

Training Needs Assessment
in Malaysia

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**Training Needs Assessment
in Malaysia**

**Exercise held
at Kuala Lumpur and Kota Bharu
from 13th October to 11th November- 1989**

**[International Irrigation Management Institute'
and
(The Department of Irrigation and Drainage7**

H7341

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CONTENTS

List of Annexures Part I	vii
List of Annexures Part II	viii
PREFACE	ix
EXECUTIVE SUMMARY	xi
1. INTRODUCTION	1
1.1 Background	1
1.1.1 Department of Irrigation and Drainage (DID)	1
1.1.2 Training Needs Assessment (TNA)	2
1.2 TNA Objectives	3
1.3 TNA Framework and Content	3
2. TNA METHODOLOGY AND ORGANIZATION	7
2.1 Methodology	7
2.2. TNA Organization	9
2.2.1 Number of Sessions and Samples	9
2.2.2 Exercise and Session Schedules	11
2.2.3 Team Composition	11
2.2.4 Language	11
2.2.5 Anticipated Outcomes	12
3. TNA FINDINGS	13
3.1 Concepts of Irrigation Management, Standards of Performance and Tasks Structure	13
3.1.1 Audience and Treatment of the subject	13
3.1.2 Discussion Following the presentation	13
3.1.3 Identifying current and future performance and competence	14
3.1.4 Conduct of the job and task analysis	14
3.1.5 Review of job descriptions	18
3.2 Identification of Management Knowledge, Attitudes and Skills	19
3.2.1 Brainstorming Session	20
3.3 Existing Gaps	25
3.3.1 Identification of existing gaps in Managerial Knowledge, Attitudes and Skills	25

3.3.2	Priorities in Managerial Knowledge and Attitudes	31
3.3.2.1	Compilation of Priorities in Managerial Knowledge and Attitudes - Engineers	32
3.3.2.2	Compilation of Priorities in Managerial Knowledge and Attitudes - Technical Assistants	36
3.3.2.3	Compilation of Priorities in Managerial Knowledge and Attitudes - Technicians	43
3.3.2.4	Compilation of Priorities in Managerial Knowledge and Attitudes - Irrigation Inspectors.	48
3.3.2.5	Compilation of Priorities in Managerial Knowledge and Attitudes - Irrigation Overseers	53
3.3.2.6	Compilation of Priorities in Managerial Knowledge and Attitudes - Researchers and Trainers	63
3.3.3	Organizational Constraints	68
3.3.4	Participants' Personal View on Training	69
4.	DISCUSSIONS ON FINDINGS	77
4.1.	Discussion on Concepts of Irrigation Management, Standards of Performance, and Tasks	77
4.1.1	Concepts of Irrigation Management	77
4.1.2	Identifying Current and Future Standards of Performance and Competence	77
4.1.3	Conduct Job and Tasks Analysis	78
4.1.4	Review of DID Job Descriptions	80
4.1.5	Accomplishment of this Session's Objectives	80
4.2	Identification of Management Knowledge, Attitudes and Skills - Brainstorming	82
4.2.1	Identification of Existing Gaps (Nominal Group Technique) and Priorities	83
5.	CONCLUSIONS AND RECOMMENDATIONS	87
A.	Conclusions	87
A.A	Other Conclusions	90
B.	Recommendations	91
	TNA Evaluation Results	93

LIST OF ANNEXURES

PART ■

		PAGE
ANNEX A	- Results of Job Analysis Study	95
ANNEX B	- Compilation of Responses to the questionnaire	103
ANNEX C	- Suggestions for Improvement of Job Description	119
ANNEX D	- Topics from Brainstorming Technique <u>Top Management</u> Group. Managerial Knowledge and Attitudes	123
ANNEX E	- Topics from Brainstorming Technique <u>Researchers</u> Group. Managerial Knowledge and Attitudes	129
ANNEX F	- Topics from Brainstorming Technique <u>Trainers</u> Group. Managerial Knowledge and Attitudes	135
ANNEX G	- Topics from Brainstorming Technique <u>Engineers</u> (1 group).	141
ANNEX H	- Gaps in Managerial Knowledge and Attitudes of <u>Engineers</u>	145
ANNEX ■	- Gaps in Managerial Knowledge and Attitudes of <u>Technical Assistants</u>	153
ANNEX J	- Gaps in Managerial Knowledge and Attitudes of <u>Technicians</u>	161
ANNEX K	- Gaps in Managerial Knowledge and Attitudes of <u>Irrigation Insoectors</u>	169
ANNEX L	- Gaps in Managerial Knowledge and Attitudes of <u>Irrigation Overseers</u>	177
ANNEX M	- Organizational Constraints	
	Engineers	187
	Technical Assistants	201
	Technicians	211
	Irrigation Inspectors	221
	Irrigation Overseers	230
	Trainers	235

LIST OF ANNEXURES

PART II

INSTRUMENTS USED DURING THE TNA EXERCISE

		PAGE
ANNEX 1	- List of Population Figures of the DID	241
ANNEX 2	- Getting to know Each Other Exercise	243
ANNEX 3	- Job Analysis	245
ANNEX 4	- Format for Self-Analysis of Irrigation Management Jobs	241
ANNEX 5	- Functions and Job Descriptions of Irrigation Managers	249
ANNEX 6	- Nominal Group Technique – 1st Phase Form	251
ANNEX 1	- Nominal Group Technique – 4th Phase Form	253
ANNEX 8	- Organizational Constraints	255
ANNEX 9	- Personal View on Training Programs Form	257
ANNEX 10	- Evaluation Form	261
ANNEX 11	- Sample Population	263
ANNEX 12	- TNA Schedule	265
ANNEX 13	- Sessions Schedule	267
ANNEX 14	- Descriptive Evaluation	271

PREFACE

This report presents the results of the first Training Needs Assessment (TNA) Exercise developed by the International Irrigation Management Institute (IIMI) in collaboration with the Department of Irrigation and Drainage (DID) in Malaysia, during the period October 1989 to February 1990.

The report describes a methodology to assess training needs and organizational constraints: an interactive exercise encourages full participation and open interchange of ideas and information among peers about their job responsibilities and organizational setting. Participants identify the shortcomings which are affecting their job performance, and propose ways of overcoming them. The application of this Methodology to the DID represents the first exercise of its kind in irrigation management.

This report has five chapters. The introductory chapter briefly describes the background of the DID and TNA, pointing out the objectives of the exercise and describing the framework used. The second chapter presents the methodology and the TNA organization, involving definition of samples, schedules, team composition, language and anticipated outcomes. The third, fourth and fifth chapters present the TNA findings, a discussion of the findings, the conclusions, recommendations and the TNA evaluation results, respectively. Participants' responses during the exercise are presented in a series of annexes.

This training activity in Malaysia was made possible by the close co-operation of the Department of Irrigation and Drainage and especially the firm support of its Director-General, Dato Ir. Haji Shahrizaila bin Abdullah. Financial support was given by the Asia and Near East Division of USAID, under grant no. ANE-0289-G-SS-7033-00 administered by Dr N Stanley Peabody. In addition to the DID, several other Malaysian organizations participated in the exercise, including the Muda and Kemubu Agricultural Development Authorities. The authors are grateful to all of these for their contributions.

The IIMI/DID team responsible for this study was composed of :

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This team is thankful to IIMI and DID staff members who helped in this exercise either in the logistical support, or in preparing tables and drawing graphics. We thank Nimal Fernando and Kingsley Kurukulasuriya, for the careful editing work in this report.

Special thanks are due to Charles Nijman and Professor Andre Kampfraath for the analytical framework for irrigation management which played a key role in the study.

Special thanks are also due to Mr D Welch, Mr Ooi Choon Ann, Mr Rahmat b Hj. Mohd. Shariff, Mr Cheong Keng Ying and Mr Teh Siew Keat for the contribution during the planning phase of this exercise and for hosting us at the Training Centers in Kota Bharu and Ampang.

We are very grateful to Ms Muriet Stanislaus, IIMI Training Unit's Secretary, for neatly typing and printing this report.

Finally, we want to thank Charles Abernethy, Director, IIMI Programs Division, for his constant support and presence during all phases of this exercise.

The involvement of all these people doubtless contributed to what IIMI feels was a highly successful first testing of a new approach of management training. The effectiveness of the Methodology may be judged by the frankness and spontaneity of the participants remarks shown in the annexes to this report.

EXECUTIVE SUMMARY

With the improvement and expansion of irrigation in the country, the Department of Irrigation and Drainage (DID) in Malaysia realized the need for appropriate adjustments in the irrigation sector including the development of management capacity through training programs.

The DID invited the International Irrigation Management Institute (IIMI) to join its efforts to review the existing training programs in order to improve the irrigation management component. The Training Needs Assessment (TNA) was proposed as the first step to identify the knowledge, attitudes, and skills necessary to improve the managerial performance of DID staff working in the irrigation sector.

The main objective was to identify factors which were affecting individual performance in irrigation management at DID and indicate the nature of the solution (training or non-training). In order to achieve this objective, the TNA identified the following secondary objectives:

- a) review the concept of irrigation management and the distinction between management and technical activities;
- b) identify current and future performance and competence standards;
- c) conduct a job and task analysis;
- d) identify managerial knowledge, attitudes and skills required to perform tasks;
- e) identify existing gaps in managerial knowledge, attitudes and skills;
- f) identify organizational constraints;
- g) establish priorities in training needs.

The TNA exercise was conducted during the period 13 October to 11 November, 1989 in Kuala Lumpur and Kota Bharu. It was attended by 321 DID staff, including top managers, engineers, technical assistants, technicians, irrigation inspectors, irrigation overseers, researchers, and trainers. This sample represented 28.6 percent of all DID personnel directly involved in irrigation work. It also included researchers from the Malaysian Agricultural Research and Development Institute (MARDI) and trainers from Muda Agricultural Development Authority (MADA), Kemubu Agricultural Development Authority (KADA), University Pertanian Malaysia (UPM), Department of Agriculture (DOA) and National Institute for Public Administration (INTAN).

The TNA was conducted through group techniques to facilitate interaction and members' participation. The 321 participants were divided for this purpose into one group of top managers, three groups of engineers, two groups each of technical assistants, technicians, irrigation inspectors, four groups of irrigation overseers, and one group each of researchers and trainers. A senior irrigation management specialist presented the analytical framework for irrigation management and discussed with the participants the distinction between managerial and technical activities.

At the end of this presentation, participants were invited to describe their duties and tasks as irrigation managers, researchers or trainers. The facilitator helped them to analyze their work and distinguish the managerial and technical tasks performed by them. Two instruments (a form and a questionnaire) were used to record the results of job analysis which was held in small groups. Two or three participants were invited to present and discuss these results with a large group.

After the job analysis exercise, the existing DID job description sheet was distributed among the participants to give them the opportunity of improving it.

The concepts of knowledge, attitudes and skills were introduced by the Training Specialist and discussed by the participants. The concepts used for this study were as follows:

Knowledge is retained information concerning facts, concepts and relationships. For example, information process; communication systems, etc.; feedback (concept, how to give and receive); decision-making processes: etc.

Attitudes consist of feelings or statements for or against certain issues; individuals are predisposed to view their jobs, other people, and the work in a certain way. Attitudes are reflected in people's behavior. For example, responsiveness; flexibility; self-confidence; adaptability; tact, etc.

Skills are the abilities to do things effectively; apply knowledge and personal aptitudes and attitudes in work situations. For example, conducting meetings; giving and receiving feedback; listening skills, etc. Skills then can be developed during the training programs and improved little by little as the participants apply a new behavior repeated in life.

The short presentation on the concepts of knowledge, attitudes and skills was followed by a brainstorming session in which participants identified the knowledge and attitudes they needed to perform their jobs.

Participants were then invited to list, discuss, and prioritize the gaps in their knowledge and attitudes. This was accomplished in three phases, using the Nominal Group Technique.

A weighing system was used to identify the ten highest priorities for each group and these priorities will be used for designing the first training

program. The gaps in knowledge and attitudes which were given lower priority will be used in designing a long-term training program.

Organizational constraints were listed and discussed in the final phase of the exercise. This information, along with the participants' suggestions on overcoming the constraints, were passed on to the management of DID.

At the end of each session, a "Personal Experience and View on Training" form was used to assess the participants' previous experience in irrigation-management training and the types of training expected, as well as the participants' feelings about training activities.

The participants evaluated the TNA sessions in terms of the achievement of objectives, orientation, group atmosphere, interest and motivation, etc. and commented on the strong and weak points along with suggestions for improvement.

The results of the TNA were satisfactory and the objectives were achieved. The conclusions and recommendations, in brief, are:

- * the main factors affecting the performance of individuals at DID were related either to training or to organizational constraints.
- * The concept of irrigation management and the distinction between the technical and managerial aspects of irrigation activities were not clearly understood by the participants before the TNA exercise was held.
- * Performance standards and associated competence levels of the job positions were not clearly defined.
- * Gaps in managerial knowledge and attitudes and the respective priorities were identified. Leadership, technical knowledge, decision-making ability, motivation, self-confidence and a responsible attitude were given high priorities by the participants.
- * Organizational constraints were also identified. Among them were political interference, limited budget allocations and farmers' inability to follow schedules.

Some of the recommendations were related to :

- * Improvement of job descriptions and personnel evaluation.
- * Provision of training based on the identified gaps in the short-term and long-term.
- * Designing of a human resources development plan for the DID.
- * Assessing training needs for technicians, irrigation inspectors, irrigation overseers, etc.

1. INTRODUCTION

The Training Needs Assessment (TNA) was carried out as a joint effort of the International Irrigation Management Institute (IIMI) and the Department of Irrigation and Drainage (DID), in Malaysia.

1.1 BACKGROUND

1.1.1 Department of Irrigation and Drainage (DID)

The Department of Irrigation and Drainage (DID), a specialized Malaysian government agency under the Ministry of Agriculture, was set up in 1932 to deal with problems of land and water development with particular reference to the utilization of these natural resources for increasing rice production. Since then, DID has been the agency generally responsible for the planning/design, construction, rehabilitation and operation and maintenance of all civil engineering infrastructures for irrigated rice schemes in the country in addition to its other functions in the field of land and urban drainage, flood mitigation, river conservancy, hydrology, and coastal erosion.

In Malaysia, the extent of irrigated lands under rice is classified into granary and non-granary areas. There are 8 granary areas (including the Huda Agricultural Development Authority (MADA) and the Kemubu Agricultural Development Authority (KADA) totalling 212,235 hectares (ha) while the non-granary areas make up a total of 131,743 ha. Management of these irrigated areas is carried out by the DID at district level, under a District Engineer who is assisted by technical staff including engineers, technical assistants, technicians, irrigation inspectors and irrigation overseers with the latter covering the smallest irrigation units. As distinct from irrigation inspectors and irrigation overseers who are involved in full-time irrigation management, the others are transferable between irrigation management and other departmental duties.

The population figures shown in annex ■ (page 236) include these engineers, technical assistants, and technicians who are not within the district or who are currently not performing duties in Irrigation management.

Development within the irrigation schemes undoubtedly increases the densities of canals, drains, farm roads and structures (from relatively low values to 30m/ha and more). Inevitably, the responsibilities and skills required for operation and maintenance of personnel engaged in irrigation have been significantly increased. Also, farmers are given more attention and are motivated to cope with the requirements of modern rice farming and proper water-management practices.

In recent years, the DID felt that there is a need to review the approach to irrigation management. It was felt that the focus should be on managerial and client-oriented aspects and on output and performance. Training and human-resources development are essential elements in this strategic planning process. Subjects of this nature were discussed and

deliberated in workshops and conferences by the DID. Nationally, a critical review of the operation and maintenance aspects of irrigation systems has been made in a paper by Dato Shahrizaila Bin Abdullah, the Director General, presented at the DID Senior Engineers' Conference held in 1986. Internationally, the Director General presented a paper on "Training for Irrigation Agriculture in Malaysia" at the USAID/World Bank joint workshop on "Training Needs and Strategies for Irrigated Agriculture" held in Washington, in 1988. In 1989, the DID Senior Engineers' Conference deliberated a paper on the "Training in Irrigation System-Strategy" for the Future, presented by Ir. Rahmat b Hj. Mohd Sharif.

There was considerable concern expressed among DID personnel over the issues of irrigation-system management, in general, and human resources development, in particular. An essential element in these processes is the improvement of training programs.

1.1.2 Training Needs Assessment (TNA)

The International Irrigation Management Institute (IIMI) was invited to join the DID in the process of reviewing the existing training programs in order to improve the irrigation-management component.

In February 1989, an IIMI training specialist visited the DID Training Centres in Kuala Lumpur and Kota Bharu and five other Training Agencies to get acquainted with the Malaysian training capabilities for developing irrigation-management training.

Two important points were observed during this visit : first, the management aspects of irrigation had never been included in the curricula of the training agencies; and second, there was lack of clear understanding about the concept of irrigation management among irrigation and training professionals.

This preliminary evaluation along with comments on managerial knowledge, attitudes and skills was presented to and discussed with the DID managers at the DID headquarters during a two-hour meeting.

As a result of this visit, the DID and IIMI agreed to conduct a Training Needs Assessment involving irrigation managers, researchers and trainers in order to find out what kind of knowledge, attitudes and skills would be necessary for improving performance through the development of an effective training program, and to find out what kind of constraints should be overcome to improve the organizational performance.

In September 1989, a provisional workplan was developed, and presented to the DID managers and training staff. The Training Needs Assessment exercise was designed to provide the participants with the opportunity of: 1) being aware of the irrigation-management concept; 2) analyzing their jobs (duties and tasks); 3) translating tasks into technical and managerial activities; 4) discussing and giving reliable information (in terms of gaps in performance) to design a training program to achieve performance objectives related to the irrigation systems and irrigation organization itself; 5) discussing and describing organizational constraints related to factors like

human, financial and material resources, information/communication, knowledge/skills and managerial processes, interference by politicians; and interaction with farmers. The concept of irrigation management, which was considered the basic element for the effectiveness of this exercise, was introduced by a senior irrigation management specialist during a **pre-orientation** session.

During the period, 13 October to 11 November 1989, a team composed of DID and IIMI professionals conducted the exercise in sixteen sessions of **one-and-half-day** duration. **It** was attended by 321 irrigation professionals.

1.2 TNA OBJECTIVES

The main objective of the Training Needs Assessment in Malaysia was to identify factors affecting individual performance in irrigation management at the DID and to indicate the nature of the solution (training or **non-training**).

In order to achieve this objective, the TNA exercise was designed to :

- a) review the concept of irrigation management and the distinction between managerial and technical activities;
- b) identify current and future performance and competence standards;
- c) conduct a job and task analysis;
- d) identify managerial knowledge, attitudes and skills required to perform tasks;
- e) identify existing gaps in managerial knowledge, attitudes and **skills**;
- f) identify organizational constraints; and
- g) establish priorities of the assessed training needs.

1.3 TNA FRAMEWORK AND CONTENT

The basic framework for assessing training needs at the DID involved five steps as summarized below:

1. Presentation and discussion on the Analytical Framework for Irrigation Management.
2. Job analysis.
3. Review of job descriptions.

- 4, a) Identification of requirements (knowledge, attitudes and skills) and gaps in the performance of managerial activities in irrigation systems.
- b) Identification of constraints within the organization.
5. Development of a workshop to be conducted in February, 1990.

The following paragraphs present the basic content of the **TNA** framework.

Step 1: Analytical Framework for Irrigation Management

1) Irrigation Management

Importance of irrigation for increasing and sustaining agricultural productivity and production in developing countries. Role of irrigated agriculture as the prime mover of socio-economic development, employment generation, and poverty alleviation.

Performance of irrigation systems below their potential in terms of yields and efficiency of water use. Inequitable water distribution and adverse consequences of irrigation like water-logging and salinity. Search for causes of underperformance and opportunities for improving performance. Irrigation management identified as a key area for research development and training.

Irrigation management - Definition and elaboration. Key words: system, process, institutions, objectives, conditions, resources, effects, performance.

Major sectors in irrigation management - Objectives, conditions, context, processes, renewal (**IIMI** strategy document).

2) Physical and Management Dimensions

Process : Physical process (water flow, **etc.**) and decision making regarding that process.

Physical conditions, physical activities, and physical results.

Management conditions, management activities, and management results.

Interrelationship of physical and management processes and the importance of feedback.

3) Management Concerns

In an organization decisions are made at all levels and key decisions have both technical and **managerial** aspects.

- DEVELOPMENT AND MAINTENANCE OF CAPACITIES : PLANNING, DESIGN, CONSTRUCTION, ETC.
 - * Strategic concerns : what to provide in view of future requirements and available resources (construction, maintenance and **rehabilitation**)
 - desired system objectives
 - feasible system objectives
 - functional system requirements (design **concepts**)
 - * Condition concerns : what should the construction be, what manpower is necessary, what type of maintenance program and professional development program are necessary?
- UTILIZATION OF THE CAPACITY : OPERATION
 - * Allocation concerns: seasonal and in-seasonal allocation **i.e.** decision making about water to different sub-systems, cropping pattern and cropping calendar, areas to **be** commanded, monitoring and adjustments.
 - * Water-flow-regulation concerns: effectuating the water flows in line with the allocations, **i.e.**, operational methods and plans; predictability of events influencing stability of flow.

4) Management of Organization

Organization and people; **administrative** structures and conditions. Decision-making processes in the organization, **information** flows and control processes; management of interfaces (coordination). Managing people and training for better performance; **training** and professional development in terms of knowledge, attitudes and skills.

Limitation of **training**: necessary but not sufficient. Relative place with respect to other conditions and constraints.

Note : This outline and illustrations were suitably adapted to the audience.

Step 2: Job Analysis

The job analysis aimed to review the duties and tasks performed, the working conditions, responsibilities and skills required. This session was conducted in individual and small-group exercises. Two instruments were designed to record the participants' information.

Step 3: Review of Job Descriptions

The review of the DID job description chart aimed to give the participants the opportunity of improving it. This was an individual exercise.

Step 4: **Identification** of Requirements and Constraints

- a) Analysis of the participants' managerial activities, identifying the knowledge, attitudes and skills needed to perform their tasks. The brainstorming technique was used to facilitate this exercise. Lists of areas of knowledge and suitable attitudes were the output of this phase.
- b) Listing existing gaps in skills and proficiencies necessary of achieve specified performance standards. This step was developed through the Nominal Group Technique to facilitate participation, discussion and maximum input from the group members.
- c) Analysis and listing organizational constraints in order to facilitate the top management decision making on the review of policies, procedures, etc.

Step 5: A Workshop

Holding of a workshop to introduce to the top-management officials the results of the training needs assessment and discuss the design of a long-term training program (setting priorities) and the possible policy implications of these results.

2. TNA METHODOLOGY AND ORGANIZATION

2.1 METHODOLOGY

The TNA at the DID was conducted through group techniques to facilitate interaction and member participation.

On the first day, meetings began with a "Getting To Know Each Other" exercise (see annex 2), which provided an opportunity for the participants to get acquainted with one another and facilitate friendship. They were invited to pair off with someone whom they wanted to know better and share professional and personal experiences with (suggestions were provided to facilitate this first approach). After 15 minutes, the Participants were invited to introduce the partner to the large group.

After the interactive exercise, the senior irrigation-management specialist presented the Analytical Framework for Irrigation Management and discussed with the participants the distinction between managerial and technical activities.

At the end of this presentation, participants were invited (as volunteers) to describe their duties and tasks as irrigation managers or researchers or trainers. The facilitator helped them to analyze their own jobs and distinguish the managerial and technical tasks performed by them. Two instruments were designed to record this job-analysis exercise.

The first instrument used a "Job Analysis" form aimed to facilitate awareness of the concepts of job, duty, task and analyze their work in these respects. This instrument (Annex 3) has two columns, one for major duties and the other for tasks. The concepts of duty and task were explained at the bottom of the page to facilitate the participants' analysis, discussion and description. The participants were requested to cite two major duties along with the respective tasks. This exercise was done in small groups or individually, depending upon the existing similarities among the participants' jobs.

The second instrument entitled "Format for Self-Analysis of Irrigation-Management Jobs" (annex 4), developed by Charles Nijman, aimed to facilitate awareness of the technical and managerial aspects in the 13 areas of concern for irrigation management in developing and using irrigation capacities. The participants were invited to choose one area from the 13 presented, which should be analyzed, discussed and described in relation to a) their involvement in the job, b) technical and managerial aspects of the job, c) how their technical and managerial performance are assessed by their supervisors, d) opportunities for improvement of both technical and managerial performance and e) the existing constraints.

At the end of this exercise, the results were reported by two or three volunteer participants and discussed in the plenary session.

The DID job description sheet (annex 5) was distributed among the participants along with a form to be returned on the following day with suggestions for improvement of the descriptions related to their categories.

Assuming that the participants were aware of their jobs, duties and tasks, and could distinguish their managerial and technical aspects, the next phase was to invite them to focus on the managerial tasks and identify the knowledge, attitudes and skills needed to perform management activities.

This phase began with a quick presentation on the concepts of knowledge, attitudes and skills by the training specialist. At the end, a brainstorming technique was used to list areas of knowledge and attitudes on the display charts.

After this brainstorming technique, the participants were invited to list, discuss, and prioritize gaps in knowledge and attitudes. The Nominal Group Technique was used to accomplish this part of the TNA exercise in the following steps:

1. Each participant was invited to list the gaps that he/she considered to be his/her knowledge, and attitudes. This list was written individually, in a specific form (annex 6).
2. Each participant was invited to list the gaps from his/her own list, one by one, until all the individual lists were recorded on the flip chart.
3. Each item of the new list was presented by the "author" and it was analyzed and discussed by the group. Detailed explanation allowed additions to improvement of this list.
4. Priorities were established by ranking the 10 most important items. Each participant, individually, chose and ranked 10 items which he/she considered to be the most immediate needs for his/her job improvement. Two ranking sheets were provided for this phase (annex 7).

To compile the individual priorities, the facilitators weighed each priority on a system where the first priority gets 10 points -- each succeeding one point less in order -- and the tenth priority gets 1 point. The priorities with the ten highest scores were considered group priorities and would be used for designing the first training program. The rest of the identified gaps can be used for designing a long-term training program. A score sheet was designed to facilitate the weighing of priorities.

In the final phase of this exercise the participants listed organizational constraints on a designed form (annex 8) provided to them. This session was improved from the 7th group meeting onward, when it was observed that suggestions discussed by the groups to overcome these constraints, should be recorded as well and presented to the top management of the DID as a contribution from the TNA participants.

At the end of each session, the "Personal Experience and View on Training" form (annex 9) which was in two parts, used to assess: 1) the level, background and previous experience in irrigation-management training of the participants and type of training expected; 2) the perceptions and feelings related to training activities.

The second part of this instrument had 24 questions to be answered within a scale from one to five to indicate :

1. strongly disagree
2. disagree
3. undecided
4. agree
5. strongly agree

Some of these questions were grouped to facilitate analysis. The participants also evaluated the TNA sessions in terms of objectives achievement, orientation, group atmosphere, interest and motivation, etc. and pointed out strong and weak points along with suggestions for improvement. The "TNA Evaluation" form was used for this assessment (annex 10).

The above methodology was used for the groups composed of engineers, technical assistants, technicians, irrigation inspectors and irrigation overseers.

However, the methodology was slightly modified for the groups composed of the top managers, researchers and trainers as these three groups were considered resource groups. For example, after the brainstorming session which generated lists of knowledge areas and skills, the Nominal Group Technique for assessing gaps was not applied during their sessions. The researchers and trainers however, were asked to give their priorities on the original list resulting from the brainstorming technique. Their priorities are presented in Chapter 3. A few other modifications were implemented for these three groups and they will be discussed in Chapter 3.

2.2 TNA ORGANIZATION

2.2.1 Number of Sessions and Samples

The program was conducted in one-and-a-half-day meetings for 16 groups comprising the top management of the DID, engineers, technical assistants, technicians, irrigation inspectors, irrigation overseers, researchers and trainers. The number of sessions per category is shown in Table 1. In addition to the DID personnel, the TNA participants included staff from other government institutions such as Muda Agricultural Development Authority (MADA) and Malaysian Agricultural Research and Development Institute (MARDI). At present they work in irrigation systems, performing management and/or research and/or training activities.

Table 1 also gives the number of TNA participants of each category as well as its percentage of the total involved in management.

TNA PARTICIPANTS

Table 1:

Category	No. of Sessions	Total No. involved in management	No. of TNA participants	Percentage
Top managers	1	25	19	76
Engineers	3	80	65	81
Technical assistants	2	70	36	51
Technicians	2	240	45	19
Irrigation inspectors	2	161	42	26
Irrigation overseers	4	529	78	15
Researchers *1	1	-	16	-
Trainers *2	1	16	20	-
<hr/>				
T o t a l	16	1,121	321	28.6

*1

Regarding the research activities, the DID does not have an established program in irrigation management. Instead MARDI develops agricultural research which includes irrigation management. For the TNA purpose, a sample of researchers was composed of MARDI professionals and prospective researchers of the DID.

*2

With regard to the trainers, a sample was drawn from the DID and from MADA, KADA, UPM, MARDI, DOA, and INTAN. These institutions probably will be involved with the DID in future training programs.

The sample was drawn from a total population of 1,121 professionals who are directly involved in the management of irrigation systems in the following areas: granary, mixture (drainage & irrigation), non-granary and a few designers, planners, construction workers, etc. Annex 11 shows the population sample along with their respective states and areas of work.

It was observed that about 70 percent of the participants, including engineers, technical assistants, technicians, irrigation inspectors and irrigation overseers have over 5 years of work experience.

A great number of them have attended courses, mainly technical courses at the DID Training Centres and others, like INTAN.

2.2.2 Exercise and Session Schedule

The TNA exercise was conducted from 13 October to 11 November at the DID Training Centres, in Kuala Lumpur and Kota Bharu.

The TNA team shuttled between Kuala Lumpur and Kota Bharu to accomplish the TNA objectives within the given time frame while respecting the different holidays in both cities. The TNA schedule is given in annex 12.

The TNA commenced with a special meeting for the top management group, who had an experimental learning session of the TNA exercise. The tentative schedules are shown in annex 13.

The above tentative schedule was re-assigned in five different ways in order to meet the needs of the participants (prayer time) and the religious holidays in Malaysia.

2.2.3 Team Composition

The TNA in Malaysia was carried out by a five-member team composed of:

1. A Civil Engineer from the DID office in Kota Bharu
2. An **Agronomist/Trainer** from the National Water Management Training Center (NWMTTC) in Kota Bharu
3. A Training Assistant (logistical support) from the Training Division, DID Headquarters, Kuala Lumpur
4. A Senior Irrigation-Management Specialist, former IIMI Researcher and Professor of Anna University in Madras, India
5. A Training Specialist from IIMI Headquarters, Colombo, Sri Lanka (Team Leader)

At the DID Headquarters, the Director of Training was assigned to coordinate the TNA program. He attended to all the needs that the TNA exercise team **required**.

2.2.4 Language

The eight sessions for the top management, engineers, researchers (trainers), and technical assistants were conducted in the English language. However, translations in Bahasa were provided by two Malaysian trainers for the technicians, irrigation inspectors and irrigation overseers during the other 8 sessions.

The written material (texts and forms) was provided in both languages.

2.2.5 Anticipated Outcomes

By the end of this TNA exercise, a number of objectives were achieved. The following "outcomes" were expected because they represented the main aims of this exercise:

1. Identification of current and expected future job-performance requirements and related competencies.
2. Improved understanding of managerial aspects of irrigation
3. Awareness of organizational constraints
4. Improved understanding of duties and tasks performed in irrigation management in terms of the required knowledge, attitudes and skills and the identification of gaps in these areas.

There were other "outcomes" expected of the TNA process. Many of them were results of the questionnaires and others were intangible outcomes such as understanding of new concepts, awareness which facilitates behavioral changes (new attitudes and skills), and relationship-building which were observed and perceived rather than documented. These "outcomes" included: awareness of performance assessment and improvement; increased interest in knowing more about people they work with; improved relationships and understandings for working together; better understanding of irrigation-management issues; and interest in improving the TNA exercise.

3. TNA FINDINGS

3.1 CONCEPTS OF IRRIGATION MANAGEMENT PERFORMANCE STANDARDS AND TASKS STRUCTURE

The main objective of this pre-orientation session was to create awareness of the concept of irrigation management and the distinction between technical and managerial aspects of irrigation activities.

3.1.1 Audience and Treatment of the Subject

The concept of irrigation management and the analytical framework of irrigation management were presented and discussed. The degree of elaboration and depth of treatment depended on the nature of the jobs, functions and experiences of the participants in a group. The subject was treated more extensively for the groups consisting of top management, engineers, researchers and trainers. It was less elaborate for technical assistants, technicians and irrigation inspectors. It was explained in an even more simple manner for irrigation overseers. In the case of each group, an attempt was made to illustrate the concepts with examples related to the duties and functions relevant to each particular group. There were translation into Bahasa Malaysia for the groups of irrigation inspectors, technicians and irrigation overseers.

3.1.2 Discussion Following the Presentation

The discussion was generally in two parts : first, there were questions of a general nature on irrigation-management concepts; second, some of the participants were requested to volunteer and describe their jobs, functions, and duties and identify the technical content and the management dimensions of their jobs. The level and content of the questions raised and the discussion that followed varied somewhat depending on the nature of the group. Some issues raised were of a very substantive nature and were clearly based on the experience of the persons concerned. There was quite often an interest expressed in knowing if the irrigation management concept and the analytical framework were applied elsewhere and if some case histories existed. There were some who had management education (either formal MBA education or self-study of management) or management experience and they were more appreciative of the management concepts and their relevance. Irrigation inspectors and irrigation overseers whose duties and functions brought them into closer contact with farmers and other people seemed to display greater awareness of the management dimensions of irrigation, especially, the human relations and resolution of conflicts. There were some, though a small number, who were frankly cynical and questioned if management concepts and principles had any relevance to irrigation because of the political interference and the consequent difficulties in performing their duties fairly. The awareness of the technical content and the management aspects of the jobs varied widely. Some participants changed their opinions after the discussion and thought that the management content of their jobs were much more than they had initially thought of.

3.1.3 Identifying Current and Future Performance and Competence

In the first session with the top management, the participants were divided into seven groups and they were asked to identify the performance requirements and the related competencies of the DID personnel working with them. There were considerable differences in the outcomes. While one group did indicate performance requirements in terms of managerial activities and the related competencies, others described them in more narrow terms. Performance concepts and performance issues did not seem to draw the required attention though it is generally accepted that it is important for managers and staff of irrigation departments to have performance targets to guide them. These targets should be as specific as possible and should include only factors over which they have some control.

3.1.4 Conduct of the Job and Task Analysis

The job and task analysis was done by the participants using two instruments designed for this study.

The first instrument entitled "Job Analysis" aimed to review the duties and tasks performed and discuss the work conditions, responsibilities and skills required. It was completed by the participants in small groups or individually, depending upon the similarities among the participants' jobs.

The facilitators explained the meanings of job, duties and tasks and presented examples for discussion among the participants. Two main duties along with the respective tasks discussed were recorded and returned to the facilitators.

At the end of this session, volunteers reported on the group or individual contribution, analyzed the duties and tasks with the assistance of the senior irrigation management specialist, who helped them to distinguish managerial from technical tasks and assess the amount of time spent for each task. In general the participants reported that most of their work-time, 60 percent to 80 percent, was spent in dealing with managerial activities.

To illustrate the results of this session, three samples of each category are presented in Annex A.

The second instrument, "Format for Self-Analysis of Irrigation Management Jobs," developed by Charles Nijman, was designed to facilitate awareness of technical and managerial aspects of irrigation work. It was introduced to the participants through a list of 13 areas of concern related to the use and development of irrigation capacities.

AREAS OF CONCERN¹

A. USE OF IRRIGATION CAPACITIES

- | | |
|---|---|
| 1. Seasonal water-management planning | 7. Determination of requirements regarding system's functions |
| 2. In-seasonal water management : matching of supply and demand | 8. Determination of technical requirements of storage canals and structures |
| 3. Operational plan for water-flow regulations | 9. Determination of a maintenance plan |
| 4. Operational methods of individual structures | 10. Determination of technical staff requirements/selection |

B. DEVELOPMENT OF IRRIGATION CAPACITIES

- | | |
|--|--|
| 5. Determination of general objectives | 11. Determination of professional/development requirements |
| 6. General system requirements: matching objectives with financial means | 12. Actual execution and monitoring of construction and maintenance activities |
| | 13. Other jobs. |

¹ Partly as result of the feedback received during this study, Charles Nijman has reviewed the wording of some areas as follows:

AREAS OF CONCERN

A. SYSTEM UTILIZATION

- | | |
|---|--|
| 1. Seasonal allocation plan | 6. Determination of feasible system objectives |
| 2. In-seasonal allocation | |
| 3. Operation plan for water-flow regulation | 7. Determination of functional system requirements |
| 4. Operational methods of individual structures | |

B. SYSTEM CREATION AND MAINTENANCE

- | | |
|---|----------------------|
| 5. Determination of desired system objectives | 8-13 remain the same |
|---|----------------------|

Apart from the top management, trainers and researchers, all groups were requested to fill-in the questionnaire of the area of concern they were most familiar with. The top management group was divided into seven small groups and invited to respond to Nijman's questionnaire, covering almost all areas of concern. The researchers and trainers analyzed their jobs mostly under other job categories because of their special activities. For the objective of making them more aware of the technical and managerial aspects of their jobs these different approaches did not make much of a difference. However, some conclusions can be derived from the choices of the engineers, technicians, technical assistants, irrigation inspectors and overseers.

Table 2 shows that engineers preferred to answer the questionnaires on In-seasonal Management (**15%**), Maintenance Planning (15%) and Actual Execution and Monitoring of Maintenance and Construction (**17.5%**). About 30 percent of the engineers were mainly involved in other jobs (e.g., financial and contract administration, urban drainage and sediment studies). Generally, engineers seem to be more familiar with planning, design, maintenance and construction activities, i.e., the development and maintenance of the irrigation systems rather than in the utilization of irrigation systems (only 23%). This was also demonstrated by the more elaborate responses for the first group of management concerns.

Similarly, technicians and technical assistants seem to be more familiar with development and maintenance of irrigation systems, respectively (43% and 59%) than with its utilization, both (12%). Most familiar to both groups were the actual execution and monitoring of construction and maintenance activities (32% and 38% respectively for technicians and technical assistants). In contrast, irrigation inspectors and irrigation overseers were more familiar with the utilization of the irrigation system (**78%** and **77%** respectively).

Whereas these "familiarity" figures are very rough indications only, they suggest that much of the utilization of the irrigation systems is left to the irrigation inspectors and overseers and that, as is the case in many countries, the involvement of higher-staff levels in these decision-making processes is limited.

These questionnaires provided extensive data. Since this session was a useful step of this exercise and aimed to promote job analysis to facilitate participants' awareness in technical and management aspects of irrigation, a compilation of the responses is presented at the end, as Annex B.

Table 2: Record of topic answered by participants on Nijman's questionnaire.

TOPIC NO	TOPIC	C A T E G O R I E S						TOTAL
		TOP MGT	ENG	TAs	TECH	I. Is	I. Os	
1	Seasonal Water-management planning	1	2	2	-	4	16	25
2	In-seasonal water-management matching of supply and demand	1	6	2	5	19	25	58
3	Operational plan for water flow regulators	1	-	-	-	1	-	2
4.	Operational methods of individual structures	2	1	-	-	7	15	25
5.	Determination of general objectives	1	1	-	1	-	-	3
6.	General System requirements: Matching objectives with financial means	-	2	1	-	-	-	3
7.	Determination of requirements: regarding system function	1	-	1	1	-	-	3
8.	Determination of technical requirements of storages, canals and structures	1	1	3	-	-	1	6
9.	Determination of a maintenance plan	-	6	3	1	-	3	13
10.	Determination of technical staff requirements (selection criteria, etc)	1	1	2	-	-	-	4
11.	Determination of professional development requirements	1	1	-	-	-	-	2
12.	Actual execution & monitoring of construction & maintenance activities	1	7	11	16	5	6	46
13.	Other jobs	-	12	9	18	4	7	50
	Total	11	40	34	42	40	73	240

3.1.5 Review of the DID Job Description

This session was aimed to give the participants the opportunity of (1) getting acquainted with their job description at the DID and (2) giving suggestions for improvement if necessary.

The "Functions and Job Description of Irrigation Managers" sheet, and a special form designed to record suggestions were distributed among the participants with the request for returning them the following day.

This was not a successful exercise. Lack of time prevented the participants from discussing this job description in the classroom. As a result, the return of the suggestion forms was not as satisfactory as expected. However, the participants' contributions were valuable and could be useful for the DID analysis.

The participants have offered, among others, the suggestions presented in Annex C as well, for improvement of their functions and/or job descriptions.

In addition to the list of suggestions, the following proposal was also presented by one participant which attracted the facilitator's attention.

"Observation on Proposed Job Description for Irrigation Managers"

1. Except for training no other management functions or duties are listed in the job description for irrigation managers.
2. Perhaps such functions and duties are assumed to be covered adequately by "overlapping" in other job descriptions, or perhaps such functions and duties are to be assumed incidental to other job descriptions.
3. However, this commentator thinks that such assumptions are unreasonable. In order that job descriptions serve their purpose, the more important reasons, which are intended to do the jobs that are better described separately, should be described as such.
4. To be effective and efficient, irrigation managers must realize that their roles include nontechnical functions and duties, and therefore, they must be adequately oriented to fulfill those other functions and to perform those other duties, as well.
5. There are other principal functions which irrigation managers must succeed in fulfilling. Amongst these are the following:
 - a. 'Product and clientele' development and management, public relations (planning and evaluation, formulation, and implementation of a PR programme).

Development of 'product' design, quality, performance, utility, etc.

Expansion of 'product mission' and clientele

b. 'Production' development and management

Acquisition and management of plant, equipment, tools, gear, materials, etc.

Acquisition and development of activity procedures, criteria, standards, etc.

Acquisition and development of monitoring and evaluation procedures, criteria, standards, etc. for productivity performance

c. Organizational development and management development of staffing, functional, and authority structure, acquisition of knowledge, skills, experience, and technology.

3.2 IDENTIFICATION OF MANAGERIAL KNOWLEDGE, ATTITUDES, AND SKILLS

This session aimed to translate the managerial tasks into knowledge, attitudes, and skills in order to assess the gaps between the actual participants' skills and those necessary to achieve performance standards determined by the organization.

The concepts of knowledge, attitudes and skills were introduced by the Training Specialist and discussed by the participants. The concepts used for this study were as follows:

Knowledge is retained information concerning facts, concepts, and relationships. For example, information process; communication systems; feedback (concept, how to give and receive); decision-making process; etc.

Attitudes consist of feelings or statements for or against certain issues; individuals are predisposed to view their jobs, other people, and the work in a certain way. Attitudes are reflected in people's behavior. For **example, responsiveness**; flexibility; self-confidence; adaptability; tact, etc.

Skills are the abilities to do things effectively; apply knowledge and personal aptitudes and attitudes in work situations. For example, conducting meetings; giving and receiving feedback; listening skills, etc.

Skills then can **be** developed during the training programs and improved little by little as the participants apply a new behavior repeatedly in life.

Taking into account this concept of skills, the participants were invited to join in a brainstorming session which was used to produce lists of Managerial Knowledge and related Attitudes.

3.2.1 Brainstorming Session

The facilitators introduced this session, inviting the group to list the Managerial Knowledge. Simultaneously, lists of related attitudes were written.

The participants were encouraged to offer as many suggestions as possible. Brainstorming is a creative rather than an evaluative technique. At the end of the session, the participants were provided with the opportunity of discussing their suggestions. This was aimed to facilitate their awareness for the following session, which was "analysis of gaps."

Lists of Knowledge and Attitudes written by the participants of previous groups with similar functions were used as inputs for the analysis of gaps of other groups. For instance, lists of Knowledge and Attitudes produced by the Top Management Group (presented in the Table 3) as Engineers were used as inputs for the first Engineers' group, after exercising the brainstorming technique and writing lists with them. This system enriched the analysis of gaps and helped the facilitator to overcome time constraints.

The brainstorming product of the group participants was grouped into special headings to facilitate analysis and curriculum development later. However, it is important to point out that these clusters were done after meetings using computer systems.

The participants' inputs were grouped as follows:

- A. Managerial Knowledge
 - 1) How to interact
 - 2) How to manage human resources
 - 3) Planning, monitoring, and evaluation
 - 4) How to use criteria and set priorities
 - 5) How to manage information
- B. Attitudes
 - 1) To stimulate communication
 - 2) To build up confidence
 - 3) To motivate others
 - 4) To improve oneself (or self-improvement)
 - 5) To direct and control

As stated earlier the Top Management, Researchers, and Trainers groups received a special treatment during this study. They were considered "resource groups."

The brainstorming session for these groups was long enough to facilitate deep discussion on the issues of the Managerial Knowledge and related Attitudes. The lists containing the results of the brainstorming exercise for these groups are in Annexes D, E, and F, respectively, for the Top Management, Researchers, and Trainers.

These brainstorming results were compiled and analyzed. Table 3 presents the contribution by these three groups pointing out the topics which were considered important to be developed during a training program.

Table 3 : Sample of results from brainstorming technique - top managers, researchers and trainers.

CATEGORIES	TOP MGT	RE-SEARCH	TRAIN-ER
BRAINSTORMING PRODUCT			
■ HOW TO INTERACT			
1. Negotiation	X*	X	X
2. Interaction with farmers	X	X	X
3. Conflict resolution	X	X	X
4. Coordinate interaction with agencies	X	X	-
5. How to motivate	-	X	X
6. How to convince	-	X	X
7. Interdisciplinary	X	X	-
11. HOW TO MANAGE HUMAN RESOURCES			
1. Leadership	X	X	X
2. Team building	X	X	X
3. Staff management: recruitment, selection, performance evaluation, (rewards, sanctions), welfare, career development	X	X	X
4. Basic psychology to understand staff and farmers	-	X	X
5. Understand staff competence level, detect talent	X	X	X
111. PLANNING, MONITORING, AND EVALUATION			
1. Problem-solving cycle	X	X	-
IV. SET CRITERIA AND PRIORITIES			
1. To set priorities	X	X	X
2. Budget allocation	X	-	X
V. HOW TO MANAGE INFORMATION			
1. Communication systems/mass media communication	X	X	X
2. Public speaking	-	X	X

* X : Items which should be developed as course content during a training program.

Table 3a: Sample of results from Brainstorming Technique
(Top Managers, Researchers and Trainers)

ATTITUDES

BRAINSTORMING PRODUCT	CATEGORIES	TOP MGT.	RE-SEARCH	TRAINERS
I HOW TO STIMULATE COMMUNICATION				
1. Patience		X	X	X
2. Flexibility		X	X	X
3. Openmindedness		X	-	X
4. Good listener		X	-	X
II HOW TO BUILD CONFIDENCE				
1. Responsiveness		X	-	X
2. Assertiveness		X	-	X
III HOW TO MOTIVATE OTHERS				
1. Empathy		X	X	X
2. Motivation of staff		X	-	X
3. Gentleness/kindness/friendliness		-	X	X
4. Appreciative		-	X	X
5. Interest/Caring/Enthusiasm		-	X	X
6. Supportive		-	X	X
IV TO IMPLORE ONESELF OR SELF-IMPROVEMENT				
1. Dedication		X	X	X
2. Perception		X	X	X
3. Adaptability		X	X	-
4. Sensitivity		X	X	-
5. Creativity/innovation		-	X	X
6. Seriousness		-	-	-
V DIRECT AND CONTROL				
1. Firmness in dealing with farmers/staff		X	X	X
2. Responsibility		X	-	X
3. Persuasiveness		-	X	X
4. Analytical ability		-	X	X
5. Pragmatism/Realism		-	X	X
6. Vision/farsightedness		-	X	X

* X Items which should be developed as course content during a training program.

Under "How to Interact" area, the items (1) Negotiation (2) Interaction with Farmers, and (3) Conflict Resolution were cited by all three groups. Two other topics, "Coordinate interaction with agencies" and "Inter-disciplinary interaction" were considered only by Top Management and researchers groups. However, the topics "How to motivate" and "How to convince" were suggested by both Researchers and Trainers.

Regarding "How to manage human resources" area, among the five topics presented above, four were stated by all three groups. They were : (1) Leadership; (2) Team building; (3) Staff management, involving recruitment, selection, performance evaluation, etc., and (4) Understanding staff competence level and detect talent. The Researchers and Trainers also recognized needs for developing "Basic Psychology to understand staff and farmers."

Referring to "Planning, monitoring, and evaluation" only "problem solving" was recommended for Researchers and Trainers.

Two other sets of items were stated by all three groups. These were : "To set priorities and communication system, including mass media." These were under the headings "Set Criteria and Priorities" and "How to Manage Information," respectively.

Budget allocation was cited by the Top Managers and Trainers. However, the trainers pointed out this topic related to training programs.

In addition to these topics, all three groups have presented other suggestions such as consultation techniques, role of farmers and politicians in irrigation, farmers' organization, etc., which are presented in the annexes.

With regard to the planning, monitoring and evaluation, among the 12 items discussed and recorded, the Researchers cited 9 items which were related to research issues. While among the eight items discussed, the Trainers cited seven items which were related to training matters.

Regarding the brainstorming results of the other five staff categories, only one sample from one group of engineers is presented in this report (Annex G).

Table 4 shows the numbers of items suggested by the participants during the brainstorming sessions.

Table 4: Number of items listed on managerial knowledge and attitudes for five staff categories.

CATE- GO- RIES	Managerial knowledge					Attitudes				
	Groups					Groups				
	1	2	3	4	Total	1	2	3	4	Total
Eng.	20	62	34	-	116	57	41	46	-	144
TA	17	29	-	-	46	51	43	-	-	94
Tech.	23	26	-	-	49	39	39	-	-	78
II	59	21	-	-	80	69	43	-	-	112
IO	32	24	24	20	100	51	46	51	49	197
To- tal	151	162	58	20	391	267	212	97	49	625

It is important to point out that during this stage there was discussion on the meaning of these items. These numbers give only an overall idea of the brainstorming product for each group.

It was observed that the number of items collected during this session was related to the level of participation and to the amount of time spent in the discussion. Some groups participated very actively in a very spontaneous way. However, there were others that had to be encouraged all the time to spell out their ideas.

Table 4 shows that the number of items collected for Managerial Knowledge (391) was about 63 percent less than that collected for attitudes (625).

Among the staff categories, the 2nd group of Engineers and the 1st group of Irrigation Inspectors have shown the most productive ones in terms of giving contributions on Managerial Knowledge. Their participation represented about 16 percent and 15 percent respectively of the whole product of this session.

On the other hand, the highest contributions given by these groups on the "Attitudes issues" came from the same group of Irrigation Inspectors cited above and, from the second group of Engineers which represented 11 percent and 9 percent, respectively, of the total contribution for this session.

Among the three categories which had two groups of participants (Technical Assistants; Technicians; Irrigation Inspectors), it was observed that the Irrigation Inspectors gave the greatest number of contributions on both areas, Managerial Knowledge and Attitudes during this exercise, even though they were the second largest group.

These five categories, after the brainstorming session, were invited to list gaps in managerial knowledge and attitudes based upon the "brainstorming lists." Most of the time, the entire product from the brainstorming technique was improved by new items highlighted by the lists of previous groups with similar functions. Since the lists of gaps are entirely presented in Annexes H, I, J, K, and L, it was considered unnecessary to include the brainstorming lists in this volume.

3.3 EXISTING GAPS

3.3.1 Identification of Managerial Knowledge, Attitudes, and Skills

This session aimed to assess gaps between the existing level of proficiencies and those required to achieve the organizational objectives among the DID staff. These were done in order to design and provide effective training programs to fulfill their needs.

The Nominal Group Technique was used during this session to assess gaps among the five staff categories. The Top Management, Researchers and Trainers did not experience this technique, since they were considered "resource groups" for this study.

This session was introduced by an explanation of the Nominal Group technique and its objectives. The participants were invited to review the lists of Managerial Knowledge and Attitudes which were displayed on the walls in order to analyze their own gaps. (Lists of previous groups with similar functions were also displayed on the walls to enrich their analysis.) This first phase required the participants to write their gaps in both areas, individually.

Afterwards, the participants were invited to spell out their contribution individually. The peers should cross out, from their lists, those items stated by the participants. (These items were listed on the flip chart.) This procedure was repeated until all contributions were given (2nd phase).

The 3rd phase aimed to discuss the items recorded by the facilitators. Each participant had to present his/her contribution and relate it to his/her real experience in the job. The items were improved and compiled when necessary during the exercise.

This third phase generated lists of GAPS in managerial knowledge and attitudes which will be taken into account to design a long-term training program. These lists of **GAPS** produced by the engineers, technical assistants, technicians, irrigation inspectors, and overseers were compiled and presented in Annexures H, I, J, K, and L. A sample of this compilation along with topics which were considered necessary for a training program is also presented in tables 5 and 6 for gaps in the managerial knowledge and attitudes respectively.

Table 5 shows the frequency of all staff categories, in relation to the topics shown as sample for this presentation.

The criteria used to select this sample were based on the topics which the group respondents have considered very important to be developed as course content during the training program. The 33 topics with high frequency were listed in Table 5 under five specific areas. It was observed that 17 topics (53 percent) were stated by all five-staff categories; 9 topics (28 percent) were given by four categories and 7 topics (22 percent) chosen by three categories.

The topics related to "How to manage human resources" presented the highest frequency among all categories. Out of eight topics recommended, seven were recommended by the participants as important for training programs. they were (1) Leadership; (2) Team building; (3) Staff management (selection, career development, etc.); (4) Basic psychology to understand staff and farmers; (5) conducting meeting; (6) Farmers' training; and (7) Culture and customs of farmers.

The second area composed of five topics presented by all categories, was "How to interact." The following topics represent their choice: (1) Negotiation; (2) Interaction with farmers; (3) Conflict resolution; (4) How to motivate; and (5) How to convince.

The third area, heading on "Planning, Monitoring, and Evaluation" was composed of four topics which were chosen by five categories. The topics were: (1) Problem-solving cycle; (2) Decision making; (3) Contract administration; and (4) How to coordinate.

Topics mostly mentioned by 3 - 4 categories are presented under "Set Criteria and Priorities" and How to manage information." They can be seen in Table 5.

Table 5: Sample of gaps in managerial knowledge from nominal group technique - Five Staff Categories.

GAPS	STAFF CATEGORIES	ENG.	TA	TECH.	IIs	IOs
I. HOW TO INTERACT						
1. Negotiation		X*	X	X	X	X
2. Interaction with farmers		X	X	X	X	X
3. Conflict resolution		X	X	X	X	X
4. How to motivate		X	X	X	X	X
5. How to convince		X	X	X	X	X
6. Coordinate interaction with agencies		X	X	X	X	-
7. Interaction with politicians		X	X	-	X	X
8. Dialogue		X	X	-	X	X
11. HOW TO MANAGE HUMAN RESOURCES						
1. Leadership		X	X	X	X	X
2. Team building		X	X	X	X	X
3. Staff management selection, career development, performance evaluation, welfare		X	X	X	X	X
4. Basic psychology to understand staff and farmers		X	X	X	X	X
5. Conducting meeting		X	X	X	X	X
6. Farmer's training		X	X	X	X	X
7. Culture, custom of farmers (basic sociology)		X	X	X	X	X
8. Attributes of a manager		X	-	X	X	X
III. PLANNING, MONITORING AND EVALUATION:						
1. Problem-solving cycle		X	X	X	X	X
2. Decision-making process		X	X	X	X	X
3. Contract administration		X	X	X	X	X
4. How to coordinate		X	X	X	X	X
5. Time management		X	-	X	-	X
6. Evaluation methods, systems, and personnel		X	-	X	X	X
7. Control maintenance plan		X	X	-	X	-
8. Planning procedures, manual		X	X	X	-	-

IV. SET CRITERIA AND PRIORITIES					
1. Budget allocation	X	X	X	X	-
2. To set priorities	-	-	X	X	X
3. To use criteria	X	X	-	X	-
4. Risk management	X	X	X	-	-
V. HOW TO MANAGE INFORMATION					
1. Communication system/mass media interaction with farmers	X	X	-	X	X
2. Public speaking	-	X	X	X	X
3. How to report (oral, written)	-	-	X	X	X
8. Information process	X	X	X	X	-

*X : Items which should be developed as course content during a training program.

Table 6 shows the frequency of all staff categories in relation to the "Attitudes" shown as sample for this report.

The criterion used to choose these topics was the frequency which indicated high importance given by the participants to the topic content. Forty topics were listed in this Table under five headings or subject areas. Among these topics 14 (35 percent) were recommended by all participant groups as very important topics to be developed as course content; 16 topics (40 percent) were advised by 4 staff categories and 10 topics (25 percent) were recommended by 3 staff categories.

The highest frequency presented in this table was under Direct and Control area (6 topics among 11). The second area was to improve oneself where among nine topics recommended four received total frequency of the staff categories. The other topics were spread among two other areas, such as How to motivate others and How to build up confidence.

The Attitudes related to Direct and Control area presented the highest frequency among all categories. From nine topics recommended, six were recommended by all the participants groups. They were : (1) Responsibility, (2) Firmness in dealing with staff and farmers; (3) Precision; (4) Vision/farsightedness; (5) Taking risks; and (6) Self-confidence.

The second area, to improve oneself or self-improvement, composed of four topics were recommended by all categories. The following Attitudes represented their choice : (1) Adaptability; (2) Sensitivity; (3) Creativity/innovativeness; (4) Willingness to be corrected/teachable.

Attitudes which accumulated frequencies of 4 and 3 were recommended under areas of "to motivate others" and "to stimulate communication". The following attitudes were among others: Supportiveness; gentleness/ kindness/friendliness; cooperativeness; trustworthiness; patience; flexibility, and others which can be seen in Table 6.

The Irrigation Overseers group has shown great concern about "Conflict Resolution" and "How to cooperate and influence cooperation" as indicated in the data analysis for this managerial knowledge. This concern was expressed in different ways during the exercise of listing and discussing topics on this respect.

Another area which demanded a great deal of attention during this exercise was staff management, pointing out topics related to career development, and performance evaluation. The topics related to this area were very much discussed and presented in different ways on the attached lists of gaps.

Contract Administration was another area which brings concerns to the DID staff, mainly to the Technicians, IIs and IOs.

Regarding the related Attitudes, table 6 presents a sample which (complemented by the other topics) would be a valuable source of information for designing a training program.

The gaps in Attitudes presented by the participants cited in Annexes H, I, J, K and L, were as follows.

Table 6: Sample of gaps in attitudes from nominal group technique - Five Staff Categories.

GAPS	STAFF CATEGORIES	ENG.	TA.	TECH.	IIs	IOs
I. TO STIMULATE COMMUNICATION						
1. Patience		X *	X	X	X	-
2. Flexibility		X	X	X	X	-
3. Openmindedness		-	X	X	X	X
4. Good listener		X	X	-	-	X
5. Humbleness/simplicity		X	-	-	X	X
6. Understanding		-	-	X	X	X
II. TO BUILD UP CONFIDENCE						
1. Honesty		X	X	X	X	X
2. Impartiality		X	X	X	X	X
3. Fairness		-	X	X	X	X
4. Diplomacy		-	X	X	X	X
5. Tolerance		X	X	-	X	-
6. Responsiveness		-	X	-	X	-
III. TO MOTIVATE OTHER						
1. To motivate farmer community and staff		X	X	X	X	X
2. Interest/caring/enthusiasm		X	X	X	X	X
3. Gentleness, kindness, friendliness		X	X	X	-	X
4. Supportiveness		X	X	X	X	-
5. Cooperativeness		X	-	X	X	X
6. Trustworthiness		X	X	X	X	-
7. Appreciativeness		X	-	X	-	X
8. Respect		X	-	X	X	X
IV. TO IMPROVE ONESELF OR SELF IMPROVEMENT						
1. Dedication		X	-	X	X	X
2. Adaptability		X	X	X	X	X
3. Sensitivity		X	X	X	X	X
4. Creativity/Innovativeness		X	X	X	X	X
5. Seriousness		X	X	-	-	X
6. Willingness to be corrected/Teachable		X	X	X	X	X
7. Commitment		X	-	X	X	X
8. Self-discipline		X	X	-	X	X
9. Coping with challenge		X	X	-	X	X

V. DIRECT AND CONTROL					
1. Firmness in dealing with staff and farmers	X	X	X	X	X
2. Responsibility	X	X	X	X	X
3. Preciseness	X	X	X	X	X
4. Vision/farsightedness	X	X	X	X	X
5. Bravery/courage	X	X	-	X	-
6. Initiative	X	X	X	-	X
7. Taking risks	X	X	X	X	X
8. Self-confidence	X	X	X	X	X
9. Concern	X	-	X	X	X
10. Punctuality	X	X	-	X	X
11. Persuasiveness	X	X	-	X	-

*X : Items which should **be** developed as course content during a training program.

3.3.2 priorities in Managerial Knowledge and Attitudes

This session was aimed to identify among the participants, priorities in existing gaps to develop a reliable curriculum for training programs in order to fulfill their immediate needs.

The 4th phase of the Nominal Group Technique provided the participants with the opportunity of giving priorities on the gaps discussed and listed during the previous session. The participants were invited to rank gaps from 1st to 10th priorities individually.

After the results were collected and compiled, the facilitators weighed each priority in the following way : 1st priority x 10; 2nd priority x 9; 3rd priority x 8; 4th priority x 7; etc., till 10th x 1, and summed the results. The ten highest scores were considered group priorities and will **be** used for designing the first training program for each staff category. The rest of the gaps will be used for designing a long-term training program.

The "scores" results of group categories were combined and listed, in order to provide a final result in terms of priorities for all staff categories.

The final Compilation of Group Priorities in the Managerial Knowledge and Attitudes were presented in Tables 7, 7a; 8, 8a; 9, 9a; 10, 10a; and 11, 11a, respectively, for engineers, technical assistants, technicians, irrigation inspectors and irrigation overseers.

The researchers and trainers were also invited to rank priorities on the brainstorming results which were presented in Tables 12, 12a, and 13, 13a, respectively, for Managerial Knowledge and Attitudes.

The results of this final Compilation of Group Priorities were analyzed and presented in Figures I, II, III, IV, and V to facilitate interpretation and conclusions.

3.3.2.1 Compilation of Group Priorities in Managerial Knowledge and Attitudes of Engineers

Tables 7 and 7a present two lists of 21 priorities for Managerial Knowledge and Attitudes as a result of the combination of three groups of engineers who participated in this study. Table 7 summarizes the results of gaps related to the Managerial Knowledge area.

Under the Managerial Knowledge area, the topics (1) Leadership; (2) Decision Making; (3) Career Planning (human resources development, personnel management, etc.), and (4) Communication System, including interaction with farming communities, were ranked among the ten priorities for all three group participants.

The topic "Team building" was ranked by two groups which together presented a high score.

"Planning, Procedures, and Manuals" was recommended by only one group of engineers who considered it the highest priority in managerial knowledge.

The other topics, as presented in Table 7 were given lower scores and there were discrepancies of opinions among the groups.

It was observed that the 2nd group of Engineers had less scores than others. Analyzing Table 4, it can be seen that this group has produced the highest number of contributions (62). This suggests that they were distracted with the number of choices which could be made when defining their immediate needs.

Figure I presents the Engineers' highest scores from group priorities, defining gaps in Managerial Knowledge.

The gaps in "Managerial Knowledge" were inconsistent among the groups. However, the "Leadership" topic was defined to be needed at the same level by all three groups.

The figure also shows that on "Decision Making" and "Career Planning" topics, the first and third groups of Engineers highly recommended these for a training program while the second group did not show the same need.

In terms of training needs, the first group of Engineers demonstrated to have consistency compared to the other groups. They presented high cumulative scores which were concentrated in a fewer number of topics.

**Table 7 : Compilation of group priorities (Engineers)
(65 participants).**

GROUP/NUMBER OF	1ST	2ND	3RD	TOTAL SCORE
	25	21	19	
MANAGERIAL KNOWLEDGE				
1. Leadership	87	77	82	246
2. Decision making	101	39	102	242
3. Career planning (human resources development, personnel, management, staff appraisal)	99	43	92	234
4. Communication system. How to interact with farming communities	84	52	50	186
5. Team building	89	--	57	146
6. Planning, procedures and manuals	103	--	--	103
7. How to motivate people	--	99	--	99
8. Farmer's training in water management	86	--	--	86
9. Communication skills, (system, intra and inter-departments)	--	--	76	76
10. Conflict resolution	71	--	--	71
- How to use criteria	71	--	--	71
- Managing poor performance of staff	71	--	--	71
- How to follow up	71	--	--	71
- Interaction with agencies	71	--	--	71
11. Technical knowledge (competence)	--	63	--	63
12. Promote positive character and attitude (sense of anti-corruption)	62	--	--	62
13. Budgetary allocation	55	--	--	55
14. Human relation		53	--	53

15. Consultation technique	--	--	51	51
16. Contract administration	--	--	48	48
17. How to negotiate	--	--	45	45
18. How to delegate	--	45	--	45
19. How to convince	--	--	42	42
20. Finance and manpower management	--	38	--	38
21. How to create good work environment	--	37	--	37