

Title: Knowledge Sharing and Communication Strategy in Agricultural Water Innovation Systems in Makanya Catchment, Same District, Tanzania

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ACKNOWLEDGEMENT

This study was conducted as part of the Swedish and Dutch governments funded Smallholder Systems Innovation in Integrated Water Management (SSI) Programme through SIDA, WOTRO, DGIS, UNESCO-IHE and IWMI. We wish to express our thanks to SSI program for funding this work and Soil-Water Management Research Group (SWMRG) for facilitating the research process. We acknowledge supports from Makanya Catchment village leaders, farmers, Makanya Catchment extension staff. Support from the Sokoine University of Agriculture (SUA) is also acknowledged.

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ABSTRACT

The main challenge of researchers in natural resources management is to turn knowledge generated into practice and achieve tangible results and outcomes to improve farmers' livelihoods. In response to the challenge, this paper examines the role of enhanced knowledge sharing and communication strategies to ensure research findings are well communicated to stakeholders in order to influence decision-making and resource allocation that enhance utilization of improved technologies. The case of the Smallholder Systems Innovations program in Makanya Catchment is used to demonstrate the impact of communicating research findings during research process. The main objective of the knowledge sharing and communication strategy in this program is to have effects on knowledge and attitudes of smallholder farmers on water resource management in the Catchment. The main concerns are to ensure that research is integrated both between scientific disciplines, stakeholders and scales, and, that it is driven by real needs on the ground. This is to ensure that the results of the research are fed into policy and development, not only in the study locations, but also to other locations and stakeholder arenas; and to design an approach to systematically and experientially learn from initiatives on the ground. Different methods and approaches for knowledge sharing were used that provide opportunity for feedback to researchers, extension workers, decision/policy makers and farming community. The approaches used include: farmers' workshops, action research, exchange visits, farmer field schools, demonstrations, farmer field days, audio visuals, River basin game, scientific publications and reach-out to policy makers. The implementation of the strategy involved active participation of District Council to ensure continuity. We learnt that adoption of water system innovations depends on combination of different promotion methods; farmers learn by seeing and doing; interactive methods complemented by other methods and media of communication like audio-visual and printed materials are more effective.

Key words: Communication strategy and Knowledge sharing, smallholder systems innovations.

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INTRODUCTION

Background

The Traditional dissemination strategy of research findings has continued to use the same research-extension-farmers pathways (Garforth, 1998, Norrish, 2001). This has resulted to failure for past and current research and development (R&D) in natural resources management (NRM) to effectively communicate findings to stakeholders other than farmers (Ashby, 2003; Garforth, 1998). Most of the information generated from NR research could not inform policy formulation and decision making to support farmers' efforts (Hatibu *et al.*, 2002; Mosse, 1998). In several cases farmers could not utilize information provided by researchers due to lack of an enabling policy environment that was a necessary ingredient for adoption of new technologies (Hatibu *et al.*, 2002; Turton, Warren and Groom, 1998). Management of water systems is part of the broader natural environment and their socio-economic environment that goes beyond land and water management to include significant parts of land-use planning, agricultural policy and erosion control, environmental management and other policy areas (Shah, *et al.*, 2000).

There is a very rich knowledge base of promising water management innovations systems for rainfed agriculture, including a broad spectrum of water-harvesting practices, conservation farming systems, water conservation techniques, integrated soil fertility management, and response farming. These have often been developed from indigenous knowledge in one location, but when transferred to neighboring communities (even in the same country); constitute innovations in water management (Bhatt *et al.*, 2006).

The case of the Smallholder Systems Innovations (SSI) program in the Makanya sub-catchment in Same District, Tanzania is used to demonstrate the impact of communicating research findings during research process. The main objective of the knowledge sharing and communication strategy in this program is to have an effect on the knowledge and attitudes of smallholder farmers on water resource management in the Catchment.

The program is multi-disciplinary in that it links a broad set of disciplinary sciences, and interdisciplinary in that it has the ambition of advancing the knowledge on eco-hydrology, integrated water resources management, ecological-economics, and integrated land management. The Outreach and Learning component addresses the three contemporary concerns when doing applied research- Firstly, how to ensure that the research is integrated – both between scientific disciplines, between stakeholders and scales – and driven by real needs on the ground. This requires a participatory action research approach, where learning and reflection form an integral part of the research. Secondly, to ensure that the results of the research are fed into policy and development, not only in the locations of study, but also to other locations and stakeholder arenas. Thirdly, what is the approach to systematically share the knowledge and learn from initiatives, such as the SSI program? Outreach integration poses the challenge to connect SSI research with development efforts, where science is directly used to support capacity building, policy development and dissemination of knowledge within an outreach or learning framework. Its focus is to develop a framework for participatory knowledge sharing. Realization of potential of indigenous knowledge development among smallholder farmers has resulted in very promising initiatives to promote farmer innovations through, e.g., farmer-to-farmer extension, however there is a lack of understanding of how indigenous knowledge can be

integrated or developed in successful water system innovation within farm scale (Bhatt *et al.*, 2006).

COMMUNICATION STRATEGY AND KNOWLEDGE SHARING

Communication is the process of sharing or conveying information while communication strategy in the context of this paper, refers to the process of preparing the ground, through communication and dialogue, that will enable effective scaling-up of the research products after a project is over. Scaling up aims at providing more quality benefits to more people over a wider geographical area more quickly, more equitably and more lastingly (Gündel, Hancock and Anderson, 2001; IRR, 2000). For scaling up to occur, sufficient attention must be paid within a research project, to the development and implementation of a sound communication strategy. Appropriate communication tools are therefore needed to enhance the sharing of knowledge.

In exchange of agricultural knowledge, a crucial issue is the mode of communication between farmers and scientists (van Dusseldrop, 1992). Therefore, appropriate communication tools are needed to enhance the sharing of knowledge. Such tools include face-to-face communication, searchable databases, websites, on-line discussion forums, synthesis documents that draw together current knowledge, forums, workshops, networking opportunities and knowledge brokering.

Knowledge consists of facts, concepts, theories, heuristic methods, procedures and relationships. It is information organized and analyzed for understanding and for application in problem solving or decision making. Knowledge functions in description and explanation of phenomenon. It is also used in prediction and in understanding the causal relationship of events (Boisot, 1995 and Draft, 2000). Knowledge Sharing in Research and Learning is considered at two distinct, but complimentary levels: Knowledge Sharing among researchers, to improve the research process itself; and Knowledge Sharing between researchers and users (policymakers, intermediaries and end-users), to increase the interaction between all stakeholders and most importantly increase the impact of research (De Silva, Sanjini, 2005).

KNOWLEDGE SHARING IN THE SSI PROGRAM

Appropriate Knowledge Sharing Products (KSPs) and strategies for dissemination have been developed with the aim of disseminating the knowledge arising out of the program. The KSP targeted stakeholders at different levels, to create awareness on the issue and inspiring creative thinking. The exchange and sharing of SSI knowledge products is facilitated in the two basins in partnership with Farmer Support Group of the University of Kwazulu Natal and the Soil and Water Management Group at Sokoine University in Tanzania. Partnerships have been sought and established with other relevant organizations and networks including RELMA/SEARNET, and PROLINNOVA.

The outreach, action research and learning program contribute to improving the integrated research output, and ensure that there is a continuous reflection on the relevance and demand for SSI knowledge outputs. The program operationalizes and contextualizes lessons learned from the SSI research, and extends this knowledge beyond the pilot catchments. In addition, SSI established communities of practices around common interest themes for exchange of experiences; stimulate creative thinking and knowledge generation. The program has also set-up appropriate systems/platforms for monitoring, evaluation, learning and information exchange. In the catchment this platform operates at farmer learning groups (FLG) and farmer field school (FFS). These knowledge domains-action

research and learning, dissemination and knowledge bridging- form part of a knowledge sharing and learning continuum within the SSI program (Bhatt, 2004).

Knowledge sharing at Field level

The target groups at this level include; Community and Farmers' groups, Village leaders, Village Councils, Extension Workers, Water Users' Associations, etc. Different means such as field experiments, open field days, trainings, workshops and feed-back meetings, exchange visits, production of brochures, posters, leaflets, and information dissemination through program partners via their communication tools and networks are used to share the knowledge.

Knowledge sharing at District/watershed Level

At this level, District Councils, District planning Agencies, Catchment Management Agencies, NGOs, local MPs and other development agencies are targeted. Means for sharing the knowledge include; promoting local multi-stakeholder dialogues, regular newsletters, material support in form of toolkits and guidelines to organizations involved in district level planning and implementation, sharing results as they come.

Knowledge sharing at National and Policy level

At national and policy level, SSI targets Policy makers, Government departments, National and International NGOs, research and academic institutions, development programs and implementing partners. The national level policy dialogues, policy briefs, research reports and synthesis documents, articles in national, regional and international magazines are the major means envisaged to share such knowledge.

Knowledge sharing at Scientific Community level

SSI being a scientific program, it also targets to reach out to researchers, scientific community and students with different publications, research reports, synthesis documents, capacity building material for post-graduate education and courses on IWRM, participation in scientific conferences and workshops.

SSI has also been extensively using local, national and international media for sharing SSI research outputs and promoting awareness. The SSI researchers also participate and share generated knowledge in national, regional and international meetings and conferences and other stakeholder and scientific forums.

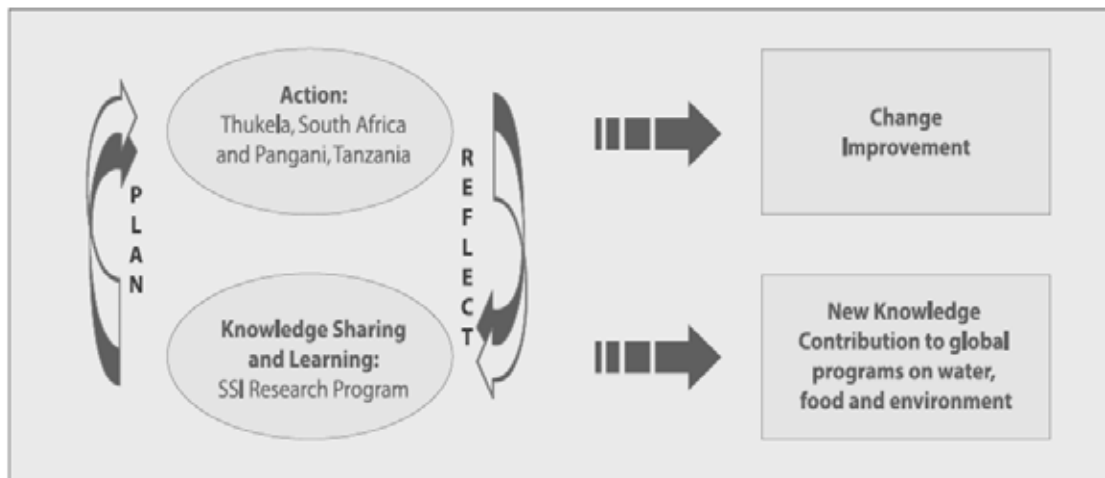


Figure 1: Framework for Action Research and Knowledge sharing in the SSI program (Bhatt *et al.*, 2006).

COMMUNICATION STRATEGY IN THE MAKANYA CATCHMENT

The SSI researchers, outreach officer and field assistants under guidance of a communication management expert designed a communication strategy that encompasses all potential stakeholders in the catchment. The strategy identified stakeholders, their respective communication needs and defined potential pathways and uptake opportunities. It also shows the timeframe and responsible personnel for each activity (appendix 1).

Nine typologies of stakeholders for knowledge sharing were identified in the communication strategy/framework, these include:-

1. Farmers: (Research farmers, neighboring farmers, farmers from villages surrounding target villages, farmers outside Makanya catchment, water user and fishery groups)
2. Local authorities: (Village and Ward leadership)
3. Extension officers: (in the target villages, outside the target villages, village level, ward levels and District Executive Director (DED), District Commissioner, Councilors, District Agricultural and Livestock Development Officer (DALDO), Irrigation/Natural Resource –District Extension Officer (DEO)
4. NGO's: (Same Agricultural Improvement Programme, Traditional Irrigation Improvement Programme, Vrededeseilanden Country Office, CARITAS, Same Association of Non-Governmental Organizations, PAMOJA, World Vision-Area Development Programmes)
5. Basin/Zonal/Regional organizations: (Pangani Basin Water Office/NGO-Pamoja, Zonal Irrigation Unit, Met office, TANROADS, regional offices (e.g. hydrology),
6. Research institutes: (Sokoine University of Agriculture, Selian Agricultural Research Institute, Mlingano Agricultural Research Institute, University of Dare es Salaam)
7. National level organizations: (Ministry of Agriculture and Food Security, Ministry of Water and Livestock Development, Ministry of Natural Resources and Tourism, Ministry of Cooperatives and Marketing, President's Office – Regional Administration and Local Governments , Vice President's Office)
8. International partners: (Regional Land Management Unit (RELMA)/World Agroforestry Centre, Water Research Fund for Southern Africa, Southern and Eastern Africa Rainwater Network (SEARNET), Soil and Water Management Network, African Conservation Tillage (ACT), WaterNET and PROMoting Local INNOVation
9. SSI partner institutes: (Sokoine University of Agriculture, Stockholm University, Institute of Hydrology Engineering, University of Kwazulu-Natal, International Water Management Institute)

Several products and information to communicate to each stakeholder were identified. These range from water system innovations, on-farm experimentation, awareness creation, research findings and data sharing. The strategy also analyzed the current knowledge, attitudes and practices of each stakeholder and action to be taken after communication.

COMMUNICATION METHODS AND TOOLS EMPLOYED IN THE MAKANYA CATCHMENT

Farmers' workshops,

A stakeholders' workshop was conducted in the initial stages of the project. The workshop was a mixture of information and experience sharing guided by presentations on ongoing and new research initiative by SWMRG on Smallholder water system innovations in the Western Pare Lowlands; existing indigenous and exogenous and Non-existing exogenous smallholder water systems innovations in the Western Pare Lowlands. Group discussions were conducted to identify stakeholders for the new project, analyze existing water system innovations and level of their adoption in the watershed and to analyze different approaches for introducing water system innovations. The workshop brought together farmers from different villages, village leaders and councilors from the Catchment, District agricultural officials and NGOs representatives.

Participatory Action research

The SSI has adopted farmer innovation systems by application of participatory approaches to research for development. Participatory Action Research in the program has engaged farmers direct into on-farm research process. Five farmers are involved in field experimentation in Bangalala and Mwembe villages. The experimenting farmers formed farmer learning groups (FLGs) in which the learning process takes place in Farmer Field School (FFS). The groups are KIHIBA in Bangalala village and KICHAHIMWE in Mwembe village.

Farmer field schools

The SSI outreach program has facilitated knowledge sharing through farmer field school (FFS). The FFS is composed of a community of practice which is a group of people working together who have a shared goal or expertise and regularly engage in exchanges and learning based on their common interests, in this case - water system innovations. Communities of practice are usually largely based on informal networks sometimes with support from more formal organizations. They are voluntary, non-hierarchical and usually there is no clear point of beginning or end. Although communities of practice evolve organically, they can be supported and nurtured in various ways by providing the necessary infrastructure and resources they need. The FFS approach is an effective approach to technical education and capacity building. Farmers generate knowledge that is functional and necessary to improve their production and livelihood potential. FFS also help to empower farmers because apart from generating knowledge, they are both the users of such knowledge as well as its owners. The FFS activities in the Catchment included training and practice on how to use ripper, how to train oxen, conservation farming and use of improved seed. The FFS sessions were held once a week whereby the farmers would learn from one farmer's field to another on rotational basis.

Through the Farmer Field School there was an improved understanding and knowledge of the farmers involved in the WSI promotion activities; positive perception on the performance of the water system innovations; improved adoption of the water system innovations researched by SSI researchers. Also through FFS there has been high acceptance of the *fanya juu* terraces and construction of water tanks in Mwembe village and ripping techniques in Bangalala village. The farmers involved in FFS are empowered to share knowledge and experience to other farmers and thus are required to establish and lead new FFS groups as a strategy to scale up technologies and disseminate the knowledge gained.

Farmer field days

Farmer Field Days (FFD) technique is used to show farmers and extension workers a successful farming practice or improved technology. The SSI researchers conducted a series of FFD in the Bangalala village at Mchikatu, Kirinjiko chini and Kwanduju sub villages and in Mwembe at Barazani and Mareti sub villages. Village chairpersons, sub village chairpersons, Extension workers and the Lead Groups from each sub village, facilitated and organized farmers during the events. The events were conducted in the Research farmers fields where by the researcher in charge explain the purpose of the experiment, its set-up, different options and functions of equipment installed in the experiment. In the process, farmers ask questions and discussions are held in the field.

Exchange visits

The study tour was conducted with the main objective of exposing farmers from the Makanya watershed on the WSIs mostly practiced in the RELMA/SearNet sites in Kenya. In particular to familiarize the farmers with use of sub-surface and underground tanks that are currently used in semi arid areas of Kenya for storing water harvested from ephemeral streams, road sides and roof tops. The SSI program in collaboration with RELMA/SearNet has since installed a few tanks in the Makanya catchment for demonstration, which has attracted a number of community members to adopt the technology.

Audio visual

In promoting water system innovations, a video session was conducted in each study village. The sessions were intended to create awareness to farmers on application and successes of different technologies/innovations implemented by other farmers from places with similar environment. The Videos shown in the catchment were recorded from Smallholder Farmers of Zimbabwe and Zambia. Briefly the video sessions involved, use of Magoye Ripper for deep tillage and conservation farming, use of plowing technology, selection of oxen, training of the oxen and preparation of the yoke. The knowledge shared in these sessions was used by the farmers to rip their field in the consequent season. To date there are a good number of farmers in the study villages who adopted the ripping technology in their fields.

River basin game

The River Basin Game (RBG) is a tool for promoting dialogue over water resources management. It is a physical representation of a sub-catchment (or small river basin) with a gradient to show upstream-downstream flow of water. Upstream users of water tend to be favored over downstream abstractors and users of water that lead to inequality in water access – which can result in conflict. The game enables role-playing to facilitate local decision-making. The game was demonstrated in Makanya Catchment to create awareness on the issues related to water allocation, water use efficiency and conflict management. The RBG has enhanced dialogue meetings on water resource management among farmers in Vudee and Chome and Bangalala villages where water users association of Ndiva Kinyang'a held a dialogue to increase water use efficiency.

Agricultural Exhibitions 'Nanenane shows'

Some farmers from the catchment were organized to attend agricultural exhibitions commonly known as nanenane (8/8) shows which are held in the first week of August with it peak celebration done on 8th August every year. This was a strategy to facilitate learning among them. The farmers were drawn from 10 villages and they were exposed to various technologies but specific attempts were made by the organizers to target those related to WSIs. After the exhibitions follow up was made to find out farmers feelings on the tour. The farmers expressed their feelings on different aspects including the stalls or

organizations they visited, technologies that were interesting to them and what they would like to implement in their farms. They also suggested strategies they would like to implement to ensure more adoption of the innovations and the enabling factors for them to succeed. They also listed technical support required and the appropriate ideas for scaling out the knowledge they obtained from the exhibition to other farmers in their respective villages

The farmers reported that among the technologies which were of interest 31% were in the category of crop husbandry, 27% were in the WSIs category, 22% were of post harvesting category. Farmers showed their interest to trial out some of the technologies in their farms. Out of those 47% were of WSIs in nature, 33% were crop husbandry based and 10% were in the category of livestock production.

Informal contacts

The SSI program has informal contacts with farmers which involve visiting scientists from outside the catchment. There has been influx of national and international researchers and scientific personnel who visit the catchment. During these visits the scientists meet the farmers, and during field visits some discussions are held between the visitors and farmers. Some questions are posed and advices given to farmers, and thereby information is passed in an informal way. For example during scientific meeting some field excursions are organized and the scientists discuss some issues on farm and thereby the farmers are advised accordingly. The SSI program has received visitors from collaborating institutions – University of Kwazulu Natal (South Africa), Stockholm University (Sweden), IHE-Delft (The Netherlands), IWMI (South Africa), IFPRI (Washington), IPTRID (Rome) and the Ministry of Agriculture and Food Security (Tanzania).

Scientific Forums

The SSI program also reaches out to international scientific communities through workshops, symposia and conferences. SSI researchers have attended various international forums where by knowledge from research findings were shared to other scientists. This helped to reach out to that level of stakeholders in our communication strategy.

Synthesis Report and Policy briefs

Various national level policy makers (PM, Ministers, MPs) have visited our project area where by the project had prepared synthesis report to reach out to these important stakeholders in our research process. The recent visit by the Prime Minister has resulted to one of our project village's water harvesting scheme to be included in the national irrigation improvement plans after he has learnt that there is such a scheme whose farmers could produce crop through rain water harvesting. This scheme covers more than 700 ha on the area that receives about 400 mm of rainfall annually. The scheme depends solely on water harvested from runoff flowing downstream the catchment.

CONCLUSION

The communication strategy when planned in the beginning of the program/project gives a right direction to target appropriate knowledge sharing products and pathways to share the knowledge obtained. We learnt that, adoption of water system innovations depends much on a combination of different promotion methods. Farmers always learn by seeing and doing – experiential learning. It was learnt that interactive methods complemented by other methods and media of communication like audio-visual and printed materials are more effective.

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Appendix 1. Knowledge sharing and Communication framework for Smallholder System Innovations Programme in Makanya Catchment.

Stakeholders	Research products and issues to communicate	current knowledge, attitudes and practices	Action to be taken after communication	Methods/ Media of communication	what feedback needed from them	When	Who
I. Farmers							
i. Research farmers	ripping technology	aware of ripping technology & practicing, weeding issue	spread the word	FFS/ Farm visits	experience with the ripper	August 2005	CA consultant, SSI field Assistants and outreach officers
	Fanya juu/ chini	aware of fanya juu technology & practicing, issues with infiltration pits	spread the word	FFS Farm visits	experience with fanya juu/ chini	August 2005	CA consultant, SSI field Assistants and outreach officer
	diversion of runoff	aware of diverting runoff & practicing	spread the word	FFS Farm visits	experience with runoff diverting	August 2005	Village extension worker, SSI field Assistants and outreach officer
	methodology of farmer field schools	groups exists, some are aware of FFS	forming groups for FFS Integrated pest and weed management	group discussion Field day	experience with FFS	May 2005 Oct-Dec 2005	Communication expert, SSI researchers, outreach officer and field assistants and village extension worker
ii. Neighboring farmers	ripping, fanya juu, runoff diversion, intercropping	observed technologies and some practice ripping, willing to experiment	establish lead group in Bangalala and Mwembe Train lead group in Bangalala and Mwembe on FFS Organize exchange visit to FFS Train lead group in Bangalala and Mwembe on ripping, fanya juu, runoff diversion, intercropping	FFS Exchange visit to FFS	experience with and practice of technologies adoption rate	July-September 2005	CA consultant, SSI field Assistants, outreach officer and village extension workers
	on-farm experiments	observed the experiments and are confused	one field day at Mwembe and one at Bangalala Integrated pest and weed management	Field visit to research farmers field plot/ Leaflet/ manual of the experiments + video Field day/attending various group or village meetings		Sep + Oct + Nov + Dec 2005	CA consultant, SSI researchers and field assistants, outreach officer and village extension worker
iii. Villages surrounding target villages	ripping, fanya juu, runoff diversion, intercropping	knowledge and practicing other innovations	for farmers to research site Attend Bangalala and Mwembe existing field days	study tour Field days Poster + leaflet		December 2005	SSI researchers, field assistants, outreach officer and village extension worker
iv. Farmers outside the target area (Makanya catchment)	ripping, fanya juu, runoff diversion, intercropping			study tour Poster + leaflet		plans for 2006	
v. Water user groups (ndiva & diversion channels)	Efficient and effective water allocation, sharing and use Catchment monitoring	aware of too large command area, water and crop relationship unclear, need for catchment approach	Identify water user groups Establishment catchment cross-cutting water user forum e.g. Demonstration of precision farming e.g. Rainfall measurements at schools	Water user forums River basin game study tour Poster + leaflet	current lay-out level of awareness after interventions	November 2005 plans for 2006	Respective SSI Researcher
vi. Fishery groups	Efficient and effective water allocation, sharing and use	expanding activity, unaware of downstream consequences	Involved in catchment management (water allocation issues)	Water user forums	level of awareness after interventions	plans for 2006	Respective SSI Researchers
2. Local authorities							
i. Village	awareness of ripping, fanya juu, runoff diversion, intercropping	observed technologies and have knowledge of and practicing other innovations	village leaders help organize field days support for FFS groups and disseminating information Facilitating role	meetings FFS, Field days	calendar of village meetings	according to village calendar	SSI outreach officer
	awareness of efficient and effective water allocation, sharing and use	Currently bi-laws	harmonizing bi-laws	Meetings	updating existing bi-laws	according to village calendar	SSI outreach officer
ii. Ward	awareness of ripping, fanya juu, runoff diversion, intercropping		represent ideas from SSI at district level	Meetings	calendar of ward meetings	according to ward calendar	SSI outreach officer
	awareness of efficient and effective water allocation, sharing and use	Currently bi-laws	harmonizing bi-laws	River basin games	updating existing bi-laws	according to ward calendar	SSI outreach officer

3. Extension officers i. in the target villages - Shirima, Mwembe Ward Kapombe, Bangalala Village	competence and assisting farmers in ripping, fanya juu, runoff diversion, intercropping	knowledge in other innovations and interested in new technologies but not yet on board	be able to implement, demonstrate and facilitate follow up to FFS	Training making literature available farmer study tours	information about adoption, number of farmers assisted, problems encountered, provide more support to farmers discussing literature		CA consultant and SSI outreach officer SUA
ii. Outside the target villages - village level - ward level	awareness raising on SWSI's awareness raising on SWSI's			study tours field days	see study tours	see study tours	see study tours
DED, District commissioner, district councilors, DALDO-Irrigation/ NR -DEO	awareness raising on SWSI's	Aware of SWSI's and SSI presence, but they don't know what SSI is doing	study tour around target villages participate in field days	study tour meetings reports Poster field days	support farmers, share knowledge and extent to other areas district report include SSI activities SSI included in district plans and policy implementation	according to district calendar monthly	SSI outreach officer
5. NGO's SAIPRO, TIIP, VECO, CARITAS, SANGO, PAMOJA, ADP's	awareness of ripping, fanya juu, runoff diversion, intercropping awareness of efficient and effective water allocation, sharing and use Awareness of suitability of SSI's in Makanya catchment Awareness of land use changes and their effects	Knowledge and promoting SWSI's, but not the ones researched by SSI unaware of catchment approach, TIIP is working on distribution efficiencies gut feeling on the issue but no real life data	extending knowledge attending farmers field days	Dialogue discussion/ meetings Farmer field days dialogue discussion/ meetings	current activities, focus area SSI issues addressed	June 2005 (Oct-Nov 2005 according to NGO's agenda planned for 2006	SSI researchers depending on their interest
6. Basin/ Zonal/ Regional i. PBWO/ Pamoja	raw data on flows, rainfall, diversion, water users Awareness raising of water users in Makanya catchment Raising awareness on conflicts in Makanya catchment	unaware of activities in Makanya catchment and no measuring structures Think Makanya catchment is unimportant for Basin plans not aware of conflicts in Makanya catchment	information on conflict resolution attending water users forum	dialogue Water user forum	incorporating Makanya catchment in Basin plans see water user forum	planned for 2006	SSI researchers
ii. Zonal Irrigation Unit	awareness of efficient and effective water allocation, sharing and use Raising awareness on conflicts in Makanya catchment	Unaware of efficiency and effective water allocations not aware of conflicts in Makanya catchment	extending knowledge attending water users forum	dialogue Water user forum	their experiences and current activities	June 2005	SSI researchers
iii. Met office, TANROADS, regional offices (e.g. hydrology)	raising awareness of monitoring network and sharing data	aware of monitoring network	sharing of data	Dialogue	cooperation	started	SSI researchers and outreach officer
iv. Research institutes (e.g. SUA, SARI, MARI, UDSM)	information on research findings Sharing constraints for information on marketing, Integrated Pest management, Input stockists/ traders, Financial institutions, e.g. i. SACA's, ii. SACCO's, rooftop harvesting tanks, etc.	Aware of other innovations but no tangible results hey don't know the situation in Makanya but have general knowledge of these issues	including research findings in their activities linking stakeholders with experts	Dialogue reports	Integration of related aspects into their research activities	planned 2006	everybody under SSI Field Coordinator
7. National level MAFs, MWLD, MNRT, MCM, PORALG, VPO	SSI objectives, activities information on research findings	no knowledge of SSI		flyers & booklets reports policy briefs	including SSI results in policy	planned for end SSI	SWMRG leadership
8. International partners RELMA/ICRAF, WARFSA, SEARNET, SWMNet, ACT, WaterNet	information on research findings	aware of SSI and cooperating	extending knowledge	dialogue/ scientific papers/ reports	other case studies and their research results	2005	Everybody
9. SSI partner institutes	Sharing cross basin experience with Thukela	communicating and attending shared SSI workshops	Sharing information	scientific papers/ reports	reports and activities	2005	Everybody