

NATURAL RESOURCES SYSTEMS PROGRAMME
PROJECT REPORT¹

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1. Introduction

This field manual will be used to collect data for the study on “Improved Pro-poor Research Strategy to assist scaling-up of the management of natural resources (NR) in semi-arid areas”. The purpose of the study is to improve understanding by researchers, development planners and service providers of the ways and means to better ensure scaling-up and the potential for impact from NRM research. The overall propositions are that:

- (a) Different approaches to communication of research products make a significant difference to the uptake of technologies like rainwater harvesting for natural resource management.
- (b) The uptake of such technologies involves conversion of different livelihood assets; and this conversion is knowledge dependent. For example: in adoption of RWH labour and financial capital used to control rainwater could increase income that could lead to investment in other physical assets.
- (c) An enabling environment for improved NRM is critical for the successful utilisation of knowledge and maintenance of NRM technologies.

Data collection will be done at national, district and village levels using a case of the Rainwater Harvesting research programme of SWMRG to track research and communication processes in order to answer the following research questions:

1. Which forms of information on RWH are most useful for different types of stakeholders?
2. What constrains and facilitates the use of information on RWH for different stakeholders?
3. What is the relationship between the promotion of RWH and farmers’ livelihoods?
4. What constrains and facilitates the adoption of RWH for different categories of farmer?
5. What are the equity implications of the adoption of RWH, including for non-adopters and downstream users of RWH technology?

1.1 Background information of the Rainwater Harvesting research in Tanzania

The Soil-Water Management Research Group (SWMRG) of the Sokoine University of Agriculture (SUA) has carried out RWH research in Tanzania over a period of 12 years. The RWH research since 1991 aims to built on the existing local knowledge of farmers in order to find ways to increase the productivity of rainwater in semi-arid areas. The programme has been dealing with the key natural resource that determines livelihoods in semi-arid areas, that is, scarce rainwater. It is for this reason that the programme will make a good case for the proposed study to improve research strategy in NRM.

The most innovative aspect of the RWH research by SWMRG is that, although university based, it has focused on action research in collaboration with local stakeholders such as farmers, livestock keepers, community leaders, extension and other change agents as well as policy makers and planners at all levels. Furthermore, it has a sustained public relations approach that kept relevant stakeholders at all levels well informed of the research and its findings. It is this innovation, which warrants an in-depth assessment of the SWMRG processes and its effect on outcomes and impact. This is because it is realised that despite the achievements of SWMRG with respect to policies, institutional arrangements and technical

practices in RWH, processes that brought this about are not very well understood. It expected that a lot could be learned from SWMRG by tracking:

- The way RWH research was designed, implemented and evaluated.
- The process, through which RWH knowledge-sharing products were developed, communicated, received, used and continues to be used by different stakeholders.
- Achievements reached by SWMRG in capacity building through working with extension providers (local government, NGOs, and private sector), trainers, research assistants, and other stakeholders; and outcomes and impacts brought about by this process.
- Constraints to the processes described above.
- The effect of the strategy to develop and sustain a long-term relationship with target institutions and supportive actors.
- Contribution of participatory approaches and the way utilization of indigenous knowledge facilitated the production of relevant outputs and outcomes.
- The role of RWH in improving agricultural and livelihood outcomes at household and intra-household level. Livelihood framework will be used to assess contribution of RWH in reducing risk (more control over water) and seasonality (potential for longer crop season and different crops; creation of new assets either at household level or group/community level; by converting assets such as labour or financial into water control infrastructures, which in turn create improved livelihood and environmental outcomes.
- Finally to put all the answers together in order to determine which elements of the research process worked to determine the outcomes, but also which aspects did not work. Most importantly is to pinpoint the reasons why some worked while other aspects did not work.

It is envisaged that this study will lead to increased understanding of how to develop and implement projects in NRM research in a way that ensures positive outcomes and wider developmental impact.

1.2 Research Objective and Planned Outputs

The overall objective of the study is to improve the understanding by research and development planners and service providers of ways and means to better ensure of scaling-up and the potential for impact from natural resources management (NRM) research using the RWH systems as a case study. The expected outputs are as follows:

Output 1: Understanding of the interactions between the five livelihood capitals and the policy, institutions and processes of research and communication for Rainwater Harvesting systems **increased**.

Tracking of the research and communication processes will be carried out to understand the impact on capital assets and livelihood development on farmers utilising the knowledge of RWH in the study areas. The hypotheses arising from the research questions are:

- Adoption of rainwater harvesting techniques is highly influenced by the availability of human capital and its ability to convert natural and financial capitals to physical capital such as infrastructure like charco-dams that increase to availability of water
- Adoption of macro-catchment systems involving diversion of runoff water from long gullies that pass through many communities, while requiring a high level of social capital

to succeed may lead to weakening of existing social capital as a result of competition for water and consequent conflicts.

Output 2: Better understanding of the efficacy of the communication methods and media products for stakeholders across a range of levels and research for development sectors developed.

The study will determine the effect of different communication media on the uptake and adoption of RWH knowledge and technologies by different level of stakeholders. The hypothesis is:

- Adoption/non-adoption of RWH results is to a great extent linked to the nature and processes of development and use of communication methods and products.

Output 3: Best combination and use of methods for tracking RWH research process, outputs and outcomes, established and tested. The method for tracking research process is required so that one can associate the impact with associated interventions. The hypotheses is that:

- Tracking of RWH research processes (i.e. from planning, implementation to evaluation) will increase accuracy in associating the contribution of research interventions to the NRM research that is realised.

Output 4: Research and communication processes for ensuring RWH research and, in a wider context NRM research that can lead to positive outcomes and impact, elaborated and promoted with target organisations at national and international levels. The results of output 1 to 3 will be an input to output 4.

1.3 Organisation of the Manual

The manual provides a guide to the research team on methods to gather information using both qualitative and quantitative methods at village, district and national levels. The methods involve discussions with various stakeholders including farmers; extension services providers, policy makers and researchers. The manual describes different stages in which data will be collected following the pathway in which information using various communication products was delivered.

The manual is organised in three parts. Part I describes district, village and household selection process and plan of action at these levels for each district and each village. Part II deals with methods and tools for secondary and primary data collection at village level with both farmers and extension staff to establish how RWH information was acquired and used and adapted to farmers' situation. It will also find out factors influencing information access and decision making on its use. The data will be collected to also increase understanding of the livelihood circumstances, use of information and outcomes at household level. In addition, investigation of the institutional context of livelihoods at village level that enable or disable utilisation of RWH information will be carried out. A sample of the stakeholders that were involved in various ways and reached by RWH research will be identified to understand the contribution of past communication methods and media products on outcomes and impact. Reasons for success and also failure of past communication activities will also be assessed to draw lessons for future research designs.

Part III will deal with national level policy and institutional aspects. The focus here will be on establishing the role of the research system in uptake promotion and how it is addressed in the current policy and strategies for improving NRM research outcomes and impact. We will specifically investigate how research programmes and project deals with communication, knowledge sharing, uptake and utilisation of knowledge and technologies produced and its contribution to improving policy-making.

PART I

2. District and Village Data Collection

2.1 Study area selection

Rainwater harvesting research by SWMRG has been conducted in semi arid areas of Tanzania, which include the Central zone, Lake Victoria Zone and some part of Northern zone of the country. This study will focus in the Lake Victoria zone and Northern zone areas where current activities by SWMRG are concentrated. Preliminary visit to the two research sites provided an insight of the on-going activities by various partners. Findings from this visit have been elaborated in R4 and a summary of past research activities on RWH are described in R2.

(i) Western Pare Lowlands

In WPLL past and current research involved two districts, Mwanza and Same. In Mwanza district research was conducted in Kisangara, Kifaru, Lembeni and Kiruru villages. Villages in which farmers received information about RWH through training by the Local Government Authorities, agriculture department and NGOs such as MIFIPRO, VECO, TCRS and CARITAS include Kambi-ya-Simba, Kivisini, Kwa-Nyange, Butu, Jipe, Kigonigoni, Kwakoa, Toloha and Ngulu. Other villages are Kisangiro, Mforo, Mandaka and Makuyuni sub-villages located in the peri-urban areas of Mwanza town; Handeni, Kituri, Mgagao, Kiria and Kileo.

In Same district, villages involved in the past research work includes Hedaru and Mgwasi; and Makanya, Mwembe and Tae are still involved in the on-going research work. In other villages farmers have received information from NGOs such as SAIPRO, TIP, CARITAS and VECO who are partners in the promoting RWH in the area. Villages identified include Kavambughu, Majevu (subvillage of Vumari village), Saweni, Bangalala (Kirinjiko sub-village), Mabilioni, Ruvu Mferejini, and Njoro.

(ii) Lake Zone Area

In the Lake Zone area three districts, Maswa, Kwimba and Misusngwi were involved in the previous research work. Research is still on-going in Maswa district where specific issues related to use of common pool resources and nutrient management is carried out. Maswa and Kwimba districts are selected for this study based on their level of involvement in past and current research work. Through grey and published literature review and preliminary visits villages involved in the past activities were identified. A total of fourteen villages had contacts with RWH activities either through participation in conducting research or in training activities. Past research work were carried out in five villages as follows:

- Maswa district: Bukangilija, Njia Panda and Isulilo villages
- Misungwi district: Iteja village
- Kwimba district: Mahiga village

Another six villages in Maswa district were involved in socio-economic surveys. These include Mwabayanda, Kinamwigulu, Shishiyu, Lali, Kidema and Dihungwa. Training was conducted to farmers from Malampaka, Lalago and Lali organised by SWMRG, District Council, IFAD funded Participatory Irrigation Development Project (PIDP) and NGOs such as World Vision. The service providers and partner organisations will identify more stakeholders involved in disseminating RWH information during the main fieldwork to include more villages that are reached in the sample.

In each of the three districts 4 villages will be selected to make a total of 12 villages that will be studied (Table 1). Two villages will be selected from the lists of villages that participated in past research work and two villages in which farmers received training. Further details of the villages selected are presented in Appendix 1 Table 1(b).

Table 1: Summary of Villages Selected

District	Villages carried out past research	Villages with farmers trained on RWH	Total villages
Same	2	2	4
Mwanga	2	2	4
Maswa	2	2	4
Total	6	6	12

2.2 Preparation work at District and Village Level and Action Plan

2.2.1 District Level

At the district level secondary information will be collected and used to place the villages and household level fieldwork in the context of the district (Appendix 2 provide format for district profile). Supplementary qualitative information will be collected through key informant interviews to understand the policy and institutional context of the district and its influence on promotion of NRM, particularly RWH technologies.

Key informants to be interviewed are the District Executive Directors (DEDs), the District Agricultural and Livestock Development Officers (DALDOs), District Extension Officers (DEOs) and District Subject Matter Specialists (DSMSs) involved in communication activities. Fieldwork for primary data collection will be done in the districts and villages selected following the plan for each district as outlined in Table 2 below. Semi-structured interviews with district officers will be conducted as elaborate in Appendix 1 Table 3 a&b.

Discussion will be held with extension staff trained by SWMRG and other extension services providers on RWH techniques. A list of extension staff trained will be updated from the existing information to include those trained by partner organisations at the district.

Table 2: Activity Plan for each district

Days	Activity	Responsible
Day 1	Courtesy call to the DED to inform about the research, its objectives and expected outcomes; ask for appointment for a brief interview	DALDO and Research Team Leader ¹
	Discussion with District Agricultural Officials on the selection of the villages and agree on villages to be involved	DALDOs and Research Team
	Write letters to villages selected and visit them to agree on the days to conducted participatory data collection	DALDOs and Research Team
	Collect secondary data and information	Research team
Day 2 &3	Visit villages to make appointments	Research Team ² 1 & 2
Day 4,5, 6	PRA in village 1 & 2	Research Team 1 & 2
Day 7	Weekend break – review and complete filling the debriefing documents	Research Teams
Day 8, 9,10	PRA in village 3 & 4	Research Team 1 & 2
Day 11,12	Discussion with extension staff at district level	Research Team 1 & 2
Day 13-14	Data entry and compilation (revisiting of debriefing notes)	Research Team 1 & 2

2.2.2 Village level

Visits to the villages will be done to discussion with the Village Chairman, Village Executive Officers (VEO) and Village Agricultural Extension officers (VAEO) on the objective of the study and the process to be followed so that we select people to participate in various group discussions. The Team will inform the village leadership the objectives of the study, that is:

“The research team from SWMRG-SUA is conducting research in semi arid areas that will enhance promotion of RWH as a way to reduce risk on production of various agricultural enterprises. The objective of our visit is to discuss with farmers about RWH harvesting, its importance in achieving food security and livelihood development and the ways in which information about RWH has been made available. The results will be used to inform policy makers in the district and national levels to guide better development planning for semi arid areas. To achieve this, a series of group discussions with farmers will be undertaken for three days in the village. We request for your active participation. Results of this work will be summarised in a village reports to be prepared by the villagers and research team and will be shared with other farmers in the village”.

Note that: if the village you are in has been visited more frequently in the past by SWMRG research teams or by any other development agent this research team should acknowledge and discussion should build into this research design.

The research team would discuss on the procedure to be followed and agree with the village leadership on the activity plan and the sequence of activities as elaborated in Table 3 below.

¹ Team Leader is Ms. M. Shetto and the Research Team will be recruited and trained for the fieldwork.

² The Team will split into two research teams of four people each to increase efficiency.

Table 3: Activity plan for each village

Days	Activity	Activity
Day 1	Community mapping: i. Discuss the criteria to be used to categorise farmers i.e. Farmers participated in RWH activities and non-participants ii. Prepare cards for households members and record information of the given household iii. Select household to be included in the focus group discussion and household survey	i. Resource inventory and mapping: to <ul style="list-style-type: none"> • Identify available NR for utilising RWH techniques in the village. • Indicate areas where RWH is mostly practiced and potential areas for expansion ii. Field visit: A visit to few sites to observe and confirm issues discussed during drawing of the resource inventory map.
Day 2 Morning	Focus Group Discussion with Men group from Group I of farmers participated in RWH activities	Focus Group Discussion with women group from Group 1 of farmers participated in RWH activities
Afternoon	Focus Group Discussion with Men group from Group II of farmers who did not participate in RWH activities	Focus Group Discussion with women group from Group 2 of farmers who did not participate in RWH activities
Day 3	Household survey: Interview 20 farm households, Ten (10) from Group I and another 10 from Group II	Semi-structured interviews with Village Extension Officers and other key informants identified during Focus Group discussions in days 1&2

Semi-structured interviews with village extension officers will be conducted as elaborated in Appendix 1 Table 2 a & b. Village leaders will be asked to provide secondary information to establish the village profile following format attached (Appendix 3).

The village chairman will then be asked to mobilise two groups of farmers as follows:

- (a) A group of at least five people from each sub-village who are well informed about households in the sub-village and can participate in the community mapping exercise. Preferably people who will be requested to participate should include 2 men, 2 women and the sub-village chairman.
- (b) Another group of at least five people who live in the village and have knowledge of the village will be selected by the village leadership to participate in RWH resource mapping exercise.

The subsequent groups for focus group discussion will be selected from the categories of farmer identified by the community mapping. They would also write letters to invite farmers who will participate in the groups identified.

PART II

3. Data Collection Activities at the Village Level

Day 1:

Data collection will be conducted in the village to collect information on extent of use of rainwater harvesting technologies and establish its contribution to improving production and other aspects of rural livelihoods. Methods and tools to be used are elaborated below.

(i) Community Mapping

Objective: to understand the village structure and stratify households according to livelihood status as a basis for sampling households to participate in the household survey.

Community mapping method will be used to categorise village population (Levy, 2003). We need to stratify the village into categories that will be used to sample household for questionnaire survey to capture household specific information. Households will be categorised into two groups, that is:

- Group 1: Farmer who participated in research activities or received training on RWH whose names will be available from the district or village office.
- Group 2: Farmers who have not received training or participate in research activities.

Farmers will do the community mapping with facilitation from the research team. Information that will be recorded on a card will include the following:

Household food security status: The farming household that will participate in the subsequent focus group discussion will also be selected from these categories. Since RWH technologies aims to help farmers to produce enough food, levels of food security is one possible indicator to assess outcomes of RWH in the study villages. Food security can also be used as a proxy for wealth in stratified household surveys.

Assets accumulation: another important use of harvested rainwater is to meet water supply for livestock. Livestock also form an important indicator for asset accumulation as most farmers keep savings in terms of animals. These are sometimes sold to household needs including food supplies. Therefore information about relative number of livestock in the household is essential.

The Process:

Representatives from all sub-villages will first informed about the research objectives and outcomes of this exercise. Guided by the checklist (Appendix 4) farmers will do the following:

- (a) Discussion about their understanding of the RWH and perceptions on food security;
- (b) List indicators for the food secure and food insecure households.
- (c) They will then be facilitated to draw a village map and agree on the boundaries that divide sub-villages
- (d) The group will then split into sub-village groups
- (e) Cards with names of heads of every household (prepared by the research team in collaboration with sub-village chairman) will be displayed and farmers will be asked to locate all households (where they reside) in the map.

- (f) Then facilitators will request participants to categorise households into two groups; trained and non-trained. The groups will be asked to indicate households, which have at least one member who attended training on RWH so that they are earmarked for interviews in the household survey.
- (g) Then participants will be requested to assess food security status of each household and write on the respective household cards (i.e. FS for food secure households and FI for food insecure households). Farmers will be requested to put respective households (cards) in the boxes provided.
- (h) Since cattle is the most important animal in the context where this research is carried out, information on relative amount of cattle will be categorised as following:
 - For households with no cattle, their cards will be given number =1
 - Households with few cattle (less than 10) = 2
 - Medium livestock keepers (between 10 – 20 cattle) = 3
 - Large livestock keepers (with more than 20 cattle) = 4
- (i) After the exercise the sub-village groups will meet to share the results with other sub-village groups. Researcher will assist farmers to sample participants for the farm household survey from the two groups, i.e. participated in RWH activities and non-participants.

For large villages additional information may only be included to sampled households. Information recorded on the cards will be as follows:

Village name:
Household Identification Number:
Name of the Head of Household
Sex	Male <input type="checkbox"/> Female <input type="checkbox"/>
Food Security Status	Food secure <input type="checkbox"/> Food insecure <input type="checkbox"/>
Livestock keeping	No cattle <input type="checkbox"/> Few cattle <input type="checkbox"/> Medium cattle <input type="checkbox"/> Lot cattle <input type="checkbox"/>

(ii) Inventory of assets important for practicing RWH techniques in the village

Objective: Identify and assess available natural and physical assets that are important for RWH in the village and how they are currently being used/not used for RWH.

A group of at least five people who know the village well, that are selected by the village leadership will participate in this discussion. Farmers with facilitation from the research team will draw a village map and indicate in this map what and where different assets are located, discuss about their potential for RWH and establish extent of use/non-use of RWH technologies and where they are not used establish reasons. Resources to be included in the map may include natural and physical such as ephemeral rivers, gullies, culverts, and presence of houses roofed with corrugated iron sheets (e.g. indicate relative number of houses such as: many houses, few houses). Indicate areas where RWH is practiced and where there is potential for RWH harvesting but not yet explored, and reasons for not using it.

The research team should first establish if there is a map drawn by other change agents that could be used as a starting point to generate more information and enrich it for this research

objective. This discussion will give information on the opportunities that exist for detailed discussion the following day.

Participants could draw the map outside on the ground if weather is good and allow them to develop moulds using any material available to represent important features such as hills, gullies and others. Then transfer the map on to a flip chart sheet. If this is not possible let them draw a map on a flip chart sheet using different colours if possible for different features of interest such as rivers, charcodams, weirs, culverts, etc. Produce a key for every map so that it is possible to share it with other readers.

The Process:

- Farmers will be asked to draw the village indicating village boundaries, location of natural and physical assets such as gullies, culverts, ephemeral rivers, rangelands; structures constructed by researchers and others organisations such as charcodams, weir; discuss whether they are being used or not; if not establish the reasons.
- Farmers will then be requested to categorise the areas with potential for RWH in-terms of water availability, soil fertility and so on as perceived by them; and other factors that support or inhibit use of different assets.
- During discussion farmer will list different crops grown under different areas and accessibility to markets for their produce.
- Farmer will be requested to visit few sites to observe, confirm and agree on issues that arise during the exercise.

Semi-structured interviews with village extension officers will be conducted as elaborate in Appendix 1 Table 2 a&b. The group will come back to where you have been drawing the map. With facilitation from research team participants would revisit the maps to include other information as a result of their field visits. Record all the information to provide qualitative information about the maps drawn. Checklist to guide discussion is provided in Appendix 5.

Day 2:

Focus Group Discussion

Objective: to understand influence of knowledge/technology on use of RWH and the relationship between use/non-use of RWH technologies versus access and control of resources available for different groups in the community in reducing vulnerability and seasonality (potential for longer crop season and different crops).

The researchers will ask questions that will help to assess how capital assets are used or converted to create new assets either at household or group level. For example converting labour and financial capitals into water control infrastructure for improve livelihood and environmental outcomes. Participants should also establish extent of use of RWH technology and its impact on food security and asset accumulation.

Time for discussion	Research Team 1	Research Team 2
Morning	Men Head of household that received training or participate in research	Men Head of household from households that did not received training or participate in research
Afternoon	Women head of household or from household with members who received training/ research	Women head of household or from household that did not participate in training/research

The Process:

The Research Team will introduce themselves to participants of the group discussion and let farmers introduce themselves. Farmers will be informed about the objectives of the discussion and requested to participate.

Group 1: Farmers who participated in research and training/communication activities

This group will provide information regarding extent of use of information received from research and extension service providers on RWH technologies. Information on various communication media used by researchers and extension agents to communicate will also be collected in order to understand the efficacy of the methods and media. Appendix 6 is a checklist that will be used to collect data.

Group 2: Farmers who did not participate in research and training activities – Use of resources and tenure issues

In this group discussion focus research team will generate information on use of rainwater as a resource. Farmers will also be facilitated to provide information on tenure issues such as right of use of various resources to utilise water resources available in the village.

First, farmers will be provided with last season rainfall data (prepared in form of a rainfall chart on a flipchart sheet). Using checklist provided in Appendix 7 farmers will be facilitated to reflect what happens to water/runoff when it rains and establish the proportional amount of runoff that flows in the areas.

Secondly, farmers assess how community access resources available including runoff to give a picture on farmers' perceptions about power relations in the community in the use. They will discuss to reflect the real situation when water flows in the gully where they harvest water.

Seasonal calendar will be used to reflect on activities carried out before and after the rains in the process of utilising water/runoff.

Day 3:**4. Household Structured Interviews**

Farmers will be selected from the two groups (refer community mapping results) for the household survey to collect household specific data that cannot be collected by the above tools. Total of 20 farmers will be interviewed. For trained group sample size will depend on the number trained, but not more than 10. For non-trained group at least 10 households will be selected for interviews. In this group 5 households will be selected to represent food secure household and another five from food insecure households. This will make a total of about 240 households from the 12 villages. Household heads will be interviewed in their homes to allow for researchers to make observation on features of RWH such as rooftop harvesting that would be evidenced by the presence of gutter at the household. The questionnaire will be pre-tested and reviewed as appropriate. The questionnaire is attached as Appendix 8.

PART III

5. District level

Different approaches to communication make significant differences to the uptake of technologies like rainwater harvesting. Tracking of communication processes require an understanding of the communication pathway and a follow up of what happened in these pathways. The pathways and flow of information to farmers is as presented in Figure 1 below:

- Researchers communicating with farmers
- Researchers communicating with Village Extension officers
- Researchers communicating with District SMS
- Researchers communicating to policy makers
- District SMS communicating with extension officers
- District SMS communicating with farmers
- Village extension officers communicating with farmers
- Farmers communicating to farmers

Semi structured interviews will be conducted with the following as elaborated in Appendix 1 Table 3 (a & b) and debriefing documents.

1. Discussion with the district extension staff
2. Interviews with the DEDs who are main implementer of development programmes, including agriculture, in the district.
3. Interview will also be done with few district councillors.

6. National level

At this level focus will be on policy issues to establish the way the research system is involved in up-take promotion. A review of policy documents, research strategies and research proposals on NRM will be carried out. The discussion will be tailored towards understanding the nature and processes of developing and using communication media on the uptake and adoption of NRM knowledge and technologies by different level of stakeholders. Pathways in which the research information systems flow and its influence on research designs will be looked into. This will address the second output of this study. Research will involve discussion with key policy makers as elaborated in Appendix 1 Table 4 a&b.

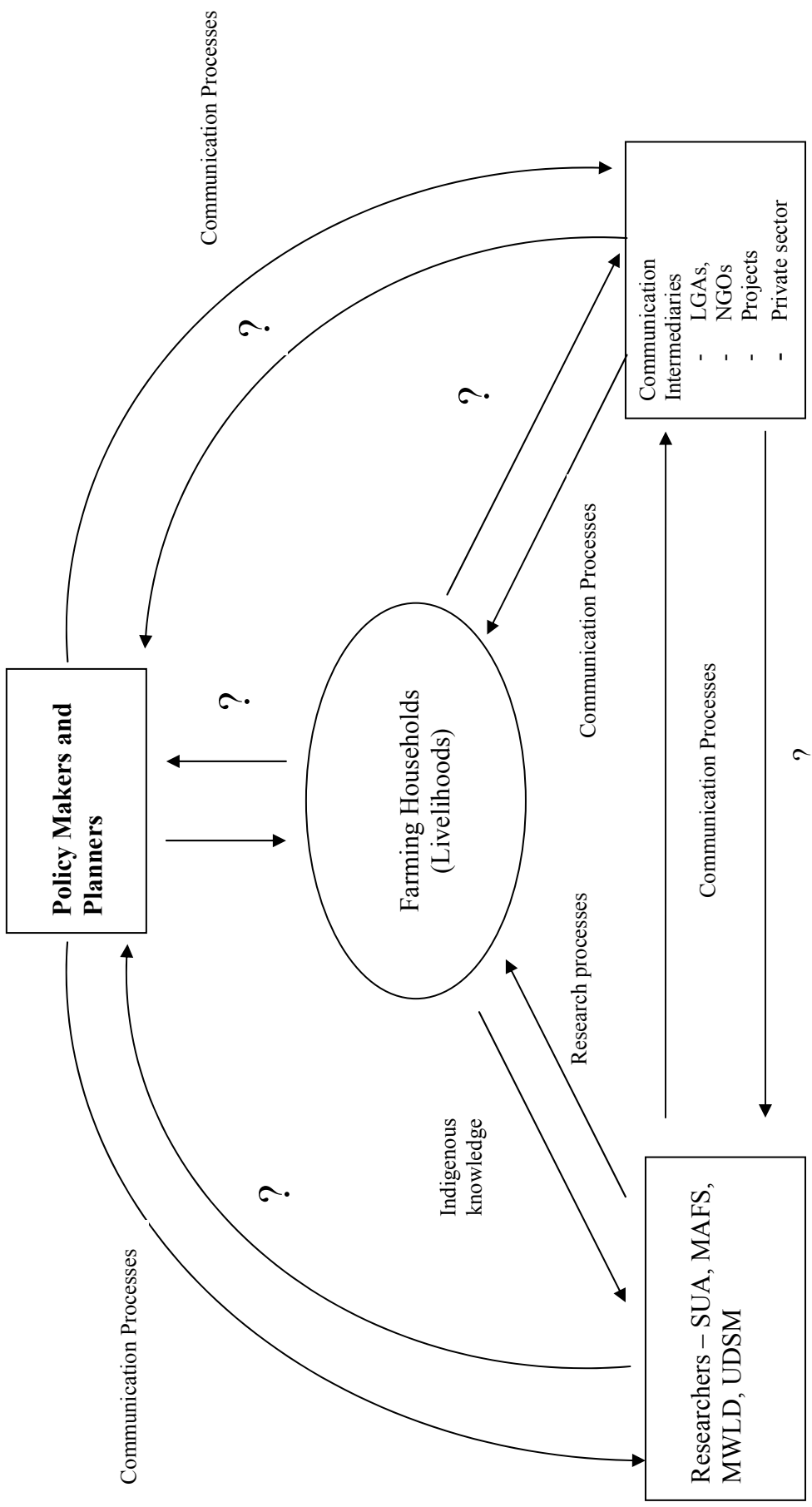
Secondary data review of policy and strategy documents including the following will also be carried out:

- Poverty Reduction Strategy Paper (PRSP),
- Agricultural Sector Development Strategy (ASDS);
- Agricultural Sector Development Programme (ASDP);
- Natural resources Management and Conservation policies and strategies (for example on land, water, and the environment);
- National science and research policy and strategy, and
- Strategic plans of target research institutions such as Commission of science and Technology (COSTEC), SUA, IRA and the like.
- The current proposed documents on research improvement that is likely to influence immediate future research designs.

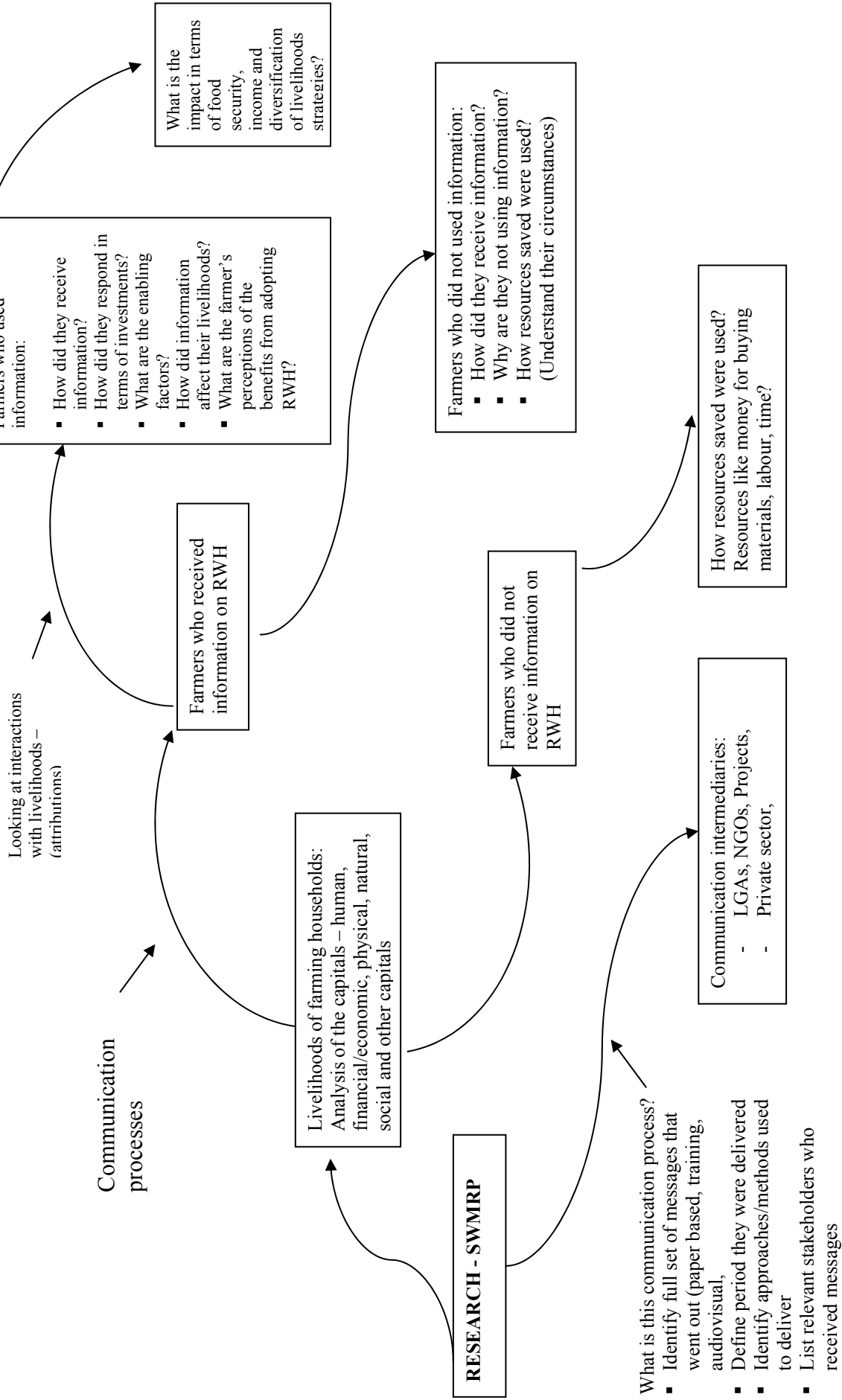
Interviews with Researchers, Research Managers and External Research Funders

Semi structured interviews with researchers and research managers in NRM programmes at the MAFS headquarters; SUA and IRA will be carried out to understand the current practices in the research system. In addition interviews will be conducted with key personnel in external funding agencies with an interest in RWH. Details of these are elaborated in Appendix 1 Table 5 a&b and 6a&b.

Figure 1: Communication Pathways for RWH



LIVELIHOOD ANALYSIS AT FARMING HOUSEHOLD LEVEL



APPENDIX 1: RESEARCH QUESTIONS, DATA SOURCES AND FIELD SITES

Table 1 (a): Relating questions to data sources: farmer level

Research questions	Source of data/additional questions	Methods
<i>What is the relationship between the promotion of RWH and farmers' livelihoods?</i>		
<ul style="list-style-type: none"> • How does RWH reduce risk? • Does RWH smooth effects of seasonality? • Does RWH result in the creation of new assets or the conversion of existing assets? • Does RWH have an impact on food security? 	<p>Does improved income as a result of RWH enable farmers to own livestock?</p> <p>How is food security locally understood? Which are food secure and food insecure households? What is the relationship of this to RWH? What are the months of greatest difficult in terms of food availability? Have there been changes in who receives food aid and why?</p>	<p>Secondary information (R8116-poverty)</p> <p>Secondary information (R8116-poverty)</p> <p>Community mapping Household interviews</p> <p>Community mapping Village profile Household interviews Secondary information (R8116-poverty)</p>
<ul style="list-style-type: none"> • Are there intra-household implications of the adoption of RWH? • How does RWH fit with other livelihood strategies? • How does information influence farmers' value/use of livelihood capitals? • Are the land use effects of RWH always positive? 	<p>What livelihood strategies do people undertake?</p>	<p>Household interviews</p> <p>Village profile Community mapping Household interviews</p> <p>FGD communications</p> <p>FGD on RWH practices</p>

Research questions	Source of data/additional questions	Methods
<p><i>What constrains and facilitates the adoption of RWH for different categories of farmer?</i></p> <ul style="list-style-type: none"> • How does availability of the five ‘capitals’ influence adoption of the different forms of RWH – (in situ, macro, micro - explain)? 	<p>What is really meant by adoption? Does ownership of livestock facilitate or lead to investment in RWH? What are the natural and physical assets present in the village and who is able to gain access? And how? How do people get access to land for RWH? How does labour availability influence adoption of RWH? How does availability of finance influence adoption of RWH? Is lack of availability of external support a limitation to adoption of RWH?</p>	<ul style="list-style-type: none"> • Inventory mapping • FGD communication • Household interviews • Village profile
<ul style="list-style-type: none"> • How does the local level political and institutional context, including customary regulations, influence adoption of RWH? 		<ul style="list-style-type: none"> • Village profile • Inventory mapping
<p><i>What are the equity implications for the adoption of RWH?</i></p> <ul style="list-style-type: none"> • Does RWH have an impact on tenure/land access? 	<p>How do different people get access to land for RWH? (age, gender, ethnicity, socially excluded people)</p>	<p>Village profile Inventory mapping FGD on RWH practices</p>
<ul style="list-style-type: none"> • Has the adoption of RWH induced any conflict/competition over resources? Who are the winners and losers? 	<p>Over what resources are there conflicts? Have conflicts resulted in reduction of social cohesion? How are they being resolved if this is the case?</p>	<p>Village profile Inventory mapping FGD on RWH practices</p>
<p><i>Which forms of information on RWH have been most useful?</i></p> <ul style="list-style-type: none"> • What forms of information on RWH have farmers accessed? 	<p>What information/contents was most useful?</p>	<p>FGD communications Household interviews</p>

Research questions	Source of data/additional questions	Methods
<ul style="list-style-type: none"> • Which sources of information have farmers found most/least useful? 	From your experience are there media which have not been used for RWH but which should have been?	FGD communications Household interviews
<ul style="list-style-type: none"> • What was the existing knowledge on RWH (before interventions)? 		FGD on RWH practices FGD communications Household interviews
<ul style="list-style-type: none"> • What formal institutions convey information to farmers and what influences who gets access to this? 	What are the strengths and weaknesses of institutions promoting RWH?	Village profile FGD communication
<ul style="list-style-type: none"> • Under what circumstances do farmers get together (church, kinship – social, women’s groups) and how does this influence information exchange? 		Village profile FGD communication Household interviews
<ul style="list-style-type: none"> • How is information transferred non-formally? 	Who do farmers share information with (spouse, children, other farmers)?	FGD communication
<ul style="list-style-type: none"> • What do farmers know about RWH and how is this reflected in their practices? 	What do people do with runoff when it rains? What are the resources needed to capture runoff? What are the constraints for tapping runoff?	FGD on RWH practices

Table 1(b): Characterising field sites – farmer level

Village	Accessibility	Level of external intervention	Nature of external RWH intervention	Other existing information
Same district				
Mwembe	16 km from Same	Very high	R6758, R8116, 8115, SAIPRO	FS survey, ann. 2 transect Survey and PRA 2004
Hedaru	Tarmac road, large	High	R6758 Construction of weir, SAIPRO	FS survey, ann.2 transect
Kavambughu	Tarmac road	Low	Training by district	Plans by district council for RWH
Bangalala (Kirinjiko Juu subvillages)	8 km Mwembe	High	R6758, SAIPRO Interest from SSI	FS survey, ann.2 transect
Mwanga district				
Lembeni	Main road	High	R6758 +E & P	FS survey, ann.2 transect Farmer monitoring 1992 Soc econ. study 1994 On farm study 1996
Kifaru	Main road		R6758 R7888	FS survey, ann.2 transect On farm study 1996

Village	Accessibility	Level of external intervention	Nature of external RWH intervention	Other existing information
Kwa Nyange	Remote but good road	NGO	MIFIPRO (NGO)	
Kisangiro/Mforo sub-villages	Main road	Low	R7888	Data on physical potential for RWH
Maswa district				
Shishiyu		Tanz/Neth FSRP 1990	R6758 R7888	Rice monitoring – 1999 FSRP study 1990 (15 farmers) Surveys 2001
Bukangilija	25km/Maswa plus rail	Very high – many donors	R8115/6	Surveys 1995,2004
Lali			World Vision + district council	
Buyubi	12 km from Maswa town	Have donor support	World Vision + district council PIDP	

Table 2(a): Relating questions to data sources – lower level extensionists
Which forms of information on RWH are most useful for different types of stakeholders?
What constrains and facilitates the use of information on RWH for different stakeholders?

Research questions	Additional questions/information
<ul style="list-style-type: none"> • What training has been received on RWH? 	Details of training: when, where, who organised it? How many times? How was it delivered? Contents?
<ul style="list-style-type: none"> • What other forms of information on RWH? 	List media received
<ul style="list-style-type: none"> • How useful was the training or other forms of information? 	Which media do you normally use to communicate with farmers?
<ul style="list-style-type: none"> • What input have you had to information on RWH? 	
<ul style="list-style-type: none"> • What follow up or other support has there been after training or other information received? 	
<ul style="list-style-type: none"> • What is the relative importance of RWH within overall work? 	
<ul style="list-style-type: none"> • What are constraints to work on RWH (and generally?) 	What are the practical constraints? What are other constraints to communication?
<ul style="list-style-type: none"> • Do farmers come to you for information on RWH? 	
<ul style="list-style-type: none"> • What is your assessment of researchers communication approaches and strategies 	To farmers? To Extensionists?
<ul style="list-style-type: none"> • Perceptions of factors influencing farmer adoption of RWH 	
<ul style="list-style-type: none"> • Perceptions of costs/benefits of RWH 	
<ul style="list-style-type: none"> • How do workshops function as a communication tool? (Relationship between content, participants, timing, and follow-up) 	

Table 2(b): Characterising field sites – lower level extensionists

Sites	Potential number of interviews
Villages	12
Participants at TOT Tabora 2001 (Maswa district) and WPLL	18

Table 3(a): Relating questions to data sources – District level

Research questions	Additional questions/information
<i>Which forms of information on RWH are most useful for different types of stakeholders?</i>	
<ul style="list-style-type: none"> • What capacity building work has been undertaken by researchers to promote RWH and what are the gaps? 	
<ul style="list-style-type: none"> • What products have been received? 	
<ul style="list-style-type: none"> • Which of these are most/least useful (for themselves/for farmers)? 	
<ul style="list-style-type: none"> • How well targeted are communication products? 	
<ul style="list-style-type: none"> • Are there examples of the integration of research findings regarding RWH into policy documents? 	
<ul style="list-style-type: none"> • What training has been carried out for extensionists and how are people selected for training? 	
<ul style="list-style-type: none"> • What is their opinion of the potential for RWH? 	
<ul style="list-style-type: none"> • How do workshops function as a communication tool? (Relationship between content, participants, timing, and follow-up) 	
<i>What constrains and facilitates the use of information on RWH for different stakeholders?</i>	
<ul style="list-style-type: none"> • What role have they played in the preparation of these products? 	
<ul style="list-style-type: none"> • How does the work on RWH fit into the other requirements of their work? 	
<ul style="list-style-type: none"> • How have the research projects interacted with IDU, ZILU, ZRELU in Lake Zone and Northern zone? 	
<ul style="list-style-type: none"> • What other organisations provide support to RWH? Are there complementarities or overlaps? 	
<ul style="list-style-type: none"> • What is the relationship between statutory and customary regulation with respect to natural resources such as runoff? 	

Table 3(b): Characterising field sites – District level

Sites	Individual within organisations	Potential number of interviews (per district)
Maswa District Council	DED, DALDO, DEO, DSMS (Irrigation), District Water Engineer, District Planning officer, District Natural Resources Officer, District Lands officer, District Information and Community/Public officer	9
	Councillors for Shishiyu, Lalago and Malampaka wards Member of Parliament	4
Same District Council	DED, DALDO, DEO, DSMS (Irrigation), District Water Engineer, District Planning Officer, District Natural Resources Officer, District Lands officer, District Information and Community/Public officer	9
	Councillors for Hedaru and Mwembe wards Member of Parliament	
Mwanga district council	DED, DALDO, DEO, DSMS (Irrigation), District Water Engineer, District Planning officer District Natural Resources Officer, District Lands officer, District Information and Community/Public officer	9
	Councillors for Lembeni and Mwanga wards Member of Parliament	
Press & Media	News reporter Msanii Africa	1
NGOs/Projects	VECO Programme Advisor MIFIPRO Project Manager SAIPRO Project Manager PIDP Maswa (IFAD funded project)	4
Private Sector	TCCIA	3

Table 4(a): Relating questions to data sources – National level

Research questions	Additional questions/ information
<i>Which forms of information on RWH are most useful for different types of stakeholders?</i>	
<ul style="list-style-type: none"> • What capacity building work has been undertaken by researchers to promote RWH and what are the gaps? 	
<ul style="list-style-type: none"> • What products have been received? 	
<ul style="list-style-type: none"> • Which of these are most/least useful (for themselves/for farmers)? 	
<ul style="list-style-type: none"> • How well targeted are communication products? 	
<ul style="list-style-type: none"> • Are there examples of the integration of research findings regarding RWH into policy documents? 	
<ul style="list-style-type: none"> • What training has been carried out for extensionists and how are people selected for training? 	
<ul style="list-style-type: none"> • What is their opinion of the potential for RWH? 	
<ul style="list-style-type: none"> • How do workshops function as a communication tool? (Relationship between content, participants, timing, and follow-up) 	
<i>What constrains and facilitates the use of information on RWH for different stakeholders?</i>	
<ul style="list-style-type: none"> • What role have they played in the preparation of these products? 	
<ul style="list-style-type: none"> • How does the work on RWH fit into the other requirements of their work? 	
<ul style="list-style-type: none"> • How have the research projects interacted with IDU, ZILU, ZRELU in Lake Zone and Northern zone? 	
<ul style="list-style-type: none"> • What other organisations provide support to RWH? Are there complementarities or overlaps? 	
<ul style="list-style-type: none"> • What is the relationship between statutory and customary regulation with respect to natural resources such as runoff? 	

Table 4(b): Characterising field sites – National level

Sites	Individual within organisations	Potential number of interviews
Ministry of Agriculture and Food Security	DRD, AD (Spec. Prog)	2
	DCD, AD (Ext.)	2
	DITS, AD (Land Plan.); AD (Mech.); AD Irrigation	4
	Dir. Policy and Planning	1
	Info. & Doc. Unit	1
Ministry of Water and Livestock Development	Farmers Educ. & Publicity Unit	1
	DRT, AD (Liv. Research), AD (Ext.)	3
	DWD	1

Table 5(a): Relating questions to data sources – Researchers

Research Questions	Additional questions/Information
<i>Which forms of information on RWH are most useful for different types of stakeholders?</i>	
<ul style="list-style-type: none"> • What products have been developed, in what form, and with what content? 	
<ul style="list-style-type: none"> • How and to whom have these products been disseminated? 	
<ul style="list-style-type: none"> • What work has been carried out in capacity building with extensionists, NGOs, private sector and district level government stakeholders? What have been the pros and cons of this? 	
<ul style="list-style-type: none"> • To what extent to the products develop build on existing farmer knowledge of NRM and specifically RWH? 	
<i>What constrains and facilitates the use of information on RWH for different stakeholders?</i>	
<ul style="list-style-type: none"> • Has there been a formal communication plan for information on RWH – and what are its strengths and weaknesses? 	
<ul style="list-style-type: none"> • What proportion of resources are allocated to research itself and to dissemination/communication? 	
<ul style="list-style-type: none"> • After generating information on RWH, what information is used and what not? 	
<ul style="list-style-type: none"> • What guidelines are used in the collection of information on RWH? 	
<ul style="list-style-type: none"> • What are the perceived barriers or sticking points for the dissemination of research results? 	
<ul style="list-style-type: none"> • What are the rewards for different forms of communication? 	

Table 5(b): Characterising field sites – Researchers

Sites	Individual within organisations	Potential number of interviews
SUA	SWMRG, Department of Soil Science, VLIR, DRPGS	10
UDSM	IRA	2
Zonal Research and Development Centres	LZADRI (ZDRD, ZRC, ZRELOs, ZILOs), Researchers (S&W management)	6
	NZARDI (ZDRD, ZRC, ZRELOs, ZILOs), Researchers (S&W management)	6
National Soils Services Centre	Mlingano Research centre	2

Table 6(a): Relating questions to data sources – External Research Funders

Research Questions	Additional questions/Information
<i>Which forms of information on RWH are most useful for different types of stakeholders?</i>	
<ul style="list-style-type: none"> When research products on RWH are received, is it because they are requested? Which research products have been received on RWH? What other forms of communication with researchers working on RWH take place? What is done with research products? 	
<i>What constrains and facilitates the use of information on RWH for different stakeholders?</i>	
<ul style="list-style-type: none"> Does this information influence practices or policies? Do they think research on RWH makes a difference to livelihoods and if so, why do they think this? 	

Table 6(b): Characterising field sites – External Research Funders

Sites	Individual within organisations	Potential number of interviews
DFID Dar-es-salaam	Social Development Advisor	1
NRSP	Programme Manager, SG Members	4
SIDA		1
IFAD		?
IWMI		?
ICRAF		?
NORAD (DSM)	Social Development Advisor	
ARF?		
FAO		?

Appendix 2: District Profile

- i. District maps showing location of the villages selected
- ii. Demographic data
- iii. Number of institutions existing such as schools, health facilities, and any other features of special interest, catchments/watershed;
- iv. Agro-ecological zonation in the district, farming systems, and crops grown in different agro-ecological zones, areas under forest, and any other NR related information
- v. How many extension workers in the district were trained on RWH and who facilitated the training? (Some data will be gathered from secondary information)
- vi. Any construction done on RWH structure such as charco dams and their locations, when were they constructed, who supported construction?
- vii. Other forms of external interventions on RWH in the district
- viii. Changes that have occurred in the past five years in enhancing peoples food availability, income and diversification opportunities; whether situation is improving or worsening;
- ix. Any environmental changes such as drought, floods, and others, their effect on peoples livelihoods; what were the district strategies in reducing the bad effects to people;
- x. Price data for various agricultural commodities and livestock at district level;

Appendix 3: Village Profile on RWH information

Secondary information will be collected from the village office. The research team will supplement data required through key informant interviews with village leadership especially the village chairman, village executive officer and village extension officers. Key items required include the following:

- i. List names of sub-villages:
- ii. What do you understand about RWH?
- iii. In which sub-village is RWH practices most? (this may guide the team to select relevant sub-villages in case of large villages)
- iv. What are the sources for domestic water in the village?
- v. What are the sources for livestock water in the village?
- vi. What are the main current sources of livelihood in the village?
- vii. What changes have occurred in the past five years in terms of food production and income earning? Has it decreased or increased? If increasing, what contributes in this increase; and if decreasing, why?
- viii. Institutional and organisations in the village: what institutions exist, within and outside the community;
 - a. What NGO/CBOs (formal and informal) exist or work with the village (including farmers and religious groups)?
 - b. Which among them support RWH at the village, communities or a catchment level. What types of support are they providing? How do they support RWH?
 - c. What traditional institutions exist in the village (e.g. is there a traditional chief, what are their roles in RWH?
 - d. What political institutions exist in the village? (Village chairman and committees, how are they operating, how does they enable of disable utilisation of RWH knowledge acquired?
 - e. Other external agencies operating in the village
 - f. Carry out stakeholders' analysis to assess their importance in the community.
- ix. Facilitate informants to list bylaws and customs and indicate who make them? How are these bylaws and customs influencing use of RWH information?
- x. Definition of food security: what is the local perception of food security?

Appendix 4: Checklist for Focus Group Discussion - Community Mapping.

- i. How many households are in your sub-villages?
- ii. What is your local perception on food security?
- iii. What is the current food security situation in the village?
- iv. What are the characteristics/indicators of a household that is food secure or insecure?
- v. Which months are of greatest difficulty in term of food availability in the village?
- vi. What are the coping strategies in times of food shortage? How effective is the strategy?
- vii. Which groups are considered to be most vulnerable? And why?
- viii. Have you received any food aid in the last two seasons? If yes, who received the aid?

Appendix 5: Checklist for Focus Group Discussion -RWH Resource Inventory Mapping

- i. What are the important natural and physical resources mentioned by farmers? Where are they located? Are they currently used for RWH? Farmer will be facilitated to reflect on the capital assets that they have access to.
- ii. Who have more access to runoff (downstream users or upstream users or all farmers)?
- iii. What factors constrains or facilitates promotion or use of RWH in the village?
- iv. Which of these factors that constrain use of RWH can be resolved within the village and which ones needs outside interventions?

Resources available for RWH in the villages observed during field visit

Areas visited	Features observed	Status of use	Explain on the status of use
Example: 1. Mforo catchment	a. Ephemeral river where farmers harvest runoff		
	b. Culverts		
	c.		
	d.		
	e.		
2.			

Appendix 6: Checklist for Focus Group Discussion on Communication aspects with trained farmers

- i. What RWH information have you received? Was this information (contents) useful?
- ii. Which sources/media of information have farmers found most/least useful?
- iii. What other sources of information could have been used to promote RWH (e.g. church groups, kinship – social groups) and how does this influence information exchange)?
- iv. What formal institutions convey information to farmers and how are beneficiaries of this information selected?
- v. Who do farmers share information with (spouse, children, other farmers)?
- vi. After the training what factors facilitated utilisation of information received? (link this with the five capitals assets)
- vii. Are farmers more organised into groups to utilise the resources now than before receiving RWH knowledge? Explain.
- viii. What are the benefits/shortcomings of using RWH?

Appendix 7: Checklist for Focus group discussion on RWH technology with farmers who did not received training

The following questions will be asked to generate information during focus group discussion.

- i. What do you know about RWH and how is this reflected in your practices?
- ii. What happens when it rain or when there is a runoff from upstream?
- iii. How much was captured (all the water that flows, half of it, very little or none)?
- iv. What are the resources needed to capture runoff? (Link it to capital assets and role of information and technology in utilisation of resources).
- v. Who uses runoff?
- vi. Why some are able to use runoff? (Research Team should lead the discussion to get information about right of use of resources available i.e. tenure issues and power relations on the use of runoff to understand the diversity of situation).
- vii. What are the benefits of using runoff?
- viii. Are there conflicts in use of RWH? What kind of conflicts?
- ix. What are do you do as a community to resolve or minimise conflicts to enable you utilise assets available for improving your livelihood?
- x. Has social cohesion reduced as a result of these conflicts? Use arrow diagram tool to assess social cohesion whether it is negative or positive as a result of use of water resources.

Information should be recorded on a flipchart sheet for all to share. (Tools to quantify some of this information will be sought).

Table ...: The five capitals and indicators of importance to RWH

Assets	Indicators
Natural:	<ul style="list-style-type: none"> • Ownership of land; • Access to land (enquire about access to land/agricultural fields by various groups such as women?) • Ownership and access to water/runoff sources (gullies, streams); • Extent and nature of this access and its effect on their decision to invest in RWH related activities? • Soil type and its fertility (as perceived by farmers)
Human	<ul style="list-style-type: none"> • Knowledge and skills about RWH • Labour: access and control of labour
Financial	<ul style="list-style-type: none"> • Access to savings including livestock keeping in assisting farmers to get money for investing in RWH; • Presence of rural financial institutions and they role in supporting agriculture
Social	<ul style="list-style-type: none"> • Membership in farmer groups and • Other social networks that enable to access assets that are limiting such as labour in kind, finances and information
Physical	<ul style="list-style-type: none"> • Markets availability for the produce encourages utilisation of RWH techniques (discuss how is this true with farmers in their respective villages?) • Road infrastructure situation in the village.

Appendix 8: Questionnaire for Household interviews

1. District:	
2. Village:	
3. Interview No:	

A: General Information

4. Person responding to the interview	Head of HH <input type="checkbox"/> Spouse <input type="checkbox"/> Other specify <input type="checkbox"/>
5. Education level	No <input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Tertiary <input type="checkbox"/>
6. Number of members of the household	Adults: Children:
7. Have you received any training on RWH?	Yes <input type="checkbox"/> No <input type="checkbox"/>
8. Do you practice RWH techniques?	Yes <input type="checkbox"/> No <input type="checkbox"/>

B: Questions related to adoption and access

9. Land ownership:

9.1 Plot No.	1	2	3	4
9.2 Location	Upstream <input type="checkbox"/> Middle <input type="checkbox"/> Downstream <input type="checkbox"/>	Upstream <input type="checkbox"/> Middle <input type="checkbox"/> Downstream <input type="checkbox"/>	Upstream <input type="checkbox"/> Middle <input type="checkbox"/> Downstream <input type="checkbox"/>	Upstream <input type="checkbox"/> Middle <input type="checkbox"/> Downstream <input type="checkbox"/>
9.3 How it was acquired	Inherited <input type="checkbox"/> Bought <input type="checkbox"/> Rented/borrowed <input type="checkbox"/>	Inherited <input type="checkbox"/> Bought <input type="checkbox"/> Rented/borrowed <input type="checkbox"/>	Inherited <input type="checkbox"/> Bought <input type="checkbox"/> Rented/borrowed <input type="checkbox"/>	Inherited <input type="checkbox"/> Bought <input type="checkbox"/> Rented/borrowed <input type="checkbox"/>
9.4 If rented or borrowed from who?	Father <input type="checkbox"/> Spouse <input type="checkbox"/> Neighbour <input type="checkbox"/> Village govt <input type="checkbox"/>	Father <input type="checkbox"/> Spouse <input type="checkbox"/> Neighbour <input type="checkbox"/> Village govt <input type="checkbox"/>	Father <input type="checkbox"/> Spouse <input type="checkbox"/> Neighbour <input type="checkbox"/> Village govt <input type="checkbox"/>	Father <input type="checkbox"/> Spouse <input type="checkbox"/> Neighbour <input type="checkbox"/> Village govt <input type="checkbox"/>
9.5 Est Ac'ge				
9.6 Under RWH?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>

10. Labour availability

10.1 Is labour availability for farming a problem for you?	Yes <input type="checkbox"/> No <input type="checkbox"/>
10.2 What is the principle source of labour for farming?	Household members <input type="checkbox"/> Hired labour <input type="checkbox"/> Reciprocal labour <input type="checkbox"/>
10.3 If RWH is adopted what was the principle source of labour?	Household members <input type="checkbox"/> Hired labour <input type="checkbox"/> Reciprocal labour <input type="checkbox"/> NA <input type="checkbox"/>

11. Finances

11.1 In adopting RWH which activities require financial input?
11.2 Were these a barrier for you to adopt RWH?	Yes <input type="checkbox"/> No <input type="checkbox"/>
11.3 How did you overcome this?	Income from: Small business <input type="checkbox"/> Pension <input type="checkbox"/> Loan <input type="checkbox"/> Savings <input type="checkbox"/> Sale of assets <input type="checkbox"/> Remittances <input type="checkbox"/> No I did n't <input type="checkbox"/>

12. Social networks

12.1 Which village group or associations are you a member of?	None <input type="checkbox"/> Womens' Group <input type="checkbox"/> Farmers' group <input type="checkbox"/> Youth Group <input type="checkbox"/> Religious groups <input type="checkbox"/>
12.2 Has your involvement in villages groups or association helped you to adopt RWH?	Yes <input type="checkbox"/> No <input type="checkbox"/>
12.3 In what way has it helped?	Mobilise labour <input type="checkbox"/> Access information <input type="checkbox"/> Access training <input type="checkbox"/> NA <input type="checkbox"/>

C: Questions related to Information

13. Information on RWH

13.1 For how long have you known about RWH?	Very recently <input type="checkbox"/> Less than five years <input type="checkbox"/> Five to ten years <input type="checkbox"/> More than ten years <input type="checkbox"/> Not before today <input type="checkbox"/>
13.2 From whom did you get this information?	Parents <input type="checkbox"/> Fellow farmers <input type="checkbox"/> Village extension officer <input type="checkbox"/> Researchers <input type="checkbox"/> None <input type="checkbox"/>

14. What is the source of RWH information?

Source/Media	Response	Useful
14.1 Training	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>
14.2 Extension agent	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>
14.3 Radio	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>
14.4 Magazines	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>
14.5 Leaflets	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>
14.6 Booklets	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>
14.7 Posters	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>
14.8 Other farmers	Yes <input type="checkbox"/> No <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>

15. If training was received?

15.1 What type of training?	
15.2 Where was the training conducted?	On-farm <input type="checkbox"/> Off-farm <input type="checkbox"/> Both <input type="checkbox"/>
15.3 Who provided training?	Village Extension agent <input type="checkbox"/> District staff <input type="checkbox"/> Researchers <input type="checkbox"/> Combination of the above <input type="checkbox"/>
15.4 How long was it?	Half a day <input type="checkbox"/> One day <input type="checkbox"/> 2 days <input type="checkbox"/> More than 2 days <input type="checkbox"/>
15.5 How useful was the training?	Very useful <input type="checkbox"/> Useful <input type="checkbox"/> Not useful <input type="checkbox"/>

D: Questions related to impact of RWH on Livelihoods

16. What type of RWH do you practice? (If is a non-adopter go to questions 19)

<i>In-situ RWH system</i>	
16.1 Deep tillage	Yes <input type="checkbox"/> No <input type="checkbox"/>
16.2 Ridging, contouring and terracing	Yes <input type="checkbox"/> No <input type="checkbox"/>
16.3 Raised seed bed (maboda)	Yes <input type="checkbox"/> No <input type="checkbox"/>
16.4 Pit holes	Yes <input type="checkbox"/> No <input type="checkbox"/>
<i>Micro RWH systems</i>	
16.5 Roof top RWH without storage tanks	Yes <input type="checkbox"/> No <input type="checkbox"/>
16.6 Roof top RWH with storage tanks	Yes <input type="checkbox"/> No <input type="checkbox"/>
16.7 Diversion from ephemeral stream or gullies	Yes <input type="checkbox"/> No <input type="checkbox"/>
16.8 Diversion of run off from rangelands	Yes <input type="checkbox"/> No <input type="checkbox"/>
16.9 Diversion of runoff from culverts	Yes <input type="checkbox"/> No <input type="checkbox"/>
16.10 Digging furrow around the farms	Yes <input type="checkbox"/> No <input type="checkbox"/>
<i>Macro RWH systems</i>	
16.11 Excavated bunds	Yes <input type="checkbox"/> No <input type="checkbox"/>
16.12 Charco dams	Yes <input type="checkbox"/> No <input type="checkbox"/>
16.13 Sand dams	Yes <input type="checkbox"/> No <input type="checkbox"/>

17. Production Activities:

17.1 Has adoption of RWH led to increased productivity?	Yes <input type="checkbox"/> No <input type="checkbox"/>
17.2 If yes in which crops?	Maize <input type="checkbox"/> Paddy <input type="checkbox"/> Vegetables <input type="checkbox"/> Beans/lablab <input type="checkbox"/> Cotton <input type="checkbox"/> NA <input type="checkbox"/>

17.3 Has RWH led to investing into any of the following livelihood strategies?

Activity	
Small business	Yes <input type="checkbox"/> No <input type="checkbox"/>
Brick making	Yes <input type="checkbox"/> No <input type="checkbox"/>
Short terms employment (labourers)	Yes <input type="checkbox"/> No <input type="checkbox"/>
Charcoal making	Yes <input type="checkbox"/> No <input type="checkbox"/>
Quarrying	Yes <input type="checkbox"/> No <input type="checkbox"/>
Lumbering	Yes <input type="checkbox"/> No <input type="checkbox"/>
Bee keeping	Yes <input type="checkbox"/> No <input type="checkbox"/>
Sand mining	Yes <input type="checkbox"/> No <input type="checkbox"/>
Local brewing	Yes <input type="checkbox"/> No <input type="checkbox"/>
Others (specify):	Yes <input type="checkbox"/> No <input type="checkbox"/>

18. Intra-household control and decision making

18.1 Who made the decision to adopt RWH?	Husband <input type="checkbox"/> Wife <input type="checkbox"/> Both <input type="checkbox"/> Widow (er)/divorced <input type="checkbox"/> Single <input type="checkbox"/> NA
18.2 Who within household controls increased income as a result of RWH?	Husband <input type="checkbox"/> Wife <input type="checkbox"/> Both <input type="checkbox"/> Widow (er)/divorced <input type="checkbox"/> Single <input type="checkbox"/> NA

19. Assets

19.1 Livestock ownership

Types	
Cattle	Less than 10 <input type="checkbox"/> 10 to 20 <input type="checkbox"/> More than 20 <input type="checkbox"/> None <input type="checkbox"/>
Goats	Yes <input type="checkbox"/> No <input type="checkbox"/>
Sheep	Yes <input type="checkbox"/> No <input type="checkbox"/>
Chicken	Yes <input type="checkbox"/> No <input type="checkbox"/>
Donkeys	Yes <input type="checkbox"/> No <input type="checkbox"/>

19.2 **Other assets:**

Plough/ridger	Yes <input type="checkbox"/> No <input type="checkbox"/>	Radio	Yes <input type="checkbox"/> No <input type="checkbox"/>
Ox-cart	Yes <input type="checkbox"/> No <input type="checkbox"/>	Bicycle	Yes <input type="checkbox"/> No <input type="checkbox"/>
Water storage facility	Yes <input type="checkbox"/> No <input type="checkbox"/>	House roofed with corrugated iron sheets	Yes <input type="checkbox"/> No <input type="checkbox"/>

20. Food Security Status

20.1	Is food produced in your farm enough for household consumption last year?	Yes <input type="checkbox"/> No <input type="checkbox"/>
20.2	If not, how did you make up the shortfall?	Bought with other income <input type="checkbox"/> Borrowed <input type="checkbox"/> Food aid <input type="checkbox"/> Sold assets to buy <input type="checkbox"/> Didn't <input type="checkbox"/>

Thank you.

Appendix 9: Checklist for semi structured interviews with Extension staff

Extension staff in the villages will be interviewed individually using a semi-structured questionnaire provided in the debriefing document. The following questions will be asked:

- i. Have you received training about Rainwater harvesting? When? Where? Who organised? How many times? How was it delivered?
- ii. If yes, which of these RWH techniques were you trained on? (If not, go to questions vi).
- iii. How practical was the training?
- iv. Did the training on RWH help you in your extension work? If yes, how? If no, why?
- v. Was there any support provided after the training to enable you communicate this information to farmers?
 - If yes, what kind of support was provided? (to be coded later)
 - If not, what could be the reason?
- vi. How does RWH fit in your everyday extension work?
- vii. Are farmer coming to you to seek for assistance/information on RWH? Yes No
If yes, how do you assist them? If no, why do you think they are not coming to seek for information?
- viii. What communication media/methods do you normally use in communicating RWH information with farmers?
- ix. What communication media would you prefer most in communicating RWH information? Why?
- x. What practical constraints do you face in promoting RWH technologies to farmers?
- xi. What constraints do you face in communicating RWH information with farmers?
- xii. What can you say about communication approaches used by researchers and other extension service providers to:
 - Extension staff?
 - Farmers
- xiii. What would you suggest to improve future designs in communications?
- xiv. What do they think are the most important factors that influence farmers to adopt or not adopt RWH technologies?
- xv. What are the benefits/shortcomings that farmers get by adopting RWH technologies?

Appendix 10: District Officials – DALDO, DEOs, DSMS and DEDs

A. **DALDOs, DEOs and DSMSs** will be interviewed to answer the following:

Training of extension staff/farmers/District leaders:

- i. How many training sessions have they conducted or involved last and this year? Who were the target groups? What was the duration of training? Who funded?
- ii. How were participants selected?
- iii. What were the contents of the training?
- iv. If you were to organise another RWH training what would be the emphasis?

Communication products

- v. What communication products/messages have you received from research?
- vi. To whom have you distributed the received communication products?
- vii. Which materials were used during training of farmers? Extension staff? Why?
- viii. How adequate/useful are communication products for delivering the messages to farmers?
- ix. Were you involved in the preparation of communication products? If yes, what was your role?

Communication methods

- x. What methods did you use to communicate RWH information to various stakeholders in the district?
- xi. What other communications methods would you prefer to use in future and why?
- xii. What suggestion do you have to improve communication of RWH information to various stakeholders in the district?

Policy and institutional support

- xiii. What is the potential of RWH in improving household food security? Income?
- xiv. What support in term of resources is provided to support RWH in the district?
- xv. What other institutions are promoting RWH in the district and how are they involved?

B. The research team will discuss with **DEDs** to answer the following questions:

- i. What support in term of resources has provided to support RWH in the district? (triangulation)
- ii. What organisations are important for promoting RWH in the district, and how they are involved?
- iii. What institutions (bylaws, customs) exists that enable/disable use of natural resources like runoff in the district?
- iv. What investments are made to support RWH promotion in the district?
- v. In his/her opinion what is the potential for RWH in the district?
- vi. Have they received enough information to support planning and decision making at district level for investment in RWH? What is the potential of RWH in improving household food security? Income?