Water Benchmarks
of CWANA project

3

Scaling-up Strategy and Action Plan

Nasri I. Haddad

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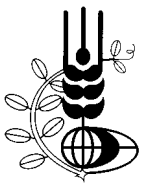

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Community Based Optimization of the Management of Scarce Water Resources in Agriculture in Central and West Asia and North Africa (Water Benchmarks of CWANA)

Scaling-up Strategy and Action Plan

Prepared by

Nasri I. Haddad

Implemented by

Badia Benchmark (Jordan), Satellite Sites (Saudi Arabia and Libya)
Rainfed Benchmark (Morocco), Satellite Sites (Algeria, Tunisia and Syria)
Irrigated Benchmark (Egypt), Satellite Sites (Iraq and Sudan)

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FOREWORD

The aim of research is to contribute to development and improvement, as much as possible, of livelihoods. Unfortunately, generally, many research results do not find their way to development projects and stay in the research domain. This is a major concern of donors, policy makers and researchers. To maximize the benefits from research outputs, a strategy to scale-up and scale-out the results is essential.

This document is not intended to be a review of information and literature on the topic of scaling-up (or scaling-out). It is rather an action plan and frame work which was designed for the Benchmark project, to assist the project staff and develop their thinking and ability to disseminate and institutionalize the findings of the project, to realize more benefits and maximize the impact on stakeholders. The document utilizes the experiences that were generated by ICARDA and other CG centers and adapts them to the project objectives and activities. The Benchmark project has three main benchmark sites; these are the *Badia* benchmark in Jordan, the Rainfed benchmark in Morocco, and the Irrigated benchmark in Egypt. The three benchmarks have a common objective, which is related to the conservation of the scarce water resources and tackling this issue using different approaches and activities. However, all of them follow a community participatory approach. The proposed scaling-up strategy and action plan take the similarities and differences into consideration while maintaining the integrity of the project as a project dealing with a major problem, which is common to all countries in our region– the shortage of water; how to address the problem and plan for a drier future.

ICARDA works closely with NARS, donors, local communities and other stakeholders to implement the outputs not only at the benchmark level but also scaling it up and out to other areas and levels that are similar or relevant. This document is already under implementation by the teams of the water benchmarks project and it is hoped that other projects benefit from the scaling-up research results.

I wish to convey thanks and appreciations to the donors (IFAD, AFESD, OFID and IDRC) for their financial support to the project. I sincerely thank ICARDA and the national programs and project teams in the ten countries, for their interest and dedication in implementing the project activities and in making the anticipated change.

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Contents

Acronyms and Abbreviations

AFESD	Arab Fund for Economic and Social Development
ARC	Agricultural Research Center
BBM	Badia Benchmark Site
CGIAR	Consultative Group on International Agricultural Research
FFS	Farmers' Field School
IBM	Irrigated Benchmark Site
ICARDA	International Center for Agricultural Research in the Dry Areas
IDRC	International Development Research Center
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IIIMP	Integrated Irrigation Improvement and Management Project in Egypt
INRA	Institut National de la Recherche Agronomique
M&E	Monitoring and Evaluation
M&M	Mashreq and Maghreb Project
MoA	Ministry of Agriculture
MoF	Ministry of Finance
MoWI	Ministry of Water and Irrigation
NCARTT	National Center for agricultural Research and Technology Transfer
NSC	National Steering Committee
NTC	National Technical Committee
NVRSP	Nile Valley and Red Sea Regional Program
OFID	The OPEC Fund for International Development
OPEC	Organization of Petroleum Exporting Countries
ORMVAT	Office Regional De Mise En Valeur Agricole De Tadla
RBM	Rainfed Benchmark Site
SWM	Sustainable Water Management
WANA	West Asia and North Africa
WH	Water Harvesting

1. Introduction and Background

Water scarcity in Central and West Asia and North Africa (CWANA) is a well-known and alarming problem. Today, the issue is of increasing concern to national governments and research institutions. Increasing water scarcity is threatening the economic development and the stability of many parts of the region. At present, agriculture accounts for over 75% of the total consumption of water. However, with rapidly growing demand it seems certain that water will increasingly be reallocated from agriculture to other sectors. Moreover, opportunities for the significant capture of new water are now limited. Most river systems suitable for large-scale irrigation have already been developed. Few major resources of renewable groundwater remain untapped and current resources are subject to overexploitation, with extraction exceeding recharge rate in many cases.

While gains in efficiency are potentially available from improved distribution and use of water in fully irrigated agriculture, a great proportion of the region's agricultural livelihoods are based on dryland farming systems where production is dependent on low and extremely variable rainfall. The challenge in rainfed areas is to enhance productivity through improving on-farm water use efficiency and supplementing rainfall either through water harvesting or the strategic use of sources of renewable water to augment essentially rainfed production. However, conventional practices, which have been developed for managing water under normal water supply conditions, are not suitable under conditions of water scarcity. The need for special management of water under conditions of scarcity, based on maximizing the return from each unit of water available for agriculture, now applies to almost all the countries of CWANA.

Technologies for improved management of scarce water resources are available. However, many of these technologies are not widely implemented or are not seen as feasible by farmers. This can be attributed to a number of constraints, including technical, socioeconomic and policy factors, but most importantly the lack of community participation in the development and implementation of improved technologies. This project will be based on community participation in research and the development, testing and adaptation of improved water management options at the farm level.

The major agricultural production environments of CWANA are the rainfed cropping systems, the drier areas (*badia)* and the fully irrigated areas. The rationale for the proposed research program is to focus on the best opportunities and potential for immediate impact on agricultural productivity, resource conservation and improved livelihoods in areas where water is most scarce.

2. The Water Benchmarks Project

Goal and Purpose

The long-term development goal of the project is the improvement of rural livelihoods in the dry areas of CWANA by enhancing the productivity of agriculture based upon the efficient and sustainable management of the scarce water resources from rainfall, groundwater and surface sources.

The immediate purpose of the project is to develop and test, with the full participation of rural communities, water management options that increase water productivity, optimize water use and that are economically viable, socially acceptable and environmentally sound.

The project consists of three main components: the *Badia* Benchmark site in Jordan, with two satellite sites in Saudi Arabia and Libya; the Rainfed Benchmark site in Morocco, with three satellite sites in Algeria, Tunisia, and Syria;

and the Irrigated Benchmark site in Egypt, with two satellite sites in Sudan and Iraq. In the following pages, a brief description of project benchmark sites is given.

Benchmark Sites

2.1 Badia Benchmark Site–Jordan
The Jordan *badia* is representative of the vast drier environments in WANA. Drought and the ensuing water shortages over the last decade have prompted the people and the decision makers to explore the potential use of these marginal dry areas. The focus on developing the *badia* in Jordan, Syria, Egypt, Tunisia and other countries in WANA is increasing and ICARDA has been approached to assist in developing options for managing the resources in these areas to improve production and combat desertification.

Almost all WANA can benefit from the research to be conducted at the benchmark site in the Jordan *badia*. Among those, Saudi Arabia from West Asia and Libya from North Africa are participating as the two satellite sites representing this environment in addition to Jordan.

Interventions adopted by the project address the sustainable and integrated resource management (IRM) of Badia, by implementing, with community participation, water harvesting interventions and fodder-shrub plantations and drought tolerant fruit trees, that conserve the soil, increase fodder production, and rehabilitate natural vegetation, and improve farmer income. These include micro-catchments (planted to *Atriplex* and *Salsola*, or fruit trees), check-dams, and ponds.

2.2. Rainfed Benchmark Site – Morocco
Like most of WANA countries, Morocco has been hit by several years of drought, and consequently, is suffering from severe water scarcity. Because of its high representatives of most WANA rainfed region environments, it was chosen as a benchmark to develop and test, with the full participation of rural communities, improved technologies for efficiently utilizing the limited water resources available in the rainfed areas that increase water productivity and optimize water use and that are economically viable, socially acceptable and environmentally sound. The program is focusing on integrating supplemental irrigation in the farming systems and transferring the approach to other similar areas in Syria, Tunisia and Algeria, which represent the satellite site.

2.3 Irrigated Benchmark Site in Egypt with satellite sites in Sudan and Iraq

Fully irrigated areas in WANA are associated with the permanent availability of surface water such as rivers and renewable groundwater resources. These irrigated areas provide most of the food in this region as irrigation permits more intensive agriculture. Recently, the demands of expanding populations have increased the pressure to increase production from these systems, thereby threatening their sustainability. Saving water in irrigated areas is a top priority almost everywhere in the world, but is of particular importance in the dry areas where water scarcity is extreme and increasing.

Water saving in irrigated agriculture could be achieved by (1) *Reducing water losses* at the farm level by improving irrigation efficiencies such as application, distribution and storage efficiencies by precision means such as leveling, modern systems, measurements etc. Most of the losses under this category are recoverable downstream and is usually recycled in the system several times, as is the case with the Egyptian experience along the Nile delta. A great deal of research work has been conducted on this component and research results are available to national programs. (2) *Increasing water productivity* at the farm level, field and basin levels. Increasing the return per cubic meter of water con-

sumed at the farm is not simply an issue of irrigation management, but involves many other factors as well. ICARDA has shown that using improved water management practices, if coupled with improved agronomy and appropriate germplasm, can make substantial increases in water productivity. Deficit irrigation, for example, may double water productivity giving similar crop yields, but saving substantial amounts of water that can be used to irrigate new lands.

3. Scaling-up Strategy and Action Plan

The project started in late 2003 and early 2004. Since then, important research results have been achieved. These findings were verified in cooperation with farmers under their field conditions. Several scaling-up activities were conducted as new findings have been verified and proved to be important to disseminate to other farmers and stakeholders in the project area. This scaling-up strategy and action plan is developed to lay down the frame work and actions to be taken by the project to achieve its final objectives and to maximize its impact at the national and regional levels. The following sections describe the scaling-up approach and action plan that will be adopted by the project.

Type of Scaling-up Approaches Relevant to the Project

The term "scaling-up" is widely used, and the literature on the subject is relatively extensive. In this sense, scaling-up and the debates surrounding it do not constitute a social science issue as such. Rather, scaling-up is a management issue. It is about how to manage projects to ensure that positive impact is maximized.

In this project, we are interested in interventions/innovations that are the outcomes of agricultural research, such as new technologies, ways of managing resources (e.g., land and water), and collective organization (e.g., cooperatives, farmer research groups, and water-user associations). Research outcomes also include methodologies.

The International Agricultural Research (CGIAR)-nongovernmental organization (NGO) committee at the conference in the Philippines (April 2000, Silang, the Philippines), defined the objective of scaling-up as:
"***Scaling-up leads to more quality benefits to more people over a wider geographic area more quickly, more equitably, and more lastingly***."

Before discussing the scaling-up models that are suggested for this project, it is useful to present information on the scaling-up typology, which is used in the literature and their alternative terms that are commonly used in agricultural research, and are relevant to our project.

There are four scaling-up strategies which are not mutually exclusive, and could be used in combination (Gillespie 2004; Menter, *et al.* 2004). These strategies are:

Quantitative Scale-up (Scale-out) Strategy: Quantitative "scale-up" can be accomplished by adding on or expanding to new areas through geographical expansion, thus Increasing the number of beneficiaries reached. Geographical expansion can take place through several different sub-strategies, referred to in the literature as "*additive strategies, associative strategies, diffusive strategies, or multiplicative strategies*". Different actors can define the package of interventions that is to be replicated no matter what sub-strategy is utilized for quantitative scaling-up. Alternative terms are: Dissemination, replication, scaling-out or some times it is referred to as horizontal scaling-up.

Functional Scale-up Strategy: Also known as vertical scaling-up.

It refers to expanding the number and types of technical intervention areas included within a program (increasing program breadth or depth). Functional "scale-up" can also be divided into different sub-strategies to increase program breadth or depth. Two types are identified; "horizontal" layering and "vertical" layering that refers to the addition of similar types of activities to an existing program. This strategy has less priority in the project.

Political Scale-up Strategy: In this strategy, projects/programs move beyond service delivery and towards change in structural/institutional. It is referred to as vertical scaling- up or institutionalization. This type of "scale-up" achieves expanded impact through deliberate influence, networking, policy change, legal reform or capacity building.

This strategy is very relevant to the project where it will establish dialogue with policy makers to mainstream Sustainable Water Management (SWM)in the national policy.

Organizational Scale-up Strategy: It focuses on improving the Organizational effectiveness to allow for growth and sustainability of interventions, achieved through increased financial resources, staff training, networking, etc. This is also refered to as vertical scaling-up, or institutional development. The strategy Emphasizes building of alliances, and requires organizational capacity building. This strategy could be adopted by the project in having cooperation and linkages with farmers' union and farmers' water groups to disseminate the SWM technology using several technology dissemination tools, also training and building up the human capacities of these organizations on the SWM technology.

4. Project Scaling-up Strategies

4.1 Project Built-in Scaling-up Strategy
The project considers scaling-up as part of it is planning, implementation and monitoring and evaluation. Even though scaling-up strategy was not implicitly indicated in the project document, but it was emphasized from the inception of the project. Some of the project planned and implemented activities that serve the scaling-up process are the followings:

- Involvement of communities: The project involves the communities in the planning and implementation. The communities diagnose their area, identify their priority problems and develop, with the technical staff, the action plan to address these problems with their full participation.

- Methodologies for site characterization and selection: The project benefits from the indigenous knowledge of the population and uses remote sensing and GIS tools, as needed, to develop an approach for selecting proper site for its interventions. This approach will be very useful for the scaling-up of the project activities to new areas.

- Linking with NGOs, national institutions and similar projects as partners in project planning and implementation, and they are represented in the project steering committee.

- Involving policy makers in the planning and implementation of project activities, and initiating a dialogue with them and the target communities.

- Staff training: Emphasis was given to staff training on the introduced innovations. Training the trainers was given high priority to ensure that large number of national staff are well qualified to continue the work after the completion of the project.

- Farmers' training were given high priority, focusing on training by doing. Farmers' field school was implemented in the irrigated benchmark site in Egypt.

- Adoption and impact assessment of project interventions are part of the planned activities. The result of these studies will support the scaling-up process.

- Project monitoring and evaluation system was developed and verifiable indicators were identified to assess the progress of the project towards achieving its objectives.

The project will utilize different approaches in scaling-up sustainable water management, and will use several dissemination approaches and tools.

However, before suggesting a scaling-up strategy for the project, the following questions and situations need to be considered, which have been addressed by other projects (Franzel *et al* 2002). Answers to these questions and concerns are location specific, sometimes even site specific, and these are the followings:

- Scaling-up requires a continuous stream of technical options based on both science and farmers' innovation. How do we capture farmers' innovation and ensure that scientific knowledge and indigenous knowledge are well integrated?

- Which information dissemination methods are most effective and why? For example, how do the effectiveness of farmer-to-farmer visits compare with those of farmers' training courses?

- What are the guiding principles for successful and sustainable farmers' organizations? How can we help such organizations to associate across villages (communities) to improve their efficiency and effectiveness

- How can policy makers – at various levels – become effective promoters of local farmers' organizations dealing with water management? The strategy for involvement will depend on the level at which the policy makers are operating.

- What is the impact of projects' introduced technologies on the livelihoods of women and poor households and on the environment? How can we facilitate farmer- and community-based monitoring and evaluation?

- How can issues of institutional ownership and attribution be overcome for the benefit of small-scale farmers?

- How can research institutions adapt functionally and structurally to be more effective partners in scaling-up and, more broadly, in rural development?

It is obvious that the above questions are not intended to address only water conservation issues, but rather the whole scaling-up process for any technology. It is important for the project to try to look at these questions and address those related directly to its objectives as also other questions that could be important to the sustainability of the activities after project completion.

4.2 Suggested Strategy for Scaling-up

The suggested scaling-up strategy in this project is based on addressing stakeholder needs and ensures their participation in the planning and implementation stages. The model is also suggesting networking as an approach to maintain linkages among stakeholder groups at the national level, and extend these linkages to the regional level.

The suggested scaling-up model consists of the following steps:

1. The key stakeholder groups of the project and the sub-groups within each group were identified. Grouping was

based on their linkages and common interest and responsibility in project involvement.
2. Comprehensive needs analysis activities were conducted with identified stakeholders groups and sub-groups, and the key needs and issues were identified.
3. The results were supplemented by senior management and project's document. Specifically, the results should focus on what is expected to be achieved (outcomes, and milestones), in order to determine an overall strategic focus.
4. Based on these findings, recommendations for addressing the issues and needs were identified.
5. Then, the suitable scaling - up techniques/tools and approaches were proposed.

4.2.1 Addressing Stakeholders Groups
First, what we need to know, before we start our scaling-up efforts, is our target group (primary stakeholder) and the type of messages we need to convey to them.

Project stakeholders are several groups who are concerned about the issue of water scarcity and sustainable use of water. They represent a spectrum of the society in each country. They have been identified in the project document and verified with stakeholders in the field through discussions and meetings.

The key stakeholders groups might slightly differ between the benchmarks. However, these differences should be considered by each benchmark during the implementation. For example, livestock (small ruminants) herders are a primary stakeholder groups in the *badia* benchmark, but is not important in the irrigated benchmark. The following are the primary stakeholder groups for each benchmark site:

Badia Benchmark Primary stakeholders Groups

- *At the community level:* Beneficiaries, farmers (men and women), land user, livestock owners, community associations.

- *Other relevant projects:* Mashreq/Maghreb (M&M) Project, Yarmouk Basin Development Project, Agriculture Resource Management Project (ARMP II), Sabha / Subhieh Development Project.

- *Governmental and non - governmental organizations:* Ministry of Agriculture, Jordan Cooperative Corporation, Ministry of Water and Irrigation, Ministry of Interior, Ministry of Planning, *Badia* Research and Development Center, Department of Land and Surveying, Royal Jordanian Geographic Center, National Center for Agricultural Research and Technology Transfer, Hashemite Fund for *Badia* Development, Royal Society for Conservation of Nature, Queen Alia Fund, Noor Al-Hussein Foundation, Civil Societies, and universities.

- *Donors:* IFAD, AFESD, OFID and IDRC

Rainfed Benchmark Primary stakeholders Groups

- *Community/Village*: Farmers/water users
  Farmers and farmers' family who suffer from water shortages for their agriculture production and livestock watering are the main stakeholders in this project. Farmers' families (women and children) are involved in farm management and assist in crop irrigation and water use. Family livelihood is seriously affected by reduction in crop yields or/and market prices due to low quality product, as a result of the low amount of water available for irrigation.

- *Concerned Ministries/ Departments (National Level)*: Relevant Ministries (MoA, MoF, High Council of Water, Water Basin Agency) and Extension

Directorates (ORMVAT) at the Ministry of Agriculture are responsible for water resource conservation and on-farm water management extension. They are also involved in policy related issues. Therefore, it is concerned in disseminating the water conservation technologies to farmers and in mainstreaming water conservation and sustainable land management in the national policies.

- *Farmers' Associations:* Farmers' Union, Water users' association
- *Research organizations:* National research institutions and universities are concerned about generating research results and their application at the farm level. The feedback they receive from farmers and extension staff will be important for their future research work to fine tune and improve the technology and to address water scarcity and sustainable water use in their technology transfer activities.
- *Other relevant projects:* National research or development projects, dealing with the issue of water conservation and sustainable land management are important stakeholders. They could benefit from the project approach and the generated technologies and extend the application of the project findings at the national levels.
- *Private Sector/*Industry: Irrigation equipments and irrigation services providers
- *Donors:* IFAD, AFESD, OFID and IDRC

Irrigated Benchmark Primary stakeholders Groups

- Farmers in the target communities at the different geographical regions ,in the main production governorates for the major crops
- Extension Agency, Subject matter specialists (SMS), Non–governmental Organizations (NGO's)
- Agricultural Research Center (ARC) and the Institutes involved in the project.
- Ministry of Agriculture and Land Reclamation (MALR).
- Ministry of Water Resources and Irrigation(MWRI).
- Water User Associations (WUA) in new reclaimed lands, old lands, and salt-affected soils.
- Other relevant projects: Nile Valley and Red Sea Project (NVRSP), Natural Resource Management Project, Integrated Irrigation Improvement and Management Project (IIIMP) in Behaira, Kafer El-Sheikh and El-Sharkia, Crop Intensification Project in middle Egypt and Eastern Delta Project at Port Said, Sharkia.
- *Donors:* IFAD, AFESD, OFID and IDRC

4.2.2 Needs Analysis Techniques

There are wide ranges of stakeholders need analysis techniques; some of the common techniques that are used by the project include the following:

- Facilitated discussions
- Focus groups
- Surveys
- Staff interviews
- Field observation

In practice, more than one technique was used with a selected stakeholders group, to ensure that a complete picture is built up. The project focused on farmers' survey using a questionnaire, focus groups meetings, staff interviews and field observations. It should be understood, however, that the purpose is not a comprehensive need analysis. It was only to identify the major needs for the different stakeholders groups and sub-groups. By targeting stakeholders groups, the

extent to which the needs vary across and within each group can be identified, and the scaling-up strategy developed accordingly. The needs of the different groups are presented in Figure 1.

4.3 Networking

To enhance scaling-up of project successes and to ensure project sustainability at the national and regional levels, the

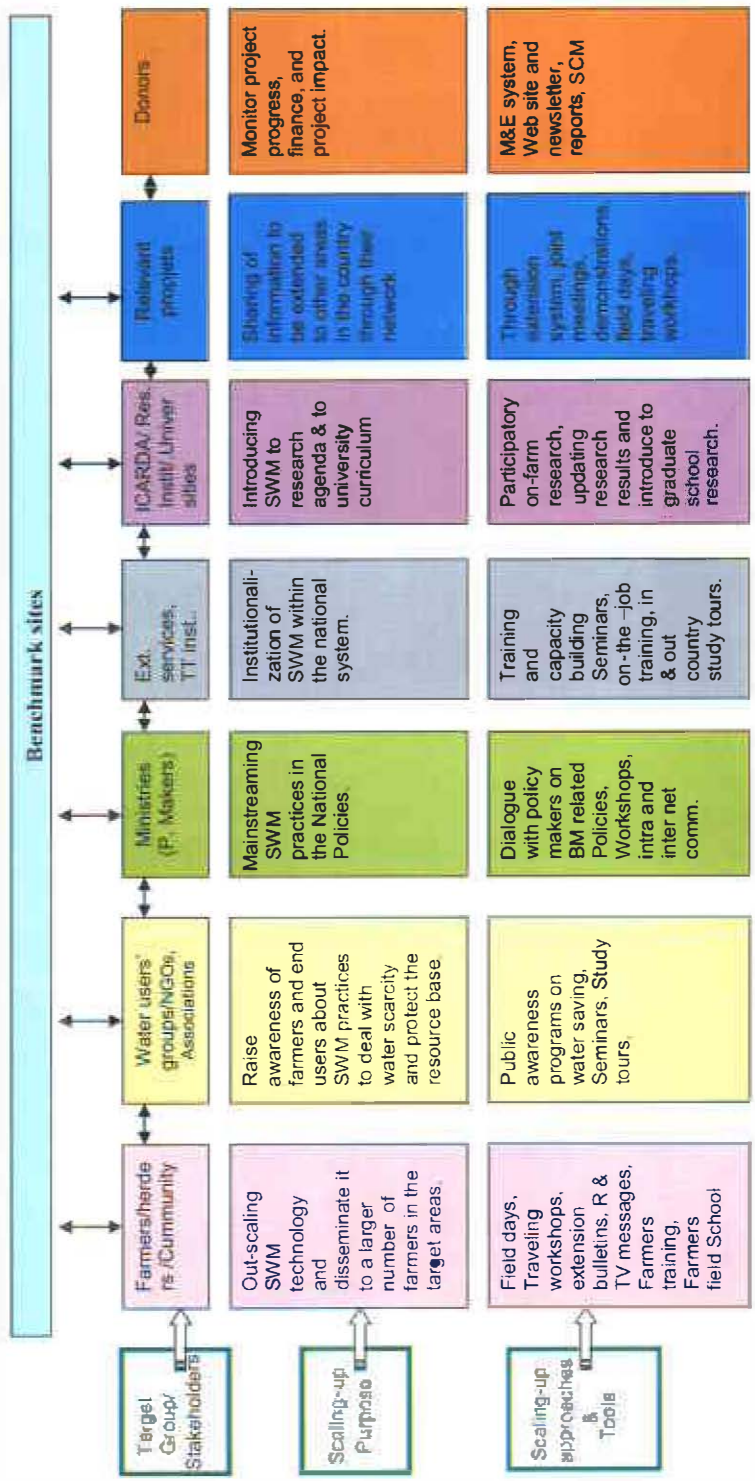

Figure 1. Scaling-up strategy based on stakeholders' needs

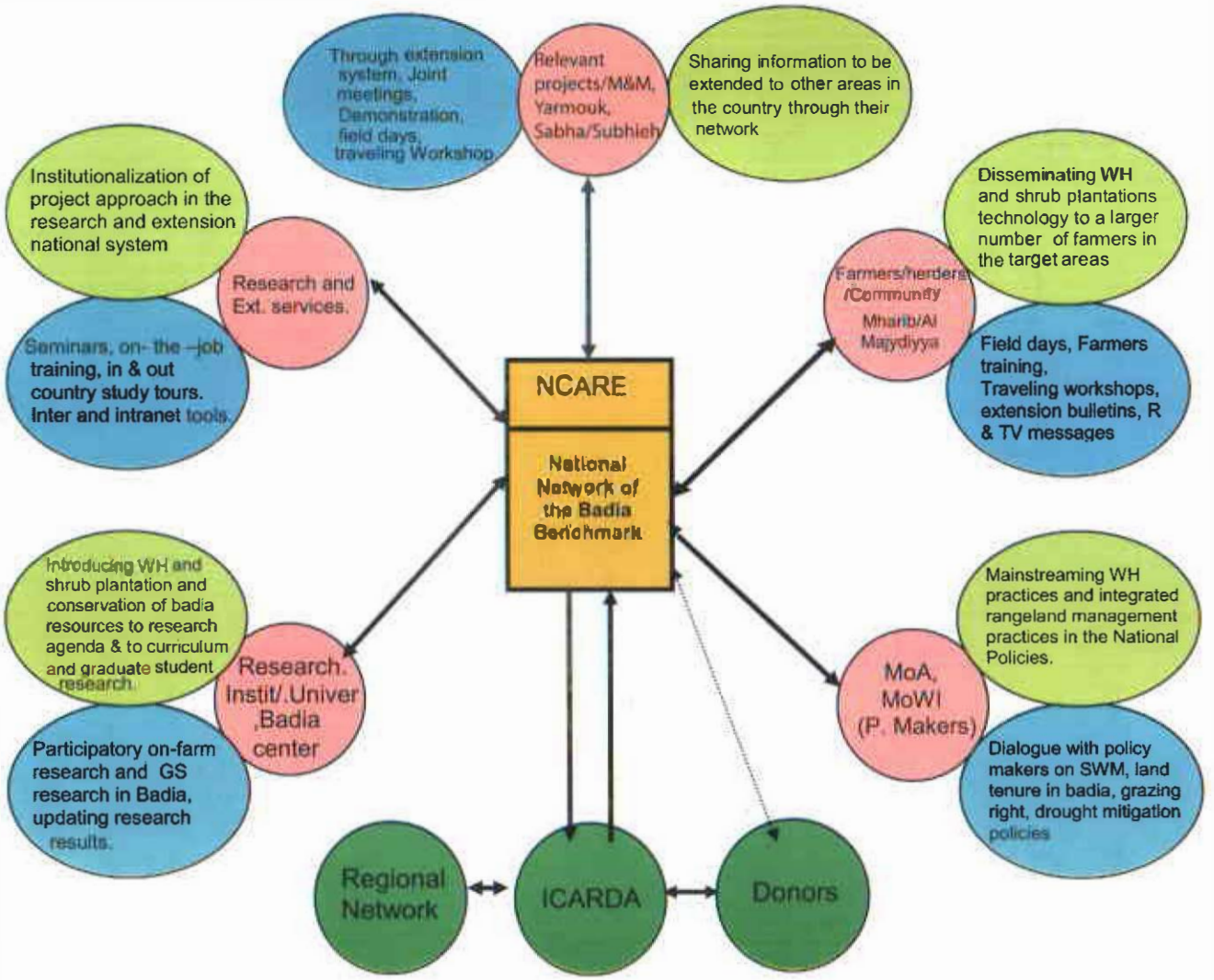

Figure 2. National Network, Badia Benchmark

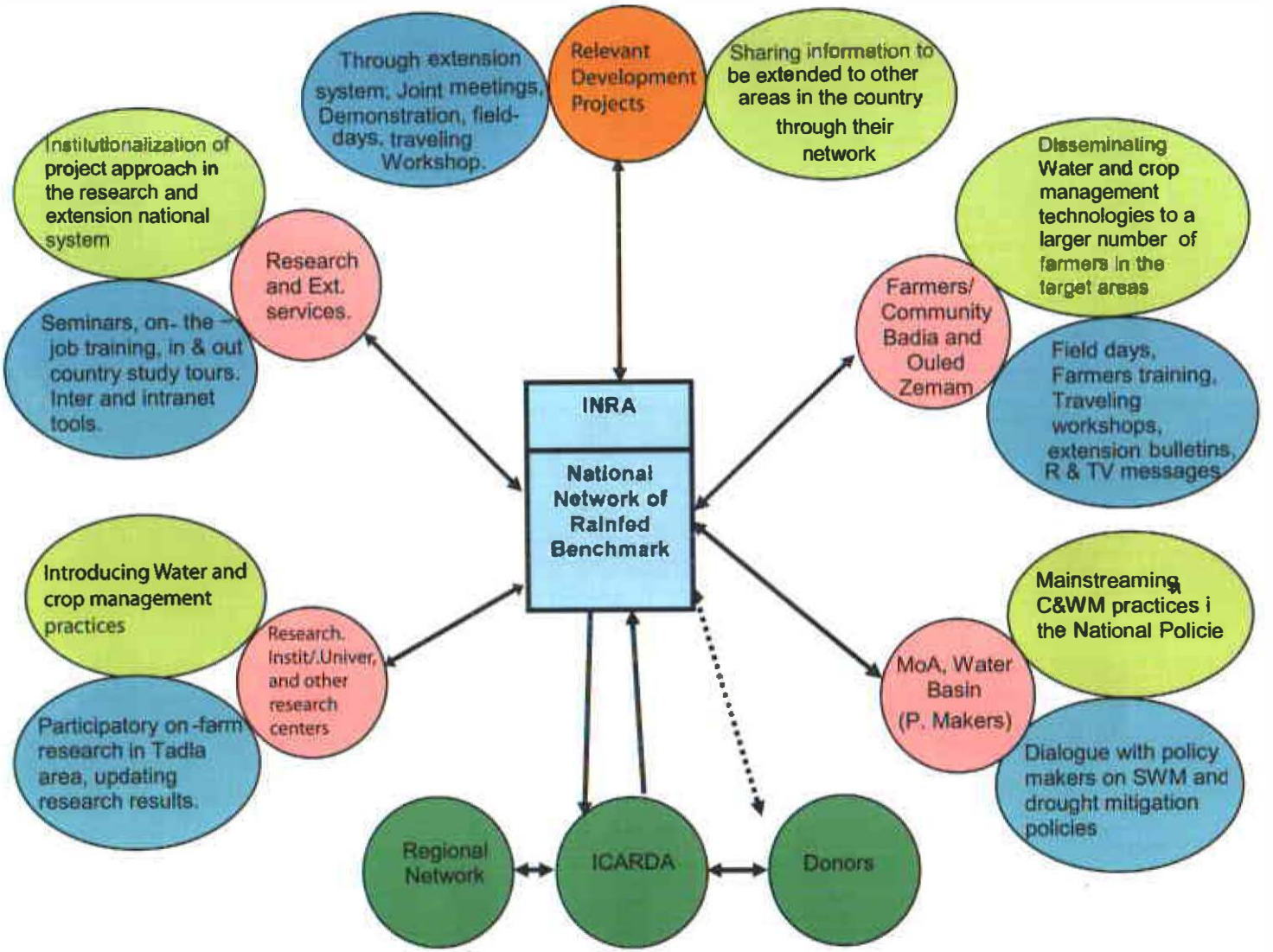

Figure 3. National Network, Rainfed Benchmark

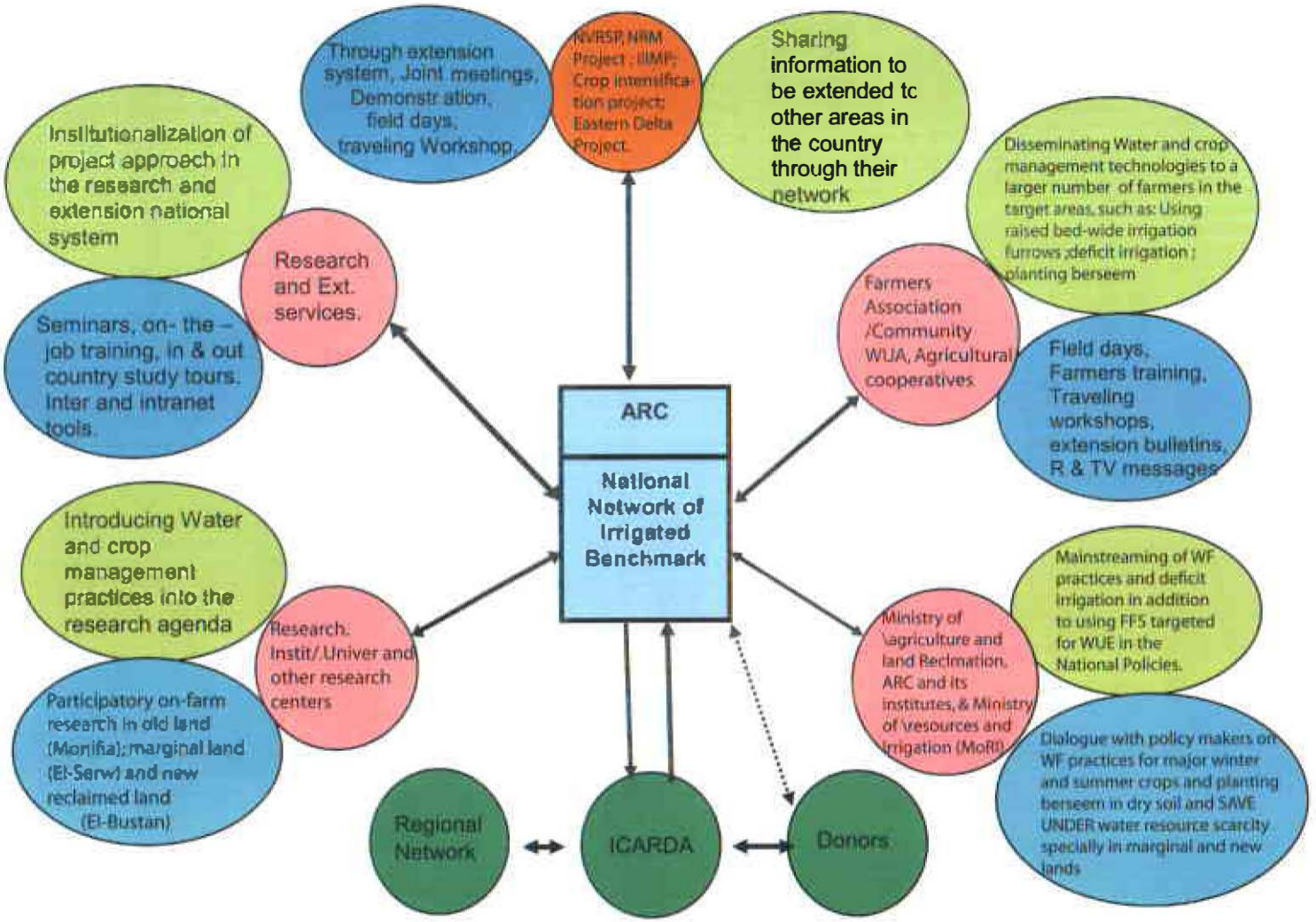

Figure 4. National Network, Irrigated Benchmark

project established two networking mechanisms:

National Networks: Each benchmark establishes and coordinates a national network to scale-up and institutionalize project approach, methodologies and successful results at the national level.

Regional Network: The network is at the regional level and coordinated by the regional project management (ICARDA).

4.3.1 National Network (*Badia* Benchmark-Jordan as an example)

Objective of the BBM: Widespread integration and adoption by people in the *badia*, of suitable water harvesting techniques to capture and efficiently utilize rainwater runoff in more productive and sustainable systems.

Network Objectives: Scaling-up (Dissemination and institutionalization) project methodologies, approaches and technologies at the national level.

Approaches: Community participation, WH Technologies, Watershed-based Livestock/Rangeland, Policies, Reforms (Land Tenure, Grazing rights) Capacity Building, Build on Previous Experiences.

Tools: Multi-disciplinary, Multi-institutional teams, Database, Demonstrations, Field days, Traveling Workshops, Progress Reports, Extension Materials, Farmers Training, Staff Training, Policy Dialogue, National Steering Committee (NSC) and National Technical Committee (NTC).

The suggested national networks are demonstrated in Figures 2, 3 and 4.

4.3.2 Regional Network

Project Goal: Improvement of rural livelihoods in the dry areas of CWANA by enhancing the productivity of agriculture based upon the efficient and sustainable management of the scarce water resources from rainfall, groundwater and surface sources.

Objectives of the Network: Standardize Methodologies and Approaches, Scaling-up, Exchange Experiences, and scaling-up activities from the benchmarks site to the relevant satellite site.

Approach: Participatory, Community Based, Modeling, Building on National strengths, Networking.

Tools: Specialized Thematic Groups, Web Site, Newsletter, Technical Planning and Coordination Meetings, SCM, Workshops, Training, Reports and Publications, M&E System, e-mail facilities.

The suggested regional networks are demonstrated in Figure 5.

4.4 Scaling-up limitations (constraints)

These limitations have been cited and discussed by Davis and Lyer (2002) which

Regional Network

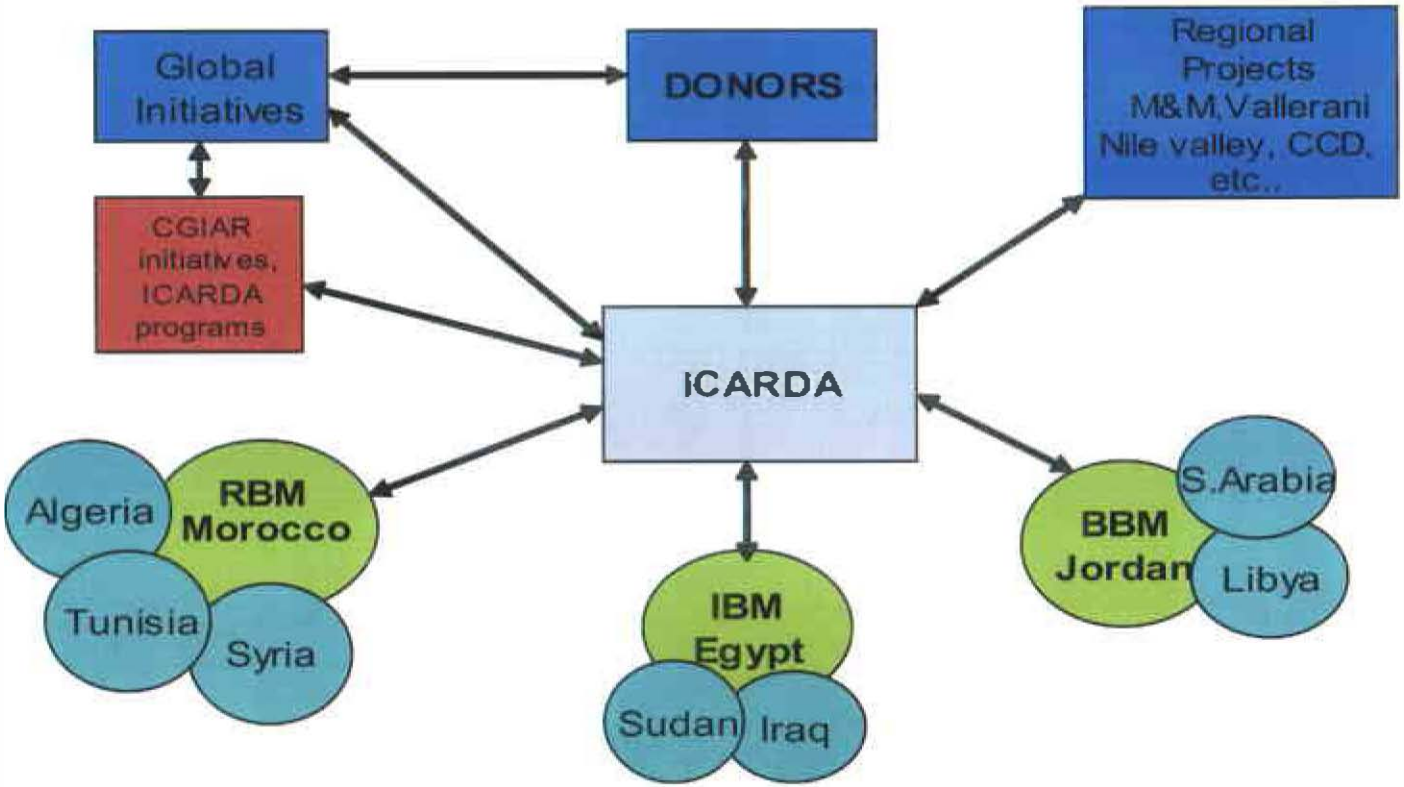

Figure 5. Regional Network

we found to be relevant to the situation of the benchmark project, and they need to be considered by project management to ensure successful scaling-up process, including the following:

Resource constraints: Inadequate funding, human capital, institutional capacity, supply chains, or other resource limitations render a successful small-scale initiative infeasible on a larger scale.

Lack of knowledge or shared understanding: Individuals responsible for planning or implementing water conservation initiatives do not fully understand its principles and/or the roles they are expected to play in scaling-up.

Resistance: Despite having full understanding of successful, sustainable approach in water conservation, key stakeholders are unwilling to support scaling-up.

Untested implementation conditions: When extended to new areas/communities, successful initiatives encounters difficulties because of their unique features (e.g., technical, social, policy, user demand) confronted in the pilot communities.

The implication of this simple categorization is that the investigation of the scaling-up of sustainable water conservation approaches incorporates issues related to dissemination of information, ideas, and new technologies; political economy of resource allocation; organizational learning and change; public finance; project management and public administration.

5. Scaling-up Action Plan

5.1 Scaling-up at the National Level

The following activities were and/or will be implemented (Tables 1, 2 and 3):

5.1.1 Knowledge sharing: Using the networking facilities and the information and knowledge database established by the project, sharing mechanisms were developed to exchange information on efficient and sustainable management of the scarce water resources from rainfall, groundwater and surface sources among the countries, project staff, Ministries' extension staff, Ministries' water management staff and pioneer farmers, who are capable to deal with advanced tools such as the internet.

5.1.2 Production and dissemination of knowledge products: Knowledge related to policies, institutions and technologies that deal with efficient and sustainable management of the scarce water resources best practices are being produced in different forms and made available to farmers, water users, technical staff and policy makers. The products include extension bulletins, leaflets, brochures, newsletter, video films, radio programs, and others.

5.1.3 Activities that support knowledge dissemination: Demonstrations on efficient and sustainable management of the scarce water resources best practices were implemented on farmers' fields with farmers' participation in cooperation with extension staff. The field demonstrations were used to show farmers the proper practices that result in water saving and better farmers' returns. The demonstrations were also used as a tool in implementing field days and for staff and farmers training.

5.1.4 Field days: Field days were organized at the proper time to show other farmers the efficient and sustainable

Table 1. Scaling-up activities that are being implemented and/or will be implemented in the Badia Benchmark site in Jordan with their organizers and target groups.

Scaling-up Activities	Specify the message/technology/policy etc for scaling- up	Scaling-up approaches	Tools	Date of implementation	Responsible/ organizer	Participants/Target groups
Knowledge products	-Methodologies for watershed characterization and selection -Water Harvesting (WH) techniques - Shrub, fruit trees and barley cultivation	Written materials and Audio-visual tools	-Leaflets -posters -extension bulletins -newsletter -video films -radio messages	2005,2006, 2008 and 2009 2008 Every year until 2009	Project technical staff, extension agents	Project technical staff, extension agents
Field Demonstrations	-Construction of WH structures. -Fodder shrub plantation Fruit trees plantation -Barley plantation	Community based participatory approach	Demonstrations will be implemented in farmers' fields with full farmer participation	October 2006, 2007, 2008 and 2009	Extension staff and farmers with technical support from project staff	Extension staff and farmers with technical support from project staff
Field days	Organize field days on the demonstration sites to show them interventions addressed by the demonstrations (see above)	Bring farmers to demonstration and let farmers who hosted the demonstration explain the interventions to them -Posters	Field days will be organized in each site	April 2005,2006, 2007, 2008 and 2009	Farmers with technical support from project staff and extension agents	Farmers with technical support from project staff and extension agents
Dialogue with policy makers	-land tenure legislations -Badia land use policies -Drought mitigation policies	Meeting and discussion in the presence of the community members	Two workshops will be organized	2008 and 2009	Project staff	Project staff
Staff Training	-Use of GIS and RS for watershed characterization and selection. -Data collection and management. -Grazing management	-class lectures and field application -In-the-job training	Training course/activities	2006, 2008	Project experts	Project experts
Farmers Training	- WH structures establishment - WH structures maintenance -Proper grazing management -Shrub seedling production	Training by doing	Training by doing during demonstration implementation and follow- up during the growing season	March-April and October-November every year at planting and maintenance of WH structures and during grazing in May	Extension agents with technical backstopping from project staff	Extension agents with technical backstopping from project staff

Table 2. Scaling-up activities that are being implemented and/or will be implemented in the Rainfed Benchmark Site in Morocco with their organizers and target groups.

Scaling-up Activities	Specify the message/technology/ policy etc for scaling-up	Scaling-up approaches	Tools	Date of implementa-tion	Responsible/ organizer	Participants/ Target groups
Knowledge products	Water productivity improvement technologies. Technical information on: performing varieties, better use of field inputs and irrigation scheduling considering rainfall.	Written materials and Audio-visual tools	-Leaflets -posters -extension bulletins -newsletter -video films -radio messages	January 2008	Project technical staff, extension agents	Farmers/ extension staff, public, and policy makers
Demonstrations	Crop, water and land management practices for better WUE. examples Improved varieties, land leveling	Community based participatory approach	Demonstrations will be implemented in farmers' fields with full farmer participation	2005-2006 cropping season,	Extension staff and farmers with technical support from project staff	Farmers
Field days	Crop, water and land management practices for better WUE. Show farmers on the site the impact of introduced interventions compared to his techniques	Community based participatory approach	Field days will be organized in each site	2005-2006 cropping season,	Farmers with technical support from project staff and extension agents	Farmers
Dialogue with policy makers	Necessity to implement new legislation regarding agricultural water use	Presentation of field and modeling results	Two workshops will be organized	End of 2008	Project staff	Policy makers and high officials, NGOs, private sectors and other stakeholders
Staff Training	Crop, water and land management practices for better WUE	Training workshops	Training course/activities	2005-2006 cropping season,	Project experts	Ministries, NGO, and other relevant staff
Farmers Training	Crop, water and land management practices for better WUE. Farmers' implication in realizing field interventions. They also visited other regions where water scarcity pushed farmers to use it very carefully and efficiently.	Field participatory trials and traveling workshops	Training by doing during demonstration implementation and follow- up during the growing season	2005-2006 cropping season,	Extension agents with technical backstopping from project staff	Farmers, community members

Table 3. Scaling-up activities that are being implemented and/or will be implemented in the Irrigated Benchmark Site in Egypt with their organizers and target groups.

Scaling-up Activities	Specify the message/technology/policy etc for scaling- up	Scaling-up approaches	Tools	Date of implementation	Responsible/ organizer	Participants/Target groups
Knowledge products	Adoption of project interventions, save irrigation water, increase water productivity, reduce leaching fertility.	Written materials and Audio-visual tools	-Leaflets -posters -Reports -bulletins -video films -radio programs	Sep 2006. Sep 2006. Sep 2006,2007,2008 Jan.,2007,2008	-Project coordinator. -Project technical staff. -Extension agents. Socio-economic staff.	Farmers at local communities. Extension staff. Policy makers.
Field Demonstrations	-Wide furrow. -Deficit irrigation. -Dry planting method. Implemented by technical staff, farmers, extensionist	-field visits. -Demonstration plots. - Posters. - Leaflets.	-M&E farmers' fields with full farmer participation	June & Dec. every year	MD team & Socio-economics staff	Farmers/communities
Field days	-Wide furrow saved irrigation water, labor costs and fuel costs without decreasing yields specially in newly reclaimed lands. -Deficit irrigation could be followed in case of shortage of irrigation water.	Extension tours to visit progressive farmers.	Field days will be organized in each site.	May. and September2006 and every year as needed for key operation.	Farmers with technical support from project staff and extension agents.	Farmers/ communities.
Dialogue with policy makers.	Water recovery, saving irrigation water to increase cultivated area for achieving food security. This is through workshops and seminars, with extensionist, ARC inst., ministry of irrigation, farmers groups.	Workshops. Field visits.	-Training courses. Workshops	Oct. and July.2005,2006 And periodically	-Project experts. -Researchers, SMS. -extension staff. -local leaders. Water user associations	AERI researchers. Socio-economic staff. NGOs, technical staff. Target communities in the three sites.
Staff Training	- Using valid formats to keep records about on-farm trials. -Irrigation modeling that help in scheduling water irrigation. - Offering out of country training for researchers in that concern.	Practicum training through farmer field schools.	Training courses/activities for 50 personnel.	August.2007 and 2008.	Project experts: researchers, technical assistance from international organizations	Ministries. NGOs. Other relevant staff.
Farmers training	-The proper time to irrigation water to avoid over-irrigation. - The advantage of develop project intervention such as wide furrows for planting in major crops. -For new land, how the farmer evaluate irrigation discharge system to use the proper irrigation amount under the condition of new lands. -How to manage new reclaimed land.	Practical training through farmer field schools	Training by doing during demonstration implementation and follow-up during the growing season. (No. of trainees 100 farmers).	Oct.2005;and periodically throughout the growing seasons.	Researchers. Extension staff. Technical backstopping from project staff.	Farmers, Community members.

management of the scarce water resources best practices as compared to farmer practices. The field demonstrations presented in the previous section were used in the field day. Farmers hosting the demonstrations explained to their colleagues their involvements in implementing these demonstrations and gave their opinions and the benefits they got by applying this system on their farms. Technical and extension staff of MoA and MoWI were available during the field day to provide technical support

5.1.5 Dialogue with policy makers: The project initiated a dialogue with policy makers and other concerned stakeholders aiming to mainstream the efficient and sustainable management of water resources best practices within the national policy. This dialogue will be formalized by organizing two workshops with participants from the MoWI, MoA, Farmers Associations, and Parliament Deputies representing the target area, high governmental officials who are concerned with water sector in the country, and pioneer farmers who cooperated in project implementation. The project will give a presentation on the results of it is activities and present to the participants the concept of water efficient and sustainable management of best practices and how much water could be saved when applying the recommended practices without reducing farmers' profit. In the *badia* benchmark, issues related to land tenure and open grazing access will be given high emphasis, whereas the optimum use of rain water and supplemental irrigation will be the focus for RBM. As for IBM, deficit irrigation and water saving and water quality will be given more importance. The first workshop will be an introductory workshop to introduce the subject to the high officials and to get their feedback, and to prepare them to the second workshop that will propose to them some legislation and specific policies that support and enforce water conservation practices at the national level. Provision for farmer incentives in the first few years to encourage them to adopt the proposed systems and technologies should be also considered. The second workshop will be organized six months after the first one.

5.1.6 Staff Training: Training courses (on-the-Job) for the MoA extension staff and MoWI water management staff will be conducted to provide them with the information and practical skills that are needed for the successful implementation of a sustainable water management best practices system. Theoretical background information and the experience of other countries on this subject will be also introduced to them to widen their knowledge base and building confidence. A regular information update will also be part of such training. The training will be conducted by the project experts. Graduate training has been given emphasis by the project which will provide sustainability to the activities after completion of the project.

5.1.7 Farmers Training: Farmers training will be conducted by the MoA and MoWI staff with technical support by the project staff. The training will cover the practical aspects of implementing SWM best practices. It will be extended to the whole growing season, and will be conducted at the farms of the participating farmers who are hosting the demonstrations. Farmers' Field School (FFS) is being conducted at the Irrigated benchmark site in Egypt.

5.2 Scaling-up at the Regional Level

The project established several mechanisms and tools to disseminate the findings and standardize the approaches and methodologies among the participating countries, especially with satellite sites. They include:

5.2.1 Thematic groups: Two specialized thematic groups were developed by the project at the level of the three bench-

marks to discuss the technical issues and approaches that are common to the participating countries to arrive at a common understanding and to provide the technical back stopping to the needed countries in specific research areas. These thematic groups are:

5.2.1.1 Socioeconomic thematic group: The groups discussed and agreed upon the approach and methodologies that need to be followed by the different countries in the areas of community participatory approach, policy and institution, adoption and impact, indicators to be used, and M&E system.

5.2.1.2 Water productivity and modeling thematic group: The group discusses the issue of water productivity across the three benchmark sites, the measurements to be used and the analysis tools, modeling that need to be applied for each bench mark and biophysical indicators.

5.2.2 Website: Project main findings, database, new development, staff dialogue and communication

5.2.3 Newsletter: communication of project progress, integration of teams and exchange views and experiences, introducing new ideas and initiatives, communication between benchmarks and satellite sites

5.2.4 Technical planning and coordination meetings: Review project progress and planning objectively , modify project work based on the results and experience gained from other projects, develop regional activities, consolidate findings and plan for impact assesment

5.2.5 Annual and progress reports: Share findings and learn from the experience of the BM sites,

5.3 Scaling-up the findings of the benchmark sites to their corresponding satellite sites:

The satellite sites will test under their local conditions what have been achieved under the Benchmark sites; adapt and fine-tune the interventions to their situations. This will be a low-cost method of disseminating project achievements at large scale at the regional level.

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