

PROJECT PROPOSAL

Low cost/Low Pressure Drip Irrigation Techniques in Irrigated Agricultural Sector in Syria: Towards Technical and Economic Feasibility

April 2004



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A. INTRODUCTION

1. IPTRID is an independent multi-donor trust-fund programme hosted by FAO in its headquarters in Rome. It provides assistance to developing countries and development agencies for the formulation and implementation of sustainable agricultural water management strategies and Programmes.

2. Agricultural water management can help to reducing hunger and poverty in the developing world. It benefits both the rural and urban poor. But most developing countries lack the capacity to enable their farmers, smallholders and other stakeholders to make use of the technologies available and to realize the benefits of irrigation. IPTRID aims to reduce rural and urban poverty, increase food security and enhance environmental sustainability by improving the access of farmers, farmers' associations and service providers to appropriate irrigation, drainage, water harvesting, salinity management and flood management technologies and practices.

3. One of the most effective ways in which external agencies can support farmers is to help governments and the private sector to identify capacity constraints and to take action and remove them. IPTRID works with international partners to do this. It supports capacity building in agricultural water management to promote irrigation technology transfer and adoption in its widest sense. It provides advisory services and technical assistance to countries and development agencies to help them:

- Formulate sustainable regional, national and sub-national agricultural water management strategies and programmes within their poverty reduction strategies, and
- Identify, formulate and implement capacity building projects that enable farmers, farmers' associations, service providers and institutions to take full advantage of improved water management technologies and practices.

4. IPTRID approach is participatory, driven by demand through listening and reacting to the issues and priorities being raised by the developing countries.

B. BACKGROUND AND JUSTIFICATION

5. Agriculture in Syria is a dominant economic sector. It contributes about 32% to the GDP, and employs nearly 31% of the workforce, with another 50% of the manufacturing force dependent on it for employment. The country accounted for a population of 16.3 million in 2000 and is rapidly growing at a rate of 2.37%.

6. Food security through increased crop production is amongst the highest priorities of the government which accords a high attention to the issue and provides support to the expansion of agriculture and rural development, particularly in the

densely populated areas. Irrigation forms the backbone of sustainable agricultural development and national food security and buffers the agricultural sector against climatic variability and water shortage. It is also a means of increasing the economic returns from agriculture and reducing production risks.

7. The cultivated land area in Syria was estimated at 5.5 million ha in 2000, which accounted about 30% of the total country area. 20% of the cultivated land area (1.2 million hectares) was irrigated. The total irrigated area increased from 650,000 ha in 1985 to 1.3 million ha in 2002. This remarkable expansion of irrigation is mainly attributed to the rapid increase in groundwater irrigation. Sixty percent of all irrigated area in Syria is currently irrigated by groundwater, which are all privately developed and operated.

8. The predominant method of irrigation is the conventional surface technique with an overall efficiency below 50%. Modern and potentially high efficient methods are limited and the overall losses associated with the traditional irrigation methods are high. The situation as described, associated with traditional irrigation practices and on-farm water management, created favourable conditions for the application of amounts of water far in excess of crop needs.

9. The rapid increase in the irrigated area and the loss of large quantities of water through mostly low efficiency, traditional methods of application have led to an overall shortage of water resources and particularly an alarming decline in groundwater levels.

10. Conscious of these issues and of the need to sustain agricultural production and rural income, especially for small farmers, through the sustainable management and optimal utilization of the natural resources, the Syrian government has adopted a strategy aimed, amongst other objectives, at: sustainable water resources and irrigation development to meet the growing demand from agriculture and other water user sectors; and optimal utilization and conservation of water resources in irrigation as a priority for national food security, through the introduction of improved irrigation methods and water control and management tool.

11. The government of Syria through the Ministry of Irrigation started in 2001 an ambitious plan investing about 32 billion Syrian Pounds (600 million US\$) for the next 4 years on the rehabilitation and modernization of old irrigation projects to improve conveyance efficiency and minimize distribution losses through converting open irrigation canal systems to pressurized pipe systems and rehabilitate lined canal systems. It also adopted the modernization policy at field level and encouraged farmers to change to modern irrigation techniques by providing tax-free low-interest loans to cover the capital costs of modern techniques and technical advice on the implementation and use of such systems. However, the level of adoption of these techniques is still low due to the lack of confidence amongst farmers in the expected financial return from the use of such techniques that justify the investment and effort associated, the lack of perception of the new techniques amongst farmers, the lack of incentives amongst farmers to invest in modernized on farm irrigation system, the inadequate technical support by extension services, and the inappropriate interface between the public distribution system and the advanced on farm irrigation systems.

12. Several studies by international organizations (IPTRID, FAO, World Bank, UNDP), however, have shown that the government policy of generalizing modern irrigation technologies may only be sustainable for medium term and gains in water deficits may not be remarkable. The policy has come up generic and was not differentiable in accordance to basins that are most critical in water deficits, type of modern techniques, land size, and adequacy according to the local conditions. Unfortunately, the projects of the NGOs in support of the government policy on modernization, like the FAO/TCP 8922, have come up also generic and did not achieve ample results on ground. For example, the FAO/TCP 8922 project, though it obtained encouraging initial results but it did not completely deliver the aimed output and, therefore, an expansion phase was recommended. The main drawbacks of this project raised in its preliminary evaluation report and may support the justification for the current proposed project are: (1) several technical errors in terms of design and installation of the equipment; (2) deficiencies in terms of appropriate design; (3) process of demonstration, training, awareness and evaluation did not yield the same level of achievement for drip as compared to sprinkler; (4) difficulties in adapting the new techniques by farmers; (5) low performance in terms of design and operation. It is concluded that there is an urgent need to enhance knowledge amongst all parties and bridging the gap for the efficient application of the new techniques. It is believed that the lack of farmers' confidence in the modern techniques is due to the fear of their sophistication, the lack of knowledge on them, and their high cost.

13. The current proposal, however, takes the above mentioned drawbacks and results into consideration, looks at the issue from different angle, and applies a differentiated approach. It focuses on drip irrigation as an ideal solution for water saving in critical basins with small land sizes and vegetables/horticultural crop patterns, e.g. Damascus basin. It aims to introduce the concept of making drip technique affordable by marketing off-the-shelf kits that irrigate small plots and to lift the fear of sophisticated technology by providing so called "customized" drip systems that are easy to install, operate and maintain, and do not require a pumped supply.

14. The project will provide low cost/low pressure small scale irrigation equipment and techniques at farmers' level, train selected technicians of the Directorate of Irrigation and Water Use (DIWU) of the Ministry of Agriculture (National Counterpart), train selected farmers on the new techniques, monitor performance of the new techniques, and assessing the feasibility of implementation and the possibility of extrapolation. A pre-selection of the basin targeted for the application of the low cost/low pressure small drip irrigation techniques has been earmarked but further defining of the pilot sites will be established. The average farm size to be equipped with the new techniques would be 3-5 Diana's (0.3-0.5 ha). An awareness/introductory training workshop will be held initially inviting farmers, organizations working with agricultural sector, and the DIWU staff. A participatory approach will be used to gauge the farmer's needs during this workshop. Further detailed training workshops of 1-2 days on the irrigation systems for farmers will also be held in collaboration with DIWU. The irrigation system when installed, will be provided by the project to the farmers on the understanding that if farmers are satisfied, they would have to purchase it at the end of the project at a certain percentage of the cost. The money paid will go in a revolving fund to extend the system to other farmers who would like to be involved in water control and small scale irrigation in the future, and ensure continuity of irrigation work.

15. It is, however, expected that the project will encompass the thrust to ensuring field level results, the acceptance of the new techniques by farmers through applying a participatory field approach, and the effective enhancement of capacities at both institutional and farming community levels.

16. Ultimately, the development of low cost/low pressure irrigation techniques will contribute to the enhancement of water use efficiency, the sustainability of water resource utilization, the increase of agricultural production and farm income and, hence, the empowerment of rural community.

C. PROJECT OBJECTIVES

17. The objective of the project is to assess the economic and technical feasibility of implementing low cost/low pressure micro irrigation technique in Syria on a pilot basis in selected water-deficit areas and to introduce the concept of “Kit” to the irrigated agriculture sector in Syria. The project will demonstrate and promote appropriate low cost/low pressure micro irrigation techniques, provide training to technicians and farmers on the new techniques, assess their feasibility, and draw lessons and recommendations for long term application/use of these techniques in the irrigated agriculture sector of Syria. The specific objectives of the project are:

- Selected number of kits is installed on a selected number of plots according to land size and cropping pattern;
- Selected number of technicians is trained on low cost/low pressure micro irrigation techniques;
- Selected number of farmers is trained on low cost/low pressure micro irrigation techniques;
- The performance of the new techniques for one season is monitored; and
- Conclusions and recommendation are drawn on the feasibility of implementation and the possibility of extrapolation to other basins.

D. PROJECT OUTPUTS

18. The expected outputs from this project will be:

First Objective: Implement and demonstrate low cost/low pressure drip irrigation techniques at the farmers’ level

1. 12 plastic water tanks installed;
2. 12 low cost/low pressure small scale micro irrigation systems installed on plots covering a total area of 60 Doanams (6 ha); and
3. Irrigation procedures and extension materials for use by extension workers and farmers developed.

Second Objective: Train selected farmers and technicians/officers from the Directorate of Irrigation and Water Use (DIWU) of the Ministry of Agriculture on the techniques, methods and implementation of low cost/low pressure small scale drip irrigation systems

1. Twenty or more farmers and DIWU technicians/officers trained on low cost/low pressure small scale drip irrigation techniques and its use; and
2. Technical and general supporting role to small scale farmers strengthened.

Third Objective: Assess economic and technical feasibility of implementing low cost/low pressure small scale drip irrigation systems and identify areas for possible extrapolation

1. Low cost/low pressure small scale drip irrigation techniques performance monitored for one irrigation season;
2. Conclusions on the technical and economic feasibility of low cost/low pressure small scale irrigation techniques drawn;
3. Global inventory of critical areas in Syria prepared where water is in shortage and small scale irrigation systems can be applied.

Fourth Objective: Define a framework of small scale drip irrigation development in Syria

1. Strategic guidelines for the development of small scale drip irrigation in Syria elaborated.

E. WORK PLAN

19. The project will cover several activities to be undertaken in collaboration with the Directorate of Irrigation and Water Use (DIWU) of the Ministry of Agriculture within a total duration of 10 months. A detailed work plan with the details of each activity listed below will be prepared at the beginning of the project.

Months 1 to 3

- Identify national counterparts and assign National Project Coordinator.
- First visit by Project Manager (IPTRID) and the Small Scale Irrigation Technical Consultant.
- Identify field sites where irrigation techniques could be implemented.
- Purchase material and equipment required for irrigation. This is a low cost/low pressure localized irrigation system (kit). Water is distributed under low pressure (1-2 meters of water head) into bi-wall drippers. The pressure required can be obtained from an elevated tank that can be provided by the local market (plastic tanks).
- Organize a local workshop in collaboration with the Ministry of Agriculture to explain low cost/low pressure small scale drip irrigation systems.
- Second visit by the project manager to attend the workshop and prepare setting up one low cost/low pressure drip irrigation system at a DIWU Research Station.
- Set up and establish one low cost/low pressure small scale drip irrigation system at a DIWU Research Station.

Months 4 to 6

- Third visit by the project manager to supervise setting up systems on sites.

- Set up and establish low cost/low pressure small scale drip irrigation systems on selected sites within Damascus Basin. The approach to be taken would vary according to the local conditions of each site and more than one option or combination of systems could apply.
- Preparation of extension material in collaboration with local counterparts for use by extension officers and farmers.
- Fourth visit of the project manager to participate in the preparation of the training activities and the field day.
- Second visit of the Small Scale Irrigation Technical Consultant to participate in the preparation of the training activities and the field day.
- Identify training needs and organize training of selected national staff and farmers on low cost/low pressure small scale drip irrigation techniques.
- Conduct Farmers Field Day at the DIWU Research Station for other farmers to observe the irrigation system.

Months 7 to 10

- Review the progress of the site irrigation systems to sustain the progress of the project.
- Analyse finding and results and draw preliminary conclusions.
- Fifth visit of project manager to participate in the preparation and attending the end of project workshop.
- Third visit of the Small Scale Irrigation Technical Consultant to participate in the end of project workshop.
- Organize end of project workshop.
- Prepare final report and submit terminal statement.
- Prepare the strategic guidelines for the development of small scale drip irrigation in Syria.

F. CAPACITY BUILDING COMPONENTS

20. The capacity building effort in this project is demonstrated by the enhancement of the human resource capabilities through the training of national staff and farmers on appropriate low cost/low pressure small scale drip irrigation techniques. The training activities include:

- Introductory workshop to explain low cost/low pressure small scale drip irrigation techniques.
- In country training on low cost/low pressure small scale irrigation techniques for national staff and selected farmers who will later become trainers for other farmers in their own communities.
- Field days for all farmers and demonstrations at the DIWU Research Station for interested farmers.
- End of project workshop to share findings and results of the project and to draw recommendations.

G. IPTRID/FAO INPUT

21. Personnel services:

- Consultant-Project Manager with expertise in water resources management and small scale irrigation development for four months and five missions to Syria.
 - Consultant-for technical assistance on Affordable Micro Irrigation Techniques for Small Scale Irrigation for one month and half and three missions to Syria.
22. Equipment:
- Localized irrigation equipment.
 - Motor pumps with accessories.
 - Agriculture equipment (tiller, ridger, topographical equipment, etc.).
23. Materials and supplies:
- Materials and supplies for tanks and installation.
 - Materials and supplies for in-country workshops.
24. General operating expenses:
- Costs related to project operation (telephone, fax, photocopying, etc.)
 - Reproduction of reports and terminal statement preparation.
25. Training:
- Cost of One Day Introductory Training Workshop for farmers and national staff.
 - Cost of Three Day In-Country Workshop for farmers, DIWU selected staff, and agricultural extension officers.
 - Cost of Two day End-Of-Project Workshop for farmers, DIWU staff, and agricultural extension officers.
 - Costs for an additional training workshop that may be requested during the implementation of the project.
26. Support cost:
- Direct operating costs at the FAO headquarter related to the implementation of the project.

H. SYRIAN MINISTRY OF AGRICULTURE INPUT

27. The Directorate of Irrigation and Water Use (DIWU) of the Ministry of Agriculture in Syria (National Counterpart) will be responsible for the following:
- At a fixed term cost and as soon as the project agreement is signed, a national consultant will be recruited to act as a National Coordinator of the project and to work under the supervision of the project manager and in close collaboration with the DIWU for the implementation of the project.
 - Allocate an office space and facilities for the National Project Coordinator during the period of the project.

- At no cost to the project, the DIWU will provide assistance and services in the implementation of the project.
- Be responsible for getting all the project materials, supplies and equipment into Syria free of tax.
- Organize and coordinate training workshops including logistical support for participants.
- Provide pilot irrigation site allocated for the purpose of the project.
- Ensure continuous demonstrations to farmers after the termination of the project.

I. PROJECT BUDGET

| Input Description | Sub Account (US\$) | Main Account (US\$) |
|-----------------------------------|---------------------------|----------------------------|
| Personnel services | | 39,000 |
| Consultant - Project Manager | 24,000 | |
| Consultant - Technical Support | 10,000 | |
| National Project Coordinator | 5,000 | |
| Travel | | 13,000 |
| Project Manager | 8,000 | |
| Consultant - Technical Assistance | 5,000 | |
| Training | | 12,000 |
| Training Budget | 12,000 | |
| Equipment | | 24,600 |
| Expendable Equipment | 13,800 | |
| Non Expendable Equipment | 10,800 | |
| Materials and Supplies | 3,800 | 3,800 |
| General Operating Expenses | 2,000 | 2,000 |
| Support Cost | 5,200 | 5,300 |
| Grand Total | | 99,700 |



IPTRID

bridging the gap

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