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"DESERT COMMUNITY ASPECTS IN AUC DESERT DEVELOPMENT SYSTEMS"

Phase One: Initiation of the Research Unit*

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Executive Summary

The AUC Desert Development Center (DDC) has three research units; namly:

a) The Desert Agriculture Unit,
b) The Desert Technology and Renewable Energy Unit, and
c) The Desert Community Unit.

The latter unit was initiated in September, 1983, through a grant from Ford Foundation. Although some part-time consultants contributed to the deliberations of the unit at this time, its major activities were delayed till March, 1984, when the Senior Rural Sociologist was appointed (Dr. Salah El Zoghby), followed by the senior Agricultural Economist (Dr. Ibrahim Soliman) in September, 1984.

The unit concentrated on three types of activities:-

a) The Socio-Economic Survey for Graduates settled in South Tahrir (which is the area where one of AUC experimental sites is located),
b) Economic Analysis and Monitoring of the Maxi Project. This also included providing DDC specialists with some indicators (based on the survey and other sources) for designing the proposed demonstration farming units of the Maxi Project , and
c) Economic Analysis and monitoring of the IORC Project.

This progress report discusses the above three activities, with special reference to the analytical study of the data collected through the Socio-Economic Survey.

As an outcome of the survey, the following findings should be stressed:

1- Social and demographic characteristics will help the DDC team to communicate. plan and participate in solving some of the graduates' problems based on their proposed priorities; with maximum reliance on the graduates' efforts through self-help projects.

2- 1-The educational level, previous experience and training acquired by the graduates may be used as a guideline to identify the training requirements of the graduates. Accordingly, the DDC team will be able to design training programs that suit the graduates' background in order to introduce new ideas (e.g. cultivation of medicinal plants), or to solve some of their problems (e.g. weed control).

3- Knowledge Of the educational level and working status of the graduates' wives can help the DDC in preparing a program in cooperation with the wives aimed at promoting their role in community development and supporting other aspects of women activities. Further studies are needed in this concern.

4- Education and health service facilities and constraints are major factors affecting the degree of adjustment of graduates and their families in the new communities. Some of the constraints could be solved through self-help projects. Other constraints are due to exogenous factors and their identification will be used as a guideline for decision-makers to solve these problems by:

A. Providing good accommodation and other incentives to encourage high quality teachers and specialized DDCtors to move to the new 1 ands.

B. Improving medical and educational facilities and securing their respective support services ego ambulances, medical supplies, libraries, and laboratories.

C. Increasing governmental efforts to provide better administrative control and supervision of the present personnel engaged in education and health services.

5- Communication, transportation, and road services need substantial "improvements by the Government for the whole area in general, and particularly for graduates who are living in dispersed farmsteads which magnifies the problem of transportation and communication for this particular group.

6- Housing: Based on the information collected from the survey. and the present and future experiences of DDC, the Center can participate, in the near future, in presenting alternative models for passive solar architecture housing for graduates and small-holders.

7- The survey has shown the need for increasing graduates' awareness of proper farm management and record keeping. It is recommended that a farm management training session(s) be organized by DDC for the South Tahrir graduates. The effectiveness of this service depends upon a proper feedback mechanism between the DDC and a representative sample of the graduates. A computer program to collect and analyses the output of this activity will be an efficient means for achieving this objective.

8- The absence of land ownership titles creates serious problems for graduates, especially with respect to availability of credit facilities. The lack of land ownership titles deprives graduates in reclaimed lands from medium term credits obtainable from the Principal Bank for Development and Agricultural Credits. Furthermore. These graduates receive low priority in securing scarce inputs as compared to those who have land titles. Lack of land titles creates a number of social and psychological problems which would negatively affect:

a) The degree of social adjustment and sense of belonging to their new communities,
b) The degree Of participation in developing their communities through self-help projects, and
c) The degree of support from other governmental agencies.

It was found from the survey that the most important factor (34.3%) hindering registration of land is the difference in opinion between the government and the graduates; steps need to be taken by the Government. as soon as possible, to reach an agreement with the graduates in order to settle this problem of land registration.

9. The economic analysis of the survey resulted in some recommendations to the policy makers, to the farmers themselves, and to DDC. The latter covers the type of services that could be offered to the graduates by the DDC units. All these

recommendations have a major objective which is to improve the agricultural performance of the new lands in South Tahrir.

10. Inter-cropping of seasonal crops with perennial crops is frequently adopted by the graduate farmers. A techno-economic study of this practice is needed in order to evaluate its technical and economic feasibility.

11. Water supply shortages and irregularity are two exogenous constraints faced by the community. The DDC will recommend to the concerned government agency appropriate measures needed to overcome these constraints. Moreover. it is recommended that, whenever possible the farmers Should cultivate only crops of low water requirements , on an economic basis. The DDC can offer recommendations to the farmers for the choice of these crops. The research of the Center currently includes a techno-economic study to evaluate the best alternative crops with respect to the water use costs and returns. This work can also lead to water pricing indicators for irrigation use. The cost of applying renewable energy sources (solar energy) to pump irrigation water should also be compared with the current conventional system of pumping water, using world market prices.

12. The farmers depend mainly upon their own experience as a source for technological information. Communications with extension service agencies is poor. This is most likely because these agencies can only provide old land know-how. It is strongly recommended to establish a national program for new land agricultural training.

13. Marketing constraints have a dominant negative effect on the farmers' interest in increasing productivity of either crop or livestock enterprises. The unfair transactions controlled by the marketing cooperatives (in the case of groundnuts) or the private traders, and the current price distortions in the agricultural sector are exogenous factors affecting the farmers' activities. Some of these factors are controlled by the government and should be re-considered. However, the relatively low yield of some major crops, implying high cost of production, plays an important role in this concern. The low yield production makes the minimum supply price accepted by the farmers above the national average. In this concern, the following actions are recommended:

    a) a comprehensive marketing study of the main summer crop i.e., groundnuts;

    b) a thorough review of the history, problems, and development of the vegetable and fruit processing plant in South Tahrir which was originally established to process the area outputs. This plant is new taken over by one of Kaha company units which secure its inputs from the Cairo vegetable wholesale market. This information will show the advantages and disadvantages of this type of experiment which should be taken into consideration when proposing processing industries directed towards raising the marketing efficiency;

    c) diffusion of technical information by the DDC to the farmers with special interest in methods of raising crop yield and diminishing production cost as well as introducing new successful crops and technologies to the area. The DDC experience in weed control is highly needed by the farmers.

d) The study provides 11 proposed cropping patterns based on the most profitable crops cultivated by the graduates; with estimates of the net income generated for each pattern. Farmers interested in raising their income by changing the cropping pattern will make use of the above proposals. This will show to what extent the farm income is an incentive for improving quality of life. Water, labor, machinery, and fertilizer needs and schedules for these patterns should be determined from the DDC and graduate farmers' experience.

Major Developments (1984): AUC Desert Development Center

A number of accomplishments were achieved during 1984:

I. The American University in Cairo, in recognition of the need for stability and coordination among the different AUC projects in the area of desert development, has approved changing the status of the Desert Project to "Desert Development Center (DDC)". This move further confirms the long range commitment of the University to applied research, demonstration, and training in desert development.

II. The initiation of the "Community Development" project sponsored by the Ford Foundation (Fall 1983) has proved to be a timely addition to our activities. The socio-economic survey conducted by members of the Community Development Unit of DDC among the "Graduates" of South Tahrir farms has encouraged a "healthy" interaction between these graduates (and later beneficiary farmers) and the Center. The "Field visits" by the Graduates to our South Tahrir and Sadat City sites, and the visits of our agronomists together with the Rural Sociologists to the "Graduates II farms has succeeded in building an atmosphere of confidence and cooperation between the South Tahrir farmers and the DDC. The genuine interest of these Farmers in implementing some of the results and agronomic practices developed through the different DDC research projects, is indeed a very encouraging sign. Now that we are confident of our accomplishments on our own farm, we are ready to diffuse the knowledge attained and the experience achieved, not only through demonstration activities on the DDC's sites, but specifically through experiments and demonstrations on the farmers' sites.

III. (The full-time appointment of Dr. Hosny El-Lakany as a Research Professor in the Desert Center with major responsibility as technical coordinator of the IDRC project and Associate Director of the Center was further strengthened by the appointment of Dr. Ismail El-8agouri (Soil Scientist) as a Research Professor in the DDC (on a half-time basis), with major responsibility as Head of the Agriculture Unit of the Center and supervisor of Soil/Plant analysis laboratory.

IV. The full-time appointment of a resident Farm Manager (Mr. Denis Bower) guaranteed that different experiments and demonstrations planned by our specialists are implemented properly on the farm.

V. The establishment of the soil testing laboratory at Sadat City (sponsored by Sheikh Saleh Kamel of Saoudi Arabia) has proved to be of great help in the quantitative assessment of soil development and crop yield under different rotations or experiments.

VI. The initiation of the "MAXI" University Linkages Project (sponsored by AID through FRCU) in September 1984 is an excellent example of the impact of the experiences gained through earlier projects on the DDC's research activities, in general. Six farming units will be established in South Tahrir and Sadat City, as a demonstration of alternative farming systems in these two areas.

The addition of the MAXI Project to the activities of DDC is expected (and already has) to benefit the existing projects. as follows:

A. The MAXI has enabled us to add other consultants to the Center, who will be available to solve problems in their areas of expertise. Most of these long term consultants are from Alexandria University (who is our partner in this linkages project). Also other short- term consultants will come to us from University of Arizona (our American partner):

- It is now clear that the area of plant protection has to be dealt with systematically and at the appropriate time, using the appropriate techniques. Special stress is given to weed control. This is more emphasized as we get involved into zero and minimum tillage experiments. Professor Samir El-Deeb, herbicide specialist, has joined our team and his work has already showed very encouraging results especially in alfalfa. Other specialists in the area of plant protection have joined the DDC, including Professor Nabila Bakri (Insecticide specialist), A. Torabia (plant pathologist), and M. Rizk (Nematologist). These consultants will not only help the AUC based demonstration activities, but will be available to the farmers in the neighborhood as part of the community development unit activities (sponsored by Ford Foundation).

- The addition of an experienced Professor of Agricultural Engineering to our team (Dr. M. Sabbah) has already proved its importance in dealing with the newly acquired minimum tillage planter.

- In the area of water management, Professor Ahmed Fathy, is working on both the IDRC and MAXI projects since the problem of water management is basic (a major constraint) to any desert agriculture project. Professor Fathy will also advise neighboring farms on appropriate irrigation practices.

- Professor Mamdouh El-Rouby, Vice Dean of Alexandria University, and Senior Agronomist and Statistician has also joined our team. His contribution is expected to enrich and strengthen the Centers crop science group, Dr. Seif A. Seif and Salama I. Salama).

- The demonstration activities sponsored by the MAXI Project on the AUC sites at South Tahrir and Sadat City (6 farming units for graduate farmers and one agrobusiness (dairy processing pilot project) will offer our scientists a unique opportunity for simulating the above mentioned farming units through implementing the results obtained from our research on rotation alternatives, soil and water management, crop choices, etc. These demonstrations will be available to neighboring farmers as a basic source for diffusion of our findings.

- The general support (equipment, staff etc.) available to the DDC through the MAXI will also be available to the Ford Foundation project; thus strengthening and facilitating the implementation of the different on-farm activities of the community development unit.

PART ONE: INTRODUCTI ON AND OVERVIEW

The AUC integrated approach to desert development is based on the interaction of technological, biological and community aspects. The ultimate long-range goal of the AUC Desert Development Center (DDC) is to plan, demonstrate and develop economically viable systems and socially acceptable communities that can be replicated by the government, or private agencies in creating desert communities in Egypt.

To achieve the above mentioned goals, the DDC draws upon the following sources of information:

a) Previous and contemporary experiences in desert reclamation, land settlement schemes and community planning, organization and development programs in arid and semi-arid zones with emphasis on Egypt.
b) Experiences of neighboring farmers' groups in South Tahrir where one of the DDC sites is located. Special emphasis is given to the information selected through the socio-economic survey which was conducted for this purpose under the auspices of the Ford Foundation.
c) Alternative designs for the six demonstration farming units in both sites based on the Fodder I Cattle I Biogas system and an agrobusiness dairy processing pilot project of 100 feddans (Maxi Project).
d) DDC experimental farms in both South Tahrir and Sadat City. The experiences obtained from these experiments provide new ideas for improving soil productivity, alternative desert farming systems. Bio-technology, and different applications for renewable sources of energy.

All above sources of information are in continuous interaction with each other (Diagram 1).

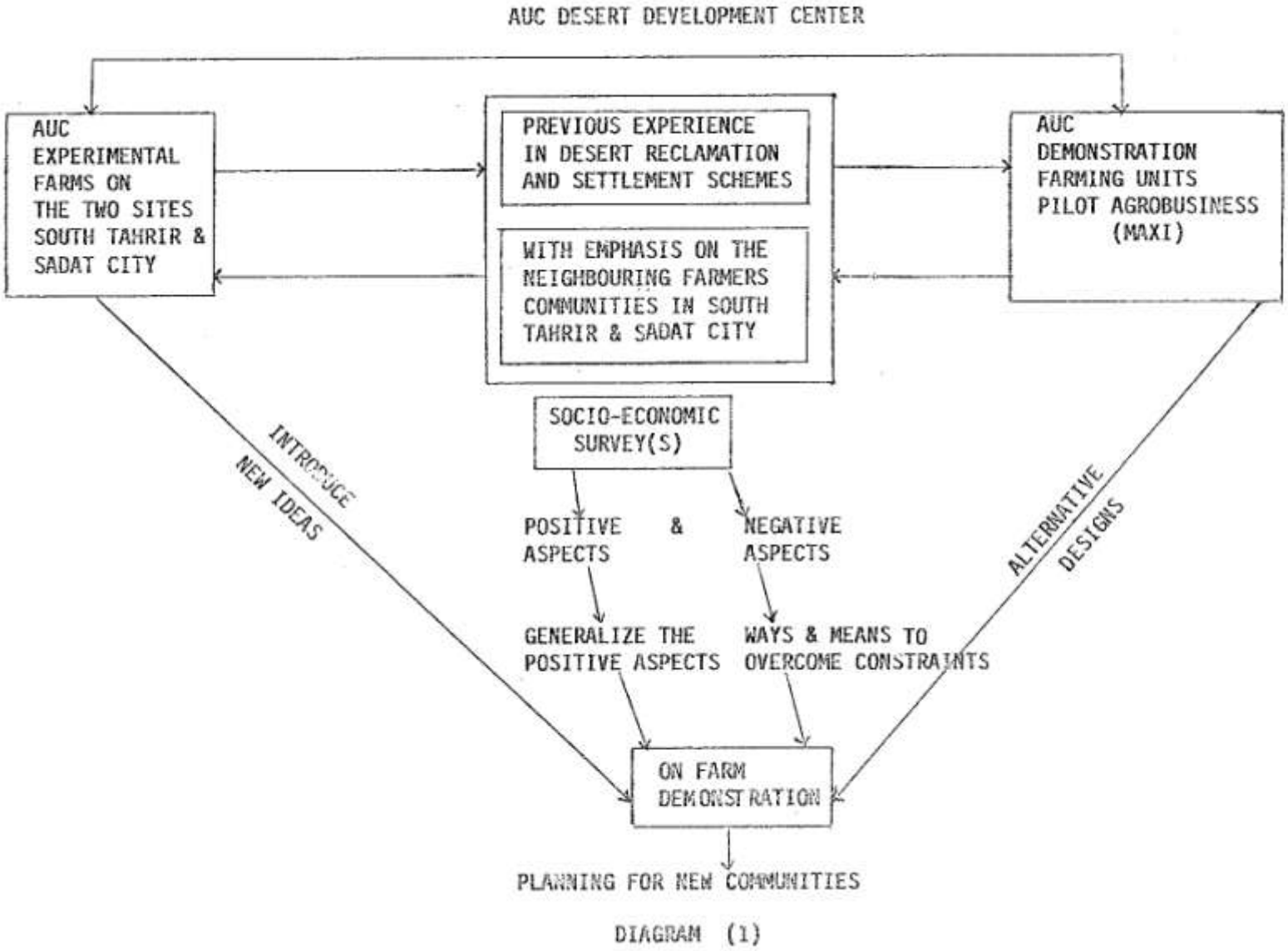

AUC DESERT DEVELOPMENT CENTER
AUC EXPERIMENTAL FARMS ON THE TWO SITES SOUTH TAHRIR & SADAT CITY
PREVIOUS EXPERIENCE IN DESERT RECLAMATION AND SETTLEMENT SCHEMES
WITH EMPHASIS ON THE NEIGHBOURING FARMERS COMMUNITIES IN SOUTH TAHRIR & SADAT CITY
AUC DEMONSTRATION FARMING UNITS PILOT AGROBUSINESS (MAXI)
SOCIO-ECONOMIC SURVEY(S)
INTRODUCE NEW IDEAS
POSITIVE ASPECTS
&
NEGATIVE ASPECTS
ALTERNATIVE DESIGNS
GENERALIZE THE POSITIVE ASPECTS
WAYS & MEANS TO OVERCOME CONSTRAINTS
ON FARM DEMONSTRATION
PLANNING FOR NEW COMMUNITIES

DIAGRAM (1)

I. THE SOCIO-ECONOMIC SURVEY FOR GRADUATES SETTLED IN SOUTH TAHRIR

The DDC selected one of its sites at South Tahrir to experiment, demonstrate, diffuse and train different farmer groups in appropriate agricultural practice, better utilization and conservation of alternative energy sources, and environ- mentally compatible housing and community facilities in general. Surrounding land in South Tahrir has been allocated to different farmer groups such as agricultural college and high school graduates, small holders (traditional farmers), personnel who previously worked in land reclamation companies, specialized cooperative societies such as Al-Auroba Society and Egyptian or joint venture investor companies.

Each group of these landholders has a different socio-economic background and experience, farm size, potentialities, constraints, motives and achievements. One of the main objectives of the DDC is to diffuse the results of its activities to these farmers I groups starting with the agricultural graduates and followed by the small holders. To achieve this objective the DDC Community Development Unit conducted a socio-economic survey for the graduates in the area.

1. METHODOLOGY:

This survey was conducted during the summer of 1984. A detailed questionnaire was designed, pre-tested and modified before the field data collection was executed. A proportional stratified random sample of 100 graduates was drawn to represent 20% of the total population of 498 graduates in the area. These graduates may be divided into three specific categories according to the farm size of each group:

- Group 1: from 9-15 feddans
- Group 2: More than 15 and less than 25 feddans
- Group 3: More than 25 feddans

Under the supervision of the DDC Community Development Unit, a team of 7 trained interviewers from the International Center for Rural Development at Mariut collected the data through personal interviewing. They resided in the area at an official rest-house for two weeks. An Arabic copy of the questionnaire is enclosed (Appendix I) .

Other sources of data collection included some information from graduate leaders and senior government officials, as well as some published literature on land reclamation and settlement schemes.

To prepare for the survey, several field visits took place first to the government officials and then to some of the graduates. The objectives of the survey were fully explained to both sides. Graduates expressed their disappointment in studies previously conducted by other agencies in their area and questioned any possible gains to them from other similar studies. It was clearly explained to them that the DDC is not only interested in research as such but also in the implementation, demonstration and diffusion of its results. The location of the DDC farm in their area supported our argument. The graduates were invited to visit the DDC sites at South Tahrir and Sadat City on July 9, 1984. A field

visit was organized for 18 graduate leaders representing all local cooperatives (nine) and their union. A number of top officials from the South Tahrir Province were also invited. The visit was mutually beneficial. One of its outcomes was the interest that the graduates showed later during the survey and their willingness to give ample time and satisfactory answers to the questions in the survey. (For further details covering the graduates' visit, see (Appendix 2).

2. OBJECTIVES OF THE SURVEY:

2.1. Identification of Social and Demographic Characteristics:

Social and demographic characteristics will help the DDC team to be acquainted with the first target group (the graduates) with whom they will work. These characteristics include age, marital status, educational level, length and type of previous experience, and length and type of previous training. Occupation, residence status as well as the educational level of the graduate's wives was also investigated.

2.2. Appraisal of Agricultural Performances, Socio-Economic and Institutional Constraints:

This covers the diagnosis and analysis of current agricultural performances and problems of the group. It also includes specifications of major constraints that limit the productivity of their land as well as the social constraints that affect their livelihood.

This appraisal study dealt with the following issues:

- Land use and cropping patterns
- Crop production efficiency measured by indicators such as crop yield, gross margin, and normal profit.
- Break-even yield per crop per feddan on the basis of three cost levels: variable cost, total cost of production and minimum cost of living.
- Technology level adopted by the farmer (labor vs. machinery).
- Farm income required for improving the livelihood of the graduate farmers.
- Constraints in agricu1tural productivity , such as .shortage of labor, shortage of mechanization, lack of credit facilities, lack of marketing and processing facilities, shortage in water supply for irrigation and low soil fertility.
- Water quality and quantity and irrigation methods.
- Livestock and poultry production performances and constraints such as shortages of feed supply, poor veterinary care, and feeding pattern.
- Social and institutional constraints: means to overcome such constraints, and increase the efficiency of relevant institutions.
- Existing social services such as health, education, housing and shortages in such services.
- Existing infrastructure such as roads, communications, electricity, and drinking water.
- Farm management and record keeping practices and constraints.
- Land tenure status and its problems as related to lack of credit facilities, graduates I social adjustment to new communities and their professional satisfaction.

The graduates I recommendations to overcome the above mentioned constraints were also identified. These included the role of the graduates the government as well as the cooperative societies.

As a result of the data collected from the survey, a number of alternative cropping patterns were designed. These patterns were based on different proportions of fodder and field crops, vegetables and/or citrus fruit. Dairy cattle were included in some of these patterns (11 patterns).

2.3. Proposing Guidelines for Planning New Communities:

The outcome of this survey can help decision-makers responsible for comprehensive planning of new desert communities through lessons learnt from negative and positive experiences in settling graduates in South Tahrir. The positive aspects should be adopted and developed, while the negative aspects should be avoided through improvements and modifications. Further- more, feedback between the South Tahrir experience and the DDC is one of the basic objectives of the center's activities.

2.4. Establishing Guidelines for Training programs:

Through proper analysis of the data collected from the survey, the training requirements of the graduates can be identified. This will enable DDC to offer special training programs for specific targets. These programs include agricultural, technological and socio-economic aspects of desert development. The socio-economic program should include farm management and accounting, means to obtain loans from credit agencies and alternative applications of these loans.

2.5. Providing Indicators for Designing Demonstration Farming Units:

The survey has provided DDC specialists with some indicators for designing the proposed demonstration farming units (Maxi Project) based on the experiences of the graduates in this area.

2.6. Initiation of self-help Projects for the Graduates:

A number of self-help projects may be initiated in the area in order to overcome some constraints faced by the graduates. An interdisciplinary task group of DDC staff members will be assigned to each project. The participation of the graduates and government officials in implementing these projects is essential to their success. Possible self-help projects Include:

a) Marketing of milk, since the survey has shown this to be the most critical constraint in animal production.
b) Pest control of nematoda which infects groundnuts; the most important.
   Cash weed crop for the graduates.
c) Weed control

Other projects may start depending upon the success or failure of the first projects and the capacity and interest of the DDC staff to handle them.

II. ECONOMIC ANALYSIS AND MONITORING OF THE MAXI PROJECT

The Maxi Project covers the following demonstrations:

1- A pilot agrobusiness activity (fodder / cattle / biogas), and a milk processing plant.
2- Three small-scale demonstration farming units (20 acres each) at South Tahrir designed to compare different combinations of animal/fodder versus horticulture and non-traditional cash crops.
3- Three non-conventional small farming units at Sadat City based on controlled environment non-conventional agricultural systems.

The DDC Community Development Unit has participated in designing these demonstration units and will also participate in the monitoring phase:

A. The unit used data gathered from the socio-economic survey at the South Tahrir consideration when these included the graduate farms to provide indicators which were taken into the proposed alternative cropping patterns were selected. most profitable crops shown by the survey.
B. The calculated farm income for each cropping pattern was taken as a guideline to measure the expected standard of living and livelihood conditions of the farmers.
C. The socio-economic survey data were not enough to achieve the above objectives, and additional data were obtained from other field research conducted in the New Lands, ego The Samalout survey (sponsored by the Ford Foundation), El- Nahda livestock farm (North Tahrir), and other observations from arid and semi-arid countries, such as: Jordan, Syria, and Saudi Arabia.
D. The type of fodder to be grown and the corresponding stock carrying capacity of the proposed farming models were adjusted by the DDC scientists using their experience on the AUC farms and the indicators referred to in (a), (b), and (c) above. The final decisions were the result of a number of meetings and discussions of the three DDC groups: technical, agricultural and community development. The adopted cropping pattern(s), livestock type(s). And carrying capacities are shown in Appendix 3.
E. A proposed model of the input-output relations was discussed with the livestock express of the project for its possible use as a guide in designing the farming units.
F. A task group including the economist, dairy scientist and mechanization expert cooperated in the preliminary designing of the proposed milk processing plant. This processing unit will, whenever possible, utilize renewable energy sources (solar, biogas). The possibility of supplying the unit with part of the graduates I milk supply will also be taken into consideration for producing a unit of economical size and helping to solve the milk marketing problem of the graduates.
G. The economist will secure the following:
    - Profitability per feddan for each enterprise.
    - Net farm income of each farming unit.
    - Seasonal cash flow analysis (liquidity) for each household of each farming unit.
    - Investment; analysis for each farming unit.
    - Optimum utilization of water and energy sources to estimate the opportunity costs of these scarce inputs.

- Seasonal peaks of demand for- labor, machinery, water, fertilizers.
- Magnitude of vertical and/or horizontal integration among and within the farming unit(s).

H. The above mentioned information requires designing data records for monitoring over the agricultural year on a monthly or seasonal basis. These records will include the following main categories, each of which itemized according to purpose, crop and farming model:

Assets inputs (energy, water, machinery, labor, seeds, fertilizers, pesticides ...etc.), Output (main, intermediate and by-products).
Livestock records will be by nature a different set of records. Additional forms are designed, such as: farm income statement, house-hold expenses of managers' families.

I. Managerial aspects of the demonstration farming units have been one of the aspects discussed by the Community Development Unit. Discussion covered incentives, facilities, responsibilities, basis for choice etc.

J. The Community Development Unit participates in the task group responsible for design of proposed passive solar architecture housing to be built units in the demonstration family housing through sociological inputs needed for the

III. ECONOMIC ANALYSIS AND MONITORING OF THE lDRC PROJECT

The aim of the economic analysis for the IDRC funded research activities under- taken by the DDC is to evaluate alternative strategies for improving desert soil productivity. The best definition of fertility for the purposes of the new lands reclamation is that based on economic criteria in addition to technical one. Thus, a feddan is considered fertile (economically) when a particular crop has reached break-even or better. This means that fertility is crop/soil specific rather than soil specific only. The economic analysis focuses on:

- Comparing the different rotations in terms of costs, number of preceding seasons, and time period until a crop/soil combination has reached the break-even stage.
- Distribution of costs, net returns and value of output for the preceding season on a unit yield basis at the break-even stage, to derive efficiency indicators.
- Evaluating the production capacity of the soil (at fertility stage) in terms of cost/unit for biomass yields or other measures such as produced amounts of oil, fiber or grain, quality of protein, or carbohydrates, etc. This evaluation is produced under different rotations using alternative crop mixes, at the break-even stage to economically measure the productive capacity of the soil.

An attempt is currently being made to apply an analytical framework to the crops studied during phases I and II of the IDRC project. Currently, an improved data monitoring system is being designed for generating more comprehensive data in the future. This is being accomplished through data sheets listing all inputs, outputs and operations to be filled by those in charge of cultivation of the project's experimental plots.

PART TWO: ANALYTICAL: THE SOCIO-ECONOMIC SURVEY FOR GRADUATES SETTLED IN SOUTH TAHRIR

1. OBJECTIVES, SCOPE AND LIMITATION OF THE SURVEY:

The survey was designed to identify social and demographic characteristics of the graduates in terms of age, marital status, educational level, previous experiences and training. The data collected should provide enough background information about the graduates which could help DDC to develop projects and prepare a viable training or diffusion program for them.

A second major objective of the survey is to diagnose and investigate the performances and major socio-economic constraints of the agricultural activities of the graduates. The agricultural activities include crops and livestock. Emphasis was given to performance aspects including land use and cropping patterns, crop efficiency measures, livestock holdings according to type, productive goals and feed use patterns. The socio-economic constraints include shortage in water supply, poor irrigation management, obstacles in securing inputs, problems in pesticide application, lack of marketing channels and incentives as well as credit facilities.

Institutional and organizational constraints such as lack of personnel, cooperative facilities, health and educational services, infrastructure and communication networks were also covered by the survey. Farm management and record keeping practices and constraints as well as land tenure status and problems were also included. The survey also collected personal opinions and suggestions from the graduates for overcoming the above mentioned constraints and the party; whether it is the graduate himself, the relevant government agency or the cooperative society.

The survey discussed in this report is restricted to a particular group of farmers (the graduates) at a particular stage of settlement in South Tahrir. It will be fol1owed by another survey for the small holders in the area. In addition, data collected from government officials and administrators cover general issues such as structure and functions of health and education provided by cooperatives as well as other organizations and institutions.

The data collected from the survey will be stored for future analytical studies relevant to the centers on-going activities including experimentation, demonstration, diffusion, training etc. One of the immediate applications will be for specific case studies; either for solving some problems facing the graduates by designing and implementing self-help projects, or to assist in the design of the demonstration farming units of the maxi projects

2. The RESEARCH SITE:

The South Tahrir area was selected as the research site for the socio-economic studies, since one of the DDC experimental stations is located in this area where a variety of farmer~ groups have settled since ~he early sixties. Accordingly, the South Tahrir neighborhood is considered to be an ideal site for working with different groups of farmers, demonstrating appropriate technologies, and diffusing new ideas.

The area where graduates are settled in South Tahrir is called Tahaddi. It consists of 37,075 feddans of sprinkler irrigated sandy soil. Water for irrigation is drawn from the

Nubaria canal (a branch of the Nile), as well as groundwater. The history of land reclamation in this area goes back to 1959 when an Italian company called Italconsult started working on the reclamation of the 37,075 feddans that lie 140 kilometers northwest of Cairo. Tahaddi belongs administratively to Al-Beheira Governorate and is located 75 kilometers west of Damanhour, the capital. The Tahaddi project was officially inaugurated in June 1967 and it was operated as a state farm under the sponsorship of the Egyptian Authority for Cultivation and Development of Reclaimed Lands.

2.1. Farm Sectors

Tahaddi is divided into seven farm sectors, five of which are already reclaimed and inhabited by small holders and graduates. The farms and their respective sizes are:

NAME	AREA (FEDDANS)	
Al Nagah (The Capital)	5,246	Reclaimed
Al Maaraka	6,723	"
Al Kifah	5,226	"
Al Azimah	4,288	"
Ayn Galut	5,564	"
Al Falugga	4,557	Not Reclaimed
Al Tal Al Kebir	2,971	"
TOTAL	34,575	Feddans
Public Land	2,500	
	37,075	

2.2 Villages

There are 17 villages in Tahaddi; one main service village and two or three surrounding satellite villages (Ezba) in each of the seven farm sectors. On the average there are 225 houses in each service village and about 130 houses in the satellite (Ezba) villages.

VILLAGES IN TAHADDI

SERVICE VILLAGES	SATELLITE VILLAGES
Al Nagah	Village No. 29 Village No. 30 Mirtah village
Al Kifah	Al Muntafi' in Al Muhagrin Village No. 20
Al Ma'araka	Sinnfa Village No. 3 As' Saidda
Al Azimah	Al Muntafi' in Al Muhagrin
Ayn Galut	Village No. 34 Village No. 37
Al Tal Al Kabir	Village No. 6A Village No. 6B
Al Faluga	Village No. 3A Village No. 3B

In 1977 the first group of graduates arrived in Tahaddi. There were 14 in this group. They were joined by another group of 410 graduates in 1978 making a total of 554. The existing population of the graduates in Tahaddi is only 500 according to the DDC survey and the official lists of the agricultural cooperative societies.

Distribution of Graduates According to Cooperatives

Name of Co-operative	Number of Graduates	Land Size		
		Feddan	Kirat	Saha
1. Al Azima	77	1306	9	4
2. Al Eman	54	1367	13	23
3. Al Sumud	38	752	17	--
4. Al Kifah	44	1420	14	8
5. Al Abur	58	1691	23	11
6. Sita October	73	1625	13	23
7. Ayn Galut	57	1707	11	23
8. Al-Basatteen	33	687	13	12
9. Al-Tahaddi	64	1238	7	16
TOTAL	498	11798	10	--

The graduates are distributed over nine local agricultural cooperative societies. Cooperative union for all the nine local Cooperatives was established in July,1979.

All graduates covered by the survey sample own houses on the farm; 89% of them are Living on the farm.

3. SOCIAL AND INSTITUTIONAL ANALYSIS:

3.1. Social and Demographic Characteristics of the Graduates:

When people move from one community to settle in another, they carry with them their social characteristics. The study of the social characteristics of the graduates and its impacts (social and economic) on the new communities is a prerequisite for understanding the graduates' problems, and will help the DDC staff to apply appropriate approaches and techniques to solve these problems. As the staff gets to know the graduates better, communication and cooperation between the two sides will improve. This will strengthen diffusion, demonstration and training programs provided to the graduates by the Center.

The survey studied the social and demographic characteristics of the graduates including age, marital status, family size, previous training experiences and wives' education, occupation, and residence.

3.1.1. Graduates-distribution by age:

The survey shows that the age distribution of the graduates does not follow a normal distribution curve since the majority (77%) of the graduates is between two age groups 36-40 and 41-45. Table (1) shows the graduate distribution by age. This distribution is an outcome of the criteria for selection of graduate settlers. The selection criteria for graduates include the following eligibility requirements:

- A graduate from an agricultural high school or university
- Between the age of 25 and 45
- A minimum of five years of agricultural experience.
- Owner of not more than ten feddans
- A non-governmental employee.

Priorities were given to married graduates with a larger number of dependents and longer experience. The principle adopted was that this age group is usually more stable and reliable, thus enabling them to withstand and adjust to the new environment. However, graduates at this age group might have children with higher educational needs that cannot be fulfilled in the new land, making the social adjustment of the family lagging behind. In many cases, the graduate's wife has to reside with her kids in the nearest city where the appropriate school is located.

Table (1): Graduates' Distribution by Age

Age Group (Years)	%
30 - 35	6
36 - 40	29
41 - 45	48
46 - 50	13
51 and over	4
TOTAL	100

3.2.1. Distribution of graduates according to marital status

The marital status of settlers in new lands will affect the population characteristics of both the old and new land. The settler's marital status affects the level and variation of consumer goods, educational and health needs as well as, accommodation and recreational facilities required for the new community. Furthermore, the social and economic problems faced by the graduates in their new communities vary in nature and in kind according to their marital status. Marriage will favorably affect the degree of adjustment of the graduate providing that appropriate accommodation and services for all family members are available. On the other hand, marriage may have a negative impact on the degree of adjustment if these accommodations and services are not available; which is the case in South Tahrir and most of the new lands.

Table (2) shows the distribution of graduates according to marital status. 95% of the graduates are married, 4% unmarried and 1% divorced. This distribution is an outcome of the criteria for the selection of graduates where priority was given to married farmers.

Table (2): Distribution of Graduates According to Marital Status

Marital Status	%
Married	95
Unmarried	4
Divorced	1
TOTAL	100

3.1.3. Educational level

The survey sample shows that 50% of the graduates have a B. Sc. in agriculture, 48% have a Diploma equivalent to high school in agriculture and 2% have a Masters degree in agriculture. (Table 3).

Table (3): Distribution of Graduates According to their Level of Education

Level of Education	%
Agricultural High School	48
University Degree (B.Sc.) in Agriculture	50
Post Graduate Degree (M.Sc.) in Agriculture	2
TOTAL	100

This relatively high level of education among this group indicates that they may accept new ideas and innovations in agriculture faster than other farmers I groups who have a lower level of education such as the small holders.

Education, in general, increases the degree of participation of the farmers in their cooperative societies as well as other rural institutions. However, the majority of the graduates were not satisfied with their cooperatives which indicate that education is a necessary but not a sufficient prerequisite for an efficient cooperative. The educational level of the graduates is reflected on the degree of their aspiration for higher standard of living; including quality of schools, hospitals and other community services. This may make the degree of adjustment of the graduates to new communities slower than that of the small holders who are mainly uneducated. However, graduates who used to live in the area before they were given agricultural land could adjust to the new conditions faster and smoother than new commers who moved from other areas.

Graduates, as educated farmers, have high educational aspirations for their sons and daughters. Most of them expressed their dissatisfaction with the quality of the schools in the area (see p, "Educational Services"), Many graduates send their children to private/foreign schools in the nearest city or capital. This has its impact on the family ties. They expressed to the DDC team their willingness to participate in the financing of a self-help English school.

3.1.4. Previous experiences

Priority for the selection of graduates was based, among other criteria, on the number of years of work for the government in agricultural projects. Each applicant is assigned a grade based on the number of years of experience. The type of this experience is as important, since it will help the DDC team to select the graduate who has the appropriate experience for a particular self-help project aimed at solving a certain problem. Table (4) shows the distribution of graduates according to their years of experience before settling in South Tahrir

Table (4): Distribution of Graduates According to their Experience

Length of Experience (Years)	%
4 - 12	38
13 - 20	54
21 - over	8
TOTAL	100

The table shows that most of the graduates (54%) have 13-20 years of experience. Further studies are needed in order to find out if there is any correlation between the previous experience of the graduates and their agricultural performance in the new community.

Table (5): Distribution of Graduates According to the Type of their Previous Experience

Type of Experience	%
Traditional Crops	99
Vegetables	89
Fruits	83
Fodder Crops	82
Medicinal Crops	2

Table 5 shows the distribution of graduates according to the type of their previous experience. It is clear from the table that most of the graduates have experience in growing traditional crops, vegetables and fruits. However, their decision to grow vegetables is subject to other factors such as availability of labor, processing and

marketing facilities; the latter being one of their major problems. While only 2% of the graduates' sample have previous experience in growing medicinal crops, the graduate leaders expressed their interest in growing medicinal crops following their field visit (July, 84) to the DDC Sadat City site where medicinal plants have been successfully grown. The survey shows the need for a training program before initiating a self-help project for growing, processing and marketing medicinal plants.

3.1.5. Educational level of graduates' wives

Table (6) shows that 55% of the wives have intermediate, above intermediate or university qualifications. This percentage indicates a relatively high educational level among graduates' wives, especially since17% have a university degree and this will, no doubt be reflected on the standard of living of the family as well as the new community in which educated women can play a major role in its development.

Table (6): Educational Level of Graduates' Wives

Educational Level	%
No Qualifications	31
Primary	4
Preparatory	5
Secondary	10
Technical Secondary	17
Teaching Diploma	8
Above Intermediate Qualification	3
University Degree	17
Unspecified	5

Table (7) shows that only 32 of the 55 "educated" wives work; which implies that the difference (23) represents the "educated" wives who do not work. This may be attributed to the lack of appropriate job opportunities, or to the reluctance of the graduates to allow their wives to work. The farmer is more plausible however, since it was found that 19 out of 32 working wives have positions in South Tahrir, .while the remaining work outside the area.

Table (7): Graduates' Wives Working Status

Working Status	%
Work	32
Do not Work	63
Unspecified	5

3.2. Services and Infrastructure

Social services, especially education and health, as well as infrastructure, especially roads and means of transportation, are not only needed for their physical function~ but also for their social functions. If the latter are available and of good quality, they could be used as an incentive to attract people to move to newly reclaimed areas in the desert. The paradox is that the new lands which need services most, have the least share in them. The allocation of funds for services is determined according to the density of population. Therefore, cities with highest density got the lion share in services, while remote areas with thin populations have low priority in funds allocated for services.

Services and infrastructure are reflected on the degree of social adjustment of the graduates to their new communities. This part of the survey covers the existing status of education, health and communication services; their availability and constraints. Housing facilities were also studied for the same reason. This survey emphasizes the graduates' opinion about the efficiency and constraints of these services. However, the size and capacity of these services will be gathered from specialized officials working in each service.

3.2.1. Educational services

The survey did not cover the number and type of schools, number of students and classes in the area, since this will be gathered from other sources which has precise records and reliable statistics. However, the survey aims to identify and assess the constraints affecting the social life of the graduate and his family. Table (8) shows the educational problems as seen by the graduates. Table (9) lists the suggestions aimed at to overcome these constraints as proposed by the graduates in the survey.

3.2.2. Health services:

The survey shows the availability of health services and the proximity of the nearest health unit or hospital to the graduates' residences (Table 10).

Table (8): Educational Constraints and their Relative Importance as seen by the Graduates

No.	Constraints	Relative Importance %
1	Shortage and inefficiency of teachers	23.5
2	Location of schools (far from the farm)	21.2
3	Lack of appropriate transportation	21.2
4	Number of classes not enough	19.5
5	Number of primary and secondary schools not enough	7.5.
6	School mismanagement	4.2.
7	Private tutoring	2.9
	TOTAL	100

Table (9): Graduates' Suggestions for Overcoming the Educational Constraints

No.	Suggestions	Relative Importance %
1	Establish new schools and incease the number of classes	38
2	Improve the roads and transport facilities	22
3	More teachers and better incentives for them	15.4
4	Better control on school management	14.8
5	Training courses for teachers	7.1
6	More financial and educational support	2.7

Table (10): Proximity and Availability of Health Services

Distance to the Nearest Health Service	Type of Helath Service	
	Hospital	Health Unit
	% Graduates	% Graduates
Less than 3 kilometers	1	48
From 3-5 kilometers	1	42
More than 5 kilometers	96	9

The majority of the graduates (96%) stated that the closest hospital is located at a distance of more than five kilometers from their residence. On the other hand, 42% of the graduates; reported that a health unit is located at a distance between 3-5 kilometers, and 48% at a distance less than 3 kilometers from their respective residence.

The presence of a health unit or a hospital in the vicinity is a necessary but net a sufficient condition to have appropriate health services. A number of constraints limit the efficiency of the health services for graduates in South Tahrir. Table (11) shows the constraints, as stated by the graduates, as well as the relative importance of each constraint.

Table (11): Constraints in Health Services and their Relative Importance

Constraints	Frequency No. of Graduates	Relative Importance
Shortage of medicine	51	30.9
Absence of specialized doctors	47	28.5
Non-availability of ambulances	25	15.2
Irregularity of doctors' attendance	22	13.3
No primary health care and first aid services	14	8.5
Health centers are too far	6	3.6

3.2.3. Communication services:

Means of transportation and communication have their major importance in the social and economic lives of the graduates of the new lands. Roads and means of transportation, the availability of means of communication such as telephones, telegraphs and mass media facilitate the procurement of inputs for agriculture as well as the marketing of its outputs.

Good means of communication play a major role in ensuring the graduates· feeling of security and safety, by being able to interact with their relatives in the old lands, and even for the graduates' immediate family where the wife and children stay away from the farm for one reason or another. Communication also links the graduates with the outside world culturally and socially. Mass media such as T.V., radio and written media exposes them to new innovations in their fields and improves their performance in agriculture in addition to its major role in recreation, which is specially needed for such remote areas.

The data for all these communication and transportation facilities will be gathered separately from more precise resources since the graduates could not supply the survey with such information. Therefore, graduates were asked about the availability of telephone and telegraph services in particular. Roads and transportation services were discussed under agricultural activities such as the provision of inputs and the marketing of outputs.

It is clear from table (12). That both telephone and telegraph services, as basic communication services, are not available for the majority of the graduates in the area. The distance between graduates· residence and the service center or the village where such services are located is a limiting factor. Table (13) shows the proximity of these services to the graduates' residences.

Table (12): Type and Availability of Communication Services for Graduates

Availability of Services	Type of Services	
	Telephone	Telegraph
	% Graduates	% Graduates
Available	32	6
Not Available	68	94
TOTAL	100	100

Table (13): Proximity of Telephone and Telegraph Services to Graduates' Residences

Distance to the Nearest Service	Type of Services	
	Telephone	Telegraph
	% Graduates	% Graduates
Less than 3 kilometers	5	3
From 3-5 kilometers	8	5
More than 5 kilometers	87	92
TOTAL	100	100

3.3. Housing

Housing is one of the most essential needs of human beings. Some societies have shown a great interest in the housing conditions of their individuals in order to improve their standard of living. In most communities, it was usually the peoples' responsibility to provide their housing, without any organized help from the government. This has been the case for a long period, due to the lack of well planned, long or short range, governmental housing strategies.

Due to the importance of appropriate housing design and materials in the desert environment, the DDC has given the subject of Desert Housing a prominent position in its research program. The survey covered a study of the graduates I housing conditions

in South Tahrir with emphasis on the availability and number of houses, housing facilities and their architectural design as well as types of construction materials.

By studying the housing conditions of the graduates in South tahrir. it was found that all graduates own houses and that 89% of them 1ive in these houses while 11% do not. Table (14) shows the distribution of houses according to number of rooms in each house.

Table (14): Distribution of Houses According to the Number of Rooms

Number of Rooms per House	Number of Houses
One Room	3
Two Rooms	17
Three Rooms	28
Four Rooms	30
Five Rooms	12
Six Rooms	6
Not Shown	4
TOTAL	100

Many factors determine the architectural design of houses in any location. Among these factors is the availability of the material needed for the building, cost predictions, the climate, the socio-economic status of the resident, availability of public utilities prevailing trends towards housing design.

The use of different building materials for the graduate houses in South Tahrir is demonstrated in Table (15), showing the distribution of these houses according to the material used. Based on the prevailing cultural practices in these newly settled areas, most of the graduates prefer to use red bricks or evacuated cement blocks in building their houses. while a minority of the graduates (about 4%) tend to use mud bricks.

Table (15): Distribution of Graduates' Houses According to Building Materials

Building Materials	Number of Houses
Red Bricks	78
Evacuated Cement Blocks	13
Stones	2
Mud Bricks	4
Unshown	3

Table (16) gives the number of houses with a flat concrete ceiling, a dome, or prefabricated metal.

The availability of housing facilities including water supply, sewage system and electricity in the graduates I houses is demonstrated in Table (17).

Table (16): Shape of Ceilings in Graduates' Houses at South Tahrir

Ceiling Shape	Number of Houses
Flat Ceiling	92
Domed Ceiling	2
Gamalun Ceiling	1
Unspecified	5

Table (17): Graduates' House Facilities in South Tahrir

House Facilities	Number of Houses
Bathroom	94
Bath tubs	90
Sanitary Drainage	86
Adequate Natural Lighting	87
Electricity	87
Ventilation	95
Unshown	3

Table 17 shows that most of the houses in South Tahrir have the essential facilities needed for sanitary housing. This may be due to the high social and cultural standards of the graduates relative to small farmers or laborers.

Table (18) shows the number of houses with regular electricity supply as compared to those with an irregular supply.

Table (18): Availability and Regularity of Electricity in Graduates' Houses

Regularity of Electrical Supply	Number of Houses
Regular	43
Irregular	44
Not Available	13

Adequate housing conditions is not the only factor that will help the graduates to settle down in these new areas, but there are other social factors which are also as important. By interviewing the eleven graduates (out of a sample of 100 graduates) who do not reside on their farms. Most of their reasons appeared to be due to lack of different institutions in the area. Table (19) shows the reason given by these graduates for not residing on their farms. That is why it is crucial to aid the graduates help themselves and initiate social institutions to satisfy their needs which will, in turn, result in a smoother social adjustment to their new conditions. The latter will be reflected on their work efficiency and, ultimately, results in the success of the experiment of settling graduates in the South Tahrir area.

Table (19): Reasons Given by Graduates for not Living on the Farm

Reasons for not Residing on the Farm	Number of Graduates
Unavailability of Appropriate Schools	4
Lack of Local Services	3
Prefer Convenient Accomodation Near the Farm	2
High Costs of Living	1
Wife Works Far from Farm	1
TOTAL	11

One can conclude here that most graduates built their houses following traditional methods of red bricks and flat ceilings etc ... without taking into consideration the climatic conditions of the desert. The concept of passive solar architecture needs to be introduced by the DDC
Especially to new settlers who moved recently at the end of 1984. Most of these settlers have not started building their farm houses yet and it may be possible to start a self-help project with them under the supervision of the DDC. The idea has been discussed with some officials and new settlers in South Tahrir who expressed their interest in having a training session (to be financed by the Central Cooperative Society) on passive solar architecture techniques of building a house in South Tahrir area. The techniques used in the design and construction of the AUC/DDC building at Sadat City is one example of passive architecture. Some of the graduates and officials from South Tahrir visited the AUC/DDC building at Sadat City last summer. Emphasis in the training session will be on self-help approach where the settlers themselves are able to do their own building construction.

3.4. Institutions and Organizations:

South Tahrir area like other new lands in Egypt is suffering from the lack and inefficiency of local institutions and organizations. Hardships and lack of appropriate accommodations does not attract high caliber government employees. Furthermore, many government agencies are not represented on the local or even on the regional level in new lands. Agricultural extension is a typical example here where extension officers are not properly qualified to advise new settlers on appropriate soil and water management for the sandy soil and desert environment.

There are different types of organizations and institutions in the new communities of South Tahrir. In this survey we have limited our questionnaire to institutions that have direct impact on the graduates such as Agricultural Cooperative Societies, Maruit International Center, Egyptian Agricultural Authority, National Research Center, and General Office for Agriculture, and, Soil Improvement Funds. The survey was concerned with the impact of these organizations on the graduates farming activities and identified major constraints impeding the efficiency of these organizations.

Table (14) lists the local organizations in South Tahrir, the percentage of graduates associated with each, and the extent of satisfaction with each organization. All graduates are dealing with the agricultural cooperative society since it represents the main channel of communication with the government and membership is obligatory. However, only 17% of the sample of graduates is satisfied with its services. On the other hand, 3 out of 19 are satisfied with the services of the Egyptian Agricultural Authority. The rest of the organizations have very insignificant impact on the graduates. The structure and functions
Of these organizations are beyond the scope of this survey.

The major organizational constraint, as seen by the graduates, is the unavailability of registered land title for 44% of the graduate sample. Of equal importance is the observation that service organizations do not have branches on the village level. Other organizational constraints and their relative importance are listed in Ta.ble (21). In general, however, the survey indicated shortage of organizations and institutions in newly reclaimed areas. And even when the organization is available, many graduates

cannot make the best use of most of these organizations, especially those providing credit facilities, due to unavailability of registered land titles. The latter constraint represents a major bottleneck in breaking the vicious circle of poverty which starts with lack of credit facilities, leading to low productivity, inability to pay their debts and installments and so on.

Table (20): Local Organizations and their Impact on the Graduates

Organization	% Graduates Affiliated With Organization	Degree of Satisfaction	
	%	Satisfactory	Unsatisfactory
Agricultural Cooperative Society	100	17	83
Egyptian Agricultural Authority	19	3	16
Maruit International Center	2	1	1
National Research Center	2	1	1
General Office for Agriculture	1	1	-
Soil Improvement Funds	1	1	-

Table (21): Organizational Constraints and their Relative Importance (as seen by the Graduates)

Constraints	Frequency %	Relative Importance
Unavailability of Land Title	44	28.4
Lack of Local Offices to Represent Service Organizations on the Village Level	44	28.4
Inefficiency and Lack of Sense of Responsibility Towards the Graduates	23	14.8
Lack of Inputs for Agricultural Production	21	13.6
Remoteness of the Area	9	5.8
Rough Roads and Poor Transportation	7	4.5
Lack of Services in the Area	6	3.9
Low Cooperative Marketing Prices	1	6
TOTAL		100

3.5. Land Tenure:

The land tenure status of a farmer affects the socia-economic aspects
of his life to a great extent. The degree of his adjustment to the new community is high ly related to hi 5.1 and: tenure status. Land owners hip , for the graduates, means social and economic stability, security, and eligibility for credit facilities.

The government criteria determining the farm size distributed among graduates is based on the educational degree of each and the soil Fertility of the land. Land under citrus and other fruit trees is considered more fertile than land under traditional crops. Accordingly, land allocated to a University graduate is around 30 acres if planted with traditional crops and 15 acres if planted with citrus or other fruits. On the other hand, agricultural high school graduate is usually allocated about twenty acres of land planted with traditional crops or ten acres of land planted with citrus or other fruit trees.

Of the 100 graduates covered by the survey, 42 hold a University degree, and 58 are graduates of an agricultural high school. Table (22) shows the distribution of the land allocated to these graduates based on the above mentioned criteria.

Table (22): Distribution of Land Based on Graduates' Educational Deg
Agricultural Activity (Traditional vs. Citrus)

Educational Degree	Agricultural activity	Size of Land Holding
University Degree	Traditional Crops	25 acres and more
	Citrus	15 acres and more
Agricultural high School Graduate	Traditional crops	15 acres and more

3.5.1. Tenure problems:

Although many of the graduates in South Tahrir received their land in 1977, the problem of registration of land ownership is still unsolved up till the time the survey was conducted (August, 1984). As mentioned earlier, this creates a major financial constraint for them as far as credit facilities are concerned. It also has negative social and economic implications including their adjustment to the new community as well as their long-term planning and investment in agricultural activities.

The survey showed that the greatest majority (95%) of the graduates realize the importance of this problem. The survey also explored the graduates opinions on the different constraints hindering the registration of land ownership. Table (23) lists these constraints and their relative importance based on the findings of the survey.

Table (23): Major Constraints Hindering Land Registration

Constraints	% Graduates	Relative Importance
Differences in Opinion Between Government and Graduates on the Terms of Contract	80	34.3
Government Red Tape	76	32.6
Delays in Installment Payments by the Graduates	42	18.0
Ineffectiveness of the Agricultural Cooperative Society in Solving the Problem	35	15.1

3.6. Farm Records:

To maintain an efficient farm, the farmer has to keep recodes of his agricultural activities. These records should cover information such as the type and amount of animal feed, number, age and kind of cattle, as well as different inputs (seeds, fertilizers, labor, insecticides, etc.) and outputs (crop yield, by products, etc.). Properly maintained records can help the graduate to minimize production costs and maximize profits. Improving on-going farm procedures, and providing information required when applying for loans are among the benefits of keeping records.

In the area under study, where the farm size is reasonable, farm records ought to be kept so that the graduates can control and organize the different agricultural operations. The survey has shown, however, that only 35% of the graduate sample kept records (Table 24).

Table (24): Percentage of Graduates Keeping Agricultural Records

Item	%
Graduates Keeping Records	35
Graduates not Keeping Records	62
Unknown	3
TOTAL	100

Increasing graduates' interests in using records can only be attained by demonstrating the importance of keeping records through training sessions to be organized by the DDC.

Table (25) lists the types of records used by the graduates, as well as the extent of their use. The table indicated that the field book is the most kept record. It records all agricultural field operations. The daily book keeps daily records of income, expenses, selling and purchasing rates and total prices. Table (26) lists the type of operations recorded by the graduates and their relative importance.

It should be noted here that some important operations such as those improving the soil, plant and animal production, are not recorded by the graduates.

Table (25): Types of Records Kept by the Graduates

Type of Record	Number of Records	Relative Importance
1. Field Book	28	45.2
2. Daily Record	18	29.0
3. Cashier Book	6	9.7
4. Inventory Record	5	8.1
5. Family Living Expenses Record	2	3.2
6. Machinery use Record	1	1.6
7. Poultry Record	1	1.6
8. Other Records	1	1.6
TOTAL	62	100

Table (26): Types of Operations Recorded by Graduates and their Relative Importance

Item Recorded	Number of Records	Relative Importance
1. Agricultural Field Operations	27	43.6
2. Dates of Planting and Crop Rotations	8	13
3. Cost Accounts	7	11.3
4. Crop Yields	4	6.5
5. Returns	3	4.8
6. Labor	3	4.8
7. Dates of Pest Control	2	3.2
8. Fertilizers and Dates of Application	2	3.2
9. Storage Records	1	1.6
10. Dry and Concentrated Animal feed	1	1.6
11. Birth Dates of Animals	1	1.6
12. Dates of Animal Insemination	1	1.6
13. Acreage	1	1.6
14. Dates of Harvesting	1	1.6
TOTAL	62	100%

3.6.1. Farm accounts:

Keeping accurate records of the farm accounts is very important for effective farm management. However, the majority of the graduates in South Tahrir rely on memory. They explained the absence of keeping records for their accounts as being due to the small land ho1dings and/or the lack of experience in handling account records and/or the sma11 size of capital used. Table (27) gives the relative importance of their reasons for not keeping account records.

Of the South Tahrir graduates who actually do keep a record for their farm's accounts, it was found that only 15% keep the records themselves (see Table 28).

Table (27): Graduates' Reasons for Not Keeping Records of their Farm Accounts

Reasons	Number of Graduates	Relative Importance
1. Reliance on Memory	55	61.8
2. Small Land Holdings	27	30.3
3. No Experience in Handling Account Records	6	6.8
4. Small Size of Capital Used	1	1.1
TOTAL	89	100

Table (28): Distribution of Farm Accounts Records Based on Who Keeps Them

Item	% of Graduates Keeping Records
Records Kept by the Graduate Himself	15
Records Kept by Another Person	84
Unknown	1
TOTAL	100

ECONOMIC OF CROP ENTERPRISES:

This section deals with the following subjects: land use and cropping pattern, production efficiency and major constraints that face the graduates· crop enterprises.

4.1. Land Use and Cropping pattern

The average farm size per holding is 23.83 feddans; of which:

- Uncultivable area: 1.52 feddans
- Cultivable area: 22.31 feddans; of which:
- Fertile eland: 10.88 feddans
- Less fertile land: 11.43 feddans

It seems that only one-half of the graduates· area is fertile, while the rest is either less fertile or even infertile. Obviously, this is a constraint in expending the cropping pattern or increasing the productivity; or at least it raises the fertilizer consumption rate and consequently the cost of production in order to reach a profitable yield.

Several farms of both university and high school graduates have changed the original cropping pattern towards other patterns. This issue may explain the wide range of the citrus yield among the graduate farmers in South Tahrir. Also, changing the cropping pattern leads to excess demand for water in comparison with the originally designed water supply capacity.

The total cropped area is shown in Table (29); the average is around 24.37 feddans, i.e. the cropping intensity coefficient is between 1.09 (based on the cultivable area) to 1.02 (based on the average farm size). This is a relatively low level of intensification in comparison with the national level which is 1.B. However, if we compare South Tahrir with another new land area (Samalout), the cropping intensity in the latter area is slightly higher, 1.2, than South Tahrir.

If the perennial crops area is excluded the winter season area then re- presents 150% of the summer season area. This is an evidence that the berseem and lupines areas are intercropped with perennial crops or cultivated as green manure and/or cultivated as winter fodder for livestock. Low crop intensity in summer may be attributed to water supply shortages during this hot season.

Table 29 shows that the most common crops in winter are: Berseem, peas and lupines. The most common summer crop is groundnuts. The most permanent crop is citrus. The food grains like wheat and barley are cultivated by less than one-fifth of the farmers on very small areas, even though they are not profitable (Table 31). Those who cultivate such crops are mainly concerned.

Table (29): Cropping Patterns of the Graduate Farms in South Tahrir (1983/84)

Crop	% of Holders	Cropped Area		Average Crop Area
		Total Area (Feddans)	%	
1. Perennial Crops				
Alfalfa	16	12	3,4	0.12
Citrus	29	272	70.0	2.72
Others	10	102	26.6	1.02
TOTAL (1)		386	100	3.86
2. Winter Season				
Field Crops				
Berseem	79	466	77.5	4.66
Lupins	45	89	14.8	0.89
Barley	20	2	0.3	0.02
Wheat	12	2	0.3	0.02
Beans	8	42	7.1	0.42
SUBTOTAL		601	100	6.01
Vegetables				
Peas	78	632	98.8	6.32
Tomatoes	2	8	1.2	0.08
SUBTOTAL		640	100	6.40
TOTAL (2)		1241		12.41
3. Summer Season				
Field Crops				
Groundnuts	83	800	100	8.0
Vegetables				
Watermelon	5	7	70	0.07
Squash	1	1	10	0.01
Eggplant	2	2	20	0.02
SUBTOTAL		10	100	8.10
TOTAL (3)		810		8.10
GRAND TOTAL		2437		24.37

With straw for livestock rather than the profitability of the crop itself. It seems difficult to get straw in such areas at reasonable price. Thus, the by-product is more important than the product.

Surprisingly, only 2% of the farmers cultivate tomatoes, although it has proven to be a very profitable high yield crop in other new land sandy soils (Samalout). The farmers in South Tahrir postulate that nematodes infection was the main problem behind such decision. The farmers in Samalout spend about L.E. 800 per feddan as variable costs in growing tomatoes, but they get 20 tons of tomatoes per feddan. The marketing problem is probably behind such limited expansion in the tomatoes in South Tahrir. Another possibility is that the graduates could not obtain the high yield varieties available to other new land areas.

If we exclude intercropped areas, the cultivable area per holding would be around 20 feddans, which represents a cropping intensity coefficient less than unity. Is it water supply shortage, soil characteristics, or finance inadequacy which lowers the cropping intensity? It seems that all these variables contribute to the existing low cropping intensity. This issue requires further studies.

Furthermore, seasonal intercropping with permanent crops needs to be studied economically and technically. This is because to grow seasonal crops under fruit trees, for example, is a source of current income over the first years till the trees bear fruits. The techno-economic impacts of this issue should be studied.

4.2. Crop Production Efficiency:

Analysis of the agricultural production efficiency is limited here to fit the data available from the survey. Therefore, it covers only the production of some major crops cultivated in South Tahrir by the graduates. The data available provide the following items per crop: area cultivated, yield, total return and variable costs.

The efficiency measures are:

a. yield per feddan
b. grpss margin
c. normal profit
d. break-even yield
e. level of technology

4.2.1. Crop yield per feddan:

To evaluate the level of crop yield per feddan, it was necessary to refer to an average reference yield for each by the graduates in South Tahrir. The national crop cultivated level was chosen.

Table 30 shows that the following crops reached to the national average: the closest yield to national average.

The first group: Strawberry, which reached a yield 70% to < 100% of the national average.

The second group: groundnuts and watermelons,: which reached a yield higher than the national average. This is an indicator that these crops are suitable for sandy soils (have comparative advantage). Some crops like eggplant or squash could not reach even 25% of the national average.

Most of the watermelon area is cultivated as a seed crop. Low yield of citrus is due to several reasons. Many fields are still in the stage of growth. The fruit trees are still young and most likely it is the first crop yield.

Surprisingly, groundnuts are the most common crop in summer and its yield is relatively low in comparison with other new land areas (Samalout). There are some reasons behind this phenomenon. First, the area suffers much from nematodes I infection. The infection is severe in the case of groundnuts. Secondly, because groundnuts are under the cooperative marketing delivery system the farmers are usually very conservative and are inclined to under-estimate their crop yields.

4.2.2. Gross margin per feddan:

The yield is a necessary but not a sufficient measure of the production efficiency. Cost and benefit measures are the sufficient measures to judge the success of a given crop.

The Gross Margin Total Return Total variable costs. It is the minimum acceptable earnings from a given enterprise for the farmer to produce a given crop, because he covers-in this case at least the cost items associated with production. Table 31 shows that all crops, except barley, wheat and squash, provide a positive gross margin. The highest gross margin in winter is provided by lupines followed by peas and the highest gross margin in summer is obtained from watermelon followed by groundnuts. Strawberry shows an outstanding gross margin. However, it is very expensive in terms of cost production and its marketing may face difficulties. Alfalfa is a very profitable cash crop around the year.

Table (30): Crop Yield on the Graduates Farms Relative to the National Average

Crops	Units of Yield	Yield per Feddan South Tahrir (1)	Yield per Feddan National Average (2)	(1) ÷ (2) X 100
Wheat	Ardab*	5	10.08	49.6
Barley	Ardab*	5	9.07	55.1
Lupins	Ardab*	1.7	4.22	40.3
Groundnuts	Ardab*	10.0	9.93	100.7
Peas	Ton	1.5	3.88	38.7
Watermelon	Ton	15.1	9.49	159.1
Squach	Ton	2.0	7.74	25.8
Eggplant	Ton	0.40	8.93	4.5
Strawberry	Ton	4.0	5.62	71.2
Alfalfa	Ton	20.7	40.0	51.7
Citrus	Ton	2.8	---	

*One Arab = 150 Kgs wheat or barley
= 75 Kgs lupins
= 80 Kgs peanuts

--- Not Available

Table (31): Yield, Gross Margin and Variable Costs per Feddan for some Common Crops in South Tahrir

op	Price/ton* (L.E.)	Yield per Feddan (Tons) (L.E.)	Total Return Per fed-dan (L.E.)	Total Varialbe costs Per Feddan (L.E.)	Gross Margin per Feddan (L.E.)	% of The Hold
Field Crops:						
A) Winter						
Lupins: Seeds	987	.255	258.7	120.9	148.8	45
by-product**	28	.39	11.0			
Barley: grains	133	.75	100.0	188.1	(-38.1)	20
straw**	40	1.25	50.0			
Wheat : grains	170	.75	80.0	166.0	(-36.0)	12
straw**	40	1.25	50.0			
B) Summer						
Groundnuts: Seeds	353	.75	264.7	198.5	76.2	83
by-product	25	0.40	10			
Vegetables						
A) Winter						
Peas	185	1.50	277	154	123	78
B) Summer						
Watermellon	11	15.1	171.4	90.0	81.4	5
Squash	70	2.0	146.0	145.0	(-5.1)	1
Eggplant	250	.40	100.0	51.0	49.0	2
Fruits						
Citrus	143	2.8	399.3	170.2	229.1	29
Strawberry	500	4.0	2000.0	930.0	1070.0	--
Fodders						
Alfalfa	13	20.7	267.7	50.6	217.1	16

Actual sale price by farmers (1984)

Estimated

Not Available

The low price of watermelon per ton is because most of the area, if not all, is devoted to seed crop. Although groundnuts is the main cash crop in summer and its yield per feddan is higher than the national level, its profitability is much lower than expected in sandy soils and in comparison with other new lands. This is attributed to the reasons mentioned earlier (see 4.2.1.).

With respect to citrus, there is a possibility of baised under-estimation by the farmer himself, in addition to the reasons mentioned in 4.2.1. Personal communication with some individual graduates showed that one feddan of oranges can yield 10 tons and generates L.E. 1000 net income.

4.2.3. Normal profit per feddan:

Since all variable costs, particularly machinery, were calculated at the market price, there is no need to calculate depreciation costs for such assets. However, two items that represent fixed costs were imputed. These are the rent share per feddan and the opportunity costs of the capital invested (the variable costs). The average rent per feddan in the area is L.E. 70 per year. The share per season (winter or summer) is L.E. 35. For perennial crops it is a year's rent, i.e. L.E. 70.

The interest rate (Bank rate) was assumed to be 13.25% per year, i.e. 6.125% per season (winter or summer).

From Table 31 and the additional imputed fixed costs mentioned above. it was possible to calculate the total costs (variable + fixed costs).

The normal profit = the management share in the return + the pure profit (the enterpriser share)

The normal profit = Total return - Total costs

Table 32 shows the normal profit per feddan for each crop.

4.2.4. Break-even yield:

Table .33presents a comparison between current and break-even yield of each major crop cultivated by the South Tahrir graduate farmers.

Table (32): Normal Profit per Feddan for some Crops
(Imputed Fixed Costs added to Variable Costs)

Crop	Total Return per	Total Variable Costs per Fed.	Fixed Costs per Feddan			Total Costs: Variable + Fixed	Normal Profit per Feddan
			Rent Share per Crop	Interest Costs of Total Variable Costs	Total		
	L.E.	L.E.	L.E.	L.E.	L.E.	L.E.	L.E.
1. Field Crops							
A. Winter							
Lupins	269.7	120.9	35	8.0	43.0	163.9	105.8
Barley	150.0	188.1	35	12.5	47.5	235.6	(-85.6)
Wheat	130.0	166.0	35	11.0	46.0	212.0	(-82.0)
B. Summer							
Groundnuts	274.7	198.5	35	13.2	48.2	246.7	28.0
2. Vegetables							
A. Winter							
Peas	277.	154	35	10.2	45.2	199.2	77.8
B. Summer							
Watermelon	171.4	90.0	35	6.0	41.0	131.0	40.4
Squash	140.0	145.0	35	9.6	44.6	189.6	(-49.6)
Eggplant	100.0	51.0	35	3.4	38.4	89.4	10.6
3. Fruits							
Citrus	399.3	170.2	70	11.3	81.3	251.5	147.8
Strawberry	2000.0	930.0	35	61.6	96.6	1026.6	973.40
4. Fodders							
Alfalfa	267.7	50.6	70	6.7	76.7	127.3	140.4

Table (33): Break-Even Yields for Major Crops Grown by the Graduates in South Tahrir

Crop	Current Yield Per fed. (Tons)	Break-Even Yield per Feddan in Tons		
		Covering Total Variable Costs (1)	Covering Total Variable + Imputed Fixed Costs (2)	Covering total Variable + Imputed Fixed + Management Costs (3)
Lupins	.255	0.11	0.16	0.225
Barley	.75	1.04	1.4	1.8
Wheat	.75	1.08	1.5	2.1
Groundnuts	.75	.56	.67	0.9
Peas	1.5	.83	1.1	1.4
Watermelon	15.1	8.2	11.9	17.4
Squash	2.0	2.1	2.7	3.5
Eggplant	0.4	0.2	0.35	.6
Citrus	2.8	11.2	1.75	2.6
Strawberry	4.0	1.86	2.1	2.2
Alfalfa	20.7	3.9	9.8	15.1

The break-even yield was calculated on the basis of three cost levels:

a. the yield that covers the variable costs
b. the yield that covers the total costs
c. the yield that covers the total costs and the imputed management salary.

The management salary was estimated as the average salary paid by DDC of AUC to the agricultural engineers working for the Center.

From Table 33 the current yield of lupines peas, citrus, alflafa and strawberry covers the total costs and the management salary; leaving some positive pure profit per feddan.

Other crops as Wheat, barley, eggplant groundnuts, squash and watermelon require higher yield levels than the current one to leave a positive pure profit.

For wheat and barley the required yield to reach some positive pure profit is beyond the existing national average which means that the success of these crops in the new land is doubtful. However, barley as a green fodder will be discussed in the livestock section.

4.2.5. Level of technology:

The graduate farmers hire all labor required. Human labor is expensive Percentage of labor (including harvesting) of total variable costs per each investigated crop shows two indicators (Table 34).

a) labor represents around one-half or more of the variable costs of most crops.
b) Some crops of negative gross margin, like wheat and barley, show that labor costs are between 62% and 79% of the variable costs.

Accordingly, appropriate mechanization techniques are required in order to minimize dependence upon human labor and to diminish costs of production. In the case of alfalfa where labor (mainly harvesting) costs represent 48% of the total variable costs, it is clear that grazing-feeding is much cheaper than non-grazing.

The survey data showed that the labor pattern used by the graduate farmers is as follows: 41% hired permanent labor. 52% hired seasonal labor and only 5% unpaid family labor and 2% paid family labor. The graduates depend, to a great extent, upon middlemen to provide

Table (34): Percentage of Labor and Harvesting Costs in Total Variable Costs for some Crops

The crops	Total Variable Costs/Fed. (L.E.)	Labor Cost (1) %
Lupins	121	39.2
Barley	188	79.1
Wheat	166	61.7
Groundnuts	199	41.2
Peas	154	48.9
Watermelon	90	22.2
Squash	145	48.3
Eggplant	51	*
Citrus	170	40.8
Strawberry	930	21.5
Alfalfa	51	48.0

(1) = Labor Costs + Harvesting Costs

* not-available

Hired labor. The graduates believe that the availability of mechanization and providing enough incentive to encourage new settlers will solve the labor supply shortage and cut the costs significantly.

In this respect, it is important to specify the labor-mechanization socio-economic relationships. This type of study is not available per see However; there are some important indicators from the survey concerning the machinery use.

a) The highest proportion of owned machinery are the tractors (38% of graduates), sprayers (23%), and transportation means.
b) The highest demand for rental of machinery harvesters, and spraying motors. are tractors,
c) The demand for irrigation machines is very graduates own irrigation machines). This. low (4% of the very probably, is due to the fact that most of the graduates are already supplied with semi-portable irrigation systems '

4.3. Major Constraints in Crop Production:

Table 35 lists the major constraints that face the graduate farmers and their relative importance in crop production.

The most important constraint is the water supply shortage. Electricity which has priority number 6, is one of the causes of water shortage, because of frequent electricity cut-off.

Although weeds represent the seventh priority, it is very important for some cropping patterns as fruit trees and groundnuts. Protection against nematodes is one of the major problems facing the graduates since ground- nuts is one of their main crops and its infection is high with nematodes.

The farmers voiced their ideas concerning the solutions that could overcome the above mentioned constraints. The relative frequency of each suggestion expresses its importance from the graduate farmers' point of view. Table (36) therefore, the graduates give: water supply and irrigation machinery seeds and fertilizers the highest priorities. Availability of credits could solve the machinery and other inputs availability. However, most of the farmers' recommendations concerning the water supply and irrigation require substantial improvements in government managed operations. Table 37 lists the constraints in irrigation and their relative importance:

a) Inefficiency of the government irrigation pumping stations (constraint number 2) and irregularity of irrigation schedule + few operating hours (constraint number 5) together represent inefficiency in the government managed operations to provide the water supply. To explain this issue one needs to mention that:

Table (35): Constraints facing the Graduates in the Implementation of South Tahrir Farming Systems

Constraint	Priority	Relative Importance
Lack of water for irrigation	1	28.4%
Shortage in agricultural labor	2	18.9%
Plant Diseases	3	10.7%
Shortage in sources of finance	4	8.9%
Lack of Agriculture machinery	5	7.7%
Lack of proper seeds	5	7.7%
Lack of fertilizers	5	7.7%
Electricity cuts	6	4.1%
Excessive weeds	7	3.6%
Unsuitability of the soil for cultivation	8	1.8%
High labor wages	9	0.5%

Table (36): Solutions suggested by the Graduates to overcome major constraints in the Implementation of their Farming Systems

Solutions	Relative Importance
Improve irrigation system	32.3%
Increase mechanization for agricultural practices	27.4%
Availability of agricultural inputs on time	21.8%
Availability of credit facilities	11.3%
Availability of insecticides	7.2%

Table (37): Constraints in Irrigation

Type of Constraint	Priority	Relative Importance
Irregularity in electrical current	1	40.3%
Inefficiency of Government Irrigation pumping stations	2	24.0%
Need to clean main irrigation canal	3	20.3%
The land is located at the end of the irrigation canal	4	10.2%
Irregularity of irrigation schedule and few operating hours	5	5.1%

1. The pumping stations' maintenance and replacement program is very poor.
2. The original design of the pumps' capacity was according to a given proposed cropping pattern. Later, and after land distribution, the farmers cultivated different cropping patterns and the water requirements were increased.
3. As other governmental organizations, the employees who are responsible for operating the stations do not always follow the approved time schedule. Accordingly, the effective working hours are quite few and irregular.

b) The canal network was designed in a classical way which included long main open canals. With sandy storms in the area, the sand partially blocks the water stream in the canals and requires higher pressures and energy (constraint number 3).

c) Irregularity in electrical current is an exogenous variable facing the farmers. It is noticed that the beginner graduate farmer in the area starts with procuring a diesel generator, even before any cultivation. This is a wise step taken as a result of the experience of the old farmers. This constraint is the most critical and represents 40% of the water supply problem. At the AUC farm in South Tahrir, the electricity failures are very common and frequent, even within a given week. Based on the DDC experience, the probability of electricity failure was established at 33%.

d) Crop production on the farms that are located at the end of the canals is more risky and more expensive. The farmers cannot get their full water requirements, even if they use their purchased water pump. Until the whole irrigation system is improved, the farmers are advised to cultivate crops with less water requirement.

e) Water loss is a main source of irrigation inefficiency and higher costs. Some previous studies showed that up to 50% of water is lost due to evaporation in sprinkler irrigation perculation. Water loss through perculation because of the high infiltration rate in sandy soil is also significant, especially if sprinkler irrigation is applied for long periods of time or if flood irrigation is used.

f) In general, low irrigation efficiency results indirectly in low fertilizer efficiency which will require excess application and higher costs. Therefore, the economics of water use and irrigation management associatedwith renewable energy applications is urgently needed when formulating a water pricing policy.

The lack of desert development know-how is a major constraint in all new land agricultural activities including South Tahrir.

Surprisingly, after 50 years of experience in cultivating the deserts of Egypt, still the farmers know-how comes from a trial and error approach.

Only 11% of the farmers depend upon some exogenous sources of information, while 80% of the graduates depend upon their own experience which grows from one year to another, but at a high cost. The sources of information of the farmer group are listed below in order
of their relative impact:

Sources of information	Relative impact
Experience of their colleagues	66%
Agricultural Research Center recommendations	28%
Extension Service	6%

Sources of information Relative impact Experience of their colleagues 66% Agricultural Research Center recommendations 28% Extension Service 6%

The majority of those who seek exogenous sources of information depend upon the old comers to the area. This means that extension and re- search has actually an insignificant effect upon the know-how development of these graduates. The major problem is that there is no specialized center that provides training in desert development aspects. Government officers provide the old valley experience when they are employed as extension agents in new land sites.

Even if all the above mentioned problems are solved, while the marketing system is inefficient, the production development programs will collapse. It seems that the graduate farmers suffer a lot from the monopoly of middlemen and traders who offer them unfair prices for their products. Poor services and infrastructure, and price fluctuations are the other marketing problems facing the farmers. Table 3J-a presents the relative importance of these marketing problems faced by the graduates.

5.ECONOMICS OFLIVESTOCK ANDPQULTRY ENTERPRISES:

The survey provided information about livestock constraints and livestock holding composition and size.

5.1. Production Performances:

The data available provide information about livestock and poultry holdings distribution, size and composition according to activity (Table 38).

Table (37-a): Crop Marketing Problems

Problem	Relative Importance
Unfair transaction between traders and farmers	33.5%
Shortage of services and infrastructure	27.7%
Lack of crop collection centers	18.1%
Price fluctuation	14.4%
No problems	6.3%
	100.0%

Table (38): Livestock Holdings According to Production Activity

Type of Activity	Holders (%)	Animals (Heads)	(%)	Average Holding Size (Heads)
1. Cattle				
a) Fattening	14	94	33.4	6.7
b) Milk	18	62	21.9	3.4
c) Milk & Meat	19	126	44.7	6.6
d) None	49	0	0	.0
TOTAL	100	282	100	2.82
2. Buffaloes				
a) Fattening	5	10	8.2	2.0
b) Milk	30	63	51.6	2.1
c) Milk & Meat	10	49	40.2	4.9
d) None	55	0	0	.0
TOTAL	100	122	100	1.22
3. Sheep & Goats				
a) None	62	0	0	.0
b) With holding	38	367	100	3.67
4. Poultry				
a) With holding	15	63000	100	4200
b) None	85	0	0	.0
TOTAL	100	6	100	630

30% of the graduates do not hold cattle or buffaloes. 62% of the graduates do not hold any sheep or goats.

The average cattle and buffalo holding size per farm is 4.04 heads. The average holding size of sheep and goats per farm is 3.67 heads.

49% of the graduates do not hold any cattle and 55% of them do not hold buffaloes.

37% of the graduate farms hold cattle for milk and 40% of them hold buffaloes for milk. Fattening enterprise is very limited among graduate farms; 14% of the farms keep cattle only for fattening and 5% of the farms keep buffaloes only for fattening.

The graduate keeps foreign breeds and their crosses because of high milk yield. However, they keep buffaloes because of their high fat percentage of their milk in order to raise the selling price of milk.

Feed shortage and fixed price for calves limit fattening enterprise expansion, Whereas 90.7% of the dry feed are purchased.

In general, each farm (24 feddans farm size and 20 feddans-cropped area) holds the following herd structure:

Cattle:		
	Fattening	.94 heads
	Only milk	.62 heads
	Milk & meat	1.26 heads
Buffaloes:		
	Fattening	0.10 heads
	Only milk	.63 heads
	Milk & meat	.49 heads
Sheep & Goats		3.67 heads

Unfortunately, data specifying the income generated from this herd or the quantity of feed used are not available in the survey. However, it is possible to estimate milk production per farm according to the following assumptions:

90% of the holding entirely for milk contributes to milking heads
50% of the holding for meat and milk contribute to mil king heads
Average milk yield per year per milking cow is 2000 Kgs
Average milk yield per year per milking buffalo is 1400 Kgs
The total graduate farmers have 500 holdings

Therefore:

Cow milk supply per farm = [.62 X .9 + 1.26 X .5] X 2000 = 2376 Kg

Buffalo milk supply per farm = [.63 X .9 + .49 X .5] X 1400 = 1137 Kg

Total milk supply of the graduate farms:

$$\text{Cow milk} = \frac{2376 \times 500}{1000} = 1188 \text{ Tons}$$

$$\text{Buffalo milk} = \frac{1137 \times 500}{1000} = 568.5 \text{ Tons}$$

Since the budget data and input - output relationships were not available from the survey, it was necessary to use an indicator for 1ivestock income based on the carrying capacity per feddan of alfalfa to be compared with the income generated from selling alfalfa as a fodder (Hay).

Data covering livestock output was based on the experience of El-Nahda Company (North Tahrir). The summary of such analysis is as follows:

Technical Coefficients:

1. 2 animal units (A.U.) per 4 feddans of alfalfa
2. 50% of A. U. (s) are mi1king cows
3. 9 Kgs milk yield per milking cow
4. per day
5. 300 days milking period
6. Calving rate 75%
7. Off-take rate 42% (culling. sale
8. for breeding and for meat)
9. Concentrates and straw were used as supplement feeds with alfalfa.

Table 39 shows the gross output and costs per milking cow. From this table the normal profit per milking cow is around L.E. 732.

From table 32, one feddan of alfalfa generates a normal profit equaling L.E. 140. Since the carrying capacity is 2 A.U. (one milking cow) per 4 feddans of alfalfa, therefore, the income foregone due to raising one milking cow is L.E. 140 X 4 = L.E. 560.

Accordingly, the net additional income per one feddan of alfalfa due to raising dairy herd on such area is = (732 – 560)/4 = L.E. 172/4 = 43

Table (39): Estimated Normal Profit per Milking Cow (Frisian) in North Tahrir El-Nahda Company (1983)

Comparative Items	Value (L.E.)	%
Output:		
- Milk Production	756.0	49.2
- Off-take:		
Culled Animals	74.6	4.8
For Breeding	513.1	33.4
Fattened Beef	187.0	12.2
- Manure Output	7.0	0.4
(1) Total Output	1537.7	100.0
Input Costs:		
- Feeds:		
Concentrate	56.7	7.1
Fodders	309.1	38.3
Straws	57.1	7.1
- Other Variable Costs*	141.1	17.5
- Fixed Costs**	241.8	30.0
(2) Total Costs	805.8	100.0
- Normal Profit (1) - (2)	731.9	

*Estimated at 25% of Total Variable Costs

**Estimated at 30% of Total Costs

Only 15% of the graduate farmers hold poultry enterprises. The poultry holding size varies as follows:

2% of the size between 1500 and 2000 chicks
6% of the size between 2000 and 3000 chicks
7% of the size is 3000 chicks and above

The average poultry enterprise size is less than 5000 chicks. Poor services, infrastructure and marketing facilities limit expansion in poultry production. A feasibility study for poultry production and marketing in South Tahrir may be worthwhile.

5.2. Major Constraints in livestock Enterprises:

Table 40 lists the constraints that face the graduates in developing livestock enterprises. Milk marketing is the major\constraint.

This is followed by poor veterinary services, lack of artificial insemination, and marketing of live animals.

Lack of funds and feeds takes lower importance because the farmers depend mainly upon home-produced fodder and they know that concentrates are governmental controlled, and that its supply depends upon the herd size and their participation in an animal insurance program. As educated farmers, they did not give it first priority. However, they suffer from lack of concentrate feeds, as shown in table 41. On the other hand, 30% of the graduate farmers are without livestock holdings and even those who hold some have very small herd. It seems· that they do not have facilities to get enough feeds, veterinary services and above all, they suffer from marketing of milk and live animals.

Whereas marketing is a major problem raised by the graduates in South Tahrir. the milk supply estimates presented earlier show that the expected daily milk supply is:

3.254 tons cow milk + 1.557 tons buffalo milk

which makes it feasible to establish a milk processing industry.

The major problem of the livestock production is the milk marketing. The farmers suffer from lack of collection centers, long distances from the markets and the unfair transactions with the traders (Table 41-a).

Table (40): Main Constraints and their Relative Importance in Animal Production in General

Constraints	Priority	Relative Importance
Marketing milk	1	22.3%
Lack of veterinary services	2	17.3%
Lack of artificial incemenation	3	15.2%
Marketing of Live-animals	4	12.7%
Lack of liquid money	5	9.1%
Lack of feed	6	8.6%
Short milk season (long dry period)	7	6.1%
Inadequacy of drinking water for animals	8	5.1%
Lack of sheds	9	1.5%
Unavailability of improved animal breed	10	1.0%

Table (41): Constraints in Providing Feeds for Animals

Type of Constraint	Priority	Relative Importance
Irregularity of feed availability	1	40.2%
Irregularity of prices	2	23.9%
Difficulty in animal insurance	3	16.3%
Lack of feed	4	8.7%
Incorrect specifications of feed	5	7.6%
Difficulties in feed transportation	6	1.1%
Lack of finance	6	1.1%
Lack of labor	6	1.1%

Table (41-a): The Relative Importance of the Marketing Problems of the Livestock Products

The Problem	The Relative Importance
Lack of Milk Collection Centers	42.9%
Long Distances from the main Markets	16.3%
Unfair Transaction Processes between Traders and Farmers	16.3%
No Problems	24.5%
	100.0

The graduates give first priority to the establishment of cooperative marketing centers and milk processing plants in order to overcome the marketing constraints (Table 41-b).

5.3. Major Constraints in poultry Enterprises:

As in the case of livestock. marketing of poultry products is the major constraint. Other major constraints include input availability in general, either as one-day-old chicks, feeds. butagaz or electricity for heating, or supply and veterinary care (Table 42).

Credits or loans cannot relax the above constraints, because the problem is not to have liquid money to purchase such services but is related to availability of supplies. The farmers feel that there is shortage in supply of such inputs beyond the issue of liquid money availability. Institutional constraints are probably behind all of these constraints. The monopoly of Giza and Kaliobia Governorates in poultry production is another reason. Furthermore, the average poultry enterprise scale (less than 5000 chicks) is another obstacle. To establish a board or an association would help in relaxing these input demand~ and output sale constraints.

6. FARM INCOMES AD INCENTIVES FOR GRADUATE FARMERS

In order to formulate an appropriate economic incentive for graduates' household to settle in the new community of South Tahrir, it is necessary to evaluate the net income generated from different cropping patterns with and without livestock. The proposed cropping patterns of a typical farm size (20 feddans) presented in Table 43 include only the crops that showed a normal profit (Table 32) above the poverty line as a minimum standard of living.

The poverty line has been estimated by the ADS project as L.E. 25 per capita per month. i.e. L.E. 1500 per year for a farm (20 feddans) held by a household of 5 persons. In other words, the share per feddan should not be less than L.E. 75 per year (L.E. 37.5 per season).

The crops that give a normal profit per feddan above the poverty line (as presented in Table 32) are citrus, strawberry, alfalfa, lupins, peas, and watermelon. Though groundnuts are the common summer crop in South Tahrir, its normal profit does not reach L.E. 37.5 per feddan and accordingly, it is excluded. However, groundnuts is a very profitable crop in other new land and sandy soil areas. Is it a problem of marketing (low prices or poor grading) or poor productivity in South Tahrir? This needs further study.

Table (41-b): Relative Importance of the Suggestions Offered by the Graduates to Overcome the Marketing Problems

The suggestion	Relative Importance
To Establish Cooperative Marketing Centers	48.5%
To Develop Milk Processing Industries	23.3%
To Raise Cooperative Marketing Prices	11.0%
Availability of Credits to the Cooperation	9.8%
Availability of Services and Infrastructure	7.4%
	100

Table (42): Constraints which the Graduates Face in Poultry Production

Constraints	Priority	Relative Importance
Marketing of poultry products	1	18.2%
Unavilability of inputs for poultry products	2	18.1%
Unavailability of feeds	3	15.9%
Unavailability of heating systems	3	15.9%
Lack of labor	4	11.4%
Lack of vaccines and medicine	5	9.1%
Lack of liquid money	6	6.8%
Shortage in lighting system	7	4.6%

Table (43): Proposed Cropping Pattern and Expected Income per Farm (20 Feddans)

Including only Crops that generate net Income above Poverty Line

Model No.	Cropping Pattern		Area (Fed.) & Crop	Return & Costs (L.E.)
	Fruit trees	:	Zero	Total Return 8715
1	Alfalfa	:	Zero	Total Costs 6251
	Winter Season	:	10 Fed. Lupins & 10 Fed. Peas	Net Income 2464
	Summer Season	:	20 Fed. Watermelon	
	Fruit trees	:	Zero	Total Return .5
2	Alfalfa	:	Zero	Total Costs 10905.5
	Winter Season	:	5 Fed. Lupins & 5 Fed. Peas	Net Income 7079
	Summer Season	:	5 Fed. Strawberry & 15 Fed. Watermelon	
	Fruit trees	:	Zero	Total Return 14937
3	Alfalfa	:	Zero	Total Costs 8866.5
	Winter Season	:	5 Fed. Lupins & 5 Fed. Peas	Net Income 6070.5
	Summer Season	:	5 Fed. Strawberry & 5 Fed. Watermelon	
	Fruit trees	:	4 Fed. Citrus	Total Return 12374.5
4	Alfalfa	:	10 Fed.	Total Costs 6841.1
	Winter Season	:	3 Fed. Lupins & 3 Fed. Peas	Net Income 5533.4
	Summer Season	:	3 Fed. Strawberry & 3 Fed. Watermelon	
	Fruit trees	:	5 Fed. Citrus	Total Return 17739
5	Alfalfa	:	Zero	Total Costs 9298
	Winter Season	:	5 Fed. Lupins & 10 Fed. Peas	Net Income 8441
	Summer Season	:	10 Fed. Watermelon & 5 Fed. Strawberry	

Table (43): Continued

Model No.	Cropping Pattern		Area (Fed.) & Crop	Return & Costs (L.E.)
	Fruit trees	:	10 Fed. Citrus	Total Return 6610
6	Alfalfa	:	10 Fed.	Total Costs 3788
	Winter Season	:	Zero	Net Income 2822
	Summer Season	:	Zero	
	Fruit trees	:	20 Fed. Citrus	Total Return 7986
7	Alfalfa	:	Zero	Total Costs 5030
	Winter Season	:	Zero	Net Income 2956
	Summer Season	:	Zero	
	Fruit trees	:	Zero	Total Return 5354
8	Alfalfa	:	20 Fed.	Total Costs 2546
	Winter Season	:	Zero	Net Income 2808
	Summer Season	:	Zero	
9	Model (4) With Dairy Cows: (3 Milking Cows & Total A.U. = 5)			Total Return 14291 Total Costs 7986 Net Income 6305
10	Model (6) With Dairy Cows: (3 Milking Cows & Total A.U. = 5)			Total Return 8526 Total Costs 4933 Net Income 3593
11	Model (8) With Dairy Cows: (5 Milking Cows & Total A.U. = 10)			Total Return 7655 Total Costs 4030 Net Income 3625

On the other hand, livestock profit in South Tahrir graduate farms was not available in the survey. To overcome this obstacle, the data analyzed from El-Nahda Company (North Tahrir), Table (39), were used to estimate the normal profit per milking cow and consequently, per feddan base of alfalfa to be introduced in the proposed cropping patterns.

The proposed cropping patterns present a number of alternatives for the graduates to follow in order to raise their farm income. Furthermore, the same models provide useful indicators for the proposed designs of demonstration farming units (Max; Project) to be implemented at the AUC/DDC South Tahrir site.

Table 43 presents the proposed cropping patterns and the corresponding return, costs and net income generated. However, before comparing the proposed models, the following points should be underlined:

A. Some current cultivated crops suffer from low selling prices as watermelons and citrus under current marketing situation, which is one reason for low net income.
B. There is a good possibility in improving the yield of the chosen crops particularly, peas, lupins and citrus. This Possibility will raise the net income of the given cropping patterns..
C. Higher yields of alfalfa and using the non-conventional feeds (DDC can offer the required experiences and practices in this concern) will cause substantial increase in the livestock feed generated net income.

In general, all presented models under current conditions show that a graduate's household can earn from agricultural activities alone, an annual net income above the national average, which ;s around L.E. 550 per capita, i.e. L.E. 2750 per household (5 persons), except the model without fruit trees or alfalfa (Model I).

The highest income generated models are numbers 5, 2, 9, 3, and 4, if marketing facilities are available. All these high income models include 3-5 feddans of strawberry. Without some area under strawberry (3 feddans), the net income falls to be between L.E. 3000 to < L.E. 4000 per farm per year.

Many farms have recently established their citrus trees, which would be more efficient after the trees reached maturity. The average sale price per ton calculated from the survey for citrus seems underestimated.

Farm System #= 2

20% fodder crops + 15% vegetables + 15% medicinal plants

Forages:

* Legume / cereal ratio 2/1

* Proposed herd: Sheep

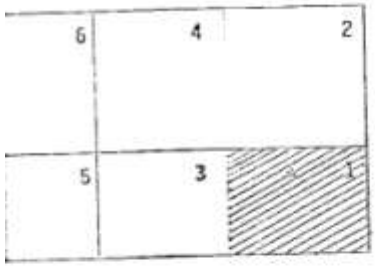
* Carrying capacity (1 AU / 2 fed)

= 32 sheep

Classification and design of the
proposed farming systems and
activities at South Tahrir

(MAXI Project)

grobusiness farm (100 fed).



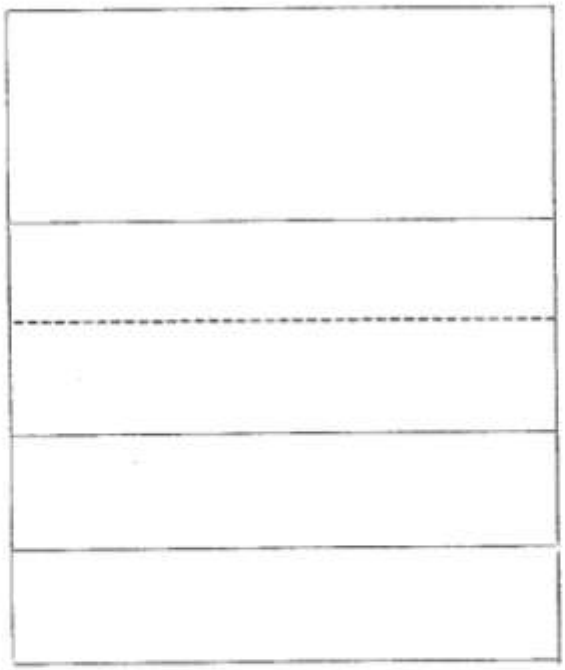
- Alfalfa CUF 101
- 1.5 fed required for each animal unit
- Total carrying capacity = 65 pregnant cows

experiments
sheds and services
dairy processing

- Beef/dairy cattle grazing mainly on alfalfa with some roughages (farm residues or straw.. if available as a cheap source of energy).
- Carrying capacity 50 AU... 30 dairy cattle
- 20 to 40 fed will be specified for high quality hay making.
- 60 to 80 fed will be used for grazing
- A well managed rotational grazing system will be used in this farm.
- Plot # 5 will be intercropped with barley in winter and probably millet in summer between the wide distance rows of the alfalfa (10 fed).
- Any source of farm residues, straw,and/or cheap roughages... if available... will be used as a source of energy and to reduce alfalfa consumption as well.

Farming System # 3

50% fodder crops + 30% field crops + 20% fruit trees



Annual Field crops
(highest income value)
(6 fed)

Annual fodder crops
(6 fed)
[3 fed cerials + 3 fed
Legumes]

Alfalfa
(4 fed)

Fruits
(4 fed)

* Annual field crops:
(Peanuts, lupins, peas.....)

* Annual fodder crops:
Summer (fodder cowpeas, SS H)
Winter (Vetches, barley, ...)

* Fruits: (grapes or citrus)

* Mixed herd of dairy cattle and sheep.
Area 12 feddan --- 8 AU
1 AU / 2 fed (2 cows + 14 sheep)

APPENDIX 2

The Graduates Visit to DDC Experimental Farm Sites:

The "Graduates" were invited to visit the AUC farms in South Tahrir and Sadat City in order to be aware of the different DDC activities and possibility to adopt whatever techniques that might suit their local conditions. It was also agreed that the DDC team would visit the Graduates' fields in order to get acquainted with them and to be exposed to their activities, problems and aspirations. The two visits should promote exchange of ideas and initiate mutually beneficial interaction between the two groups (Graduates and DOC team).

Eighteen leaders representing the Agricultural Cooperative Union and the nine local Co-operatives as well as a number of officials from the South Tahrir General Supervisory Committee for development visited the two DDC sites on July 9, 1984.

Most of the DDC staff members communicated with both the farmers and officials on the site.

Objectives of the Visit:

- To initiate the Graduates' interest in the socio-economic survey and to secure their cooperation in providing the researchers with the data needed.

- To increase their interest in DDC activities at the two sites and to expose them to new ideas adopted by the Center covering biological, technological and community development aspects.

- To identify some of their problems which may be related to specific activities of the Center?

Impact of the Visit:

The two groups communicated smoothly since they had some similar field activities and faced similar problems. However, some problems represented top priority for the Graduates but not for the DDC, at least at this phase of the project. A good example here is the nematoda infection of the groundnuts, which is the main cooperative cash crop for the Graduates. Mechanization and marketing problems are other examples. After the approval of the Maxi project in September 1984, the DDC has the capabilities to handle most of these problems.

Some new ideas adopted by ODC attracted the Graduates; an examples is solar photo-voltaic energy and its application in pumping water for irrigation.

The Graduates were also fascinated by the DDC building in Sadat City and they expressed their desire to have a training session to learn the techniques of constructing such a building on a small scale.

They also expressed their interest in the experiment of growing medicinal and aromatic plants at the Sadat City site.

In the area of forestry, they requested the availability of seedlings from the Nematoda resistant varieties of Caswarina which Dr. El Lakany is selecting and breeding at the South Tahrir site.

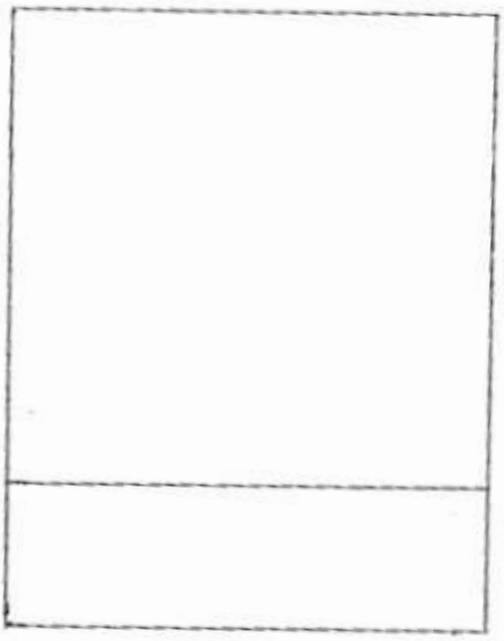
These are some examples of the many activities that could be included in a diffusion and training pr6gram for the graduates.

One of the important outcomes of the visit was the interest they showed later on during the data co11ection of the survey and the willingness of each graduate to give reasonable time and satisfactory answers to the survey questionnaire.

APPENDIX 3:

Farming System #= 1

(100% Fodder Crops)



Alfalfa
(15 fed)

Perennial grass
(5 / fed)

Carrying Capacity (1 AU / 2 fed)

= 6 dairy cows

Proposed herd = dairy cattle