Workshop proceedings

Feed the Future Innovation Lab for Small-Scale Irrigation: Tanzania

Workshop proceedings documentation
Morogoro, Tanzania – 26 August 2014

"The Feed the Future Innovation Lab for Small-Scale Irrigation works to enhance food security and reduce poverty by developing and introducing gender-sensitive, small-scale irrigation systems into food and agriculture production on small farms."

The stakeholder consultation workshop and proceedings were made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of the authors, the International Water Management Institute (IWMI) and the International Livestock Research Institute (ILRI) and do not necessarily reflect the views of USAID or the United States Government.

Contents

1. Introduction and Background

The Innovation Lab on Small- Scale Irrigation (ILSSI) is a cooperative research project being implemented through the United States Agency for International Development (USAID) Feed the Future (FtF) program.[1] The project is being implemented in Ethiopia, Ghana and Tanzania. The project aims to increase food production, improve nutrition, accelerate economic development and contribute to the protection of the environment through a partnership and engagement approach to ensure continual learning; responsiveness to local needs, demands, and realities; complementarities with national goals and initiatives; and the uptake of outputs and recommendations by farmers, researchers, policy makers and investors. The project seeks the desired development and environmental objectives by identifying, testing and demonstrating technological options and promoting dialogue among stakeholder communities and policy makers. A research partnership comprised of the International Water Management Institute (IWMI), the International Livestock Institute (ILRI), the International Food and Policy Research Institute (IFPRI), North Carolina A & T (NCAT) State University and led by the Texas A & M University System (TAMUS) will collaborate with national partners to: 1) identify promising small-scale irrigation technologies, 2) demonstrate and assess feasibility of solutions, 3) develop context specific technological and strategic recommendations, and 4) train agricultural development students and professionals. The project builds on knowledge and experiences gained from earlier interventions, including the recent AgWater Solutions[2] project.

1.1. Summary of the workshop

On 26th August 2014, the ILSSI project organized a one-day workshop in Morogoro, Tanzania in collaboration with local partner Sokoine University of Agriculture (SUA). The workshop was attended by over 25 participants not directly involved in the project. Attendees were drawn from Government of Tanzania line ministries, universities, non-governmental organizations, institutes of the CGIAR, USAID (Tanzania Mission) and farmers. Eight participants were women. Presentations and valuable input was provided by the Deputy Permanent Secretary of the Ministry of Agriculture Food Security and Cooperatives (MAFC), Engineer Raphael Daluti, as well as the Assistant Director of Irrigation Research and Technology Promotion (MAFC) Engineer Amandus Lwena. Professor Henry Mahoo ran sessions I and II (see Appendix 2) and Dr Simon Langan ran session III and IV. All of the project team facilitated participatory sessions, and took photographs and notes. Prof Siza Tumbo, Dr Fredrick Kahimba and Dr Victor Kongo were responsible for collating all of the material. The sessions often took longer than planned to enable translation into Kiswahili for the farmers. At the end of the workshop, all participants provided an evaluation of the workshop.

1.2. Objectives of the Workshop

Objectives:

- Share experiences and lessons on promising small-scale agricultural water management and fodder integration opportunities;
- Review, discuss and propose potential water delivery and management technologies for small- scale irrigation in Tanzania that may be field-tested and piloted under ILSSI project;
- Review, discuss and propose potential irrigated fodder and other cropping systems for small-holders in Ethiopia that may be field-tested and piloted under the ILSSI project.

[1] ilssi.tamu.edu/
[2] http://awm-solutions.iwmi.org/

Expected outputs:

- Stakeholder networking for future consultation and dialogue on potential interventions
- Identified sets of interventions, experiences and research on small-scale irrigation
- Prioritization of potential intervention for small-scale irrigation and irrigated fodder
- Initial input on sites for field studies

2. Participants

Participants of the consultative workshop came from research and academia (SUA, UDSM, NM-AIST, TALIRI), non-governmental development organizations (TAPP, NAFAKA and CARE), international research organizations (ILRI, IWMI and ICRAF), representatives from the Ministry of Agriculture, Food Security and Cooperatives, Ministry of Livestock and Fisheries Development, Zonal Irrigation Offices, and Local Governments from Same and Morogoro. A complete list of participants is available in Annex 1 of this report.

3. Workshop proceedings

3.1. Opening

The workshop started by workshop organizer Prof. Henry Mahoo of SUA welcoming the participants, followed by a short introduction about the project by Dr. Simon Langan of IWMI. Dr. Neville Clarke of Texas A & M University System also provided a brief background of the ILSSI project and what the project is planning to accomplish in its five years of implementation in Africa. After the brief project introductions, the participants were requested to introduce themselves before official opening of the workshop.

The workshop was officially opened by the Guest of Honour, Eng. Raphael L Daluti, the Deputy Permanent Secretary in the Ministry of Agriculture, Food Security and Cooperatives (MAFC). He expressed his sincere gratitude to the organizers and all partners for facilitating such an important workshop in Tanzania. He then provided an overview of agriculture and irrigation development in the country by highlighting the different national policies, strategies and programmes and other initiatives that are all aimed at improving agriculture production and productivity. He also indicated the importance of the ILSSI project and link between the project and government policies and initiatives. He concluded by stating that he hopes that the ILSSI project will effectively contribute towards development of technologies for addressing some of the challenges currently faced in the irrigation subsector in Tanzania. He also assured that Government is committed to work on recommendations from the Project. The full opening speech by the Deputy Permanent Secretary (MAFC) Eng. Daluti is appended in Annex 2 of this report.

3.2. Presentations

Three background presentations were made, which provided the basis for discussion. The first presentation was mainly on the promising small-scale irrigation (SSI) interventions and focused on research gaps and needs. The second presentation was on integrating fodder into small-scale irrigation and the last presentation was made by the Deputy Director of Irrigation and Technical Services in the Ministry of Agriculture, Food Security and Cooperatives, on behalf of the Director, on challenges and opportunities in irrigation in Tanzania.

3.2.1. Promising small-scale irrigation interventions in Tanzania: Research gaps and needs

Dr. Frederick Kahimba presented the background paper on promising small-scale irrigation interventions. He highlighted that the specific objective of the paper were to review previous experiences and lessons from research projects with the view to identify key research issues in small-scale irrigation (SSI), to review relevant policies, plans and legal/institutional framework related to SSI, to highlight research gaps and needs, and to suggest promising small-scale irrigation interventions in Tanzania. In his presentation he highlighted the importance of agriculture and irrigation in the country, irrigation development, their performance and challenges, national policies, institutional arrangements, strategies programmes and projects, past and current irrigation research and gaps. He concluded by recommending research themes for small-scale irrigation interventions in Tanzania, which are summarized in the box below. The full presentation is available as Annex 3 of this report.

Research themes recommended

Technologies for improved water management

(i) evaluation and improvement in productivity of irrigation water
(ii) mechanical and drip irrigation systems for high value crops
(iii) evaluation and improvement of utilization and efficiency of irrigation water
(iv) water application technologies
(v) land management practices for controlling rainfall runoff and soil erosion
(vi) managing rainwater for plant growth and environmental conservation
(vii) assessment of the potential of groundwater for small-scale irrigation

Policies and institutional frameworks

(i) tools for sustainable management and utilization of water resources
(ii) assessment of policies and institutional dynamics in irrigation and water resources management
(iii) irrigation value chain development

3.2.2. Experiences and technologies to integrate fodder into small-scale irrigation

Ben Lukuyu from ILRI-Nairobi presented on potential of irrigated fodder in Tanzania and highlighted research gaps and needs. He noted that the main challenge in livestock keeping is in meeting or availing sufficient feed stocks (quantity and quality) throughout the year. In general, livestock keepers only meet 55% of their livestock feed requirements and that the inadequacy is aggravated by strong seasonal variations of rainfall resulting in seasonal feed availability. He indicated that it is possible to take advantage of existing emphasis of irrigation in growing food crops to enhance feed production by exploiting the use of food and feed crop varieties in these systems. For example, crop residues in irrigated cereal and root/tuber crop production offers an opportunity for fodder production. Another opportunity is to integrate improved forages in mixed crop-livestock systems for example, using farm boundaries to plant fodder or to dedicate plots in crop dominated irrigation systems to produce fodder for livestock. Another option is to produce fodder in the upland areas where *'vinyungu system'* is practiced. He also presented challenges on integrating the two production systems. The full presentation is available as Annex 4 of this report.

3.2.3. Challenges and Opportunities in Irrigation in Tanzania

Eng. Amandus Lwena, the Assistant Director of Irrigation in the Ministry of Agriculture, Food Security and Cooperatives presented on challenges and opportunities in irrigation in Tanzania. He provided the history of irrigation development in the country, challenges facing the irrigation sector, irrigation sector reform and opportunities for irrigation development. In his presentation he highlighted several challenges facing the sector including:

- Inadequate funding for irrigation investments;
- Low capacity and interest from private sector in irrigation development;
- Inadequate storage of water for irrigation development;
- Low production and inefficient marketing systems to absorb the produce from irrigation farming;
- Inadequate institutional capacity with respect to planning, implementation and sustainable management of irrigation development in Tanzania;
- Inadequate database for irrigation development;
- Ineffective and inefficient control of irrigation water which limits the application of the principles of Water Markets and Socio-Economic Mobility of Water use permit;
- Inadequate proper agricultural land use and management plans; and
- Inadequate irrigation research and technical innovations.

In order to address some of the challenges, the Department of Irrigation and Technical Services in MAFC initiated internal institutional reform including formulation of the National Irrigation Policy (2010), National Irrigation Development Strategy (2010-2025), National Irrigation Act (2013) and National Irrigation Regulations (2014) and soon to be established National Irrigation Commission. The department is also planning to establish the National Irrigation Research and Training Centre.

3.3. Plenary discussion and feedback

Dr Simon Langan facilitated discussion to highlight further some of the issues raised in the presentations. One of the participants commented on the presentation by Ben Lukuyu on opportunities of integrating SSI with fodder production by noting that, from his experience, pastoralists move to irrigated areas (wet areas) during the dry season and hence the source of conflicts between farmers (cultivators) and pastoralists. He noted that the presentation on the integration of livestock feed and irrigated crops is only applicable for zero grazing systems and not pastoralists. He noted that the presentation highlighted an opportunity of which is a huge challenge to implement. He suggested that this could be a research front to be taken forward in the ILSSI project.

Another participant noted that the linkage between irrigation and fertilizer management or other agro-chemicals in the context of environmental issues (water quality) was not well discussed in the presentations. He noted that the drained water from irrigation schemes always pollutes water resources, because it is not treated before being released to steams or drained to low lands.

The same participant also noted the possibility of planting and integrating fodder trees (agro- forestry) in SSI especially along boundaries so that part of the trees could also be used as wood fuel on and above reclaiming land. The participant also noted the importance of managing catchments against over exploitation and degradation.

Another smallholder famer in one of the SSI schemes noted the need to include education and training programmes on best irrigation practices to smallholder farmers. He highlighted the fact that most farmers are ignorant of best irrigation practices of which are key to increased production, sustainable

and equitable utilization of water and land resource. He highlighted the immense benefits from the System Rice Intensification (SRI) technology that has led to doubling of their production with minimal application of irrigation water. Previously, they used to get 10 bags of rice per acre of which has now increased to 20-38 bags per acre on using SRI. The farmer learned of SRI from the FtF funded NAFAKA project in Morogoro region. He noted that their livelihood is tagged to irrigation due to the fact that they have only one rainy season, with irrigation assuring their production all year round. However, the participant noted several challenges they are facing including delay of agro-inputs reaching the farmers (after planting), lack of farm power to mechanize some of the manual operations in the rice and sugarcane SSI schemes, e.g. a need for combine harvesters, lack of appropriate infrastructure, especially electricity supply to enable efficient and cost effective pumping. He noted that they have several perennial rivers but the farmers cannot access the water due to inability to effectively pump the water from the rivers.

Another smallholder farmer also strongly supported SRI technology. She highlighted her success; rice production increased from 8 bags per acre in 2011 to current levels of 35-42 bags per acre. She highlighted how her life has been transformed, as she is now able to educate her child in the top of the range schools and has bought a motorbike. Previously, she was living in a deplorable state; barely producing enough for household consumption. The increased income from high rice yields through SRI has enabled her acquire more land (irrigated farms) on lease from neighbours. She is currently being consulted and outsourced as an extension agent on SRI to other neighbouring regions. However, she noted several challenges in SSI including research and knowledge on soil characterization including nutritive levels. Unfortunately, soil information in SSI is seldom known and hence farmers end up misusing fertilizers of which is detrimental to soil health. Thus, there is a need to roll out education and training programmes on use of fertilizer and other agro chemicals.

One of the participants noted the need of farmers to change their management practices and perceptions by collaborating with pastoralists. He highlighted a possible collaborative front where the farmers (especially rice farmers) could allow pastoralists to access the crop residues (fodder). The latter is usually burnt by the farmers, but could be used beneficially by the pastoralists. The farmers would benefit from the manure deposited on their farms and/or some agreed upon payment from the pastoralists. However, the participant noted that more research is required on the interaction between farmers and pastoralists.

Another smallholder farmer participant noted that some of the research findings have not been forthcoming and hence not helpful. He specifically noted previous research efforts and results on managing a certain rice pest that is prevalent under SRI production system. The farmer also contributed on the interaction between farmers and pastoralists by suggesting that, possibly, the government designate (gazette) grazing areas for pastoralists and avail all the necessary infrastructure including water. This will in effect reduce potential conflicts between pastoralists and farmers. However, he pointed several challenges in SSI including dilapidated infrastructure, need of mechanizing rice harvesting and post-harvest processing, including value addition. On marketing, he suggested the need to introduce and institutional the Warehouse-Receipt System that is currently being implemented for farmers producing maize. This marketing system enables the farmer to escape the inherent market pitfalls that are always instigated by middlemen traders.

Another participant noted the need to initiate and pilot fodder production in the country. The current production is relatively low. This idea was supported by other participants who noted that there used to be a fodder farm in Kahe District in Kilimanjaro region that specialised in producing Lucern. Unfortunately the farm is now part of a private farm, the Tanganyika Planters Company Ltd. The

participants noted the need to emulate other countries in the regions, e.g. South Africa, that has a high number of hectares under pasture.

Another participant noted the need to undertake more research on water resources, especially groundwater in meeting increasing irrigation needs in the country. There is a need to know the potential and extent of all relevant aquifers.

One of the participants noted that that the Government of Tanzania has already developed guidelines on managing irrigation schemes from design to operational aspects. Most of the irrigation schemes in the country do not have well-structured farmer organisations and are always facing management challenges, e.g. the Dakawa irrigation scheme. Thus, there is a need to emphasise the establishment of effective farmer organisation in irrigation schemes and train the farmers on key issues, including financial management.

One comment was on the need to train pastoralists on establishing irrigated fodder stocks. Most of the pastoralists go to the fields for grazing purposes, but also for cultural practices. They need to be taught on the potential and benefits of irrigated fodder. Otherwise, it will take a while before they can adopt such relatively new ideas.

In closing the discussion session, the facilitator noted that most of discussions on SSI were centred on interactions between pastoralists and farmers, adding value to commodities, mechanization, water resources management and training needs.

3.4. Group work sessions: Discussions and recommendations

3.4.1. Summary of group discussions

The last session before lunch time was group discussion of which four groups were formed to discuss four lead questions. Each group appointed a chair and a rapporteur, of which the latter reported back to the plenary as summarised in Table 1. Generally, it was agreed that the interventions should target the poor who are food insecure and women.

Table 1: Summary of all group discussions

Questions	Summary response from all groups
What are the key intervention areas that need to be focused on and what are the criteria for selecting the interventions?	• Performance and sustainability of small scale irrigation systems • Need assessment and sustainability of organized groups for irrigators • Group dynamics and conflict management between farmers and pastoralists in smallholder irrigation systems • Soil and water quality for smallholder farmers under irrigated systems • Economic assessment of groundwater use for irrigation in smallholder agricultural systems • Input and supply chain efficiency • Water resource management including reliable source of water i.e. water storage structures, water source conservation, integration with agroforestry, water use efficiency, conveyance systems, use of ground water in irrigation • Climate dynamics i.e. use of selected crops to withstand prevailing climatic conditions, integrated pests management under prevailing climatic conditions

	• Gender issues with the view to create gender balance • Past lessons from previous similar projects • Land tenure and governance systems • Markets and micro-financing • Social structures that enhance social cohesions and formations • Improvement of existing farming systems • Raise awareness on fodder irrigation, and allocate pilot areas to fodder production • Lining canals • Digging wells and promoting a variety of water lifting technologies • Farmer field school approach
What are the criteria for selecting sites for implementing such interventions?	• Evidence of poor management in a smallholder irrigation scheme • Potential of sustainability of an irrigator's organization (farmer organizations) • Evidence of decreased in soil and water quality due to poor farming practices • Little information on use or availability of groundwater • Accessibility to the site • Viable land tenure system • Demand driven i.e. the SSF should demand for the intervention • Evidence of ownership by the project beneficiaries • Existence of poor farmers in the area • Availability of sufficient land and water resource • Appropriate topography • Good governance within the farmers (no management conflicts) • The site should be in an area where it can be oriented towards being a farmer's field school.
What do we want to get from the interventions?	• Improved and increased production of food • Increase in income • Enhanced household food security • Alleviation of poverty
Which interventions are more beneficial in terms of: - **Nutritional aspects** - **Reaching and benefiting poor farmers** - **Reaching and benefiting women**	• Water lifting devices including Treadle pump, Rope and Washer, solar and wind turbine, small motor pumps • Farmer Field Schools • Increasing irrigation water use efficiency

3.4.2. Synthesis of key recommendations from the stakeholders

Suggested areas of interventions:

i. Further understanding of groundwater potential for use as a source of water to expand irrigation in Tanzania.

ii. Lifting technologies, ranging from traditional and simple practices of conveyance by bucket, rope and washer, treadle pumps through to diesel and solar pumps.

iii. Increasing capacity within practitioner community at grass roots, one specific example was farmer field schools

iv. Interventions that would explore and promote improved linkages between irrigation institutions such as irrigation organisations and water users associations.
v. Taking a more systematic approach to irrigation from inputs through to markets- a value chain approach.
vi. Investigating further the role of irrigation with respect to increasing resilience to climate change.
vii. Two specific interventions relating to specific crops/farming practices were discussed:
    i. Sustainable Rice Intensification (SRI)
    ii. Introducing irrigated fodder and the potential to reduce conflict between irrigation farmers and neighbouring pastoralists.

3.4.3. Criteria for intervention and site selection

i. Interventions should be discussed and agreed with willing communities to maximise potential for their adoption and longer term ownership.
ii. The sites selected should be accessible to allow frequent visits for both data collection but importantly so they can act as demonstration sites.
iii. The key objective and therefore criteria given by the stakeholders was to have sites that provided good pilot and demonstrable interventions.
iv. Interventions and sites should build on past experience (both positive and negative).
v. Something new

3.5. Group work assignment: Identification of implications for socio-economic and equity, sustainability and nutrition

The workshop participants were facilitated to undertake a learning and information sharing exercise on four thematic areas (issues) with regard to interventions in SSI. The objective was to define cross cutting issues that should be addressed in and across the interventions and to discuss how the interventions can enhance the status of these cross cutting issues. A 'bus stop' or 'helicopter' method was used for this activity. Each participant visited each of four stations and shared ideas on gaps or opportunities in the respective thematic areas. The issues included:

- Nutrition
- Environment
- Gender
- Socio-economic & institutions/governance

Below is a summary of some of the gaps and opportunities that were identified by the participants in each thematic area.

3.5.1. Nutritional issues

- SSI will increase both food and horticultural crops, which will increase nutritional security and diversification of crops
- SSI has the potential to increase availability of animal products, e.g meat, eggs and milk
- SSI has the benefit of increasing income and improving livelihoods, including in health

3.5.2. Environmental issues

- Most of the areas with SSI are affected by water logging, which leads to issues such as water borne diseases, e.g. malaria and bilharzia

- Many areas under SSI are currently affected by soil salinity and sodicity, often caused by poor irrigation practices, including drainage. This has led to loss of crop yields and a negative effect on smallholder livelihoods.
- There is an evident misuse/abuse of agrochemicals in SSI areas, as a result of lack of awareness. This has led to pollution of water resources in the areas.
- Soil erosion as a result of poor agricultural and livestock management practices has affected ecosystems in many parts of the country. For example, uncontrolled livestock keeping with high stocking rates has had a huge impact on water resources through land degradation in several parts of the country. Deforestation has led to opening new lands for irrigation and occasionally for firewood and destroyed ecosystem including goods and services.
- There has been reduction in environmental flows due to SSI.
- Water quality is a challenge in most SSI due to poor management practices and monitoring.
- SSI has led to encroachment on water sources, including wetlands.
- Abandoned irrigation infrastructure is a waste of resources with potential negative impacts, e.g. mosquitoes/malaria.
- Some SSI areas that use groundwater have recorded significant drawdowns of the water table.
- There is a risk of using GMO products in SSI areas.
- Reduction of water for downstream users when water is over used by upstream users.
- Elimination of dry-season die-back and creation of a micro-climate that is more humid that may lead to increased infestation of pests and plant diseases.

3.5.3. Gender issues

- Inequality in access and ownership of land (production resources), including rights to production, is a challenge given embedded social dynamics.
- Gender equity and representation in decision-making processes are a challenge, e.g. inequitable allocation of water for irrigation with women allocated water at odd hours.
- Some of the repair and maintenance works on infrastructure are not suited for women e.g. concrete works.
- SSI maintenance can add to the workload of women.
- There have been cases where all the produce from an SSI farm is equally distributed to a wife and husband. However, the husband is expected to provide for the family and it adds more burden on the male spouse.
- Most youth who are more enterprising do not have land rights that would allow them to take more risks in investing in the agricultural sector.
- Some women have children to take care of and SSI adds more burden on women.
- There is need to incorporate new technologies in SSI so that the farming enterprise can be interesting to the youth.

3.5.4. Socio-economic & institutional issues

- There seems to be successful pilot interventions. However, there is minimal effort to scale up such interventions. This is the purpose of the IDSS, a major product of the study.
- The current land tenure system is a constraint to meaningful investments. Most farmers do not have titles to their land and cannot use as collateral for lending institutions.
- There is apparent conflict between various policies notably in the Agriculture, Water and Land sectors.
- Some of the traditional SSI schemes have survived over time with meaningful impact. However, some of the modern irrigation schemes have not done well and have failed within a

short period. Thus, it would be useful for modern irrigation schemes to learn from the traditional SSI on how the latter have managed to survive over time.

- There seems to be a lack of institutional by-laws and/or disrespect of existing ones that govern SSI.
- Most farmers are not well versed on the importance of joining or forming respective farmer groups for collective bargain power or fronting of common ideals. However, the cost of registering organizations is a constraint to securing their legal status as required by law.
- There seems to be poor linkages between relevant institutions that provide backstopping services and the target farmers.
- Most of the grazing resources have been considered as a free resource and hence little effort to secure sustainability.
- Some of the projects have not been fully owned by the beneficiaries as expected. This is evident when such projects are called or known by the name of the funder, NGO or researcher who brought the project to the community.
- There has been conflict between small and large scale irrigators where a common water source is shared. This is more evident if the large scale irrigator is on the upstream with favourable access to the water resource; weak linkage between large and small scale irrigation farmers.
- The current water resource management plans allow for water use license of renewable 5 years. However, most of the investments have a longer life span, e.g 20 years for cost recovery. Thus, the time mismatch between the allowable period of water use license and investment schedules is a constraint to some of the potential investors in irrigation.
- Most of the SSI farmers grow cash crops, which are male dominated. This has an implication in the institutional set up with a possibility of disempowering women including decision making processes.
- There is a potential of increasing the workload of women. This is due to the fact that most of the farming activities are done by women and any increase or intensification of agricultural activities will directly demand more work from women.

3.6. Next steps after the workshop

Dr. Simon Langan shared the next steps to follow the workshop. The proceedings of the workshop will be prepared and shared with participants for comments before final circulation to all stakeholders. IWMI will then work closely with SUA to identify and select appropriate sites for implementing some of the suggested interventions. Thus, there is a need to initiate a process of prioritizing some of the interventions. One component of the project will be on training and training needs of different stakeholders at different levels should be assessed. Notably, there will be a training session in early 2015 on various modelling tools and application of the accompanying outputs in decision-making processes. Experts from Texas A&M will facilitate this model training session of which is relatively high level, i.e. targeting academicians and practitioners. However, there will be other capacity trainings sessions for other lower levels over time.

3.7. Evaluation of the workshop

All participants were invited to evaluate the workshop. In all, 22 participants submitted evaluations. Table 2 highlights the summary evaluation of the workshop.

Table 2. Evaluation summary

Component	% Good	% Do better
Format	91	9
Content	73	27
Logistics	77	23
Overall	73	27

The participants were also prompted to highlight any comments for possible improvement with respect to format, content, logistics and overall perspectives. Below is a summary of their comments.

Table 3. Comments to improve or change workshop

Comments on format	Comments on content	Logistics/venue	Overall
Not time conscious	Need to be reader friendly	Could do better by choosing a better venue	Could do better by printing evaluation forms
Could do better by allocating more time for discussion	Could do better by getting presentations from farmers	Time management	Could do better on language/translation
Not all understood the objectives of the breakout sessions	Could do better by allowing more time for discussion	Short time to read background paper	Introduction and purpose had to be clearly explained
	Could do better by doing more analysis on existing small scale irrigation	Adhere to time	
	Integrated water resources management should be discussed		
	More time to deliberate		
	Not all expected outputs were met		

3.8. Closure

Dr Langan and Prof Henry Mahoo closed the workshop with a vote of thanks.

Annex 1: List of participants

S/N	NAME	ORGANIZATION	JOB TITLE	EMAIL
1	Masakia, Nicholaus Jackson	Government-Morogoro	District Agriculture Eng. Irrigation	jmasakia@yahoo.com
2	Benafel, E. David	USAID/NAFAKA PROJECT	Deputy chief of party	dbenafel@nafaka-fy.org
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5	Kimaro, Anthony	ICRAF/ AFRICA RISING - Tanzania	Country representative	a.kimaro@cgiar.org
6	Chemka, Nyakamwe David	Zonal Irrigation and Technical Services	Principal Civil and Irrigation Engineer	Chmka20@yahoo.com
7	Kahimba, Cassian Frederick	Sokoine University of Agriculture	Senior Lecturer	kahimbafcs@yahoo.com
8	Kaiza, John Richard	Nafaka –Morogoro	Irrigated Rice Specialist	Richard.kaiza21@gmail.com
9	Minja, Gadiel M.	TALIRI –West Kilimanjaro		lrcwestkili@yahoo.com
10	Mjema, Elieza Herieli	Same District Council	District Subject matter specialist	herielimjema@gmail.com
11	Tarimo, Prof. Andrew	Sokoine University of Agriculture	Professor	andrewtarimo@yahoo.com
12	Samwel, Rizaeli Mmgugu	Same DC	Champion farmer	
13	Kigadu, Said Muhidini	Kiroka – Farmer	Farmer	
14	Hosseni, H. Mwanaidi	Mkindo	Farmer	
15	Ntoga, L. Meshack	Buigiri	Farmer	
16	Magwila, Christina Floliani	Chita Kilombero	Farmer	
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19	Tumbo, Donald Siza	SUA	Professor	siza.tumbo@gmail.com
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			unit lead	
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25	Mwita, Macha Lucia	MLFD	Principal Livestock Officer	Gaticha2006@yahoo.com
26	Rwehumbiza, Bartazar Filbert	Sokoine University of Agriculture	Professor	Rwehumbizaf2002@gmail.com
27	Massoro, M. Erasto	Care International (TZ)	Project Field Coordinator	Erasto.massoro@co.care.org
28	Lukuyu, A. Ben	ILRI, Nairobi	Scientist	b.lukuyu@cgiar.org
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31	Hall, Chris	CDM SMITH	Irrigation Head	
32	Nakawura, Prossie	IWMI	Post-doctoral Fellow	p.nakawura@cgiar.org
33	Clarke, Neville	TAMU	Project leader	n-clarke@tamu.edu
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Annex 2: Workshop programme

SESSION I:	**Welcome and Introductions (Chair: Henry Mahoo)**	**Speaker**
9:00-9:10	Welcome & Opening Remarks, Context of the meeting and Workshop format	Henry Mahoo
9:10-9:15	Roundtable introductions (at each table)	Henry Mahoo
9:15-9:25	Objectives of the workshop - Project overview	Simon Langan
9:25-9:55	Paper presentation: Irrigation for Small-Scale Farmers in Tanzania: Research Gaps and Needs	Frederick Kahimba
9:55-10:05	Opening address by Guest of Honour	Guest of Honour
10:05-10:20	Questions and Discussion	All
10:20-10:50	**PHOTO SESSION & COFFEE BREAK**	**ALL**
SESSION II:	**Highlights on Interaction between water resources, irrigation and livestock (Chair: Henry Mahoo)**	
10:50-11:05	Presentation by Irrigation Department: Challenges and opportunities in irrigation	Director of Irrigation
11:05-11:20	Presentation on interaction of Small Scale Irrigation and Livestock	Ben Lukuyu
11:20-11:50	Questions and discussion	ALL
SESSION III:	**Group Discussions (Chair: Simon Langan)**	
11:50-12:50	Group discussions	
12:50-13:30	Group report back	
13:30-14:20	**LUNCH BREAK**	
Session III:	**Group Discussions (Chair: Simon Langan)**	
14:20-15:20	Group Discussions	
15:20-16:00	Group report back	
16:00 – 16:15	**COFFEE BREAK**	ALL
16:15-16:40	**WAYFORWARD** Summary of the discussions and next steps and closure	Simon Langan
	Closing Remarks	Henry Mahoo

Annex 3: Opening address: FtF Innovation Lab for Small Scale Irrigation: Tanzania

Eng. Raphael L Daluti - Deputy PS, Ministry of Agriculture, Food Security and Cooperatives (MAFC)

Chairperson of this Stakeholder Consultation Workshop;

Workshop Facilitators;

Participants;

Ladies and Gentlemen;

I feel honoured to be here for this very important one-day consultation with national stakeholders on the Small-scale Irrigation cooperative research Project. I am told that this gathering bring together the stakeholders towards sharing prior research on small-scale irrigation and irrigated fodder production, as well as prioritizing with stakeholders the research on the potential interventions in our country that will contribute to increase food production, improve nutrition, protect the environment and accelerate economic development through improved access to small-scale irrigation technologies.

I take this opportunity to express my sincere gratitude to the Facilitator and other partners who enabled the establishment of this forum.

Agriculture is the mainstay of the Tanzanian economy contributing about 24.1 percent of GDP, 33 per cent of export earnings and employs about 75 percent of the total labour force, many of whom are women. The sector remains the single highest ranking employer in the country though its share in GDP has, in recent years, showed a declining trend in favour of recent emergence of the new high-growth sectors of mining and tourism. In the medium term and long-term horizon, agriculture will continue to play a central role in Tanzanian's economy.

Tanzania is endowed with huge arable land area estimated at 44 million ha. The current cultivated area is estimated to be 10.8 million hectares or 23% of the arable land. The area under irrigation is further estimated at 461,326 hectares (MAFC, June 2014) out of the irrigable potential of 29.4 million hectares (NIMP, 2002).

Agricultural production in Tanzania is still dominated by small-scale farmers cultivating plots typically ranging from 0.2 hectares to 2 hectares each, employing poor production technologies as characterised by:

- Heavy reliance on rainfed production and suffers from the inadequacy, seasonality, and unreliability of rainfall;
- The type of farm power used for which about 62 % of farming being dependent on the hand hoe; 24 % on ox-plough, and 14 % on tractors;
- Low crop yields ;
- Production level mostly being subsistence level;

Although irrigation is considered necessary to mitigate climate constraints and to stabilize agricultural production and ensure local food security its systems have not been extensively developed. As a result of high reliance on rainfall for food production and little use of the huge potential for irrigation, the country is highly vulnerable to the vagaries of weather.

This, notwithstanding, the sector has been identified as a growth driver. Thus, given its role in supporting the rural poor and in reducing malnutrition, agriculture has the potential of lifting many of the poor out of poverty. Moreover, increased food demand in neighbouring countries provides further opportunities for agriculture to expand and increase exports to these countries.

The Government has been putting emphasis on the development of irrigated agriculture through various interventions using its own resources and with support from Development Partners. The Government has been working on creating favourable Policy environment through formulation of various National Policies, Plans and Strategies which are strongly recognizing the importance of irrigated agriculture towards the increase in food security and enabling agricultural contribution to catalyse the economic growth at both household and National levels. The policies include: the Tanzania Development Vision (TDV) 2025; the National Strategy for Growth and Reduction of Poverty-NSGRP (MKUKUTA) II; the Millennium Development Goals (MDG) 2015; the National Irrigation Master Plan (NIMP) 2002; the National Irrigation Policy 2010, which provides the direction for irrigation interventions to contribute effectively towards food security and poverty reduction; the National Five Year Development Plan 2011/2012 – 2015/2016; the Agricultural Sector Development Strategy (ASDS) 2001 and ASDSII (now being finalized); the Agricultural Sector Development Programme (ASDP) 2006 and ASDP II (also being finalized now); and the Public Private Partnership (PPP) Policy 2009 which provides an opportunity for the Public and Private Sectors to collaborate in agricultural development through the entire value chain. To foster the implementation of the above national strategies, in 2009 the government officially launched the KILIMO KWANZA initiatives to provide more impetus in the development initiatives of the agricultural sector in the country. The Tanzania Food Security Investment Plan (TAFSIP), the Southern Agricultural Grow Corridor of Tanzania - SAGCOT have been initiated to complement speedy implementation of the ASDP. The reforms aim to creating an enabling environment for ensuring household food security, improving agricultural productivity, profitability, farm income and alleviating rural poverty. These initiatives will lead to the re-orientation of approaches for public-private partnership in the development of the sector focusing on scaling up investment as a move towards modernizing small, medium and large scale farming for increased productivity and profitability, promotion of off-farm activities with particular emphasis on agro-processing.

The Government recently (2013) launched the Big Result Now (BRN) initiative during which the Agricultural sector is one of the seven priority sectors identified to be addressed for accelerated development. Furthermore the National Agricultural Policy 2013 was launched to provide guidance in the sector development under the new regime of reforms.

The Government's strategy on irrigation development stresses on attainment of national food security, increased productivity and profitability in agriculture. In this context the government has placed priority on the following interventions when viewing irrigation development:-

- Improvement of existing traditional irrigation schemes and construction of new ones especially in the high development potential areas;

- Improvement of irrigation schemes based on water harvesting technology in climatically marginal regions in the country;
- Construction of small, medium and strategic large scale dams for irrigation development;
- Exploitation of ground water for irrigation development in areas rich in ground water; and
- Promotion of water saving technologies such as sprinkler, drip irrigation systems coupled with use of renewable energy sources like wind power and solar power for pumping water for irrigation.

The existing irrigation infrastructure in most of irrigation schemes in Tanzania is still poor and inappropriate causing the overall low water use efficiency. The irrigation practice in Tanzania is characterized by:-

- Reliance on the run–off–river water abstractions for gravity-fed irrigation schemes, hence highly susceptible to climate change effects on rivers and stream flows thus affecting the optimal availability of water resource for crop production;
- Low irrigation water use efficiency;
- Weak farmers organizations; and
- Irrigated agriculture dominated by smallholder farmers whose knowledge in irrigation water management and capacity to afford efficient irrigation water use technologies is low.

The challenges encountered while implementing irrigation development in Tanzania which needs to be addressed so that the country could move forward in addressing food security and poverty reduction more effectively while ensuring sound and sustainable water management practices includes:-

- Low or minimal investment in irrigation research;
- Inadequate investment for irrigation infrastructure development both by public and private sector including smallholder farmers;
- Inadequate investment in water storage infrastructure;
- Inadequate number of irrigation professionals;
- Low or minimal use of ground water;
- Low use of modern and appropriate water saving technologies; and
- Climate change causing adverse effects on the optimal availability of water resource for crop production.

The Government has prepared the National Irrigation Act No 5 of 2013 to provide for the establishment of an Institutional set up (the National Irrigation Commission) to effectively oversee irrigation development in the country. The act also provide for coordinating research on irrigation and drainage for improving the hydraulic performance of irrigation infrastructure for effective water management and enhanced crop production and productivity.

Technologies to improve the water use at field level by modernizing/improving irrigation system infrastructure along with proper water management is necessary for boosting the water use efficiency. Water saved from these initiatives can be allocated to other productive sectors of the economy including meeting the needs of the ecosystem.

It is my hope that the Small-scale Irrigation Cooperative Research Project will effectively contribute towards development of technologies for addressing some of the challenges currently faced by irrigation subsector in Tanzania. May I assure you that Government will be committed to work on recommendations from the Irrigation Cooperative Research Project.

After sharing these few words, it is now my honour and privilege to declare that this Stakeholders Consultation is officially opened.

THANK YOU FOR YOUR KIND ATTENTION

Annex 4: Presentation

Promising small-scale irrigation interventions in Tanzania: Research gaps and needs

Mahoo, H.F., Tumbo, S.D., Kahimba, F.C. - (SUA)
Kongo, V. - (UDSM)
Lukuyu, B – (ILRI Kenya)

ILSSI Project Stakeholders Workshop
Morogoro Hotels, Morogoro, Tanzania.
26th August 2014

PRESENTATION OUTLINE

- Introduction
  - Objectives
  - SSI in Tanzania, successes and challenges
- Relevant National Policies, Plans, and Programmes
- Irrigation Development in Tanzania
- Irrigation Research in Tanzania
- Research Gaps
- Proposed Research Themes

ILSSI Project Objectives

Main Objective:

- To identify, test, and demonstrate technological options in small-scale irrigation and promote dialogue among stakeholders

ILSSI Specific Objectives

- Identify promising small-scale irrigation technologies
- Demonstrate and assess feasibility of solutions
- Develop context-specific technological and strategic recommendations, and
- Train agricultural development students and professionals

INTRODUCTION

Objectives of the review paper

- Review previous experiences and lessons from research projects with the view to identify key research issues in small-scale irrigation (SSI)
- Review relevant policies, plans and legal/institutional framework related to SSI
- Highlight research gaps and needs
- Suggest promising small-scale irrigation interventions in Tanzania

INTRODUCTION

Agriculture in Tanzania:

- Largest sector in the economy (37% of GDP)
- Largely dependent on smallholder production (70% of people earn their living)
- Has relevant National Policies and Programmes
- About 17 million people (42.5%) live below the poverty line of US$ 0.65 per day

INTRODUCTION: Irrigation potential

- About 44 out of 94.5 million ha in Tz is classified as suitable for agriculture
- 23% (10.1 million ha) is cultivated
- Tz irrigation potential 29.4 million ha (NIP 2009).
  - 2.3 million ha high potential; 4.8 million ha medium potential and 22.7 million ha low potential (JICA 2002, NIP, 2009).
- Smallholder farming system dominates the agricultural sector in Tanzania (82%)
- But, small scale irrigation (SSI) is not performing very well.


Headwork – Ruaha mbuyuni
Good performing SSI
• Good headwork
• Properly lined canals
• Well planned and yielding fields
• Well constructed dams
Mbuga Nyekongu - Karatu
Fields - Lower Moshi (LMIS)
Good performing SSI…
Ochuna dam - Mara
Mvumi – Morogoro
Mabogini - Moshi
Good performing SSI…
Mkindo - Mvomero
Challenges on SSI
Costly infrastructures
Other users - Misuse?

Performance of SSI

- Small Scale Irrigation accounts 82%
- Some performing poorly due to:
  - Management challenges
  - Technical challenges
  - Policy issues
- Smallholder irrigation technologies has the potential to address some of the challenges

Irrigation development in Tanzania

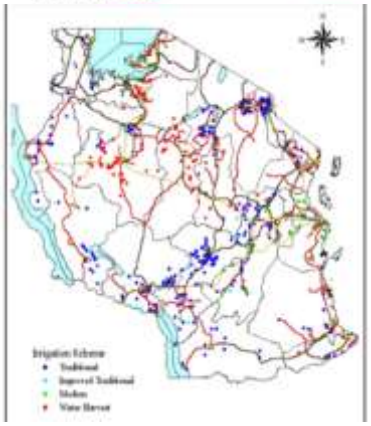
Main goal (MAFC - NIP):

- To ensure that the nation attains reliable and sustainable agricultural production for food security and poverty reduction (URT, 2009)

Inventory of schemes by type of irrigation

Type of Irrigation	No. of Schemes	Existing Area (ha)	Estimated Total Area (ha)
Existing Schemes	1,189	191,900	670,400
Traditional Irrigation	982	122,600	518,700
Water Harvesting	42	7,900	27,600
Modern Irrigation	52	35,900	73,800
Improved Traditional Irrigation	113	25,500	50,300
Newly Proposed Schemes	239	-	183,900
Water Harvesting	163	-	123,100
Modern Irrigation	76	-	60,800
Total	1,428	191,900	854,300

Source: URT, 2002b



Irrigation schemes in Tanzania (Source: MAFC, 2002)

Challenges...

Traditional irrigation schemes:

- Population increases
- Infrastructural wear and tear
- Catchment degradation
- Other environmental problems such as waterlogging and salinity.

Main irrigation canal (unlined) with poor maintenance

NATIONAL POLICIES AND PROGRAMMES (With small-scale irrigation issues)

- The National Agricultural Policy (1983),
- The National Land Policy (1995),
- Agricultural and Livestock Policy (1997)
- The National Environmental Policy (1997)
- The National Water Policy (NAWAPO, 2002)
- The National Irrigation Policy (URT, 2009)

Legal and institutional frameworks

Acts have been enacted that sets instruments for implementation of various policies and programmes in:

- Irrigation
- Water Resources Management
- Land resources
- Environmental management

Strategies and Plans

Provides the framework and enabling environment for achieving objectives and targets.

- Agricultural Sector Development Strategy (ASDS 2001)
- "Kilimo Kwanza" (Agriculture first)
- The Big Results Now (BRN)
- Southern Agricultural Growth Corridor of Tanzania (SAGCOT)
- National Irrigation Development Plan (NIDP)

Challenges (as per NIMP)

Smallholder Irrigation:

- Lack of appropriate participatory approaches
- Unsound logical structure of projects and weak linkage between purpose and output of projects
- Misunderstanding of the concept of "simple and low-cost technology", taken to mean "easy and no concern of technical know-how and understanding"

Programmes and Projects

For enhancing agricultural development and meeting the set objectives and targets.

- River Basin Management and Smallholder Irrigation Improvement Project- RBMSIIP (1990-96/97)
- Traditional Irrigation and Environmental Development Organization-TIP (1997/98-2005)
- Participatory Agricultural Development and Empowerment Project - PADEP (1997/98-2005)
- National Irrigation Master Plan - NIMP (2002)
- Agricultural Sector Development Programme- ASDP (2006-2015)
- Participatory Irrigation Development Programme-PIDP (2007)

Past Irrigation research and their challenges

- Have demonstrated the importance of irrigation systems in enhancing rural agricultural production
- Most of them were uncoordinated
- Most irrigation efforts Tanzania have focused on production of high value food crops, especially vegetables and rice
- MAFSC 15-year irrigation research plan will assist in coordinating research

Current Irrigation research (examples)

- Integrated salt affected soils (SAS) management options for sustainable rice production in selected irrigation schemes in North and Eastern Tanzania (under iAGRI)
- Enhancing Climate Change Adaptation in Agriculture and Water Resources in the Greater Horn of Africa (ECAW)
- Development of a precision irrigation control system for horticultural food crops in Tanzania
- Effect of irrigation regimes on yield and quality of grapes
- Innovative drip emission devices for resource poor farmers under changing climate
- Investigation of the performance of SRI and Rodent Ecology and Prevalence of Zoonotic Diseases under SRI Traditional Rice Growing Systems in Tanzania

Lessons from policies and programmes

- The NIP and its Act are all supportive of irrigation development and SSI in the Tanzania
- Introduction of *water user permit* by NAWAPO has affected the traditional water access rights of smallholder farmers
- Some policies have conflicting statements with regard to smallholder irrigation
- The need for policy harmonisation amongst sectoral policies and policy instruments
- Need for better institutional arrangements on links between smallholder farmers and private investors (e.g. PPP)

Areas for further studies from Policy reviews

- Traditional water rights, water pricing, and catchment conservation
- Review of conflicting policies such as the National Water Policy and the National Land Policy
- Institutional arrangements due to transformation of various initiatives and programmes e.g. BRN, Kilimo Kwanza, SAGGCOT

Recommended research themes

- Technologies for improved productivity and sustainable water management
- Strengthened policies and institutional framework

Sub-themes on technologies for improved productivity:

1. Evaluation and improvement in productivity of irrigation water
2. Mechanical and drip irrigation systems for high value crops
3. Evaluation and improvement of utilization and efficiency of irrigation water
4. Water application technologies.

Sub-themes on technologies for improved productivity....

5. Land management practices for controlling rainfall runoff and soil erosion
6. Managing rainwater for plant growth and environmental conservation, and
7. Assessment on the use of groundwater for irrigation.

Sub-themes on policies and institutional framework

1. Tools for sustainable management and utilization of water resources,
2. Assessment of policies and institutional dynamics in irrigation and water resources management, and
3. Research in irrigation value chain development.

ACKNOWLEDGEMENTS

USAID FROM THE AMERICAN PEOPLE
THE BORLAUG INSTITUTE
IFPRI INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
IWMI International Water Management Institute
TEXAS A&M AGRILIFE RESEARCH
THE TEXAS A&M UNIVERSITY SYSTEM
ILRI
NORTH CAROLINA A&T STATE UNIVERSITY

Annex 5: Presentation

Feed the Future Innovation Lab for Small-Scale Irrigation:
Irrigated Fodder in Tanzania - Research Gaps and Needs

Ben Lukuyu and Alan Duncan, ILRI

Stakeholder Consultation Workshop, Morogoro, Tanzania
26th August 2014

USAID IWMI ILRI ILRI CGIAR

Let's talk about fodder....

The Problem

- Meeting year round feed quantity and quality requirements for livestock producers in much of Tanzania is a big challenge.
- Overall, livestock keepers meet only about 55% of their livestock feed requirements
- Inadequate quantity and quality of feeds fodder is aggravated by strong seasonal variations resulting in seasonal feed availability.

A map of Tanzania showing livestock only and rainfed crop-livestock production systems in Tanzania

A map of Tanzania showing livestock only and rainfed crop-livestock production systems in Tanzania

Past research

- Various research works have demonstrated the importance of irrigation systems in enhancing rural agricultural production
- This research mainly focused on food crops.
  - Irrigation has improved yields and has led to a shift by most farmers to production of high value crops (Mowo, et al, 2002).
  - Irrigation has enabled income increases through the multiple cropping seasons and higher prices fetched in the dry season (Mkavidanda and Kaswamila 2001)

Past research

A literature review shows no current research work focused on improved irrigated forages

So, what is the major gap?

What are the opportunities?

- Take advantage of existing emphasis on growing food crops under irrigation systems to enhance feed production:
  - Exploiting the use of food and feed crop varieties in these systems:
    - E.g. irrigated cereal and root/tuber crop production offers an opportunity for fodder production (crop residues).
    - Hence need to evaluate and recommend the basic productivity components of these crops within these systems.

What are the challenges?

- A major challenge is that the adoption of these technologies has remained low primarily. What are the issues?
  - Capital (costs)?
  - Poor access to inputs and services?
  - Labour?
  - Land?
  - Knowledge?
  - Other?

Opportunities (2)

- Integrate improved forages in mixed crop-livestock systems:
  - fodder banks,
  - use of boundaries,
  - Intercropping
  - dedicated plots in crop dominated irrigation systems to produce fodder for livestock

Challenges (1)

- Other challenges include
  - Water-logging due to irrigation (potential for fodder that withstand water-logging)
  - Labour shortage (competition between crops and forages)
  - Unreliable market for vegetables and other high value crops (market pull for sustainability).

Opportunities (3)

- To help alleviate seasonal feed shortages some of the strategies might include:
  - fodder conservation
  - fodder trading (strongly linked to irrigation)
  - Improved utilization of locally available feed resources

The Key Messages

Opportunities (4)

- The '*vinyungu system*' has enabled farmers to increase the production of cash and food crops (high value crops)
- Vinyungu is a Swahili word > a valley bottom dry period farming practice > farmers harness water from rivers and or springs for subsistence irrigation.
- Introducing fodder ' in the upland areas where the 'vinyungu system' is practiced.
  - Control erosion and maintain soil fertility.
  - Produce animal feed

better lives through livestock

ilri.org

Annex 6: Presentation

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF AGRICULTURE FOOD SECURITY AND COOPERATIVES

NATIONAL IRRIGATION COMMISSION

CHALLENGES AND OPPORTUNITIES IN IRRIGATION SECTOR

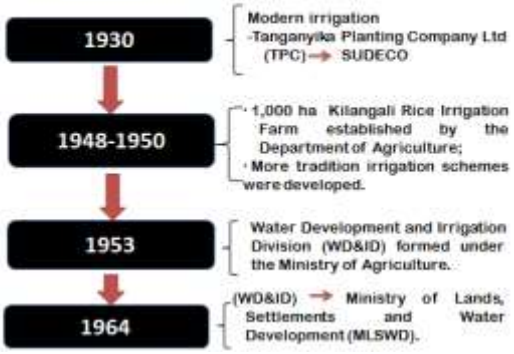
Eng. Seth P. Luswema
Ag. DITS

26 August 2008

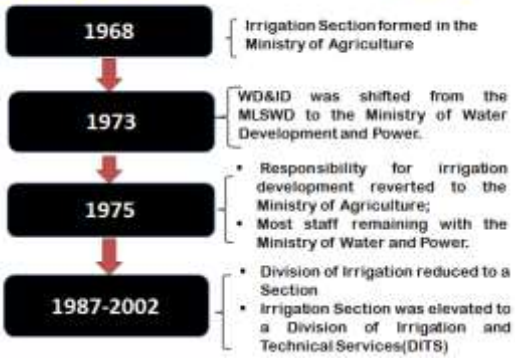
❑ Contents

- ❑ Introduction
- ❑ Irrigation overview in Tanzania
- ❑ Challenges Facing Irrigation Sector
- ❑ Irrigation Sector Reform
- ❑ Opportunities For Irrigation Development

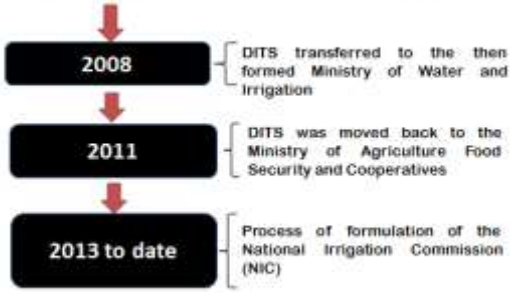
❑ Introduction



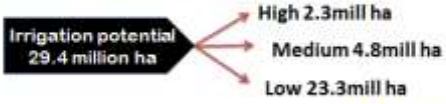
❑ Introduction cont....



❑ Introduction cont....



❑ Irrigation overview in Tanzania



- Current developed irrigation area 461,326 ha
- Water resources: total renewable (actual) 96.3 (10^9 m3/yr)
- Water resources: total renewable per capita (actual) 2,512 (m3/inhab/yr)
- Agricultural water withdrawal 4.63 (10^9 m3/yr) which is 89.4% of the total renewable.

❑ Challenges Facing Irrigation Sector

- Inadequate funding for irrigation investments;
- Low capacity and participation of private sector in irrigation development;
- Inadequate storage of water for irrigation development;
- Low production and inefficient marketing systems to absorb the produce from irrigation farming;
- Inadequate institutional capacity with respect to planning, implementation and sustainable management of irrigation development in Tanzania;

Challenges Facing Irrigation Sector

- Inadequate funding for irrigation investments;
- Low capacity and participation of private sector in irrigation development;
- Inadequate storage of water for irrigation development;
- Low production and inefficient marketing systems to absorb the produce from irrigation farming;
- Inadequate institutional capacity with respect to planning, implementation and sustainable management of irrigation development in Tanzania;

Challenges Facing Irrigation Sector cont...

- Inadequate capacity of institutions at Local Government Authority level (LGA) to handle irrigation investments, implementation and sustainable management;
- Inadequate database for irrigation development;
- Low irrigation water use efficiency;
- Ineffective and inefficient control of irrigation water which limits the application of the principles of Water Markets and Socio-Economic Mobility of Water use permit;
- Inadequate proper agricultural land use and management plans;

Challenges Facing Irrigation Sector cont...

- Inadequate irrigation research and technical innovations;
- Low level of irrigation skills of the farmers;
- Inadequate farm power for various farm operations;
- Inadequate attention to drainage;
- Competing demand for water with other users such as Hydropower, domestic use, livestock and wild life); and
- Changes in river flow patterns as a result of catchment degradation and climatic changes.

Irrigation Sector Reform in Tanzania

National Irrigation Development Strategy

Vision Statement

To be sustainable and dynamic irrigation sector that has developed irrigation and drainage infrastructure which enables efficient utilization of water and exploiting the vast irrigation potential area in the country for crop growth in highly productive, modernised and commercial irrigation schemes

Mission Statement

To facilitate a participatory demand driven irrigation development through Integrated Water Resources Management in developing irrigation and drainage infrastructure to enhance water use efficiency and increased crop production and productivity in irrigation schemes.

OBJECTIVES

- Provide a framework through which the objectives and policy statements of the National Irrigation Policy, 2010 shall be implemented by all relevant institutions and stakeholders to attain the vision and mission stated in the policy.
- The National Irrigation Development Strategy is designed to cover the period from 2010 to 2025 whereas 450,000 hectares are expected to be developed for irrigation in line with the NIMP targets of developing 30,000 hectares per annum. This will bring up the cumulative developed area for irrigation in the country to 760,700 hectares by 2025.

Strategies Framework

- Investment for irrigation development in Tanzania;
- Management of Irrigation Schemes;
- Irrigation Research and Development;
- Promotion of Appropriate Technologies in Irrigated Agriculture;
- Production and Productivity in Irrigated Agriculture;
- Agriculture Training and Human Resources Development;
- Institutional Capacity Development.

Investment of irrigation development

Unimproved Tradition Irrigation Scheme

- Identify and quantify investment requirements for traditional irrigation schemes using the Comprehensive Guidelines for Irrigation Development under DADPs;
- Establish sources of funding;
- Prepare a participatory investment plan for improvement of traditional irrigation systems;
- Involve stakeholders in the implementation of the investment plan;
- Provide training to both farmers and technical staff in the operation and management of the traditional irrigation schemes; and
- Assist beneficiaries to get organized into irrigators organizations.

❑ Investment of irrigation development

Improved Tradition Irrigation Scheme

- undertake appraisal of the performance of improved irrigation schemes;
- establish sources of funding in consideration of cost sharing
- establish and strengthen farmers organizations;
- prepare a participatory rehabilitation plan which will ensure operation of the schemes at full capacity;
- establish a mechanism that could attract private sector investors to participate in the operation and management of improved irrigation schemes;
- provide training to both farmers and technical staff in modern farming practices, operation & maintenance and management of improved irrigation schemes.

❑ Investment of irrigation development

Unimproved Rain Water Harvesting Irrigation Schemes

- Identify investment requirements for water harvesting irrigation schemes using the Comprehensive Guidelines for the Development of Irrigation Schemes under DADPs;
- prepare a participatory investment plan for improvement of water harvesting irrigation schemes;
- Establish funding mechanisms;
- Establish and strengthen farmers organizations;
- Create awareness for the beneficiaries to contribute in the improvement of water harvesting irrigation schemes;
- Involve stakeholders in the implementation of the investment plan;
- Provide training to both farmers and technical staff in the operation and management of water harvesting irrigation schemes systems.

❑ New Smallholder Irrigation Scheme

- mobilize different sources of funding including contributions from beneficiaries;
- carryout accurate and exhaustive mapping and demarcation of potential areas;
- support the development of new irrigation schemes with a focus on diversified cropping;
- prepare a participatory implementation plan;
- Assist the process of mobilization and organization of the smallholder farmers;
- Undertake training on irrigation skills and techniques for irrigators;
- Create awareness on participatory, demand driven and cost sharing mechanisms for new smallholder farmers;
- support in the management of newly developed smallholder irrigation schemes.

❑ Existing Commercial Irrigation Schemes

- Establish irrigation funding mechanisms;
- Develop surface explore groundwater resources and water saving technologies for adequate irrigation water supply;
- Develop irrigation and marketing infrastructure to leverage investment; and
- Establish appropriate out-grower models.

❑ Management of Irrigation Schemes

Management of Traditional and Rainwater Harvesting Irrigation Schemes

- strengthen the capacity of irrigators' organizations for effective monitoring and management of irrigation schemes;
- institute a legal framework that will require all farmers owning land in an irrigation scheme to be members of the irrigators' organization;
- institute a mechanism that will enable IOs to prepare constitutions and bylaws and their effective enforcement;
- institute mandatory formal transactions on transfer of land from one farmer to another in an irrigation scheme for openness and transparency pertaining to the responsibility for operation and maintenance of the irrigation infrastructure.

❑ Management of Traditional and Rainwater Harvesting

- Establish a mechanism for service providers in the private sector to provide services for management of irrigation infrastructure where farmers have demonstrated inadequate capacity; and
- Establish mechanisms for effective representation of scheme management systems into river basin management sub-systems

❑ Management of Irrigation Schemes cont..

Management of Large Scale irrigation schemes

- Strengthen irrigators organizations and provision of training to farmers;
- Undertake transitional measures by providing competent staff to form Scheme Management Support Teams (SMST);
- Institute Public Private Partnership (PPP) arrangement for effective Operation, Maintenance and Management of irrigation schemes;
- Monitor private investors in large commercial irrigation schemes to ensure that they abide by the prevailing contractual agreements and propagate the benefits of their existence to the out-growers.

❑ Management of Large Scale irrigation cont..

- Set a mechanism for public institutions such as the National Service, Prisons and Seed Farms to propagate the benefits of their existence to the out-growers

❑ Irrigation Research and Development

- Recruit staff and provide training, equipment and facilities;
- Identify irrigation research activities and prepare an action plan;
- Solicit and provide adequate funding;
- Document research findings and disseminate to targeted users;
- Establish mechanism for linkage and coordination of all types of irrigation research by various stakeholders nationally and internationally;
- Establish a National Irrigation Research and Training Centre.

❑ Promotion of Appropriate Technologies in Irrigated Agriculture

- Identify, compile and adopt available technologies, practices and innovations;
- Provide financial and technical support on urban and peri-urban irrigated agriculture where water harvesting from roof tops, treated waste water and appropriate technologies can be used;
- Provide training to irrigators on appropriate technologies in irrigated agriculture;

❑ Promotion of Appropriate Technologies in Irrigated Agriculture

- undertake awareness creation and training on appropriate and improved technologies, practices and innovations to irrigators;
- establish and strengthen collaboration and networking with national and international irrigation based institutions such as UDSM, SUA, ATC, ICID, ARU, UDOM, IRRI, IWMI, IPTRID, INPIM to mention a few for promoting irrigation technologies.

❑ Production and Productivity in Irrigated Agriculture

- Provide financial and technical support for effective irrigation extension services;
- Provide training on appropriate land use practices; water management; irrigation and agronomic practices; and integrated pest management practices;
- Facilitate availability of credit services for enhancing irrigators' purchasing power;
- Provide training, financial and technical support for irrigation of strategic food crops, a wide range of horticultural crops, industrial crops, pasture and integration of livestock and fisheries farming in irrigation development.

❑ Production and Productivity in Irrigated Agriculture

- Sensitize farmers on the use of appropriate farm implements and agricultural inputs;
- Obtain and disseminate appropriate research findings on new and appropriate technologies;
- Sensitize irrigators on the production of high value crops; and
- Establish improved marketing systems in terms of infrastructure development, storage, crop processing, and market linkages.

❑ Training and Human Resources Development

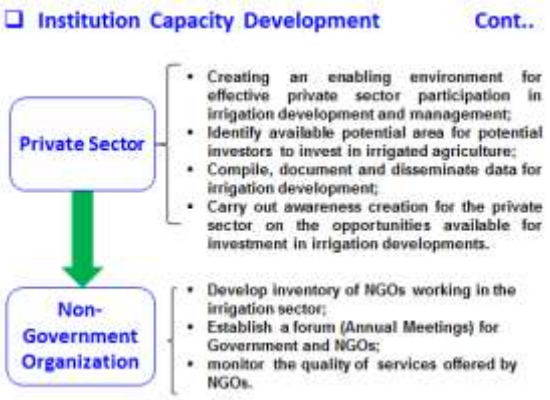
- establish effective collaboration with training institutions in issues pertaining to irrigation development;
- identify shortfalls in institutions related to irrigation training;
- provide financial support to strengthen the institution which includes inter-alia support for training adequate number of qualified graduands in the field of irrigation;
- collaborate in the preparation of curricula;
- provide appropriate short and long term in-service training to irrigation staff.

❑ Training and Human Resources Development

- Recruit adequate number of qualified staff at all levels to oversee irrigation development in Tanzania;
- Establish effective collaboration and networking with national and international professional institutions related to irrigation development;
- Establish fora for sharing knowledge and experience including conferences, workshops and exhibitions (Irrigation Day).

❑ Institution Capacity Development


Institution Capacity Development cont...
Local Government Authorities
• Establish an irrigation development department at the district level
• Provide adequate and timely funding, equipment and facilities
• Establish Irrigation Scheme Management Support Teams (SMST).
IO/Irrigators
• Formulation, registration and strengthening of IO for effective implementation and management of irrigation schemes;
• Having irrigators with adequate knowledge and keen on their roles and responsibilities.


Institution Capacity Development Cont..
Private Sector
• Creating an enabling environment for effective private sector participation in irrigation development and management;
• Identify available potential area for potential investors to invest in irrigated agriculture;
• Compile, document and disseminate data for irrigation development;
• Carry out awareness creation for the private sector on the opportunities available for investment in irrigation developments.
Non-Government Organization
• Develop inventory of NGOs working in the irrigation sector;
• Establish a forum (Annual Meetings) for Government and NGOs;
• monitor the quality of services offered by NGOs.


Thank you!!!
Karibu Tanzania