. In addition, I was to assist the NALDOC staff in developing a set of keywords for retrieving the irrigation water management documents and to identify sources and titles of international publications and journals in the area of irrigation water management.

Background

Professional staff working in the area of irrigation water management (IWM) at BARC have continually found it frustrating to identify and locate various reports and documents covering research activities in water resources in Bangladesh. In order to alleviate some of these frustrations, BARC with the assistance of IADS initiated a program to identify and collect the publications on irrigation water management produced by local research institutes.

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[1] Information Specialist, INTERPAKS, Office of International Agriculture, University of Illinois at Urbana-Champaign

universities, consulting firms, donor organizations as well as commercial publishers in Bangladesh. To date, with the assistance of Mr. Masharraf Hossain, over 500 such publications have been identified. Mr. Hossain has meticulously recorded the citations and written annotations for each document. The IWM staff has arranged for two copies of each document to be provided to NALDOC.

To date over 500 publications in the area of irrigation water management have been identified through this program. Of those identified, approximately seventy percent (350-400 titles) have so far been obtained for the NALDOC collection. Dr. Gisselquist estimates that these 500 publications most likely represent only about thirty percent of the studies in water management that have been done in Bangladesh. This small percentage shows that Mr. Masharraf Hossain, BARC librarians, and others involved in this program have only begun to uncover the large number of studies that have been conducted on this subject.

Implications for NALDOC

The acquisition of materials is only one aspect of the overall plan to make these materials more readily available to researchers and policy makers. Making them available to researchers requires systematic organization of the materials into an information storage and retrieval system. NALDOC is the logical institutional unit to handle this function since it acts as the national repository and dissemination center for all materials pertaining to agriculture in Bangladesh.

The impact of the concentrated collection of IWM materials and their subsequent deposition in NALDOC was not fully understood by all parties

involved at the onset of the project. In a system that requires one hour of a clerk's time to type a set of five catalog cards for a single title, the influx of 350 to 400 new titles in a six-month period places a significant burden on the human and physical resources of an organization.

IMPLEMENTATION OF THE TERMS OF REFERENCE

In order to accomplish the tasks requested by the consultancy, several activities needed to be organized and implemented in a logical manner. Having been previously informed of the hardware available for use at BARC, the consultant brought with her a computerized system she had developed for a similar application. Information on the desired characteristics of the specific system to be developed for IWM materials had to be gathered, coordinated and combined with the base system in order to design a system that would meet the needs of both the IWM specialists and NALDOC staff. Once the system was designed, NALDOC staff needed to be trained in the use and management of the system. During this period, the system would continue to be refined as problems and/or snags surfaced.

Gathering Essential Information

Each of the IWM publications passed to the NALDOC library via the concentrated collection effort had been assigned a classification number from the Universal Decimal Classification System (an international classification system originally based on the Dewey Decimal Classification System) and a book number. The annotated bibliographic citations had been divided into 16 categories (see Appendix A) awaiting further processing.

Mr. Mohammad Zahirul Islam, the Principal Scientific Officer at NALDOC, was most interested in a more efficient method to organize and access this large influx of research materials. He has been most supportive of the work plan of this consultancy by making his staff available to assist in the various tasks that must be performed in planning and organizing a microcomputerized bibliographic data base. Several professional staff members have been working steadily editing and tagging the annotated citations for input into the computerized data base system. Mr. Islam has allowed one clerk-typist and one professional staff member to work almost full time with the consultant to be trained in data entry and in management and use of the bibliographic data base system. Mr. Islam has tried to coordinate the efforts for publishing the annotated bibliography by involving the BARC irrigation water management specialists in the identification and organization of the categories for the published bibliography and through their input into the list of keywords for describing the irrigation water management materials.

Software for the Microcomputerized Data Base

The consultant brought with her for demonstration two software packages with which she has developed a microcomputerized bibliographic database for a special collection similar to the one in irrigation water management. These packages were easily installed on the IBM PC/XT with 640 Kb (kilobyte) RAM (random access memory), one 10 Mb (megabyte) hard disk, and one 360 Kb floppy disk drive that was available for use. (Further comments on the hardware may be found in the recommendations section.) The software package used for data entry is WordPerfect™, a sophisticated word processing program, but one that is relatively straightforward for a beginner to learn to use the basic

functions. One feature of WordPerfect™ that makes it so valuable in data entry, particularly for persons in a country in which English is a second language, is the spelling checker that accesses a 100,000 word dictionary. New words, including local and foreign words, may be added to the dictionary.

The main software package utilized in the bibliographic data base is INMAGIC™, a general data and information management software system. This package was chosen over a dBASE II/III[2] type program for its ease of use, variable length fields, repeating field capabilities, etc.; while, at the same time, it matches or surpasses the dBASE II/III type programs for flexibility in output formatting and retrieval capabilities.

Two computer software packages were selected as each one has outstanding capabilities to perform a set of the functions executed in the bibliographic data base system as a whole. The consultant has yet to discover a single software package that performs quickly and efficiently all the functions that are needed for the range of activities in an information storage and retrieval system.

Developing the Microcomputerized Data Base

Discussions with Dr. David Gisselquist and Mr. Masharraf Hossain, the principals involved with identification and collection of the irrigation water management materials to be included in the annotated bibliography, provided background information and an overview of their expectations from the consultancy period. Considerable time was spent working with Mr. Islam in NALDOC to gain an understanding of how best to set up the microcomputerized

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[2] A well-known data base management software package.

system to follow the same conventions currently practiced in their information storage and retrieval system.

Mr. Islam's unit is the designated input center for Bangladesh into FAO's AGRIS data base. It was agreed that any computerized system established would be most useful if it would follow the conventions in the AGRIS system. Mr. Islam provided a copy of the AGRIS manual for data input to use in setting up the computerized data base.

The INMAGIC™ data base for irrigation water management (called IWM-DATA) was organized in such a manner that field labels or tags were defined, as much as possible, to coincide with those in the AGRIS system. (See Appendix B.) It was understood that there would necessarily have to be some variations as the two software packages do not work exactly the same.

Data Entry and Refining the Data Base

The development of the computerized system was accomplished in one week. However, to set up a system serves no purpose unless its use may be continued. In order to transfer the basic knowledge necessary for continued use of the data base, Mr. Islam assigned two staff members from NALDOC for training on the new computerized system.

Mr. Sukumar, a clerk-typist at NALDOC, worked daily in learning the basics of the word processing program for data entry into the IWM data base. Initially, the entry of each record took quite a lot of time since the use of the hardware, software, and keyboard required training, practice, and time to comprehend new concepts. Within a little more than a week, Mr. Sukumar was able to enter ten annotated records in two hours time, a commendable speed by any standards. He has quickly comprehended the basic commands of the word

processing software to be able to type in data, add, delete, and modify where necessary. He has also developed good working habits for computer usage like saving files often so as not to lose several hours of work through a power failure or any other unexpected event.

Mr. Kamal, a junior documentation officer at NALDOC, has been working with all aspects of the IWM data base. Drawing from his experience in preparing worksheets for data entry into the AGRIS system, he has assisted in the labeling of the fields on the annotated citations for data entry. Initially, Mr. Kamal worked with Mr. Sukumar to learn the basics of the word processing software used for data entry and to assist Mr. Sukumar in the translation of the annotated citations into the format required for data entry into the INMAGIC™ IWM-DATA data base. After a few days, the consultant began training Mr. Kamal in the processes of editing Mr. Sukumar's data entry files for spelling and typographical errors, adding new records to the data base, monitoring the data base for inconsistencies, modifying the records when necessary, searching and retrieving specific information, and preparing basic outputs from the retrieval of data. Several step-by-step instructional guides have been prepared for both Mr. Sukumar and Mr. Kamal to use in data entry and data transfer. (See Appendix C.)

Additional Uses of the Software at NALDOC

The main thrust of the consultancy was to develop a computerized bibliographic data base for irrigation water management materials. However, other useful applications of the two software packages to NALDOC processes have surfaced.

Having established the IWM data base to conform with NALDOC cataloguing

practices, other materials received by the center may be added to another data base using the same structure (called BIBLIO). The bibliographic information on each new title added to the collection may be typed once during data entry. Monthly accessions lists may be generated from the new entries and distributed to BARC scientists in a more timely fashion than before. (See example in Appendix D.)

A sample format for printing catalog cards has been written for output in the INMAGIC™ database. (See Appendix E.) As stated earlier in the report, the typing of a set of catalog cards for each new title added to the collection is a very time consuming task. With the generation of the cards from the computerized information system, the processing time needed for each new title would be shortened considerably. Although the format for card output has been written, the tractor feed card stock is not yet available in Bangladesh. The consultant met with Mr. A. A. Kamruzzaman from Sakaimex Ltd., a local supplier of continuous feed paper for printers. Mr. Kamruzzaman's company has the perforating machine to make continuous feed forms but is not yet making forms in a 3"x5" (3"x6" with pin feed holes on each side) format.

One should not overlook an important, but basic application of WordPerfect™ to library functions--that of general word processing. NALDOC, like other units at BARC, has daily correspondence, proposals, and reports to prepare. Using WordPerfect™ for these daily tasks would help to reduce a lot of the errors in typed materials and cut down on the time used by senior staff in proofreading. Using the spelling checker helps to catch typographical errors before a draft is sent to the senior staff. Once errors are detected, the corrections may be made without generating new errors, as is usually the case with materials typed on a typewriter. The Epson LQ-1500 printers

available in the BARC computer center can output both data processing type characters at 200 characters per second (cps) or letter quality print (as in this report) at 100 cps.

Software Applications for Administration

During meetings with various BARC/IADS specialists, it became clear that there was a need for a data management system for areas other than bibliographic information. Dr. Byron Mook, Senior Research Officer at the International Service for National Agricultural Research, had just completed a consultancy at BARC to design a manpower survey data base. He worked with the BARC officials to develop the necessary data input sheet and discussed the need to computerize the data once received for easier retrieval of the information. Prior to his departure, he had not made a decision as to what software would be most appropriate for such a data base.

Fortunately, the same software combination (INMAGIC™ and WordPerfect™) lends itself extremely well to this type of application. As an aside to designing the computerized IWM bibliographic data base, the consultant designed a data base for the manpower survey with an output format listing all the information supplied on the survey form. (See Appendix F.)

Mr. Islam of NALDOC was also interested in this survey as he has been planning to update the 1978 edition of the Directory of Agricultural Scientists in Bangladesh. Approximately seventy percent of the information normally included in the directory (name, position, educational background, past positions, etc.) was included on the survey form designed by Dr. Mook and the BARC staff. It was suggested that, with the addition of the three fields of consultancies, memberships, and honors to the survey form, the data needs

of both the administration and NALDOC could be met. A sample output for the updated directory of agricultural scientists drawing from the same data base, MPSURVEY, is shown in Appendix G.

As a generalized data base management system, INMAGIC™ lends itself to a multitude of uses. The consultant feels very strongly that if two or more persons use the same software package(s), they will be better able to exploit the capabilities of the software programs by sharing experiences with and understanding of the system.

RECOMMENDATIONS

The following recommendations are based on insights gained during the consultancy period related to the value of the microcomputer for accomplishing overall NALDOC functions. It has been shown that the uses of a microcomputer in an information center are many and varied. Examples of several applications of two software packages for documentation and administrative purposes are included in this report. However, it cannot be stated strongly enough that the applications developed during the consultancy cannot continue unless the NALDOC staff trained in the systems have daily access to the microcomputer. Proficiency in microcomputer applications for information management (or any task) does not come with only one or two weeks of training, but is gained through daily, hands-on practice and experimentation with the software packages. Expectations from senior staff must remain realistic and take into consideration the time necessary to become familiar with both the hardware and software available at the BARC computer center. If the committment is present, then the following recommendations outline a plan of action for the

continuation of the work started during this consultancy.

1. Computer Software

The software used to set up the irrigation water management and manpower survey data bases was brought by the consultant and belongs to the University of Illinois. They may not be given to BARC as they are copyrighted materials. In order to continue with the computerization of NALDOC processes, BARC should purchase the following two software packages:

a) INMAGIC-Micro, latest version

Order from: INMAGIC, Inc.
238 Broadway
Cambridge, MA 02139
U.S.A.

INMAGIC^{tm} retails for US$ 975.00 but a 15% discount for government, educational, or non-profit organizations should apply to BARC. Additional copies are available at a 50% discount. When ordering INMAGIC^{tm}, a signed license agreement which includes information on the CPU model (IBM PC/XT), operating system (DOS 2.1), and CPU serial number must accompany the order. IADS administrators have been provided with a copy of the INMAGIC^{tm} order form and license agreement.

b) WordPerfect^{tm} Version 4.0

Order from: SSI Software
325 North State Street
Orem, Utah 84057
U.S.A.

WordPerfect^{tm}'s list price is US$ 496.00. However, SSI Software offers a 50% discount for educational and non-profit institutions.

WordPerfect™ is usually available through mail order software dealers for around US$ 275.00 if for some reason BARC does not qualify for the 50% discount.

Manuals and function key templates accompany the program disks for both packages.

2. Hardware

The NALDOC staff should have full-time access to one of the IBM PC/XT's in the computer center. A unit with a hard disk drive is necessary for bibliographic data bases as the size of the data base quickly surpasses the capacity of the floppy diskettes. If another machine is to be purchased for NALDOC's use, the IBM PC/AT would be the appropriate machine to purchase. The recommended software runs on the IBM PC/XT or IBM Portable as well as on the new AT. The AT (Advanced Technology) has an international power supply and is switchable from 110v, 60 cycles to 220v, 50 cycles. With its open architecture it is designed to be expanded and, thus, has the capacity to grow as BARC's requirements grow. The AT should be ordered with a minimum of 512 Kb RAM, one 20 Mb hard disk, one 1.2 Mb floppy disk drive, and one 360 Kb disk drive for compatibility with the other IBM PC models. A monochrome/parallel printer interface card and a monochrome monitor will meet the documentation center's needs. The purchase of a back-up system for the hard disk or a system such as the Bernoulli Box which includes a large capacity disk with tape back-up should be seriously considered.

The Epson LQ-1500 printer would be a very good choice for NALDOC work as it has both data processing and letter quality type faces and speeds.

Publications in camera ready form could easily be generated by the hardware system described in this section.

The hardware should remain in the computer center until such time as the new NALDOC facility with controlled temperature is completed. It is very important that wiring for the computer installation be simplified and stabilized so that machines will not be inadvertantly destroyed by plugging the machines into the wrong power source. Particularly in the early stages of learning to master the microcomputer, the frustrations are great enough without new ones being added because of poor electrical connections. It is also important that the wiring be elevated off the floor. It is extremely difficult to keep the room properly cleaned when there is a jumble of wires under each table.

The importance of the UPS (uninterrupted power supply) system and surge protection cannot be overemphasized. The capacity of the UPS units currently in use is too small for the power demands of the IBM PC/XT systems. Their dependability to take over during power outages is unreliable, but they do serve as a surge protection device.

3. Applications for NALDOC Processes

Several applications of the computer to NALDOC processes have been illustrated. Not all may be implemented on a day-to-day basis as a result of this short consultancy. However, priorities should be set on the order in which functions are to be computerized. The following is a suggested list of processes suitable for computerization with comments on the timing for their implementation.

a) Irrigation Water Management Annotated Bibliography

The system for data entry into the irrigation water management data base has been established and refined. The two NALDOC staff members trained in the use of the software packages should continue to input the remainder of the new publications. If access to the computer is stopped for any length of time, it is most likely that much of the knowledge gained during the short training period will be lost. However, if daily access is allowed to continue, the basics gained from training will be reinforced and growth in the use of the software will occur.

Output formats have been designed for the publication of the IWM annotated bibliography. However, it will probably require the services of a consultant to work with the NALDOC staff to establish the procedures for producing camera-ready copy from computer output for publications.

b) Computerizing Other NALDOC Procedures

1) Monthly Accessions List

Other materials acquired by NALDOC could be entered into the IWM data base (IWM-DATA), if appropriate, or another data base could be started using the same data structure (BIBLIO) since the fields in that structure are generic for any type of bibliographic citation. Certainly the monthly accessions list could easily be generated by retrieving all monographic materials added to the data base during a particular month.

2) Catalog Card Production

Probably the most productive library process to computerize would be the generation of catalogue cards for each new title added to the NALDOC collection. Catalogue card output formats have been written (SHLFLIST,

SUBJ-C, and TITLE-C). When tractor-feed catalogue cards become available in Bangladesh (or if such cards could be ordered from abroad), it would be useful to engage a consultant to spend some time with the NALDOC staff in designing procedures and training staff in the generation of card sets via the INMAGIC™ data base.

3) AGRIS Data Base Input

Presently one of the concerns at NALDOC is the ability to input bibliographic information on Bangladesh agriculture into FAO's AGRIS data base. The AGRIS Processing Unit at FAO issued a statement that by the end of 1984 it would be necessary for each country to send their input to Vienna on magnetic tape using one of the two variations in format approved by the AGRIS unit. Previously NALDOC has sent its completed input sheets to the FAO Regional AGRIS Centre in the Philippines for processing. That center has lost its funding and no longer can enter the data from input sheets for other countries. In order for NALDOC to continue adding data to the AGRIS data base, they will have to be able to send their data in the required magnetic tape format. After discussions with Mr. Moin Khan at Beximco Computers Ltd., it was learned that there is presently no linking mechanism in Bangladesh between microcomputers and a larger computer attached to a magnetic tape drive unit. However, the Beximco specialists stated that the Bangladesh University of Engineering and Technology (BUET) is in the process of purchasing 40 IBM PCs that they plan to hard wire to interface with their IBM 4300 series mainframe computer. Once this hardware configuration is operational, the capabilities for transferring data from an INMAGIC data base to a magnetic tape format acceptable to AGRIS will exist in Dhaka. Mr. Moin indicated

that their firm has staff who could advise NALDOC in the specifics of such a transfer. In the meantime, however, it is recommended that Mr. Islam contact the AGRIS Processing Unit in Vienna to see if any further action has been taken on the possibility of using floppy disks to transfer data as was stated in their Technical Note No. 13 of 10 May 1982.

4. Staffing for the Computerized Library and Documentation Centre Functions

Adding new processes in an organization requires a readjustment in job specifications and grades. One NALDOC professional staff member should be designated as coordinator of the computerized data bases. He should supervise the data entry, perform the management functions in keeping the data base current, and develop the procedures necessary to produce the desired outputs from the data bases. He must become a resident expert in the use of the software for library functions. Once he has had the opportunity to learn the software systems, he should be able to train other NALDOC staff in the use of the data bases.

One clerk-typist should be designated as the data entry and word processing clerk. He should receive additional training as needed by the coordinator of the NALDOC data bases. It would also be useful for him to receive some more in-depth training in word processing as the typing of reports, proposals, etc. could be done more efficiently using the microcomputer. Other typists could be trained in word processing as the demand and access to microcomputers warrants it.

5. Back-up Support and Training

BARC should provide back-up support in the use of the microcomputers. The

NALDOC coordinator needs to be trained in the use of the DOS 2.1 operating system as many of the commands relate directly to his efficient use of specific software packages running under DOS. This type of training should be available to BARC staff who are just beginning to use specialized software packages. The training staff must become proficient in the use of the software packages utilized by the various units at BARC. It is imperative that novices in the computer field have colleagues with whom they may discuss their problems and with whom they may pool their knowledge and understanding of a particular package to work out solutions for overcoming these problems.

6. Administrative Uses of the Software

A data base for the manpower survey data has been designed. However, there are some aspects of the survey that need to be thought out more thoroughly. Most likely, the survey form will be modified somewhat and the data base will need to be refined. It may be necessary to seek the services of a consultant who is familiar with microcomputerized data base management systems and Dr. Mook to work in refining the manpower data base and in designing output formats needed by the users of the manpower information system.

Appendix A

CATEGORIES FOR IWM DATABASE

1 - Climatology

2 - Construction, Operation and Maintenance

3 - Cultivation under Irrigation

4 - Drainage

5 - Economics

6 - Education, Extension and Training

7 - Equipment and Machinery

8 - Flood Control

9 - Hydrology

10 - Irrigation Development

11 - Irrigation Methods and Systems

12 - Water Management

13 - Water Resources

14 - Water Supply

15 - Water Survey and Mapping

16 - Water Use

Appendix B

CODES FOR IRRIGATION WATER MANAGEMENT DATABASE

The codes established for the Irrigation Water Management Database follow those used in the AGRIS input sheet. The INMAGIC database management program uses the terminology label (for a shortened form) and name for a longer form. A fuller explanation is attached where necessary.

LABEL	NAME	EXPLANATION
001	NO	Record number
008A	TYPE	Type of record (see AGRIS field 008 for codes)
008B	BIBLEV	Bibliographic level (see AGRIS field 008 for codes)
008C	LITIND	Literary indicator (see AGRIS field 008 for codes)
008D	AGRISCL	AGRIS classification number
008E	CALLNO	Call number in NALDOCS Library (UDC)
008F	DTINPUT	Date input (use form yymmdd, i.e. 850406)
100	AUTHOR	Author(s)
110	CORPAU	Corporate author(s) (use only if there is no personal author)
111	DEGREE	Degree if a thesis, i.e. B.Sc. Ag. Engg.
200	TITLE	Title of the piece
201	SUBTIT	Subtitle of the work
210	CONF	Name of the conference (use only if there is no personal author or corporate author)
211	CONFPL	Place of conference
213	CONFDT	Date of conference
230	OTI	Original title or journal title if the work is an article in a journal
231	ORIGST	Subtitle of the original title
250	EDITION	Edition statement
300	RPTNO	Report number
310	SECNOS	Secondary numbers
320	ISBN	International Standard Book Number
321	ISSN	International Standard Serial Number
401	PLACE	Place of publication
402	PUBSHER	Publisher(s)
403	DATE	Date of publication
500	COLLAT	Collation
600	LANG	Language of text
610	NOTES	Notes
620	GEOG	Geographical names (AGRIS uses codes rather than names)
800	KEYWORD	Keywords and/or descriptors from AGROVOC, Water Resources Thesaurus, etc.
860	ABSTR	Abstract or annotation
EN	ENTRYNO	Entry number (added after items arranged in order for producing a publication)

SO	SOURCE	Source of an analytical entry for a chapter in a book or a paper in a published proceedings (e.g., In T. E. Schultz (Ed.), Proceedings of the 5th Water Resources Conference (pp. 28-35). Chicago, American Water Resources Association, 1978)
CA	CATEG	Category for arranging items for the bibliography (e.g., Economics, Drainage, Water Supply, etc.)
SR	SERIES	Monographic series statement

Appendix C

BASIC COMMANDS FOR USING WORDPERFECT

1. Check to make certain the transformer is plugged in correctly. Turn on the transformer and UPS. The green light should light up on the UPS box.

2. Turn on the central processing unit (CPU) and the monitor.

3. When you have the C> on the screen, insert your data diskette into drive A, close the door, and type WP {Enter}.

4. You will have a blank screen ready for data input.

Retrieve a File {Shift} {F10}

Press {Shift} {F10}. You will be asked for the Document to be Retrieved. Type in the name of the document you wish to retrieve from the disk. (Upper and lower case letters make no difference for file names.)

Save a File {F10}

Press {F10}. You will see the prompt Document to be Saved. If you have previously saved the document on which you are working, it will be followed by the name of the document.

Example: Document to be Saved: wp-instr.txt

If this is a new document that has never been saved, you will need to give it a name. The name may be one to eight characters, a period and then up to three characters for the extension.

Examples: bhatt testdata.txt
inmagic.1 123.doc

Exit from Word Perfect or Clear Screen {F7}

Press {F7}. You will first be asked if you with to save the document. Notice that the default is Y for yes. WordPerfect does not want you to exit out without having a chance to save what you have been typing. Press Y or {Enter} to save the document. It never hurts to save a document one time extra, but it can hurt a lot if you save it one time too little--you may lose it!

You will then be asked for the Document to be Saved. Continue to follow the prompts the same as you would in the section Save a File above. Finally you will be asked Exit WP? (Y/N). If you only wish to clear the screen and work on a new document press {Enter} or type N for no. If you wish to exit completely out of WordPerfect, type Y for yes and you will return to the operating system.

Print a File {Shift} {F7}

Press {Shift} {F7}. You are given four options. We will work with only two of them now. If you wish to print the entire document on which you are working, choose 1 Full Text Print by typing 1. If you wish to print only the page on which you are working, choose 2 Page Print by typing 2. If your document in only one page, either 1 or 2 will print only the single page.

Cursor Control

Arrow keys	moves the cursor up, down, right, or left one character at a time
Home, arrow	moves the cursor to the edges of the text screen--top, bottom, right, left
Home, home, up	moves the cursor to the beginning of your document
Home, home, down	moves the cursor to the end of your document
+/- (on number pad)	moves cursor to the beginning of the first or last line on the screen, and keeps moving through the text one screen at a time
PgUp, PgDn	moves the cursor to the first line on the previous/next page, and moves through the document one page at a time
Ctrl left, right arrows	moves the cursor to the beginning of the previous/ next word

Cancel

If you press one of the function keys by accident and get something on the screen you do not recognize, you may go back to where you were by pressing the {F1} key to cancel the last command you gave by accident.

Deleting Text

Use the backspace key { } to delete a letter to the left of the cursor. Use the Del key to delete a letter above the cursor.

Reveal Codes

To look at the special codes that WordPerfect puts into your document to perform certain functions, press {Alt} {F3}. If you need to delete a code you may use the backspace key to delete a code or letter to the left of the blinking cursor or the {Del} key to delete a code or letter to the right of the cursor.

Rewrite Screen

If the words on the monitor look out of alignment or strange, press {Ctrl} {F3} to rewrite the screen as it should appear correctly.

Search a Letter, Word, or Phrase

To search forward in the text, press {F2}, type in the letter, word, or phrase you wish to search, then press {Esc}. If the letter, word, or phrase is found, the cursor will move to that location. If the letter, word or phrase does not occur, you will see the message *Not Found* in the lower left hand corner of the screen.

To search backward through the text, press {Shift} {F2}, then follow the same instructions as above for searching forward in the text.

Spell Checking

To begin the spelling check, press {Ctrl} {F2}. You will be given six options in a sub-menu. You will normally want to choose either 2 Page to check the spelling on a particular page of a document or 3 Document to check the spelling throughout the entire document.

When the WordPerfect speller encounters a word it does not recognize, you will be given the option to do the following:

1 Skip once - This will skip over the word only a single time.
2 Skip - This skips over the word throughout the remainder of the document.
3 Add word - Use this option when you wish to add an often used word to the dictionary.
4 Correct - Choose this option when you need to correct an error. You may either press 4 or move the right arrow to edit the word.
5 Lookup - This allows you to look up a word pattern in the dictionary
6 Phonetic - This allows you to look up other words in the dictionary with the same consonant pattern.

Centering Text

To center text on a line press {Shift} {F6}, type the line you wish to enter, then press {Enter}.

Underlining Text

Press {F8} at the beginning of the area you wish to underline, type in the characters to be underline, then press {F8} again to end the underlining. The {F8} key works like an on/off switch. Notice that the position number in the bottom of the screen is underlined when the underlining function is turned on.

Quick Summary of Basic WordPerfect Commands

Command	Function Key(s)	Code
Bold on/off	{F6}	[B][b]
Cancel	{F1}	
Center	{Shift} {F6}	[C][c]
Exit	{F7}	
Margin Set	{Shift} {F8}, 3 Margins	[Margin set: 10,88]
Retrieve a file	{Shift} {F10}	
Reveal codes	{Alt} {F3}	
Rewrite screen	{Ctrl} {F3}	
Save a file	{F10}	
Search backward	{Shift} {F2}	
Search forward	{F2}	
Spacing set	{Shift} {F8}, 4 Spacing	[Spacing set: 2]
Spelling check	{Ctrl} {F2}	
Tab	{TAB}	[TAB]
Tab set	{Shift} {F8}, 1 Tabs	[Tab set: 10,30,60]
Underline on/off	{F8}	[U][u]

DATA ENTRY FOR IRRIGATION WATER MANAGEMENT MATERIALS

Start-Up

1. Turn on the IBM PC/XT. When you have the C>, put the WordPerfect data diskette in drive A.

2. Type wp {Enter} to enter the word processing program.

Preparation for Data Entry

3. With the screen blank except for the status line in the lower right hand corner of the screen, retrieve the file form-m for monographs (or form-s for serials) by typing: {Shift} {F10} and typing in the file name form-m (or form-s).

4. When the form comes on the screen, change field 008F to the correct date. Exit and resave the form by pressing {F7}. When asked if you wish to save the document, press {Enter} for yes. When asked Document to be Saved:, press {Enter} to keep the same name. When asked if you wish to replace the file, type y. Finally, when asked Exit WP (Y/N), press {Enter} for no and the screen will clear.

Data Entry

5. Begin data entry by retrieving the form on the screen. Press {Alt} m for the monographs form or {Alt} s for the serials form. The labels for the various fields will appear. Type in the data next to the appropriate label (i.e., 001, 100, 200, etc.).

Saving the File

6. After you have finished the first record. Save the file by pressing {F10}. The first time you save the file, you will see the statement Document to be saved: A:\form-m (or A:\form-s). You do <u>not</u> want to save the file under the name form-m (or form-s). Instead, you want to name it add-data.# where the # is replaced with the appropriate number (i.e., add-data.1, add-data.8, add-data.11, etc.). Type in add-data.# {Enter}. From now on when you save your file, your new file name will appear in the Document to be Saved statement and you may simply update that file.

Checking the Spelling

7. After entering all the records for the day, check the spelling via the computer. Press {Ctrl} {F2} to begin the spelling check. Choose 3 Document to check the spelling of the complete document. Make the

necessary corrections to your document. If the word is spelled correctly but not in the dictionary, press 2 to skip it throughout the remainder of the document. If the word is one you want to add to the dictionary like the name of a district in Bangladesh, press 3 to add it to the dictionary.

Format of the Records for INMAGIC

8. The data must be entered in the format acceptable to the INMAGIC data base management system. The following criteria must be followed in the data entry process.

   a. All fields must begin with the label for that field.
   b. Lines longer than 80 characters may be continued on additional lines. However, each line must end with a carriage return (HRt, in WordPerfect) and each continuation line must begin with a space.
   c. Repeating fields (or subfields) must begin with a semicolon (;).
   d. Each record must be terminated by a dollar sign ($).

Example

	001 0015
	008A B
Field	008B M
labels	008E 631.67 SIR
	008F 85-04-11
	110 Sir M. MacDonald & Partners Limited
	; Hunting Technical Services Limited
	200 BADC/IDA - Tubewell project. Volume III, Groundwater
	401 Dhaka
	402 Bangladesh Agricultural Development Corporation
	403 1977
	500 116 p
	620 Northwest Bangladesh
	800 Groundwater
	; Tubewells
Repeating	; Aquifers
fields	; Water balance
	; Evapotranspiration
	860 This report examines the nature and extent of the groundwater resources of Northwest Bangladesh and assesses
Continuation	the development potential of the aquifer. Both the limits
lines	and nature of future development have been considered. Since
	land use determines the demand for irrigation water, a brief review of the environment of the project area is included.
End of record	CA Water Resources
delimiter	$

TRANSFER OF FILES

FROM WORDPERFECT TO INMAGIC DATABASES

The transfer of files from WordPerfect to INMAGIC requires that files be sent in a standard format called DOS text files or ASCII files. These instructions delineate the steps to follow in entering data into the databases established using the INMAGIC database management software.

Saving WordPerfect Files as DOS Text Files

1. While in WordPerfect with the file you wish to transfer on the screen, press {Ctrl} {F5}. You will see the following menu on the screen:

   Document Conversion and Locking
   1 - Save current document as a DOS text file
   2 - Retrieve a DOS text file
   3 - Lock and save current document
   4 - Unlock and retrieve a locked document

   You want to choose 1 - Save current document as a DOS text file by pressing 1. You will then see the prompt Document to be Saved: filename (the filename will probably be add-data.1, add-data.2, etc.). Press enter as you wish to save the current document as a DOS text file. This procedure takes all the special codes out of the document that are put into it by the word processing program and saves it in the standard format that may be read by many software programs.

2. After saving the file as a DOS text file you will return to the text on the screen. At this time you want to exit out of WordPerfect by pressing {F7}. You do not want to save the file. If you saved the file again, all the WordPerfect codes would be put back into the file. When prompted Save Document? (Y/N), type N. Then when asked Exit WP?, type Y. You will then return to the DOS operating system with the C> on your screen.

Adding Data to the INMAGIC Database

1. With the C> on your screen, type inmagic {Enter}. This will put you into the INMAGIC database management software system.

2. When the INMAGIC Environment Supervisor screen appears and you are asked to Enter choice:, type 1 {Enter} for the MAINTAIN Function Selection menu. You will then be asked to Enter name of data file (up to 8 characters). Type iwm-data {Enter}. You will then be asked to Enter user ID code. Type the first initial of your name and {Enter}.

3. The INMAGIC - MAINTAIN Function Selection menu will appear on your screen.

INMAGIC - MAINTAIN Function Selection

(L)OG - Specify transaction log to a file or printer
(C)REATE - Create new record
(D)ELETE - Remove a record
(I)NSPECT - Examine a record
(M)ODIFY - Change a record
(A)DD - Add records in batch mode
(R)EMOVE - Remove a field index
(B)UILD - Build a field index
(E)ND - Leave the MAINTAIN environment

At the prompt Choose function or H for HELP:, type A to add records in batch mode. You will then be asked Name of incoming file. Type a:add-data.# with the # replaced by the number of the add-data file you are adding. When asked Replace existing records if found (Y/N)?, type N. Since you are adding new records to the database, there should not be anything to replace. As the records are added you will see a message on the screen showing which record number was added. If one of the records does not get added, you will see an error message on the screen that tells which record number did not get added. You may then go back and look at the record to see what the problem is.

Making Corrections in the Data File

1. If you receive an error message in INMAGIC like Line does not begin with an acceptable character or field name or Record already exists, then you need to see what the problem is. INMAGIC requires a very specific format for data entry and, if there are any mistakes, then the record will not be entered into the database. To make the necessary corrections, exit out of INMAGIC by pressing e (for END) {Enter} two times to return to the operating system and the C>.

2. Enter WordPerfect by typing wp {Enter}. Since your file is in DOS text file format, you will need to retrieve it as a DOS text file. Press {Ctrl} {F5}. Choose 2 - Retrieve a DOS text file by pressing 2. When prompted Document to be retrieved, type the name of your file (e.g., add-data.2). The file will then come on to the screen.

3. Make any necessary corrections. Then resave the file as a DOS text file as in the section above Saving WordPerfect Files as DOS Text Files.

Reentering Data into the INMAGIC Database

1. Repeat the steps in the section Adding Data to the INMAGIC Database. Again you must choose not to replace existing records by typing N.

2. As the records are found, you will see the message Record already exists, Record added, or an error message to let you know what happened to the record.

3. When the batch process is completed, press {Enter}, and then type e {Enter} two times to exit out of INMAGIC and return to the DOS operating system.

Appendix D

ACCESSIONS LIST

To retrieve the records input during a particular month, type

* GET 008F ST 85-04 (or year and month of list to be made) AND 008B EQ M

Once the records are found you wish to write to a DOS text file sorted by call number. Use the command:

* WRITE IN A:ACCESS.APR (or any file name) USING ACCESS BY 008E

Sample Output

338
CHO
Chowdhury, Q A.
Socio-economic feasibility study of Faridpur area-1. Dhaka, University of Dhaka, 1984.
206 p.
ECONOMIC ANALYSIS / SOCIAL STRUCTURE / DRAINAGE / FLOODING / FARIDPUR

511.577
HOQ
Hoque, M. M.
Evaluation of drought condition of Bangladesh; a report. B. Sc. Ag. Engg. Mymensingh, Bangladesh Agricultural University, 1977.
DROUGHT / RAINFALL INDEX / RAINFALL DISTRIBUTION / BANGLADESH / COX'S BAZAR / RANGPUR / MAIZDI COURT / NORTH BENGAL / RANGAMATI

539.217
HOS
Hossain, M. A.
The measurement of permeability by a constant head permeameter. B.Sc. Ag. Engg. Mymensingh, Bangladesh Agricultural University, 1973.
21 p.
PERMEABILITY / MEASURING INSTRUMENTS

551.437
HAQ
Haq, L.
The socio-economic feasibility study of the SAWRA Basin project, Bogra. Dhaka, Netherlands Technical Assistance Programme; Swedish International Development Authority, 1983.
128 p.
CANALS / DRAINAGE / ECONOMIC ANALYSIS / BOGRA

ANNOTATED BIBLIOGRAPHY

Select records to be included in the bibliography and use the output format IWM-BIB to write the records to disk.

Example: WRITE IN A:ANNOTBIB.TXT USING IWM-BIB

Sample Output

Asaduzzaman, M. Barind Tract Rajshahi, groundwater exploitation: follow-up report. Rajshahi, Bangladesh Agricultural Development Corporation, 1983, 78 p.
(Call No.: 551.495 ASA)
GROUNDWATER / DEEP TUBEWELLS / SHALLOW TUBEWELLS / RAJSHAHI / BARIND TRACT / PORSHA / NAWABGANJ / NIAMATPUR

This is a follow up report and begins with several recommendations. Since the completion of the first study report an additional 36 deep tubewells have been installed and the total figure is now 168. In 1982-83, twelve deep tubewells were installed in Niamatpur, Porsha, and Nawabganj thanas where there had been no deep tubewells earlier The final report of Northwest Bangladesh Groundwater Modeling Study by Sir MacDonald and Partners preferred deep tubewell installation over shallow tubewell in the Barind tract; however, the existing number of shallow tubewells is much higher that the estimated optimum number, and, on the other hand, the existing number of deep tubewells is much smaller than the estimated optimum number.

SAMPLE CATALOGUE CARD OUTPUT

Shelflist Card

631.67
SIR

Sir M. MacDonald & Partners Limited; Hunting Technical Services Limited.
Water balance studies, Bangladesh. Final report, Annex I, Northeast data. Dhaka, Bangladesh Water Development Board; United Nations, 1983.
213 p.

1. Water balance. 2. Experimental data.

Subject Card

WATER BALANCE

631.67
SIR

Sir M. MacDonald & Partners Limited; Hunting Technical Services Limited.
Water balance studies, Bangladesh. Final report, Annex I, Northeast data. Dhaka, Bangladesh Water Development Board; United Nations, 1983.
213 p.

1. Water balance. 2. Experimental data.

Title Card

Water balance studies, Bangladesh. Final report, Annex I, Northeast data.

631.67
SIR

Sir M. MacDonald & Partners Limited; Hunting Technical Services Limited.
Water balance studies, Bangladesh. Final report, Annex I, Northeast data. Dhaka, Bangladesh Water Development Board; United Nations, 1983.
213 p.

1. Water balance. 2. Experimental data.

Appendix F

MANPOWER DATABASE

Label	Name	Explanation
NO	RECNO	Record number
FN	FNAME	First name
SN	SNAME	Surname
ADD	PERADD	Permanent address
CITY	*	Permanent city
DIST	*	Permanent district
PA	PRADD	Present address
PC	PRCITY	Present city
PD	PRDIST	Present district
OPH	*	Office phone
RPH	*	Residence phone
BD	BIRTH	Birth date
SEX	*	Sex (M-male/F-female)
MS	*	Marital status
ACAD	*	Academic degrees (Degree, Institution, Year, Subject)
SP	SPECLTY	Field of specialization
SUBSP	*	Subarea of specialization
POS	*	Current position
ORG	ORGAN	Organization
ST	STATUS	Status (P-Permanent / T-Temporary)
BGDT	BEGINDT	Beginning date
PL	PLACE	Place of posting
SAL	SALARY	Base salary
PPOS	*	Past positions (Position, Organization , Place, Dates)
PST	*	Past status (P-Permanent / T-Temporary)
PSAL	*	Past base salary
TR	TRAIN	Career training (Training Course, Institution, Location, Dates)
BK	BOOKS	Number of published books
FP	FULLPAP	Full papers
SC	SHRTCOM	Short communications

SAMPLE OUTPUT FROM MANPOWER DATA BASE

Search command: * GET SAL GT 1000

Output command: * PRINT USING MP-BRIEF

Printed Output

Name	Rec. No.
Islam, Md. Abdul S.S.O. / BRRI / Head Office / 1400/=	0001
Khan, Quzi Md. Abdur S.S.O. / BRRI / Joydebpur / 1400/=	0004
Nazir, Md. Raffique S.S.O. / BRRI / Joydebpur / 1550/=	0002

Output command: PRINT USING MP-BRIEF

Printed Output

DATA BASE FOR AGRICULTURAL SCIENTISTS OF BANGLADESH

Islam, Md. Abdul 0001

Permanent Address:
Vill 2 P.O.
Comilla

Present Address:
S.S.O., Agric. Econ. Divn.
BRRI
Joydibpur, Gazipur

Telephone: 391200 (Office)

Date of Birth: 6 Feb 1951 Sex: M Marital Status: M

Academic and Professional Degrees:
(Degree, Institution, Year, Subject)
B.Sc. Ag. (Hon), BAU, 1975, Ag. Econ.
M.Sc. Ag., BAU, 1977, Ag. Econ.

Specialization: Agricultural Economics
Subarea:

Present Appointment:
(Position, Institution, Place, Dates, Status, Base Salary)
S.S.O., BRRI, Head Office, 1983, P, 1400/=

Previous Appointments:
(Base Salary, Status, Position, Institution, Place, Dates)
750/=, P, S.O., BRRI, Joydebpur, 1977-1983

Career Training:
(Course, Organizing Institution, Location, Dates)
Irrigation Water Management, IRRI, Philippines, 17/8/79 - 29/9/79
Rice Cropping Systems, IRRI, Philippines, 30/9/79 - 20/2/80
Applied statistics, BRRI, Bangladesh, 10/84

Publications:
Full Papers: 2
Short Communications: 1

Appendix G

SAMPLE OUTPUT FOR DIRECTORY OF AGRICULTURAL SCIENTISTS

Output command: WRITE IN A:DIRECT.TXT USING MP-DIR

Output in Text File

0001 ISLAM, Md. Abdul, b. 6 Feb 1951. M. S.S.O., BRRI, Head Office. Education: B.Sc. Ag. (Hon), BAU, 1975, Ag. Econ., M.Sc. Ag., BAU, 1977, Ag. Econ. Appointments: S.O., BRRI, Joydebpur, 1977-1983. Address: S.S.O., Agric. Econ. Divn., BRRI, Joydibpur, Gazipur. Telephone: 391200 (Off).

0004 KHAN, Quzi Md. Abdur, b. 2 Feb 1953. M. S.S.O., BRRI, Joydebpur. Education: B.Sc. Ag. (Hons), BAU, 1975, Entomology; M.Sc. Ag., BAU, 1977, Entomology; M.S., UPLB, Philippines, 1984, Entomology-Agronomy. Appointments: S.O., BRRI, Joydebpur, 1977-1982; S.C.O., CSA, Dhaka, 1977-1977. Address: Entomology Division, BRRI, Joydebpur, Gazipur. Telephone: 391200 (Off).

0002 NAZIR, Md. Raffique. b. 26 May 1952. M. S.S.O., BRRI, Joydebpur. Education: B.Sc. Ag. (Hons), BAU, 1974, Soil Science; M.Sc. Ag., BAU, 1975, Soil Science; M.S., UPLB, Philippines, 1982, Agronomy. Appointments: S.O., BRRI, Joydebpur, 1977-1983. Address: Senior Scientific Officer, Agronomy Division, BRRI, Joydebpur, Gazipur. Telephone: 391200 (Off).

ADDITIONAL BARC PUBLICATIONS

ON

IRRIGATION WATER MANAGEMENT

The following publications are available upon request to the IWM Program Area IADS/BARC.

BARC. Soils-Water Management Research Inventory and Problems in Bangladesh. 1979.

Oswal, M. C. Soil and Water Management Program for Bangladesh. BARC. July 1979.

Brammer, H. Ploughpans and Tillage Problems in Bangladesh Soils. BARC. March, 1980.

Siddique, A. B. and C. Prav. Survey of Irrigated Cropping Patterns in Bangladesh and Implications for draft 5FYP. A/D/C - BARC. November 1980.

Khan, M. K. and M. A. Rahman. Water Requirement of Cotton for Optimum Yield under Different Cultural Practices. First Annual Project Report. BARC. June 1981.

BARC. Inventory on Manpower and Physical Facilities Available for Irrigation and Water Management Research in Bangladesh. Soils and Irrigation Division. November, 1981.

Karim, Z. et al. Coastal Saline Soils and their Management in Bangladesh. BARC. January, 1982.

Levine, Gil. Irrigation & Water Management. BARC/IADS Consultancy Report. February, 1982.

Loewenwarter, Max. Final Report on Consultation (Water Management). BARC/IADS Consultancy Report. March, 1982.

BARC. First Annual Report: Coordinated Irrigation and Water Management Extension Specialist at BARC. BARC/IADS Consultancy Report. October, 1982.

Blasingame, David. Proposed Activity for IADS Water Management Extension Specialist at BARC. BARC/IADS Consultancy Report. October, 1982.

Johnson, Loyd. Proposed Water Management Activities Report for BARC/IADS Agricultural Engineer. BARC/IADS Consultancy Report. November, 1982.

Karim, Z. and M. A. Hamid. Net Irrigation Requirement of Rice and Evapotranspiration of Wheat and Potato for Different Locations of Bangladesh. BARC. December, 1982.

Hanratty, Martin. Minor Irrigation Development in Bangladesh. USAID/Bangladesh. April, 1983.

Johnson, Loyd. Observations on Water Management Issues in Bangladesh. BARC/IADS Consultancy Report. May, 1983.

Ghani, A. et al. Collection of Different Types of Manually Operated Pumps Available in the Country and Evaluation of their Performances in Order to Select the Best Available Design to Carry Further Modification, if Necessary, to Improve Performance. Ag. Engineering. Research Report No. 7. July, 1983.

Levine, Gil. Water Management Workshop. BARC/IADS Consultancy Report. August, 1983.

BARC. Second Annual Report: Coordinated Irrigation and Water Management Studies (1981-82). Soils and Irrigation Division. September, 1983.

Walter, Michael & others. Review of Irrigation Water Management Program at Bangladesh Agricultural University, Mymensingh. BARC/IADS Consultancy Report. October, 1983.

Radosevich, George E. Groundwater Development and Management in Bangladesh: Institutionalizing a Strategy. BARC/IADS Consultancy Report. November, 1983.

BARC. Priorities for Research in Irrigation and Water Management. Soils and Irrigation Division. December, 1983.

Howes, Richard B. Options in Powering Irrigation Equipment for Tubewells and Low-lift Pumps in Bangladesh. BARC/IADS Consultancy Report. December, 1983.

Gill, Gerald J. The Demand for Tubewell Equipment in Relation to Groundwater Availability in Bangladesh. BARC Agricultural Economics and Rural Social Science Papers No. 13. 1983.

Weaver, Thomas et al. A Framework for Economics Research on Water Management in Bangladesh. BARC/IADS Consultancy Report. January, 1984.

Radosevich, George E. Water Law Bibliography for Bangladesh. BARC/IADS Consultancy Report. January, 1984.

Blevins, Robert L. Potential for Minimum Tillage in Bangladesh. BARC/IADS Consultancy Report. February, 1984.

Johnson III, Sam. Economics and Technical Operation of Deep Tubewells in Bangladesh. BARC/IADS Consultancy Report. March, 1984.

Chaudhuri, S. D., A. Ali, M. A. Ahmed. 1983 Internal Review of BARC's Irrigation Water Management Research Program. April, 1984.

McConnen, R. J., D. C. Slack, I. H. Khan and M. N. Haq. 1984 External Evaluation Report of Irrigation and Water Management Program July, 1984.

Emmert, J. P. Equity Issues in Irrigation in Bangladesh: A Comparative Discussion of Technologies, Organization, and Support Services. BARC/IADS Consultancy Report. August, 1984.

Chawdhuri, S. D. and David Gisselquist. Command Area Development for Minor Irrigation: Integration of Organizational, Economic, Agronomic, Engineering, and Institutional Components. December, 1984.

Carson, Bill. Debiganj Irrigation System Master Plan. BARC/IADS Consultancy Report. January, 1985.

Howes, Richard R. A Suggested Approach to Model Use and Development at the Bangladesh Agricultural Research Council. BARC/IADS Consultancy Report. March, 1985.

Johnson, III, Sam. Economic and Technical Criteria for Location of Deep and Shallow Tubewells. BARC/IADS Consultancy Report. April, 1985.

Johnson, Jane S. Data Base Management at BARC: Applications for Documentation and Administration. BARC/IADS Consultancy Report. April, 1985.

Dalsted, Kevin. Use of Remote Sensing for Agricultural Research in Bangladesh. BARC/IADS Consultancy Report. April, 1985.

Hargreaves, George. Irrigation Water Production Functions: Report on a Training Course. BARC/IADS Consultancy Report. April, 1985.

Clyde, Calvin G. Groundwater Investigations: Report on a Training Course. BARC/IADS Consultancy Report. April, 1985.

Sardhar, Ghulam Rasool. Assessment of Saline Soils Research. BARC/IADS Consultancy Report. April, 1985.

Ali, Arshad S. M. 1985 Internal Evaluation Report: Water Management Program Area of BARC II. BARC/IADS Consultancy Report. April, 1985.

IRRIGATION WATER MANAGEMENT [illegible] AREA
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26. Md. Shafiqul Islam
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BARI, Joydebpur

27. Md. Mainur Rahman
PSO (In charge)
Soil Physics Section
BARI, Joydebpur

28. Mr. B.C. Basak
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Mymensingh

29. Library
Institute of Flood Control &
Drainage Research
BUET, Dhaka

30. Dr. A. Nishat
Director, IFCDR,
BUET, Dhaka

31. Mr. Walter Koch
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Dhanmondi, Dhaka

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BAU, Mymensingh

38. Head, Engineering Division
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39. Dr. A. Karim, PSO
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BARI, Joydebpur

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