

TECHNICAL REPORT NO. 14



"Administering An Interdisciplinary Project:
Some Fundamental Assumptions Upon Which to Build

by:
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EGYPT WATER USE AND MANAGEMENT PROJECT

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**Administering An Interdisciplinary Project:
Some Fundamental Assumptions Upon Which to Build**

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ABSTRACT

An interdisciplinary project evolves around a set of fundamental situations which are present from the beginning of the project. These situations are as follows: (1) there are contrasting working perspectives between the technical experts of the project and the extension experts, (2) there are different perceptions regarding the involvement of farmers in the project, (3) there are different communication patterns which a project may follow, and (4) there are specific staff/farmer patterns which can emerge in the work of the project. Each situation is described in this report and the consequences for selecting the different aspects of each situation are presented. All interdisciplinary projects need to take into consideration the above mentioned situations and what choices the projects make will influence the outcome of the project's work.

مستخلص

تم استنتاج مجموعه من الدوافع الأساسية من خلال مشروع العمل الجماعي منذ بداية وهي كالآتي :

- (١) الاستفادة والتجارب في العمل بين الجزار الفنيين وخبراء الإسداد بالمحطات الرئيسية .
- (٢) للمحافظة التكلفة الخاصة باستكمال الفلاصية في المشروع .
- (٣) تحديد النماذج المختلفة للعلاقات والاتصالات والمكث أنه يتبعها المشروع .
- (٤) تحديد النماذج المتعلقة بالهيئة العاملة و الفلاصية والمستنتج من خلال العمل بالمشروع .

وقد تم شرح كل نقطة بالتفصيل مع ذكر الخطوات المتعلقة بإختيار الجهات الخاصة بكل موقف على حدة .

كما يجب أنه يؤخذ في الاعتبار الخطوات السابقة عند العمل في مشروع جماعي ليتم على تخصصات متعددة ، كما أنه الإختيار الذي سيتبناه المشروع سيؤثر على فعالية المشروع .

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INTRODUCTION

The Egypt Water Use and Management Project (EWUP) is based upon the assumption that appropriate communication with, involvement of, and participation among the local farmers and community leaders where it is being implemented must be an integral part of all phases of the project life.¹ There is much evidence that this program has been more successful than most in utilizing a team approach to implementation in which the technical staff in agronomy and engineering has worked cooperatively with staff experts in sociology and economics in an attempt to ensure that the technical recommendations, project goals, and suggested innovations will be understood and accepted by the farmer population.

It is also recognized that such an interdisciplinary approach to technical change programs requires an extensive commitment to continued efforts in communication and coordination of activities among the individual members of this team, and between the team and the farmers. Great care must be taken to strengthen this communication process. The purpose of this report is to look at situations attached to an interdisciplinary project with regard to communication which need to be taken into consideration when working with such a group. These situations do exist to differing degrees in different circumstances and how an interdisciplinary team addresses these issues and acts on them will to a large extent dictate how successful the project will be. The special situations which will be discussed are: (1) contrasting perspectives between the technical staff of a project and the extension staff, (2) involvement of farmers, (3) communication patterns within a project, and (4) staff - farmer interaction patterns.

¹ Egypt Water Use and Management Project, Problem Identification Report for Mansouria Study Area, (EWUP Technical Report No. 1, 1979).

CONTRASTING PERSPECTIVES BETWEEN THE TECHNICAL
AND EXTENSION STAFF

The specific areas of conflict and stress which often characterize a rural development project team charged with integrating the specific points of view of managers and technical experts are identified in Figure 1.

Figure 1: CONTRASTING PERSPECTIVES BETWEEN THE
TECHNICAL STAFF, THE
SOCIOLOGY/EXTENSION STAFF
AND THE FARMERS

Program Manager/
Technical Staff

1. Great pressure to justify the expenditure of funds through quick and observable projects to ensure that the program will be continually funded.
2. General awareness on the part of the project experts that the goals, techniques, and strategies being used are based upon solid scientific principles which have been empirically verified.
3. The technical expert's tendency to assume that any rational program or project will easily be accepted by the farmers once it has been explained and demonstrated to them.

Sociology/
Extension/Farmer

1. Great pressure to go slowly to ensure that the farmers completely understand the purpose and goals of the project before it is implemented.
2. General awareness that regardless of how technically correct the project's goals might be, their continued use over time requires that the farmers themselves see the value and utility of these innovations.
3. Recognition that the process by which farmers come to accept a change is not easy; that one or two meetings to explain a project can never be a substitute for the long-term need to allow farmers to observe the project in action, to experience some success with it, and to gain a complete awareness of why it is being suggested and how to use it.

Figure 1 (Cont'd)

4. The technical expert's genuine belief that he has something which the farmers will readily accept once it has been implemented. Thus, the crucial problem is getting the project completed as quickly as possible.

4. A strong belief that any technical innovation must be introduced into a social environment in which political, cultural, economic, and social pressures exist quite independent of the project. Patterns of influence which lead to its acceptance or rejection are not based on scientific information, but upon human values, perceptions, and emotions which must be understood and carefully considered both before and during its implementation.

5. The technical expert's belief that the changes he is suggesting will be better for the farmers than the old way of doing things.

5. The feeling that the old way is the best way, or at least a good way, because it is consistent with their past experiences, their values and social norms, and the social realities of their community.

6. The general assumption that the innovations being suggested hold no risk for the farmer because the expert is confident that these changes will help the farmer.

6. The widespread anxiety that any shift from the "tried and true" way of doing anything may be disastrous, especially for the farmer living at the bare subsistence level.

These conflicting views of reality make coordination and communication difficult. The project team management must recognize the implications of these differing perceptions, for they suggest contrasting priorities of interest, time schedules, and strategies of implementation.² A great deal of effort is going to be

² James B. Mayfield, Local Government in Egypt: Some New Change Strategies and Training Opportunities (Washington, D. C.: Agency for International Development, 1976), pp. 56-71.

needed if these points of stress and miscommunication are to be managed effectively.

FARMER INVOLVEMENT

In order to understand completely the multiple relationships impacting on the farmers and the positive and negative consequences of these factors for the success or failure of the project, much care must be taken to ensure that all technical decisions are coordinated with the data being collected by the sociology team. There will be times when technical decisions may have to be postponed until adequate social and farmer perceptual data are available. It is equally important that the sociologists on the project be sensitive to the technical team's need to demonstrate some progress and to complete the phases of its work in a timely way. Both groups of experts much recognize each other's problems, but the crucial focus must be on their joint awareness (1) that program success requires farmer acceptance and (2) that in a village setting there are interrelationships and patterns of influence which must be understood and taken into consideration if the project is to be implemented successfully and maintained over time³.

All project members must recognize that a very effective and efficient water management system can be established in this project area. However, if the farmers do not accept this system, if they have been manipulated or coerced into superficially adopting the new techniques and procedures, the long-term impact of this project will be less than hoped for. Early commitment to involve the

³ Edgar Owens, "Small Farmer Participation and World Agricultural Development," Public Administration Review, March/April, 1976, pp. 142-47.

farmers in the entire process of implementation can ideally help to ensure:

(1) that the best aspects of the farmer's present approach to irrigation are not ignored. Close communication with the farmer will help the technical expert to understand the rationale which underlines the farmer's present approach to irrigation. Much of what the farmer does may be completely relevant and technically appropriate given the realities of his environment;

(2) that the farmer clearly understands the goals, strategies, and purposes of the project. It is important that a communication system be developed to ensure that the farmer's concerns are identified, that no misunderstandings will disrupt the project, and that the farmer begins to recognize the utility and value of such a project;

(3) that there will be appropriate feedback from the farmer to ensure that the project design may be restructured or modified on a regular basis to make the project both technically and socially compatible with the realities of the Egyptian environment;

(4) that some type of water users' organization be established through an encouraged system of participation among these farmers. If the benefits of this project are to be maintained after its completion, much effort must be expended to involve the farmers to the point where they begin to consider the project their own, and begin to develop the organizational skills and cooperation needed to manage the system after the support team has gone. A long-term maintenance system in a mesqawill require some type of voluntary water users' association which can take responsibility for the management and maintenance of the water system developed.

Much effort must be expended to gather all relevant information on the many patterns of interaction among the farmers. Face-to-face interviews and in-depth discussions

are absolutely essential. The technical staff must recognize the utility of this data collection process and should take an active interest in the data being collected. An awareness of the family relationships, ownership-tenant relationships, formal and informal leadership patterns, sources of authority and influence, and a comprehensive view of how not only the farmers, but also the recognized leaders and significant people in the village perceive the project. There is a great tendency for farmers to agree readily to suggestions and recommendations made by an "expert," "official," or "outsider". Once the outsider is gone, the promise to fulfill certain kinds of activities or procedures is forgotten or disregarded with the often-heard expression, "Ahu Kalam" (these are only words to be ignored).

COMMUNICATION PATTERNS WITHIN A RURAL DEVELOPMENT PROJECT

It is quite common in a bureaucratic environment for communication to be based upon a one-way system in which orders are given, plans presented, requirements announced, procedures established, and goals defined with little or no feedback from those below as to whether they have understood the orders, plans, procedures, or goals. The key assumption of this system rests upon the premise that if something has been said once, explained once, or distributed once as a memo, that should be enough.

Administrative systems seeking to improve their communication networks often adopt a two-way system which requires the receiving elements to acknowledge their understanding and awareness of the orders, plans, or procedures in order to give the sender of the directive some confirmation that the message has been understood.

In recent years there have been some efforts to move beyond mutual understanding between two people in an organizational setting to a more profound level of

communication .. generally described as "shared awareness". This requires extensive staff training in team-building, interpersonal skill development, conflict resolution, problem identification, and role negotiation skills. Based upon some experience in conducting this type of training in Egypt, Tunisia, and the Philippines, the conviction emerges that administrative teams working in rural development can have their effectiveness greatly increased both in terms of working together and in terms of working with farmers.

The following brief descriptive figures below identify the basic assumptions and the advantages and disadvantages of the three types of communication systems usually found in a rural development organization. (Figures 2, 3, 4)

STAFF FARMER INTERACTION PATTERNS:

THE VICIOUS CYCLE OF EXPERT - FARMER DISTRUST

We will try to outline what has been called the "vicious cycle" of expert-farmer distrust. Most farmers throughout the world function within a social reality that very few outsiders ever completely understand or can ever hope to appreciate. Much of this social reality is conditioned by a set of assumptions about the world in which they find themselves which over time have been proven to be correct, logical, and therefore, true. Out of these assumptions come behaviors which are perfectly appropriate and consistent.

The rural development expert who, generally, is unaware of the farmer's social reality and has no intimate knowledge of how the farmer sees his environment, must react to his behavior - the only observable social act available to the expert. Since the farmer's behavior often reinforces and confirms certain attitudes non-farmers have toward farmers, the expert's reactions to this behavior are also natural and logical. The problem,

Figure 3: TWO-WAY SYSTEM OF COMMUNICATION

<u>Assumptions</u>	<u>Advantages</u>	<u>Disadvantages</u>
A. Administrative Level		
1. Communication requires that subordinates have the opportunity to ask questions and obtain clarification of what the order or procedure means.	1. Subordinates are more apt to comply with an order or procedure if they fully understand what is being communicated.	1. This kind of communication requires much more time.
2. Effective communication requires that the sender and the receiver of a message have the opportunity to exchange ideas on how they each interpret it so that both may see how the other understands its purpose and meaning.	2. Supervisors are more apt to have their subordinate do what they want if the subordinate has an opportunity to ask questions and seek clarification.	2. Even though the subordinate may understand the message, there is no opportunity for him to express his feelings or concerns about it.
B. Farmer-Expert Level		
3. When a farmer feels free to raise questions about the project and has certain parts of the project explained several times, he is much more apt to accept the ideas of the expert.	3. There is a higher probability that the farmer will truly understand what the expert wants done, and he will, therefore, be more apt to follow the latter's directions and ideas.	3. Even though the farmer may understand what the expert is trying to do, this basic two-way system does not allow opportunity for the farmer to disagree, express concerns, or bring up political, religious, social, or emotional issues.
4. Several meetings will be necessary before the farmers will truly understand what the experts are trying to do. This type of interaction is best conducted in the field with both experts and farmers explaining and sharing ideas, answering questions, seeking clarification, and confirming that both sides understand each other. Such communication is often associated with a "supervision in practice" system where experts work closely with farmers on a daily basis.	4. Again, two-way communication has one major goal - to make the farmer truly understand what the expert is trying to do. (Note that in a one-way system a command is issued, information is disseminated, and ideas or activities are demonstrated without too much concern as to whether the farmer has really understood the purpose of the expert.)	4. Although it is important that experts and farmers understand each other, this model of human interaction provides no effective way for the expert to know how the farmer really feels about the project. There is no easy way to create an environment of trust so that a farmer will feel comfortable in sharing his concerns, the subtle pressures that are coming from family, friends and influentials, and the natural anxiety he may be feeling in adopting something new.

Figure 2: ONE-WAY SYSTEM OF COMMUNICATION

<u>Assumptions</u>	<u>Advantages</u>	<u>Disadvantages</u>
A. Administrative Level		
1. If I say something once to a subordinate, that should be enough.	1. This system takes very little time to get information to subordinates.	1. The subordinate often has questions about the order or request which make it difficult for him to know exactly what his superior wants.
2. If I send a memo to a subordinate, then I have communicated with him; and if I tell someone what I want him to do, he will do it.	2. This system does not allow subordinates to question the orders given.	2. The subordinate has no way to explain some of the problems of which the superior is not aware that may exist at his level.
3. If I explain something to someone once, he should be able to understand what I want him to do or what I intend to do	3. This system forces the subordinate to do what he has been told regardless of the subordinate's own priorities or problems.	3. If the subordinate has misunderstood the order he may do something different from what the superior wanted.
B. Farmer-Expert Level		
4. Farmers need to be told what to do because otherwise they will do nothing.	4. You only have to go into the field once or twice or, even better, you can bring them into the project office.	4. Farmers may not understand what you are saying after only one or two discussions.
5. Farmers will do what we want if we just tell them. If we meet with the farmers once or twice, that will be enough to explain what we are trying to do.	5. Little time is wasted in talking to the farmers.	5. It generally does not allow the farmer to share his concerns or to ask questions.
6. A very good example of one-way communication is a demonstration project. Let the farmer see, and he will accept the new ideas and methods.	6. There is no wasted time in trying to get farmers to agree upon a project before you begin. Just set up the demonstration and wait for the farmers to accept it	6. There is much evidence in the literature that demonstration projects by themselves are generally not effective in inducing farmers to accept new ideas. This is especially true of the poorer, less-educated farmers.

Figure 4: SHARED AWARENESS SYSTEM OF COMMUNICATION

<u>Assumptions</u>	<u>Advantages</u>	<u>Disadvantages</u>
A. Administrative Level		
1. Messages can be sent and people may understand each other completely, yet until people are free to share how they really feel about the message, true communication has not taken place.	1. If both the sender and the receiver completely share their feelings, there is a much greater chance that the sender will have a better sense of what to expect from the receiver and will be less apt to be disappointed when the receiver does not do what the sender expected.	1. It requires a great deal of time before there is enough trust and openness for both the sender and receiver to share their real feelings. Many people, especially in a bureaucratic environment, are unwilling to listen to those below them. They are accustomed to giving orders and have never learned how to listen.
2. Effective communication requires that people have an opportunity to experience a shared awareness. Until both people fully understand the other's point of view, his values, his perceptions of the situation, his concerns, his way of looking at the world, and how he sees himself, only a superficial kind of pseudo-communication has taken place.	2. When there is a shared awareness between two people, each is in a better position to understand the other's point of view and to take that point of view into consideration before attempting to plan and implement some project.	2. When a project is under some pressure to be completed as quickly as possible, a process of communication involving individuals sharing their feelings and concerns will be much too time-consuming.
B. Farmers-Expert Level		
3. Too many projects fail throughout the world because experts do not take the time to fully understand the farmer on his terms and not on the expert's terms.	3. Projects based upon a complete awareness of the farmer's environment and how he perceives it is much more apt to be structured in a way which allows the farmer to accept the project.	3. There are very few experts who have the communication skills, the patience, or the willingness to involve the farmers in a total shared awareness experience. This is why most rural development projects fail in the world today.

Figure 4: SHARED AWARENESS SYSTEM OF COMMUNICATION - (Con't)

Assumptions

4. Only if the farmer is truly involved in the planning, designing, and implementation of a project is he apt to have developed the competences and skills which will enable him to maintain the project after the expert is gone. A primary goal of rural development is to make the rural development extension worker unnecessary.

Advantages

4. A communication system which is characterized by shared awareness helps farmers and experts to see themselves as co-workers, and not as superiors and subordinates. Farmers will be encouraged to participate actively in the planning and designing of the project so as to ensure that it reflects their social reality and allows them both to identify with the project and to begin to see it as their own. This is the most effective way of ensuring that the farmers will take responsibility for the project and will actively work to make sure it will continue after the experts have gone.

Disadvantages

4. Very few rural development experts throughout the world are committed to the time-consuming process which demands that they spend more time in the village, more time understanding the farmers, and less time issuing orders and commands. Until experts accept this challenge, rural development will continue to be ineffective and short-term in its impact.

of course, is that the expert's reactions and his consequent behavior merely reinforces and confirms the original assumptions that the farmer already had about government officials.

Figure 5: THE VICIOUS CYCLE OF EXPERT - FARMER DISTRUST

Social Reality of the Farmer

1. Need to protect himself from government officials based upon his past experience.

2. Need to maintain his income in ways that appear best to him or which have succeeded in the past.

3. Willingness to listen to friends and associates in his village more than to experts from outside his village.

Assumptions

1. Officials may cheat the farmer. Officials may take advantage of the farmer. Officials cannot be trusted completely. Promises officials make seldom come true. Much of what officials may say are only words (Ahu Kalam).

2. The way a farmer plants and irrigates is the best way, given the circumstances. The past way of farming ensured a reasonably good crop - why change? If the new way suggested by the expert should not work, the farmer will have no crop. Many times a new way introduced by the expert cannot be provided for or supported by the existing infrastructure.

3. Friends and neighbors are more apt to tell him the truth than are experts and outsiders. It is better to do what the local influentials suggest than what the experts may suggest.

Out of this social reality which is built upon accepted assumptions emerges a variety of farmer behaviors which, given the past experience of farmers with many outsiders, are quite natural when interacting with an expert who has not gained the total respect of the farmer.

1. Never tell the expert what you are really thinking because he will take advantage of you. Pretend to agree with the expert when you really don't.
2. Exaggerate your problems in order to gain more help from the expert. Promise to cooperate with the expert when you really feel it would be better not to do so.
3. Tell the expert what you think the expert wants to hear; e.g. - Question from expert: Do you feel that this is a good project? Answer from farmer: Oh, yes, this is a very good project. Accept the ideas and observations of your family and village influentials because they can be trusted.

As a government official observes the behavior of farmers and does not cooperatively work with the farmer, it is not surprising that his assumptions about them are based upon his reaction to the behavior observed:

1. Farmers cannot be trusted - they will agree, then not do what they agreed on.
2. It is better to force them to do what you want - force is all they understand.
3. Farmers are stupid and uneducated, and that is why they won't accept the expert's advice.
4. It is better to ignore the farmer and just get the project implemented.
5. It is better to manipulate the farmer - don't tell him what the expert is really going to do because if the farmer finds out, he will cause problems for the expert.
6. Anger and frustration when the farmer won't cooperate are the inevitable reactions of the expert.

As one analyzes the social reality of the farmer, his assumptions about government officials, his behavior which is a logical and natural consequence of his assumptions,

and the natural and logical reaction of the expert to this behavior, one begins to recognize the difficulty of establishing trust and cooperation between farmers and project experts. Such an analysis should sensitize the project expert to this difficulty and motivate him to reconsider his approach to the farmer. Is the expert's present behavior encouraging or discouraging trust?

1. Have I made promises which were not kept?
2. Have I tried to manipulate or coerce the farmer into doing something he may not have wanted to do?
3. Do I treat the farmer in such a way that he may feel that I consider him to be stupid or uneducated?
4. Do I hold meetings with him that have two purposes, one purpose expressed, the other purpose hidden and which may be confusing to him? I may tell the farmer I just want to make a social call: I really hope to convince him to accept the project.
5. Do I try to persuade the farmer to my point of view without acknowledging that his point of view may also be reasonable, logical, and valuable?
6. Do I act superior to the farmer and make him feel that he is inferior to me?

Most people are not aware of how their behaviors are being perceived and interpreted. Often what we intend people to believe will be just the opposite of what happens.

Figure 6: CONTRASTING PERCEPTIONS BETWEEN
FARMERS AND EXPERTS

<u>Expert's Intentions</u>	<u>Farmer's Perceptions</u>
1. I want to promise the farmer something so he will be favorable to the project.	1. Here is another example of an official making promises that will never happen

Figure 6: CONTRASTING PERCEPTIONS BETWEEN FARMERS AND EXPERTS - (Con't)

2. If the farmer knew what we were going to do, he would never agree; therefore, I must try to trick him or manipulate him into accepting what I want.

Expert's Intentions

3. I know the farmer is very intelligent in some ways, but in other ways he is very stupid and uneducated, but I must not let him know I think he is stupid.

4. I hope this farmer will agree to our project. I know some other farmers may be opposed to the relation-project, but I don't care farmers, what they think. I will only work with this one village farmer.

2. The expert is saying one thing, but it appears he has something else in mind. It is very confusing; therefore, I better not trust what he is saying.

Farmer's Perceptions

3. Everytime the expert gives me advice or tells me what he thinks I should do, he makes me feel like I don't know anything about farming or irrigation.

4. This expert does not understand how decisions are made in our village; he appears to ignore the ships that exist among families, influentials, and other officials in our

Given this very frustrating dilemma, let us consider some specific strategies which may be helpful in breaking through the "vicious circle of farmer-expert distrust":

1. A great deal of effort must be expended to become personally aware of the farmer's problems, concerns, and perceptions of his reality. In the beginning the major purpose of interaction with the farmer is to learn from him how he ploughs his land, prepares the seed bed, plants the seeds, irrigates, fertilizes, and uses insecticides. Why does he do what he does as opposed to some other method? At this point, the purpose is not to introduce new ways of farming or irrigation, but merely to understand his reasons for doing what he does now.

2. Attempt to understand what specific problems he faces as a farmer, how he defines these problems, and why he thinks they are problems.
3. There is a strong need to understand the farmer, not only in terms of his farm, but also in terms of his family and friends and those he goes to for help and advice. Who are his closest associates, what do they have in common, who does he trust to advise him, and why does he go to these people and not some other person in the village? This type of interaction is understood as a shared awareness experience, rather than as a two-way system of communication.
4. Trust building does not come from four or five meetings with a farmer, but from an extended period of interaction which is characterized by behavior on the expert's part which is perceived by the farmer to be trustworthy, sincere, and consistent.
 - a. Promise to do some little things and then make sure you fulfill your promise.
 - b. Take an interest in his farm, his family, and his social community in a sincere way. One basic problem for the expert is that if he pretends to be interested and concerned when he really is not, the farmer will sense this insincerity. It is much more difficult to hide your feelings than you may believe.
 - c. Look for some specific problem which the project could help solve. Don't promise help if it is going to be six months or a year before help will come.
 - d. If there is something you can do to help the farmer, do it.
5. Before you implement any project task that may impact on the farmer, great care must be made to

ensure that the farmer understands and agrees with the task. If one important goal of this project is to help the farmer become more successful and also to encourage him to take more responsibility for his own improvement, then the expert in this project must help the farmer to trust him, to want to cooperate with him, and to work with him. If the expert allows the old patterns of distrust to remain, the project will never have any long-term impact in helping the farmer to help himself.

The four situations presented are seen as crucial indicators to how an interdisciplinary project may pursue its goal. Each project begins by bringing in specialists from different disciplines. When a project is combining a technical aspect and an extension aspect to it, the above mentioned differences in perspectives must be identified and procedures for working with these differences must be agreed upon. This is a fundamental requirement for any project in order to be successful.

Next on the list, but no less important is that there must be an agreement on how the farmers are to be involved in the project's work. There is substantial documentation that the farmers should be meaningfully involved in the project work right from the beginning in order to ensure successful integration of the project goals with the farmers.

The situations including the contrasting perspectives of team members and the beliefs on how and when to involve the farmers focus on the assumptions of how decisions are made which will direct the work of the project. The next two situations involving different communication patterns and staff/farmer interaction patterns focus on the means by which a project will pursue its work. Which communication pattern a project will elect to follow

demonstrates how the project decided to manage the difference between the technical and extension aspects of the team. Likewise, what strategies are devised to communicate with farmers will to a large extent be determined on what the project perceives is necessary farmer involvement.

Such basic decisions on the four described situations will affect the operations and thus the consequences of an interdisciplinary project. A major effort needs to be made at the inception of the project to discuss and satisfactorily come to an agreement on how these four situations will be managed in the project. Given the goals and objectives of the project, the team members can look at which conditions they wish to follow and then they will have a fair idea of what will be the ultimate effect of their work.

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AMERICAN EQUIVALENTS OF EGYPTIAN ARABIC
TERMS AND MEASURES COMMONLY USED
IN IRRIGATION WORK

<u>LAND AREA</u>	<u>IN SQ METERS</u>	<u>IN ACRES</u>	<u>IN FEDDANS</u>	<u>IN HECTARES</u>
1 acre	4,046.856	1.000	0.963	0.405
1 <u>feddan</u>	4,200.833	1.038	1.000	0.420
1 hectare (ha)	10,000.000	2.471	2.380	1.000
1 sq. kilometer	100 x 10 ⁴	247.105	238.048	100.000
1 sq. mile	259 x 10 ⁶	640.000	616.400	259.000

<u>WATER MEASUREMENTS</u>	<u>FEDDAN-CM</u>	<u>ACRE-FeET</u>	<u>ACRE-INCHES</u>
1 billion m ³	23,809,000.000	810,710.000	
1,000 m ³	23.809	0.811	9.728
1,000 m ³ / <u>Feddan</u> (= 238 mm rainfall)	23.809	0.781	9.372
420 m ³ / <u>Feddan</u> (= 100 mm rainfall)	10.00	0.328	3.936

<u>OTHER CONVERSION</u>	<u>METRIC</u>	<u>U.S.</u>
1 <u>ardab</u>	= 198 liters	5.62 bushels
1 <u>ardab/feddan</u>	=	5.41 bushels/acre
1 <u>kg/feddan</u>	=	2.12 lb/acre
1 donkey load	= 100 kg	
1 camel load	= 250 kg	
1 donkey load of manure	= 0.1 m ³	
1 camel load of manure	= 0.25 m ³	

EGYPTIAN UNITS OF FIELD CROPS

<u>CROP</u>	<u>EG. UNIT</u>	<u>IN KG</u>	<u>IN LBS</u>	<u>IN BUSHELS</u>
Lentils	<u>ardab</u>	160.0	352.42	5.87
Clover	<u>ardab</u>	157.0	345.81	5.76
Broadbeans	<u>ardab</u>	155.0	341.41	6.10
Wheat	<u>ardab</u>	150.0	330.40	5.51
Maize, Sorghum	<u>ardab</u>	140.0	308.37	5.51
Barley	<u>ardab</u>	120.0	264.32	5.51
Cottonseed	<u>ardab</u>	120.0	264.32	8.26
Sesame	<u>ardab</u>	120.0	264.32	
Groundnut	<u>ardab</u>	75.0	165.20	7.51
Rice	<u>dariba</u>	945.0	2081.50	46.26
Chick-peas	<u>ardab</u>	150.0	330.40	
Lupine	<u>ardab</u>	150.0	330.40	
Linseed	<u>ardab</u>	122.0	269.72	
Fenugreek	<u>ardab</u>	155.0	341.41	
Cotton (unginned)	<u>metric qintar</u>	157.5	346.92	
Cotton (lint or ginned)	<u>metric qintar</u>	50.0	110.13	

EGYPTIAN FARMING AND IRRIGATION TERMS

<u>fara</u>	= branch
<u>marwa</u>	= small distributor, irrigation ditch
<u>masraf</u>	= field drain
<u>mesqa</u>	= small canal feeding from 10 to 40 farms
<u>qirat</u>	= cf. English "karat", A land measure of 1/24 <u>feddan</u> , 175.03 m ²
<u>qaria</u>	= village
<u>sahm</u>	= 1/24th of a qirat, 7.29 m ²
<u>sagia</u>	= animal powered water wheel
<u>sarf</u>	= drain (vb.), or drainage. See also <u>masraf</u> , (n.)

EGYPT WATER USE AND MANAGEMENT PROJECT
PROJECT TECHNICAL REPORTS

<u>NO.</u>	<u>TITLE</u>	<u>AUTHOR</u>
PTR#1	Problem Identification Report for Mansuriya Study Area, 10/77 to 10/78.	By: Egyptian and American Field Teams.
PTR#2	Preliminary Soil Survey Report for the Beni Magdul and El-Hammami Areas.	By: A. D. Dotzenko, M. Zanati, A. A. Abdel Wahed, & A. M. Keleg.
PTR#3	Preliminary Evaluation of Mansuriya Canal System, Giza Governorate, Egypt.	By: American and Egyptian Field Teams.
PTR#5	Economic Costs of Water Shortage Along Branch Canals.	By: A. El Shinnawi M. Skold & M. Nasr
PTR#6	Problem Identification Report For Kafr El-Sheikh Study Area.	Egyptian and American Field Teams.
PTR#7	A Procedure for Evaluating the Cost of Lifting Water for Irrigation in Egypt.	By: H. Wahby, M. Quenemoen, and M. Helal.
PTR#9	Irrigation & Production of Rice in Abu Raya, Kafr El-Sheikh Governorate.	Compiled By: R. Tinsley.
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