

Spate irrigation for rural economic growth and poverty alleviation

Technical Progress Report 2011
Implemented by the Spate Irrigation Network



Enabling poor rural people
to overcome poverty



SPATE IRRIGATION FOR RURAL ECONOMIC GROWTH AND POVERTY ALLEVIATION

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1. Introduction

The Grant for the project: Spate Irrigation for Rural Economic Growth and Poverty Alleviation (SIREGPA) was approved by the International Fund for Agricultural Development (IFAD) in November 2010. The Spate Irrigation Network (SpN), which is co-convened by MetaMeta and UNESCO-IHE, did not wait for all the administrative arrangements and contract paper works. With strong support from the project Task Managers at IFAD (Rudolph Cleveringa and Laura Sollazzo) and the country team leaders and project staff in the four target countries: Ethiopia, Sudan, Yemen and Pakistan, the SpN immediately embarked on implementing a number of capacity building activities and organized its inception workshop and steering committee meeting in January, 2011 in Addis Abeba, Ethiopia.

This technical progress report, first presents the rationale and relevance, main goals and objectives and the expected outputs of the project. It then outlines the main activities undertaken and the major achievements realized in 2011.

2. Rationale and relevance to IFAD and SpN

Spate irrigation is a resource management system whereby short-duration floods in ephemeral rivers are diverted for crop production, groundwater recharge, rangeland and local forestry improvement.

In the past few years good spate irrigation management and development practices have been documented and training material has been prepared - a process that is still continuing. By documenting and sharing experiences within and between countries a compendium of improved practices is evolving on organization and governance, on water diversion and engineering, on improving agronomy, on moisture management and non-agricultural activities.

The rationale of the project is that spate irrigation in general and the large menu of improvements requires much more attention and should be promoted at country policy level as well as at operational level. The combined effect of improved spate irrigation system management can vastly increase economic productivity and improve livelihood situations considerably. The spate irrigated areas in most countries constitute poverty pockets hence making use of the potential for improvements effectively contributes to poverty alleviation.

IFAD has been the single-largest development organization that has supported spate irrigation. IFAD has supported spate irrigation activities among others in Tunisia, Sudan, Yemen and Eritrea.

The objectives and expected outputs of this project are very much akin to the central focus of the SpN (www.spate-irrigation.org). The Network strives to improve the livelihoods of those living in the spate irrigated areas. It exchanges experiences and good practices, initiates and supports new programs and policies, and mainstreams education and training.

3. Overall objective

Contribute to poverty alleviation and acceleration of rural economic growth through solutions-oriented research and capacity building programmes that address tangible practical problems and feed to policy formulation.

4. Target countries and group

Target countries: Ethiopia, Pakistan, Sudan and Yemen

Target group: Smallholder spate farmers, farmers' and local organizations, educational institutes, relevant IFAD-funded investment programmes, activities of SpN, UNESCO-IHE and MetaMeta.

5. Expected outputs and benefits

Output 1: Strengthened Spate Irrigation Network

- Country chapters and plans of SpN operational with at least 50 members
- Spate irrigation programmes of 12 key organizations supported through training and program assistance
- Country spate irrigation policy notes prepared

Output 2: Solutions-oriented research activities implemented

- Eight solutions-oriented research activities implemented - covering a wide range of good practices
- Each research activity evaluated, documented and scaling up pathways identified

Output 3: Capacity built and knowledge documented and disseminated

- Six MSc studies completed with a research focus on spate irrigation
- Sixteen practical notes printed and translated; four instructional videos prepared, four modules updated
- Spate irrigation mainstreamed in at least one university/college in each target country
- Spate irrigation practices in five 'unknown' places documented

Output 4: Support pool to IFAD projects and Country Programmes

- On demand support provided to projects and country programmes as budget allows
- Spate irrigation support activities and materials widely spread through IFAD projects and country programmes

6. Major achievements in 2011

6.1 Project Management

To lay the foundation for a smooth start-up and implementation of the project activities, the following activities were undertaken:

- Main project contract between IFAD and UNESCO-IHE on behalf of all the project implementing partners was finalized in January, 2011.
- Inception workshop was successfully held in Addis Abeba, Ethiopia in January-February, 2011 attended by all the steering committee members (IFAD Grant Manager, Rudolph Cleveringa, country project team leaders in the four target countries, project leaders from SpN (UNESCO-IHE and MetaMeta). The main output of the workshop was a detailed 2011 Work plan along with a results-based budget.
- The country work plans for 2011 were finalized in March, 2011.
- A seminar was conducted at UNESCO-IHE in March, 2011, to introduce the project approach, rationale and objectives, expected outputs and benefits. The seminar also addressed four key questions: What is spate irrigation? How is it different than other conventional spate irrigation systems? What need to be done differently to ensure sustainable management and development of spate irrigation? How important is spate irrigation now and in the future as far as water and food security in the least developed countries are concerned? A total of 70 staff and students attended the Seminar. A strong recommendation was given to embed MSc studies within the research programmes of the project.
- Seminars were conducted in the period March to May, 2011 at the Hydraulic Research Station (HRS), Sudan; Water and Environment Centre (WEC), Yemen; Araba-Minch and Haramaya Universities, Ethiopia; Strengthening Participating Organizations (SPO) and Pakistan Agricultural Research Council (PARC) to introduce the project activities, expected outputs and benefits.
- Guidelines for preparing research proposals, progress and annual reports as well as financial statements were shared with all country team leaders in May, 2011.
- A research seminar was conducted in July, 2011 at UNESCO-IHE by Sudan project staff. The objective of the seminar was to attract MSc students to undertake their research as part of the Sudan project research programmes. The seminar succeeded in enlisting 5 MSc students.
- A short write up was prepared for the Asia Pacific newsletter of IFAD on the activities in Pakistan.

In attempt to further enrich the outputs of the project and increase its impact, several complementary project proposals were developed:

- A proposal for additional funding to the SpN-Pakistan was prepared for the World Bank-Dutch Trust Fund on Water. Under the budget of USD 188000 activities in innovative pilot projects (developing new areas; bulldozer stock replenishment), mainstreaming spate irrigation in education, training national NGOs, translating material in local languages, support to policy development and the development of provincial focal persons is envisaged. This proposal was approved and is expected to become effective early 2012.

- Shallow tube wells in flood based farming systems in Ethiopia and Mozambique: prepared for the Partners for Water Program (Euro 130000). As shallow tube wells need not be reconstructed and can penetrate shallow aquifers at deeper depth, they would add considerable water security to the flood based systems. The proposal was favourably reviewed but needs to be resubmitted after minor modification in February 2012.
- Spate irrigation and climate change adaptation: prepared for the German-funded International Climate Initiative together with GiZ (Euro 1.2 Million) to promote the exchange of flood based farming systems and fund innovative measures. This is mainly investment-tailored project and focuses on resilience of spate irrigation systems.

6.2 Strengthening Spate Irrigation Network (SpN)

- Draft 4-year country network plans operational with registered and active members: 22 (Ethiopia), 31 (Sudan), 70 (Yemen) and 100 (Pakistan). The network plans present the vision, mission and mandates of the networks and outlines the main activities to be accomplished in the period 2011 to 2014.
- Links are established and maintained with several key collaborating implementing organizations. Training workshops, seminars and meetings were undertaken with full participation of these organizations.

Sudan:

Ministry of Irrigation and Water Resources, Ministry of Agriculture; Agricultural Research Corporation (ARC) in Wed Medani, Kassala and Toker; Gash department of the Ministry of Agriculture, Gash River Training Unit as well as Gash WUAs, Kassala; Delta Toker Scheme in Toker; Khor Abu Habil Scheme in North Kordofan; Khartoum, Sudan and Gezira Universities; IFAD Gash Sustainable Livelihoods Regeneration Project (GSLRP).

Representatives of these organizations that included the State Minister of Irrigation and Water Resources, the Provincial Minister of Agriculture, higher government officials, water resources management professionals and practitioners as well as WUA leaders and farmers, participated in the stakeholder consultation workshop that was successfully conducted in Kassala, Sudan in June, 2011. Following the introduction of the spate irrigation project objectives and expected outputs and benefits, several papers covering technical, institutional, social and economic aspects of spate irrigation were presented. The two tangible outcomes of the workshop were: 1) a database of 31 SpN-Ethiopia members and 2) four priority research topics (see details in section 6.3).

Ethiopia:

Bahirdar University, Hawasa University, Hawassa Water Resources Bureau, Bahirdar Water Resources Bureau, Tigray Water resources Bureau, the Southern Region Pastoralist Development Bureau, and IFAD Ethiopia office.

22 participants represented the above mentioned organizations in the training workshop conducted in Adama, Ethiopia in the period 8 to 14 February, 2011. The programme included lecturers,

exercises, group work and field trips covering technical, institutional, social and economic aspects of spate irrigation. All 22 participants became registered and active members of SpN- Ethiopia.

Yemen:

Groundwater and Soil Conservation project (GSSP), Tihama Development Authority, Social Fund for Development, General Irrigation Department, Ministry of Agriculture and Irrigation, WUAs in Wadi Zabid and Wadi Mawr.

Representatives of these organizations attended a series of spate irrigation lectures conducted by the SpN-Yemen at WEC - University of Sana'a. The lectures introduced spate irrigation systems in Yemen and the Middle East. The activities of SpN and the membership benefits and obligations were also discussed. These lectures provided the platform for registering 59 new members.

Pakistan:

A section on spate irrigation was included in the Water Sector Task Force Document of the Friends of Democratic Pakistan. This document is the combined donor statement on priorities in water related investment in the country.

- A new website was built (www.spate-irrigation.org) - using Word Press making it much easier to add material and send out mailings. The website was then 'refilled' with all the source documents of the previous site – including 100 plus documents in the library. The photo library was updated. Special section on training material and Practical Notes and Overview Notes were prepared. More than 100 new members were added to the list server. Three mailings were sent out to all members.
- Discussions were held with the IMAWESA program and a proposal for coordinated training and documentation activities was prepared (see details in section 6.5) - implementation will start as soon as this is endorsed by IMAWESA – keeping in mind budget opportunities and limitations.
- SpN-Sudan page was incorporated to the HRS website (www.hrs-sudan.sd). The website is updated with spate news and activities and outputs of the spate project including workshop report, on-line access to presentation conducted at the UNESCO-IHE, and competitive research calls.

6.3 Solutions-oriented research

Sudan

Proposals were developed on four main research programmes:

- 1 Towards productive and profitable spate irrigated agriculture in Sudan.
- 2 Gash river training and protection works to mitigate flood damage to Kassala town.
- 3 WUAs in Gash: If and how they can be viable and credible contributors to better irrigation water management.
- 4 Spate flow for artificial aquifer recharge for both domestic and agricultural water use.

While fund was available from the spate project for only 2 research programmes, the Sudan project team secured additional 20,000 Euros from DUPC to implement research programmes 3 and 4 following

their successful research seminar at UNESCO-IHE in July, 2011. This very seminar also generated interest of 5 UNESCO-IHE, Land and Water Programme MSc students to pursue their MSc research in Sudan. Accordingly, implementation of research programme 1 (implementation was planned for 2012) started in July 2011 with the development of 5 MSc research proposals:

- Optimizing the Design of Diversion Structures in Gash Agricultural Scheme (GAS), Sudan.
- Sediment Control and Management in the Diversion and Main Canal Network of GAS, Sudan.
- Towards Solution Oriented Institutional Arrangements for better O &M in GAS, Sudan.
- Optimizing On-Farm Water Management and Agronomic Practices under Spate Irrigation in GAS, Sudan.
- Optimizing Irrigation Distribution System for Higher Agricultural Productivity of Toker Delta Agricultural Spate Irrigation Scheme, Sudan.

These five MSc students in collaboration with three local (Sudanese) MSc students have successfully conducted their field work and collectively:

- Quantified sedimentation problems in irrigation canals, identified optimum water distribution and diversion design alternatives as well as cropping pattern and calendar and soil moisture conservation measures.
- Recommended measures that build upon the strengths and address the weaknesses of the institutional arrangements with regard to operation and maintenance.
- Formulated spate irrigation relevant cost-benefit analyses methodology and assessed the profitability of GAS under different cost and benefit scenarios.

The complete detailed findings are due in April, 2012.

The Research programme offered a platform for knowledge and experience sharing among the MSc students who worked as a coherent research team as well as the staff from the Hydraulic Research Station, Sudan and UNESCO-IHE, the Netherlands who jointly supervised the work of the MSc Students. In concrete terms, the UNESCO-IHE students shared their knowledge on proposal development, analytical approaches including simple and practical models and tools to optimize water diversion and distribution and soil moisture conservation and critically evaluate institutional performance. The Sudanese students were instrumental in uncovering the local wisdom of traditional water management and farming practices as well as the socio-cultural attributes of the spate irrigation communities.

The support of the GSLRP staff has been invaluable. They were involved in the identification of the four research programmes; supported the MSc students as resource persons, provided open access to all their documents, made available their office premises and facilitated field visits and meetings with farmers.

Ethiopia

Three research concept notes are developed and these are expected to contribute to the overall improvement of spate irrigation schemes through studying the sediment and flood water management, flood control and distribution, field water management are developed for Bililo and BoruDodota spate irrigation schemes. Two MSc thesis proposals are also developed on the two case study areas. The research topics are:

- Improving Flood diversion, conveyance and Water Distribution of Spate Irrigation in Billio Spate irrigation scheme.
- On- farm Water Management and Soil Moisture Conservation in Boru Dodota Spate Irrigation System, Ethiopia
- Optimum operation of flow control structures towards effective flood and sediment management in Spate Irrigated Field, case of BoruDodota Spate Irrigation scheme.

As per the plan, implementation will start in 2012. MSc students will have the lead role and the core SpN- Ethiopia team will closely guide and supervise the research work in collaboration with local universities and UNESCO-IHE and MetaMeta.

Further, a concept was prepared to develop a multi-functional combination of a sand dam, spate bed stabilizer and low causeway (Irish Bridge). This will be worked out in the coming year under the DWA program in Ethiopia.

Yemen

Research Concept notes have been developed on:

- Ground water recharge from wadi bed and the impact of supplementary irrigation in crop yields and patterns in wadi Zabid.
- Strengthening of WUA's in wadi Zabid reaches.

These research topics were identified as relevant and of high priority by more than 15 Yemen water sector organizations during the extensive labour market analyses conducted by MetaMeta in February - March, 2011. The analysis was undertaken as part of the inception phase of the NUFFIC supported and MetaMeta and UNESCO-IHE led Yemen NICHE project: *Strengthening Research Capacity in Yemen's Water Sector for Policy Formulation, Education and Awareness Raising*. This project was suspended by the Dutch Government in May, 2011 when the political unrest was at its peak. With situation improving, the project will likely resume in 2012 – its activities will link to and create synergies with this spate irrigation project.

During the meeting held among the Yemen SpN project team leader; and IFAD staff, namely Ms. Abeer Al-absi, country representative, Sanai Amin Al-Aswadi, assistant administrator and Derek Kim, the communications and advocacy officer/coordinator for water projects; it was agreed that the above two research activities are relevant and worthy of investment. A decision was taken to further develop and identify appropriate ways to embed the research projects into relevant IFAD pilot programmes.

Pakistan

The SpN in Pakistan initiated the following action research and development activities:

- Following the publication of a practical notes a research project with the Pakistan Agricultural Research Council was initiated on the cultivation of desert truffle mushrooms – a potentially high-value commodity in the spate areas that was previously unknown
- With all local parties a discussion was initiated on developing the 15,000 hectare command area of the Sanghar Irrigation system and addressing associated water rights and land tenure issues. Following the development of the Chasma Right Bank Canal part of the spate command areas were converted in perennial commands, leaving more water to be diverted elsewhere in the spate areas of DI Khan and DG Khan. New headworks (bed stabilizer and intakes) were developed – however no command area works took place – leaving a large potential unutilized. During the 2010 floods in Pakistan the intakes were damaged. The potential to develop Sanghar was discussed at JICA.
- Similarly discussion was initiated on replenishing the stock of earth-moving equipment, which have been invaluable assets for farmers to expand and improve their spate irrigation systems. The fleet of bulldozers and front loaders however is way beyond its economic life – and have as an indication of their usefulness been partly kept in operation – by joint efforts of Agricultural Departments in the respective four Provinces and farmers-water users. Initial discussion on restocking the fleet - probably with different management arrangements – was held with JICA.

6.4 Capacity building knowledge documentation and dissemination

- With crucial start-up funding from IFAD, UNESCO-IHE and Haramaya University started new Double Degree MSc Programme on Agricultural Water Management in Arid and Semi Arid climates:
 - Spate irrigation course is mainstreamed – spate course is explicitly included, the MSc research will be on spate irrigation.
 - Three students enrolled in the programme in September, 2011. Another 3 students with additional support from UNESCO-IHE research fund will start in September 2012 and complete their studies in June 2014.
 - In an effort to ensure financial sustainability, the Programme has been submitted for support to the Netherlands Fellowship Programme (NFP) and is expected to be eligible for funding as of October 2013.
- Spate irrigation is incorporated as a course under the Flood and Drought Management module of the IRBM (Integrated River Basin Management) MSc programme to be implemented in 8 Ethiopian universities.
- 6 young professionals - 2 from each Sudan, Ethiopia and Pakistan successfully completed a short course on spate irrigation – they are now active members of the country spate irrigation networks.
- An introduction video on spate irrigation has been prepared with original footage from Sudan, Yemen, Pakistan and Ethiopia. This video is meant as a short introduction for those not initiated to spate irrigation. The video is complete with only minor final editing to be done.

- In Pakistan a popular book ‘The Dry Side of the Indus’ has been drafted and is in final stages of publication by Vanguard for broad dissemination. The book describes in easy language the spate systems in Pakistan – that in spite of their size hitherto are unknown with a larger audience in Pakistan.
- A series with 14 video-taped lectures on all aspect of spate irrigation has been prepared – engineering, agronomy, water rights, climate variability and sediment management. The lectures take 20-50 minutes. Several of these are already available on www.thewaterchannel.tv. The lectures series are meant to help the mainstreaming of spate irrigation in education and have already been provided as an input for instance for the Double Degree Programme. In 2012 the packages will be given the final editing touches for wider dissemination.
- A video on the reconstruction of the large soil diversion bund in Pakistan – following the devastation of the 2010 floods was prepared and placed on www.thewaterchannel.tv.
- Six Spate Overview Notes have been prepared that describe the extent and potential of spate irrigation and flood based farming in a given country; Ethiopia (Spate Irrigation), Iran (Spate Irrigation and Flood Water Spreading), Morocco (Spate Irrigation), Kenya (Flood Based Farming Systems), Horn of Africa (Spate Irrigation), Ethiopia (Flood Based Farming Systems), Sudan (spate irrigation).
- Five new Practical Notes have been issued – Spate Irrigation and Climate variability, Acacia Ehrenbergiana Plantations; Mushroom Cultivation; Improved Agricultural Production (in Tigrinya), Useful Trees in Tihama (in Arabic)
- Translation of Practical Notes has started - three notes in Amharic and another five in Arabic are ready.
- The publication of a bi-lingual (Arabic-English) book on Traditional Irrigation and Water Harvesting in Hadramawt and Shabwa Directorates in Yemen (including a description of the spate systems there) was technically supported and copies were distributed through the SpN and UNESCO-IHP network.
- Several resource documents of the pre-digital age have been scanned – such as groundwater studies in the Tihama and flood management studies in Pakistan.
- In Pakistan a start was made by scanning the records of rights of spate irrigation systems – that are generally 80-120 years old but still actively used. The first of these has been placed on the website.

6.5 Support pool to IFAD projects and Country Programmes

Sudan

Good relations were established with IFAD staff and successful joint activities completed with the IFAD Gash Sustainable Livelihoods Regeneration Project (GSLRP):

- On demand from GSLRP, the SpN provided technical support and prepared a comprehensive document on the assessment of the current status and future strategy for strengthening of the WUAs in GAS. The funding for this assignment was shared by the SpN and the GSLRP. The mission was undertaken for three weeks by Karim Nawaz, one of the convenors of the Pakistan Spate Network.
- Sudan Spate Irrigation Network (SSpN) and GSLRP developed a joint proposal for a farmer-to-farmer knowledge and experience sharing. This proposal has already been included in the 2012

first quarter work plans of GSLRP and SSpN and cost-sharing arrangements are in place. Members of the GAS Apex WUA accompanied by relevant GAS and IFAD institutional and technical experts are to visit the Sheeb Spate Irrigation Scheme in Eritrea and exchange experience and knowledge with the Sheeb WUA in wide ranging issues including organizational structures, management arrangements and operation and maintenance plans and strategies.

- The GSLRP has provided valuable contribution to the implementation of the SSpN led research programme: *Towards productive and profitable spate irrigated agriculture in Sudan*. These include: technical, open access to all of its documents, making available its office premises for meetings, facilitating field visits.

Ethiopia:

- Intensive discussion was held with the Participatory Small Scale Irrigation Development Program (PASDIP) – that includes several spate irrigation systems. A proposal was prepared for support to PASDIP through training in design, training in WUA strengthening and an inventory of the opportunities in lowland areas. As there is no accessible funding in the project or in IFAD Ethiopia operations these activities could not yet materialize.
- A proposal has been prepared for joint IMAWESA-SpN Ethiopia activities for 2012 on:
 - Training in agricultural water management focused on small scale and spate irrigation systems.
 - Documentation of Aba’ala scheme - the use of spate flow for development of agropastoral areas in Afrar region; and Dodota traditional field water management.
 - Site visit and follow-through activities to support development of the Ethiopian lowland – a vast untapped resource.
 - Share fair and community of practice.

Yemen:

- A good working relationship has been established between SpN and the IFAD country office. Frequent visits and discussions were undertaken with IFAD country officer and support staff. These resulted in a mutually agreed upon two solutions-oriented research topics on ground water recharge and strengthening of WUAs. IFAD are considering appropriate ways of embedding the research activities into their ongoing pilot projects.

Pakistan

- First contact was made with the IFAD representative in Pakistan.

7. Core Project Team

IFAD

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