



**REPORT ON THE  
AFRICAN UNION–EUROPEAN UNION  
REGIONAL WORKSHOP ON IRRIGATION FARMING  
FOR SMALL AND MEDIUM SCALE FARMERS  
NOVEMBER 18-20, 2003  
LE MERIDIEN CAPITAL HOTEL,  
LILONGWE, MALAWI**



African Union  
Regional Office for Southern Africa  
P.O. Box 30898  
Lilongwe 3  
Malawi  
Tel. +265 1 775 335  
Fax. + 265 1 775 300  
e-mail: [ou-saro@malawi.net](mailto:ou-saro@malawi.net)

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## ACRONYMS AND ABBREVIATIONS

%	Percentage
AIDS	Acquired Immuno-deficiency Syndrome
AU	African Union
EDRP	Emergency Drought Recovery Programme
EU	European Union
FAO	Food and Agricultural Organisation
FARA	Forum for Agricultural Research in Africa
GDP	Gross Domestic Product
GoM	Government of Malawi
Ha	Hectares
HIV	Human Immuno-deficiency Virus
IFAD	International Fund for Agricultural Research
IFPRI	International Food and Policy Research Institution
ILRI	International Livestock Research Institute
JICA	Japanese International Cooperation Agency
Km	Kilometre
Km <sup>2</sup>	Square Kilometres
MASIP	Malawi Agricultural Sector Investment Project
MoAIFS	Ministry of Agriculture, Irrigation and Food Security
MP	Member of Parliament
NARES	National Agricultural Research and Extension Systems
NEPAD	New Partnership for Africa's Development
NGO's	Non-Governmental Organisations
SADC	Southern Africa Development Community
SARIA	Southern Africa Regional Irrigation Association
SPFS	Special Program for Food Security
Sq	Square
TLC	Total Land Care
WB	World Bank
WFP	World Food Programme

## **EXECUTIVE SUMMARY**

The African Union-European Union Regional Workshop on Irrigation Farming for Small and Medium Scale Farmers was held in Lilongwe, Malawi from November 18-20, 2003.

The objectives of the workshop were to:

- (i) provide a forum for irrigation experts from the SADC Member States to discuss and review appropriate irrigation technologies that are effective and suitable for small and medium scale households, and are transforming the living standards of rural communities in Malawi,
- (ii) provide an opportunity for delegates to conduct a field trip to some irrigation schemes to appreciate their effectiveness, and identify special attributes that make them easy to use and affordable by farmers,
- (iii) afford the delegates the opportunity to interact and share experiences with technology developers, and discuss any improvements, or adjustments, that can be made to enhance their effectiveness, and
- (iv) develop practical strategies for the implementation of irrigation schemes in the Southern Africa Region, and adopt common approaches to enhance food production through the introduction of irrigation farming across the Southern Africa Region.

Seven keynote and expert presentations were made by the delegates from regional organizations based in the SADC Region and Malawi. The presentations focussed on several issues including:

- (i) a new approach to food security that integrates food aid and food security objectives in a broader framework of poverty reduction, and emphasizes on capacity building of national organizations, safety net programmes, enhancing information systems and reinforcing monitoring and evaluation exercises,
- (ii) (ii) the current state of over-dependence on rain-fed agriculture, lack of irrigation culture and lack of crop diversification and intensification in time and space,
- (iii) (iii) highlighting agriculture as the key sector for achieving economic growth,
- (iv) (iv) small scale irrigation initiatives of the GoM/EU Public Works Programme,
- (v) (v) promoting irrigation culture in the way rain-fed production systems have been inculcated in people's livelihood,
- (vi) (vi) implementing small-scale irrigation projects, and
- (vii) giving full support to irrigation farming, and lobbying for a 10% budgetary allocation to agriculture, because the

agriculture sector will remain the engine of economic growth for Africa in general, and the SADC Region in particular, for the next decade and beyond.

All the twelve delegates presented country papers, which highlighted:

- (i) country profile in relation to natural resource endowment,
- (ii)** (ii) the current status of irrigation initiatives,
- (iii)** (iii) current efforts at implementing various irrigation programmes, and (iv) major problems that constrain irrigated agriculture. It was clear from the presentations that all SADC Members States are endowed with abundant natural resources, which are currently under-utilized and under-exploited, and that the problems and constraints encountered by medium and small- scale farmers are the same and cut across all SADC Member States. This implies that common strategies can be applied across the region, with minimal site-specific modifications.

Field visits were made to Kagombe and Kambewa in Lilongwe, and Tilime and Tikondwe Freedom Gardens in Dowa, with the purpose of observing and appreciating different types of irrigation systems used and the type of crops grown. At each of the three irrigation sites, the delegates were briefed on

- (i) how the farmers' clubs were formed,
- (ii) (ii) how to assemble, use and maintain treadle pumps, (iii) how to make and use compost manure,
- (iii) (iii) how to prepare seed beds,
- (iv) (iv) how to plant, apply mineral fertilizers, weed, etc,
- (v) (v) how to apply and irrigation water
- (vi) (vi) how the farm inputs (hoes, shovels, fertilizers and insecticides) were acquired, and
- (vii) (vii) how they market the produce. At Tikondwe Freedom Gardens, individually owned by Dr. G. Chinkhuntha, delegates were briefed on a cleverly designed gravity fed irrigation system that uses narrow channels to irrigate several crops, including maize fruit trees, vegetables, herbs, bananas and spices using on-farm recycled organic manures only.

Lessons learnt from paper presentations, group discussions and field visits provided an excellent avenue to distil information and come up with detailed strategies and critical issues that need immediate and urgent attention. These included:

- (i) the introduction of irrigated agriculture in the whole SADC Region,
- (ii) (ii) expansion of smallholder irrigation farming,

- (iii) (iii) water harvesting and storage, and
- (iv) (iv) creating an enabling political environment and the commitment of all SADC Member States. The way forward for the medium and small scale irrigation farmers in the SADC Region is to implement all the strategies that address these critical issues in a holistic and coordinated manner.

After three days of hard work, the delegates made the following recommendations:

- (i) Re-confirmed that irrigation should remain a high priority SADC Member States agenda,
- (ii) (ii) member countries to implement irrigation strategies with urgency, so as to double production by the year 2015,
- (iii) (iii) member countries to lobby for at least a 10% allocation of their budgetary resources to support the agriculture sector, hence irrigation,
- (iv) (iv) member countries to enhance networking and collaboration among SADC Member States,
- (v) (v) member countries to inventory the availability of, and access to, irrigation technologies and facilities,
- (vi) (vi) NEPAD to facilitate the development of a concept document on networking among small scale irrigation farmers
- (vii) (vii) member countries to facilitate the formation of farmers' organisations,
- (viii) (viii) member countries to enhance human resource development and capacity building that includes training for both farmers and professionals,
- (ix) (ix) member countries to make a deliberate effort to support individual farmers skills development,
- (x) (x) member countries to provide commodity specific marketing information and infrastructure to enable small scale irrigation farmers effectively compete on the open markets,
- (xi) (xi) member countries to promote and institutionalise water harvesting and storage practices
- (xii) (xii) member countries agreed that irrigation culture should be inculcated in prevailing production systems through awareness public campaigns,
- (xiii) (xiii) the establishment of an "Irrigation Day" to commemorate the importance irrigation as an integral component of the food security and poverty eradication strategy in the SADC Region, in particular, and Africa in general.



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## **Report of the African Union–European Union Regional Workshop on Irrigation Farming for Small and Medium Scale Farmers held at the Le Meridien Capital Hotel, Lilongwe, Malawi, November 18-20, 2003**

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### **I. INTRODUCTION**

The African Union-European Union Regional Workshop on Irrigation Farming for Small and Medium Scale Farmers was held at Le Meridien Capital Hotel in Lilongwe, Malawi from November 18-20, 2003. The main purpose of the workshop was to bring together Irrigation Experts from the Southern African Region to share information and experiences, and to develop harmonised irrigation approaches and strategies to enhance food production and hence, contribute to the fight against hunger, poverty and malnutrition in furtherance of the objectives of the African Union.

### **II. ATTENDANCE**

The Workshop was attended by more than 80 delegates as follows:

- Twelve Southern Africa Development Community (SADC) member countries of: Botswana, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.
- Regional and International Organizations: African Union (AU), European Union (EU), Japanese International Cooperation Agency (JICA), New Partnership for Africa's Development (NEPAD), SADC, and Food and Agriculture Organization of the United Nations (FAO),
- National Agricultural Research and Extension Systems (NARES), including the University, and Special Government of Malawi donor funded projects/initiatives, such as the Emergency Drought Recovery Project (EDRP) and the Malawi Agricultural Sector Investment Process (MASIP),
- Local and International Non-Governmental Organizations (NGOs), and members of Church Organizations, and
- Individual farmers.

The list of delegates and the Workshop Programme are given in Appendix 11.1 and Appendix 11.2, respectively.



### III. OPENING CEREMONY

- The Workshop was officially opened by the Second Vice President of the Republic of Malawi, who is also the Minister of Agriculture, Irrigation and Food Security (MoAIFS), the Right Honourable Chakufwa Tom Chihana. In his opening speech, the Minister thanked the African Union and European Union, for organizing and funding this important workshop, which brought together more than 50 Irrigation Experts from the Southern Africa Region, and for affording Malawi the opportunity to host the workshop. He informed the delegates that African countries are faced with the primary challenges of reducing poverty and eliminating hunger, along with protecting the environment. The challenge of ensuring food security falls squarely on agriculturists and members of the farming communities. With recurrent droughts, and the need to produce crops during winter months, against a background of abundant natural resources, including water, the use of irrigation, especially in the dry season, is the surest way of ensuring food security and reducing poverty. He further emphasized that food security should not be interrupted to mean maize only, but rather to embrace and promote the growing of other staple food crops, such as sweet potato, cassava, sorghum and millets, and the growing of high value cash crops, to generate cash that can be used to buy food. However, he noted that this required the change of the mindset and a change of eating habits to recognize that “food” is not only maize, but includes all the other food crops. It is for this reason that he hailed the usefulness of the workshop because irrigation offers a wide range of appropriate technologies for the growing of a vast array of cereals, legumes and horticultural crops. In his closing remarks, he challenged the delegates to recommend best irrigation practices that can be replicated across the Southern Africa Region and improve the livelihoods of the rural communities. He wished the delegates good luck during their deliberations, and requested them to feel free and enjoy the unique Malawian hospitality.
- In her welcoming remarks, the Executive Secretary of the African Union, Southern Africa Regional Office, Ms. Susan Sikaneta thanked the EU, workshop sponsors, and the Malawi Government for hosting the workshop. She remarked that hunger is the commonest disease in Africa in general, and the SADC region in particular. Hunger is mainly caused

by chronic food shortages, hence the need to ensure food security and reduce poverty. Hence, she emphasized the need to use production-increasing agricultural technologies, including the recommended irrigation practices, against a backdrop of Africa's abundant natural resources, including water. She challenged the delegates to come up with appropriate and user-friendly irrigation technologies and action plans that can be used and applied by farmers across SADC member states to ensure adequate food production. She thanked all the participants for coming to the workshop, but regretted that delegates from Angola and the Democratic Republic of Congo were unable to come owing to poor telecommunication. Finally, she wished the delegates fruitful deliberations.

- In his welcoming remarks, Mr. Lellis Braganza, Acting Head of EU Mission in Malawi, hailed the long-standing cordial relationship between the EU and African countries. He emphasized that the EU is pleased to participate in Africa's development programmes, in general, and in Malawi, in particular. For Malawi, he outlined the EU's current shift in focus from food aid to food security and the public works programme and various other safety net approaches designed to address food shortages among rural communities in the short-to the long-term. In the short-term, EU has contributed about 1 million metric tonnes to Malawi's Strategic Grain Reserve, which is sufficient to provide enough food to Malawians for a period of three months. He invited the delegates to visit some Malawi Government/EU Irrigation Sites, learn from them, provide alternative approaches for improvements, and/or adapt them for use by farmers in their own countries. The use of these simple, but effective irrigation techniques, is a sure way to ensuring food security, reducing malnutrition and poverty.

#### **IV. OBJECTIVES OF THE WORKSHOP**

The main objectives of the workshop were as follows:

- To provide a forum for Irrigation Experts from the SADC Member States to discuss and review appropriate irrigation technologies that are suitable for small and medium scale households that are effective and are transforming the living standards of rural communities in Malawi,
- To provide an opportunity for delegates to conduct a field trip to some irrigation schemes to appreciate their effectiveness,

- and identify special attributes that make them easy to use and affordable by farmers,
- To afford the delegates the opportunity to interact and share experiences with technology developers, or manufacturers, and discuss any improvements, or adjustments, that can be made to enhance their effectiveness, and
  - To develop practical strategies for the implementation of irrigation schemes in the Southern Africa region, and adopt common approaches to enhance food production through the introduction of irrigation farming across the Southern Africa Region.

## **V. KEYNOTE AND EXPERT PRESENTATIONS**

Seven keynote and expert presentations were made by delegates from regional organizations. These are as briefly outlined below.

### **5.1. The EU Food Security Programme and the Safety Net Approach (Mr. Paul Ginies, Food Security Expert, EU, Lilongwe, Malawi)**

The EU described a new approach to food security that integrates food aid and food security objectives in a broader framework of poverty reduction. It represents a change of paradigm from food aid to food security, from logic of supply to a demand approach, a focus on access to food and the linking of relief-rehabilitation-development. Food security at national level was defined as an outcome of faltering development and a weak trade position while food insecurity at household level was defined as an outcome of poverty. Thus, food security objectives are best met by integrating into a long-term poverty eradication policy providing a coherent a framework for national and regional development strategies.

Overall problems in Malawi were defined as follows: poverty is widespread, deep and severe; a centralized economy with high dependence on agricultural exports (tobacco, tea, sugar); 80% of the population is dependant on rural income yet there is very little or no investment in the rural areas; a low GDP where a large part of the population live on less than 0.34 USD per day; and, a high prevalence of HIV/AIDS.

The programme strategy emphasizes the following: capacity building of the national institutions; safety nets (income, employment, nutrition, risk management); support information system; and, reinforcement of monitoring and evaluation. The Food Security Support Programme in Malawi employs safety nets strategy based on four pillars under the Malawi Poverty Reduction Strategy. These are: free distribution of inputs, implementation of public works programmes, implementation of targeted nutrition programmes, and the provision of direct welfare transfers.

It is expected that: the management and implementation of the Food Security and Nutrition Policy Implementation will be improved; Strategic Grain Reserve management will be more efficient; institutional capacity in trade policy will be improved; household farm and non-farm incomes will be increased, and nutritional status of vulnerable groups will be improved.

## **5.2. SADC's Initiatives in Irrigation and Water Management (Mrs. Margaret Nyirenda) SADC Secretariat, Gaborone, Botswana**

SADC member states occasionally experience unfavourable weather conditions, which make the region prone to severe droughts, floods or related phenomena and their related consequences. Adverse weather in a number of SADC countries from time to time, results into reduced planting and crop failure, promoting serious food shortages especially in rural and peri-urban areas, thus undermining access to food for large sections of the populations with the resultant heavy human and economic losses.

Yet, a review of the regional situation highlights an overdependence on rainfed agriculture and a concentration on low value crop production. Total land under cultivation in the region is estimated at 2,121,000 ha against a total arable land of 146,723, 000 ha.

The SADC Watershed Management and Water Harvesting Demonstration Project Component proposes to finance the development of at least two watersheds in each participating country and promote the practice of water harvesting in drought prone areas of the member countries. Watershed management activities will include

design of small scale low cost irrigation schemes and farmer training in the practices required to meet the quality requirement of the private sector entities engaged in the programme. The water harvesting activities will concentrate on arid and semi-arid areas of the participating countries where the effects of droughts are often most acute. The SADC LIFDC countries will be supported to increase their pool of qualified technical and managerial skilled worker in the irrigation section. High value crops to be produced in the watershed areas will be assured of ready markets following the engagements of the private sector in scheme development and crop husbandry products for their markets

5.3. **NEPAD's Vision for Agriculture and its Plan of Action for Agricultural Renewal on the Continent (Professor Richard Mkandawire, Agriculture Adviser to NEPAD, NEPAD, Johannesburg, South Africa)**

The presentation highlighted that 40 million people are currently at risk of starvation on the continent where over 300 million Africans live on less than \$1 a day and where of the 800 million malnourished people in the world 200 million of these chronically hungry people live in sub-Saharan Africa. Further, ninety-two percent of these people are not victims of extreme events but suffer from chronic, silent malnutrition. Fifty percent of them live in farm households in marginal areas. In the next two decades, most inhabitants will continue to reside in rural areas.

NEPAD is the AU framework for socio-economic development in Africa and represents increased determination by African leaders to take destiny into their own hands and determine the agenda for African's Revival. In this endeavour, agriculture has been highlighted as the key section for achieving economic advancement and poverty alleviation. Agriculture utilises 60% of labour force, 20% of merchandise and 17% of GDP. However, most governments spend less than 3% of budget on agriculture, Africa is a net importer of food where in 2000, Africa imported 2.8 million tons of food.

Attainment of food security entails the following: improvement in the productivity of agriculture, dynamic agricultural markets, integrating farmers into the market

economy, better access to markets, Africa becoming a net exporter of agricultural products, more equitable distribution of wealth, strategic player in agricultural science and technology development, practice environmentally sound production methods, and sustainable management of the natural resource base.

It is conceived that the framework on operationalization and action to revitalize African agriculture rests on: African ownership and leadership including commitment of resources, accelerating and deepening regional and continental economic integration, enhancing public-private partnerships, civil society organizations, international community, and the recognition that creating an enabling environment for agriculture to thrive is a dynamic and evolving process.

Agricultural activities envisaged include: extending the area under sustainable land management and reliable water control systems, improving rural infrastructure and market access including inputs and finance, increasing food supply and reducing hunger, agricultural research, technology dissemination and adoption, and soliciting aid for 30 identified concrete projects to end the food crisis and kick-start agricultural development.

The framework of operation recognizes the following partners: Food and Agriculture Organization (FAO), World Food Programme (WFP), International Fund for Agriculture Development (IFAD), World Bank (WB), Forum for Agricultural Research in Africa (FARA), International Food and Policy Research Institute (IFPRI), Hunger Task Force, and the International Livestock Research Institute (ILRI).

**5.4. The EU Public Works Programme (Mr. Adriaan Esterhuizen, Programme Manager, EU, Lilongwe, Malawi)**

The objectives of the GoM/EU Public Works Programme include: poverty alleviation, improvement of living conditions, gender and families, improved accessibility, training and capacity building, sustainability, environmental impact, increased food production and crop diversification. Amongst the component targets is irrigation where 2,900 treadle pump have been procured for farmers

for irrigation, 40 stream diversions have been established with 200 farmers, and 27 holding ponds with 270 farmers.

The principle behind small-scale irrigation is the management of risks associated with rain-fed agriculture and the provision of safety nets. It has since been shown that each farmer practicing smallscale irrigation has the potential to feed 70 others for 3 months with a bonus of cash income, inputs for rainfed farming and greater crop and food diversity. In the project, farmers have been selected based on interest and commitment, willingness to participate in an irrigation club, a cash deposit for a treadle pump in the amount of US\$10, and access to arable land and perennial water source.

To-date, the project has delivered 2,714 treadle pumps, 548 farm families have established stream diversion irrigation schemes, and 285ha are under cultivation in Central Malawi. Direct benefits from sales of maize and vegetables have reached 19,500 family members including provision of food to 200,000 people. Potential income is in the region of \$500,000. Indirectly, the activities have created employment to other community members. It has been shown that cash inflows and outflows need to be monitored beyond one calendar year of activity in view of repayment of loan for treadle pump and the need for cash inputs for rainfed farming within the calendar year. Further, that experience is the best teacher regarding timely field preparation for dry season farming, crop varietal selection, and identification and application of best practices.

**5.5. Dissemination Material to Promote Irrigation as a Culture (Mr. K. Hashiguchi, Sanyu Consultant, JICA Study Mission Leader, Lilongwe, Malawi)**

The presentation by JICA emphasized that irrigation ought to be promoted as a culture in the way rainfed production systems have been inculcated in people's livelihood. Thus irrigation should be viewed not as a technology but a culture that has to be passed on from one generation to another. Second, irrigation being a culture, facilities should be those that are constructed, operated and maintained by farmers themselves. Farmers should be committed implementers and owners of the irrigation system while

government or NGO officers take the role of technical advisors and participants. Further, to bring the irrigation system into being in the farmer's locality, locally available resources should be used. The presentation then focused on practices for diversion of streams and rivers to provide for irrigation water. These practices included: identification of potential diversion site; construction of diversion structure (weir); alignment of canals; lay out of irrigation fields; and, equity issues to reduce conflict over water and land resources.

**5.6. Implementation of Small-scale Irrigation Projects in Malawi (Dr. T. Zaw, Irrigation Expert, FAO, Lilongwe, Malawi)**

The Food and Agriculture Organisation (FAO) of Malawi has been implementing two projects: Special Program for Food Security (SPFS) and Treadle Pump Project. The Government of Myanmar offered to support SPFS activities in Malawi under the South-South Cooperation Program. One of the four components of SPFS is water control and management whose objective is to contribute to the reduction of the incidence of household food insecurity in Malawi through sustainable rapid increases in agricultural production by promoting smallholder irrigation development. The following objectives are expected to be achieved after a three year period 2001-04: (a) establishment and strengthening of water users associations at each scheme with the aim of ensuring sustainable operation of irrigation systems, (b) rehabilitation of traditional irrigation systems at four sites in central region, (c) enhancement of the capability of government staff to support the project and strengthen the ability of farmers to sustain the infrastructure provided.

The FAO launched a treadle pump project with a grant from the Dutch Government in 2003, with the assistance of Total Landcare (TLC) Malawi, which is a locally registered NGO. The goal of the project is to improve household food security, nutrition and income level among smallholder farmers in the target area. The programme is being implemented through a partnership approach with reputable organizations that have ongoing irrigation programmes. A total of 1,800 treadle pumps, of which 50 were from a local manufacturer, were procured and



distributed to targeted districts and beneficiaries. Training and field visits were conducted.

**5.7 Keynote Address for the African Union Regional Workshop on Irrigation for Small and Medium Scale Farmers (presented by Dr. I. Diallo, Director for Rural Economy and Agriculture, Addis Ababa, Ethiopia on behalf of the Commissioner of the African Union Commission responsible for Rural Economy and Agriculture, Mrs. Rosebud Kurwijila)**

The paper recognised that irrigated agriculture has the potential to improve nutrition, household food security of the rural farmers and to generate employment, thereby significantly contributing to poverty reduction. The presentation urged governments to engage into constructive and fruitful dialogue with the private sector to support efforts towards introducing irrigation farming on a wide scale especially for smallholder farmers in rural areas. The paper emphasised the role of the AU in advocating for governments to be fully supportive of irrigation farming. The AU takes the agriculture sector as the engine of growth for Africa for the next decade and beyond

The presentation acknowledged the presence of relevant knowledge, expertise and capacity to design technologies that will reverse high rates of malnutrition and poverty afflicting the SADC region. The paper recognised that irrigation is the only sure way to assist the region to attain food security.

## **VI. COUNTRY PRESENTATIONS**

All the twelve delegates from the twelve SADC member States presented country papers to highlight the status of irrigation activities in their countries. The presentations focused on the country profile, current efforts made at implementing various irrigation programmes, and the major problems and/or constraints encountered in the implementation of these. A brief overview for each of the country follows.

### **6.1 Botswana**

Botswana is a very dry country and about two thirds of the country is occupied by the Kalahari Desert. Its average rainfall ranges between 250-650 mm per year. Irrigation is mostly practiced as a part time enterprise especially in the

fields of horticulture and subsistence agricultural production.

As Botswana is a dry country, the promotion of irrigated agriculture is mostly through the exploitation of ground water resources through the sinking of deep bore holes which may reach up to the depth of 300 m and through the harnessing of surface water resources through the construction of earth dams. The economy of Botswana is particularly dependent on minerals. The country would however be interested in diversifying by venturing into agricultural development.

## 6.2. **Lesotho**

Lesotho is a mountainous, temperate climate water abundant country. Lesotho has an extensive irrigation potential. Its major technology is however limited to backyard home kits with gravity fed systems where appropriate.

The major constraints to irrigated agricultural production in Lesotho include: (i) the blocking system that is practiced, (ii) practicing farmers are unable to expand due to limitations of the existing land tenure system, and (iii) the vulnerability of existing water storage facilities, particularly dams, due to siltation, drying up and limited capacity.

## 6.3. **Malawi**

A small country with a population of about 12 million and covering 11.8 million ha out of which 2.4 million ha is under water. Its persistent food shortage has aligned its policies towards rapid irrigation development, which it feels is a way towards attaining food security.

The major stakeholders in irrigation in Malawi are the estate sub-sector and the smallholder farmers. Currently only around 62,000 ha of the 400,000 irrigation potential is developed. The major constraints to irrigation development in Malawi being lack of irrigation culture and inadequate resources to effectively implement irrigation development plans

#### 6.4. **Mauritius**

Mauritius is a small country covering around 1865 sq km with 1.2 million people. It is mainly an agricultural land with sugar plantations covering about 90% of the arable land.

In terms of irrigation, the country aims at increasing productivity, reducing the cost of production and promoting diversification. The administration of public irrigation activities in Mauritius is through an irrigation authority where the beneficiaries are mostly the sugar cane planters involved in the project.

#### 6.5. **Mozambique**

Has an area of about 800.000 square km with a population of around 17 million people. The country has over 36million hectares of arable land out of which 3 million hectares is suitable for irrigation. Agriculture employs about 80% of the people and contributes for about 40% of the GDP. Its major threats are food insecurity and poverty.

Out of the 120,000 ha developed for irrigation, around 45,000 ha was destroyed during the war. The country's objective in irrigation is to maximize the use of existing schemes and to try to utilize the existing irrigation potential.

#### 6.6. **Namibia**

Namibia has 1.8 million people and covers an area just over 820,000 sq km. It is one of the driest countries within the region. Rainfall ranges between 0-700 mm per year. The country has in place the green scheme that aims to guide the country's development objectives.

Apparently it has an advanced irrigation planning schedules as can be advanced by its farmers being able to plant their crops every 2<sup>nd</sup> week to phase harvesting season, thereby capitalizing on the market availability potential

#### 6.7. **Seychelles**

The smallest country within the region that specializes in tourism. It only has around 81,000 people on an area of about 475 sq km. The country uses the watering cans, overhead sprinklers and mini sprinklers for irrigation

#### 6.8. **South Africa**

South Africa has varied rainfall, which ranges from 20 to 1000 mm of rainfall per annum. Irrigated agriculture covers around 1.3 million hectares and contributes only 3% of GDP. Most of the irrigation schemes in South Africa are commercial large scale irrigation schemes. In the area of small-scale irrigation, South Africa is however a stranger. It is however ready to learn from other countries in the field of small scale irrigation as there is need to reach the proportion of its citizens who can still benefit from small scale irrigation. These are those that live in the rural, are poor and are still vulnerable to food insecurity.

#### 6.9. **Swaziland**

Swaziland is a landlocked country covering 17364 km<sup>2</sup> with a population of 1 million 77% of which is in the rural areas. Over 74% of the Swazi land is used in Agriculture, with agriculture contributing 14% of the GDP. The total irrigation potential is estimated at around 90,000 ha of which 49,860 ha is irrigated. Medium and large schemes are largely sprinkler systems. Large schemes (more than 500ha) comprise 67% of the total irrigated area. Medium schemes (50-500) are estimated to be 20% and 13% are small schemes (less than 50).

Major problems are that some schemes were poorly designed which makes them not to be sustainable, limited farmers knowledge in operation and maintenance of the irrigation infrastructure, unclear departmental policies

#### 6.10 **Tanzania**

Tanzania is a relatively large country within the region with an area of around one million sq km and having a population of 34 million people. Agriculture contributes more than 50% of GDP. It has an irrigation potential of 29.4 million ha and the current area developed for irrigation is 200,000 ha.

The existing types of irrigation are surface mainly for smallholder farmers, conventional sprinklers for commercial farmers and drip irrigation primarily for horticultural crops. The main constraints to irrigation development in Tanzania include the absence of well-articulated policy and strategy framework and, financial and technological shortcomings.

The current key interventions include rehabilitation of the existing traditional irrigation schemes, promotion of schemes based on water harvesting, the construction of dams and the empowerment of the farmer through formation of workable water users associations.

#### 6.11 **Zambia**

Consists of 10 million people of which 56% live in urban areas. 35 million ha are available for cultivation but only 1.5 million ha are cultivated. The potential area for irrigation is about 423,000 ha but only 100,000 have been developed. Irrigation practices comprise principally low cost technologies namely drip and use of treadle pumps. Constraints to irrigation include: inadequate financing and institutional support, high operational costs, inaccessible credit, inadequate markets and poor legal mechanisms.

#### 6.12. **Zimbabwe**

The country has an irrigation potential of around 400,000 of which 150,000 is already developed. Emerging national issues were highlighted and included the following: (a) policy framework- need to allocate internal funding, private sector to play bigger role in irrigation development, small scale farmers be empowered to lead process, need to heed environmental concerns in irrigation; (b) legal framework; (c) on-farm soil/water management- waterlogging, salinization, cropping programs (good mix of high value crops and food crops) (d) funding issues (e) marketing (f) research and technology development- suitability and compatibility of technologies, generation of information base

## **VII. FIELD VISITS TO IRRIGATION PROJECT SITES**

On Wednesday, November 19, 2003, delegates visited small-scale irrigation schemes in Lilongwe West Rural Development Project (RDP) and Dowa RDP to appreciate different types of irrigation methods and various crops grown under irrigated conditions. The sites visited are: (i) Lilongwe West RDP: Kagombe and Kambewa Farmers' Groups, and (ii) Dowa RDP: Tikondwe Freedom Gardens (an individual farmers' enterprise), and Tilime Farmers Group.

At each Irrigation Scheme, the Chairperson of the scheme briefed the delegates on the various activities, which included: (i) how the farmers' club were formed, (ii) how to assemble, use and maintain treadle pumps, (iii) compost manure making and application, (iii) preparing seed beds, (iv) crop husbandry practices, (v) irrigation practices, (vi) the acquisition of farm inputs (hoes, shovels, fertilizers and insecticides) and (vii) marketing issues. Specific and special attributes of each irrigation scheme are briefly described below.

### **7.1. Kambewa Farmers' Group**

There are 150 households, with 125 and 25 households that are male and female headed, respectively. Some 111 households own dimba gardens with 6.4 ha under irrigated conditions. Out of these, 15 farmers own and use treadle pumps. There is a perennial stream that is diverted at some points to enable the farmers access the water. Water is also pumped either directly from the main stream or wells dug along the diverted channel. The programme support farmers who belong to a club with farm inputs to cultivate 0.01 ha. However, for farmers who are able to purchase their own inputs are now cultivating plots which larger than 0.01 ha. The main crops grown include maize, tomatoes, cabbages, beans, Chinese cabbage and rape.

### **7.2. Kagombe Farmers' Group**

There are 40 households, with 35 and 5, respectively that are male and female headed. Some 35 households own dimbas who cultivate a total area of 5.6 ha. Out of these, ten farmers own treadle pumps. Maize is the main staple food crop grown by farmers, whilst the others include: tomatoes, cabbages, beans, Chinese cabbage and rape

### **7.3. Tikondwe Freedom Gardens**

One individual innovative farmer, Dr. G. Chinkhuntha, owns Tikondwe Freedom Gardens. This enterprise directly benefits more than 15 farm families in the surrounding villages. Some 20 ha are under cultivation to maize, fruits, vegetables, herbs, bananas, spices and various other crops. The most distinctive feature about this irrigation facility is the use of a cleverly designed gravity fed system using narrow channels, and the use of organic sources of fertilizer in crop production. The source of irrigation water is from a flowing river and underground sources through the use of horizontal wells.

#### **7.4. Tilime Farmers' Group**

There are 40 club members, with 30 and 10 households that are male and female-headed households, respectively. Currently, the length of the canal is about 1,852m. JICA and GoM/EU Public Works Programme have supported this project. The crops grown by farmers include maize, vegetables and beans.

### **VIII. LESSONS LEARNT AND THE WAY FORWARD**

The proceedings of the field trip, paper presentations and group discussions provided an opportunity to distil the strengths, weaknesses, opportunities and challenges that are summarised below as lessons learnt by delegates of the workshop. These critical issues include: (i) introduction of irrigated agriculture in the SADC region, (ii) expansion of smallholder irrigation, (iii) water harvesting, and (iv) political commitment.

#### **8.1. Introduction of irrigated agriculture in SADC countries**

Irrigation farming has been introduced in all SADC countries arising out of the widespread food insecurity, and erratic and unpredictable rainfall in the region. These are at different stages and scales in the SADC member countries.

The workshop was pleased to note that SADC strategies on food availability included the promotion of efficient irrigation systems. The workshop however noted that irrigation expansion has not kept pace with food requirements and population increase in the region and that there is an urgent case therefore to accelerate this expansion.

#### **8.2. Expansion of Smallholder agriculture**

Currently, there is need to expand smallholder irrigation agriculture. The steps needed to do this include:

- The development of national master plans on irrigation development. There is need for proper planning to include: natural resources, socio-economic aspects, economics, physical considerations, environmental

impact assessment, rules and regulation, decentralization and scale to ensure control and ownership at the lowest possible level and NGO support.

- The establishment of database of all the resources available,
- The establishment of the desirability for the potential of irrigation. The provision of adequate training to farmers, full farmer participation (e.g., using PRA approaches), community involvement, and farmers sensitisation so that they are aware of the full potentials, benefits and dangers,
- The organisation and formalisation of existing systems and policies. This includes linking to existing farmer practices to support uptake (e.g., from watering cans to treadle pumps; from drainage furrows to diversion furrows). The challenge is to identify good 'hooks' in different countries and/or circumstances, and
- The prioritising of irrigation within the agricultural sector. Irrigation expansion needs coordination, e.g., mechanisation to move to larger scales. Expansion options comprise both horizontal (more farmers starting) and vertical (existing farmers growing bigger) that are important. Each country has to analyse and decide where it wants to go or to put more emphasis,

However, there are also many constraints to irrigation expansion, some of which are briefly outlined below.

- Primary constraints:
  - Unavailability of resources (land, water, etc),
  - Lack of marketing information, poor infrastructure, lack of inputs, credit, etc,
  - Reluctance to adopt new and appropriate technologies, and
  - Poor human capacity – energy, education and culture
- Secondary constraints:
  - Lack of political will 'to sow the seed',
  - In adequate funding – policy, research, prioritisation,
  - Poorly defined constitutional / legal water rights, and
  - Prevalence of HIV/AIDS and other diseases on the population.



Nonetheless, irrigated agriculture can be expanded by using the following strategies:

- Mobilising more households into irrigation farming, especially through small scale irrigation technologies as a starting point,
- Intensifying the production on existing lands, regardless of scale,
- Improving the quality of existing production,
- Using water harvesting techniques at all scales,
- Requesting farmers to pool land (but this needs attention to successful farmer organization models, land tenure and business management),
- Using government intervention that ensure fallow irrigation land is brought under cultivation, and
- Requesting existing farmers to growing larger areas.

Expansion is required to support capacity: 3-legged pot: government – NGOs - private sector, so as to:

- Define scheme costs, benefits, beneficiaries and targets,
- Emphasise the implications of not supporting irrigation – food aid/food production,
- Private/public, donor/NGO sector participation,
- Local affordable credit, revolving funds,
- Insurance and risk management,
- Multi disciplinary projects and interdisciplinary teams supporting the irrigation sub sector, and
- Adequate and motivated staff accompanied with good budgets and skills

Farmer training:

- Farmer training and capacity building is NOT receiving enough attention
- Need to share experience and material for farmer training across the region – easy to do!
- Have to train on the right topic at the right moment – otherwise wasted, e.g. no use training farmers on water use efficiency when they are not even irrigating yet
- Need proper water management and training on water use efficiency

### **8.3 Water harvesting**

A range of rainwater harvesting approaches, aimed at avoiding excessive run-off, erosion and siltation include:

- Promoting water infiltration into the soil and groundwater,
- Improving soil-water holding capacity,
- Roof toping water harvesting,
  - Floodwater harvesting from micro to large scale
  - Water storage from micro to large scale

The implementation strategy would be aided by:

- Norms and standards
- Early planning for proper introduction of rainwater harvesting, and
- Planning of housing and buildings should include rainwater harvesting

Rainwater harvesting techniques are well known, but the adoption rate is low. This is because maybe it is:

- Lack of government support
- Lack of proactive ways of implementing, and
- Easier said than done?
- Lack of seriousness in sensitisation of these.

Water storage is underdeveloped in Africa, at 20 m<sup>3</sup>/capita compared to 2000-4000m<sup>3</sup>/capita in developed countries. The impression that WCD is advocating against dams needs to be dispelled. SADC policies should provide clear support for storage development.

#### **8.4. Political commitment**

There is need for political will, right through to actual budget expenditure. It is recommended to:

- Facilitate people's voice to reach politicians. People to Parliament. Government budget to enable even the smallest farmers to speak in Parliament. Bottom-up budgeting, as in Zambia,
- Link to big issues, e.g., show how irrigation can address HIV/AIDS problems,
- Inform politicians well!! Take politicians on field visits. Demonstrate value of irrigation interventions to convince politicians and farmers,
- Public awareness campaigns; lobby groups/farmer organizations, and
- Enhance commitment of technocrats.

It was recommended that:

- Copy of the proceedings should be made available to the Speakers of Parliaments to share with their counterparts in the country, requesting them to discuss in Parliament,
- Public awareness campaigns with high-level political visibility (e.g., impact of Malawi President's Manure Campaign),
- Technocrats (e.g., agriculturalists) should be diligent in initiating and writing proposals, and lobby for their funding, because this is how implementation comes to fruition,
- Irrigation to be given high priority in country budgets, and
- Donors to include irrigation component in agricultural facilities.

## **IX. RECOMMENDATIONS AND ACTIONS TO BE TAKEN**

1. The workshop re-confirms that irrigation should remain a high priority on the agenda within the SADC countries if food security and the peoples household incomes are to improve in the region through crop intensification, diversification, marketing and commercialisation of agriculture,
2. The workshop recommends that member countries immediately develop strategies which will enable farmers to double production and efficiency in irrigation farming by 2015,
3. The workshop recommends that member countries report to AU, through mechanisms at the SADC secretariat, on the strategies that will ensure member countries attain at least 10% allocation of their budgetary resources to support the agriculture sector and within that allocation sufficient resources be made available for irrigation development within the next five year period,
4. The workshop recommends that member countries should enhance networking and collaboration between them both at national and regional level, and to take advantage of the existing organs such as the Southern Africa Regional Irrigation Association (SARIA). The workshop further recommends that:
  - NEPAD and SADC Secretariat interrogates FAO irrigation inventory data to strengthen and share it amongst member countries.

- Inventories available in irrigation directories in member countries be used to facilitate network development, and
  - The Southern Africa Regional Irrigation Association provides an entry point for networking and collaboration,
5. The workshop agreed that each member country should have and make available an inventory of irrigation technologies in order to provide the necessary information to enable the farmers make informed decisions when selecting irrigation technologies,
  6. The workshop recommends that NEPAD facilitates development of a concept document that details networking initiative among small scale irrigation farmers through profiles of farmers' organizations, technologies and practices, knowledge and skills available , and networking activities,
  7. The workshop recommends that member countries facilitate the organisation of farmers both at grassroots and organisational level taking into consideration group and community dynamics as well as legal framework for production and marketing operations,
  8. The workshop recommends that member countries commit themselves to enhance human resource development and capacity building that includes training for both farmers and professionals, and to research and technology development and adaptation,
  9. The workshop agreed that member countries should make a deliberate effort to support individual farmers and skills as integral to the effort of moving toward food security through irrigation,
  10. The workshop agrees on the need for cooperating partners, as a matter of policy, to move away from emphasis on food aid, to supporting in concrete terms, increased food production in the region
  11. The workshop recommends that member countries enhance their capacity to provide commodity specific marketing information and infrastructure in order for small scale irrigation farmers to effectively enter and compete on the open market,
  12. The workshop recommends that member countries promote and institutionalise water harvesting and storage technologies to increase water availability and area under cultivation through irrigation,

13. Water storage is critical for food security. More studies should be undertaken on ways and means of storing overflow of rain water for use later in irrigation.
14. The workshop recommends that irrigation culture be inculcated in prevailing production systems in member countries through awareness campaigns using print and electronic media and public campaigns, and
15. The workshop recommends the establishment of an “Irrigation Day” to commemorate the advancement and importance of irrigation as integral to food security and poverty eradication in the region.

## **X. CLOSING CEREMONY**

The workshop was officially closed by the Deputy Minister of Economic Planning and Development, Hon. Khwauli Msiska, MP. In his speech, the Minister emphasized the importance of agriculture, which is the engine of growth of the Malawi economy. Unfortunately, agricultural productivity is low, leading to chronic food deficits among Malawians. Thus, there is need to develop and utilize production-increasing agricultural technologies, such as the use of irrigation technologies. The Deputy Minister observed that this is why the holding of the workshop is timely. He commended the delegates for coming up with good irrigation strategies to address food security problems. He challenged the delegates to share the knowledge and skills gained with their counterparts at their workplace. He appealed to all delegates to use the knowledge gained to initiate small-scale irrigation projects in their countries. He thanked the EU and AU for funding and organizing the workshop.

In his closing remarks, Professor Richard Mkandawire, re-affirmed NEPAD’s commitment and its vision to transform and catalyse agriculture. He noted that irrigation is at the core of its strategy in the transformation process. He emphasized the need to scale-up and scale-out best irrigation technologies, instead of re-inventing the wheel. He advised the delegates not to repeat the past failures, work with the farmers and be committed to their cause, so as to realize the vision of food security for all by the year 2015.

Ms. Susan Sikaneta, Executive Secretary of the African Union, Southern Africa Regional Office, reminded the delegates that what goes up always comes down. So it was with the workshop that was now coming to an end. She expressed great satisfaction

about the quality of discussions, and the commitment of the delegates in coming up with practical strategies that will enhance agricultural productivity under irrigated conditions. She thanked EU for funding the workshop, and applauded the efforts made by Ambassador Wiepke van der Goot, Head of the European Union in Malawi and his dedicated staff. Finally, she thanked the Malawi Government for hosting the workshop, JICA and the EU Public Works Programme for organizing field visits, and Dr. G. Chinkhunta of Tikondwe Freedom Gardens for the opportunity to visit his farm and for sharing his fig tree concept. Finally, she thanked all the delegates for their contributions, and urged them to give irrigation the highest priority in the agriculture sector because this is the surest way that Africa can eliminate hunger.

The Head of the European Union in Malawi, Ambassador Weipke Van der Goot, hailed the good relationship between EU and AU, and the common goals and interests of the two organizations. He underscored the use of irrigation as a solution to many problems, especially in the fight against hunger and poverty. He noted that building an irrigation scheme is simple, but maintaining it, is the difficult part. Thus, this is the challenge he had for Agricultural Engineers as they try to implement irrigation projects in their countries. Finally, he thanked AU for organizing the workshop, FAO, JICA and the EU Public Works Programme for the collaboration.

Dr. Ibrahima Diallo, Director of Rural Economy and Agriculture, AU in Addis Ababa reported that the African Union is charting a new vision for Africa in the 21<sup>st</sup> Century. In this vision, the AU wants to utilise to the maximum, our natural resources of land and water and, through irrigation farming, turn this region into the breadbasket of Africa. He had hope that the goal shall be achieved, given the goodwill of all the participants and the commitments that have been made in form of the Way Forward. He hailed the AU, NEPAD, EU, SADC and JICA among others, for supporting irrigation initiatives in the SADC region in particular, and Africa in general. He said the interventions should serve as a model for the region in dealing with food security issues. He intimated that he would be urging the other four regions to do the same. He however stressed the need to start small and slowly but surely graduate to higher levels in terms of irrigation technologies. He concluded by stating that he would include the outcomes of this workshop on the agenda of

the Ministers of Agriculture of African Union at their next meeting.

Dr. Charles Matabwa, who is Principal Secretary in the Ministry of Agriculture, Irrigation and Food Security, thanked the EU for financial support and AU for organizing the workshop. He noted that the delegates worked hard to come up with various strategies and action plans for implementation. He thanked all the Irrigation Experts for their dedication and hard work.

## X. **CONCLUSION**

This was a highly successful workshop that brought together several expertise from twelve SADC Member States and NGOs dealing in agriculture with the aim of sharing knowledge and experiences in irrigation farming in the region. All the workshop objectives were achieved. Irrigation issues were thoroughly discussed, best irrigation technologies and action plans were identified, and opportunities for the application of these technologies in other SADC Member States were well-articulated. Irrigation farming is the surest way of empowering farmers achieving sustainable livelihoods for the majority of the people in the SADC Region. The challenge is for all SADC Member States to raise the profile of agriculture, and implementation of irrigation farming technologies to fight against hunger, poverty, malnutrition and land degradation.

## XII. Appendices

Appendix 12.1: List of Delegates at the AU-EU Regional Workshop on Irrigation Farming for Small and Medium Scale Farmers, Le Meridien Capital Hotel, Lilongwe, Malawi, 18<sup>th</sup> to 20<sup>th</sup> November 2003

### A. SADC COUNTRIES

No	NAME	TITLE	CONTACT ADDRESS	E-MAIL ADDRESS	COUNTRY/ INSTITUTION
1	Abraham Leshomo	Principal Technical Officer	Ministry of Agriculture, P/Bag 003, Gaborone		Botswana
2	Diirilwe Matoto	Principal Irrigation Engineer	Ministry of Agriculture, P/Bag 003, Gaborone	<a href="mailto:dmatoto@gov.bw">dmatoto@gov.bw</a>	Botswana
3	Khotso Mapepesa	Crops Production Officer	Ministry of Agriculture and Food Security, P.O. Box 75, Mafeteng 900	<a href="mailto:kgmaps@yahoo.com">kgmaps@yahoo.com</a>	Lesotho
4	Mpiti Moeletsi	Agricultural Engineer	Ministry of Agriculture and Food Security P.O. Box 7260, Maseru,100		Lesotho
5	Tendai Tembo	Divisional Irrigation Officer	Blantyre ADD, P/Bag 379, Blantyre 3	<a href="mailto:ship@globemw.net">ship@globemw.net</a>	Ministry/BT
6	Erica Maganga	Programme Manager – Blantyre ADD	Ministry of Agriculture, Irrigation and Food Security, Blantyre		Malawi
7	Chatta Hookom	Head of Irrigation Planning Unit	Irrigation Authority, 12, Edith Cavell Street, Port Louis, Mauritius	<a href="mailto:irrig@inet.mu">irrig@inet.mu</a>	Mauritius
8	Roopesh Ramburn	Technical Officer	Irrigation Authority, 12, Edith Cavell Street, Port Louis, Mauritius	<a href="mailto:irrig@inet.mu">irrig@inet.mu</a>	Mauritius
9	Alberto Tembe	Project Provincial Deputy Director	Ministry of Agriculture and Rural Development, Maputo, Mozambique	<a href="mailto:ssip@tvcabo.co.mz">ssip@tvcabo.co.mz</a>	Mozambique
10	Klaus P. Jacobi	Chief Control Engineering Technician	Ministry of Agriculture, Water and Rural Development, P/Bag 13184, Windhoek, Namibia	<a href="mailto:jacobik@mawd.go.na">jacobik@mawd.go.na</a>	Namibia
11	Erastus Mbereshu	Senior Agricultural Extension Technician	Ministry of Agriculture, Water and Rural Development, P/Bag 13184, Windhoek, Namibia	<a href="mailto:jacobik@mawd.go.na">jacobik@mawd.go.na</a>	Namibia



No	NAME	TITLE	CONTACT ADDRESS	E-MAIL ADDRESS	COUNTRY/ INSTITUTION
12	Peter Estico	Research Officer	Ministry of Agriculture and Marine Resources, P.O. Box 166, Victoria, Mahe	<a href="mailto:vers@seychelles.net">vers@seychelles.net</a>	Seychelles
13	John Rose	Irrigation Officer	Ministry of Agriculture and Marine Resources, P.O. Box 166, Victoria, Mahe	<a href="mailto:vers@seychelles.net">vers@seychelles.net</a>	Seychelles
14	Marna de Lange	Representative for Africa	The International Water Management Institute (IMWI)	<a href="mailto:marna@global.co.za">marna@global.co.za</a>	South Africa
15	Thamsanqa V. Mpanza	Senior Agricultural Officer – Technical Services	Ministry of Agriculture and Cooperatives P.O. Box 162, Mbabane	<a href="mailto:mpanzat@gov.sz">mpanzat@gov.sz</a>	Swaziland
16	Bhekisisa Mkhonta	Irrigation Engineer	Ministry of Agriculture and Cooperatives, Crop Promotion Section, P.O. Box 501, Manzini	<a href="mailto:bonz20002001@yahoo.com">bonz20002001@yahoo.com</a>	Swaziland
17	Mbongo P. Futakamba	Assistant Director – Irrigation Services	Ministry of Agriculture and Food Security P.O. Box 9192, Dar es Salaam, Tanzania	<a href="mailto:irrigation@kilimo.go.tz">irrigation@kilimo.go.tz</a>	Tanzania
18	Vincent J. Chikoleka	Senior Irrigation Engineer	Ministry of Agriculture and Food Security P.O. Box 9192, Dar es Salaam, Tanzania	<a href="mailto:irrigation@kilimo.go.tz">irrigation@kilimo.go.tz</a>	Tanzania
19	George W. Sikuleka	Chief Irrigation Officer	Ministry of Agriculture and Cooperatives P.O. Box 50291, Lusaka, Zambia	<a href="mailto:gwsikuleka@hotmail.com">gwsikuleka@hotmail.com</a>	Zambia
20	Dr. Francis Chigunta	Lecturer	Department of Development Studies, University of Zambia	<a href="mailto:fchigunta@hotmail.com">fchigunta@hotmail.com</a>	Zambia
21	R.J. Chitsiko	Director	Ministry of Lands, Agriculture and Rural Resettlement , Harare, Zimbabwe		Zimbabwe
22	Rindayi G. Chimonyo	Project Manager	The Platform on Women's Land and Water Rights in Southern Africa 13 Langhan University of Zimbabwe, Harare	<a href="mailto:wlwrsa@africaonline.co.zw">wlwrsa@africaonline.co.zw</a>	Zimbabwe

#### **B. AFRICAN UNION**

23	Dr. Ibrahima Diallo	Director of Rural Economy and Agriculture	African Union Commission, P.O. Box 3243, Addis Ababa	<a href="mailto:ibrahima_diallo@hotmail.com">ibrahima_diallo@hotmail.com</a>	African Union
24	Ms. Susan Sikaneta	Executive Secretary	African Union, Southern Africa Regional Office, P.O. Box 30898, Lilongwe 3	<a href="mailto:oau-saro@malawi.net">oau-saro@malawi.net</a>	African Union

**C. NEPAD**

No	NAME	TITLE	CONTACT ADDRESS	E-MAIL ADDRESS	COUNTRY/ INSTITUTION
25	Prof. Richard M. Mkandawire	Agriculture Advisor	NEPAD Secretariat, P.O. Box 1234, Midrand 1685	<a href="mailto:mkandawirer@nepad.org">mkandawirer@nepad.org</a>	NEPAD
26	Reatile T. Mochebelele	Water and Sanitation Advisor	NEPAD Secretariat, P.O. Box 1234, Midrand 1685	<a href="mailto:mocheberlt@nepad.org">mocheberlt@nepad.org</a>	NEPAD
27	Louis Gnagbe	Media Manager	NEPAD Secretariat, P.O. Box 1234, Midrand 1685	napog@nepad.org	NEPAD
28	Rapitse Montsho	Head Imaging	NEPAD Secretariat, P.O. Box 1234, Midrand 1685	<a href="mailto:rapitse@nepad.org">rapitse@nepad.org</a>	NEPAD

**D. SADC SECRETARIAT**

29	Mrs. Margaret Nyirenda	Supervisor	Food Agriculture and Natural Resources Directorate, SADC Secretariat, P/Bag 0095, Gaborone,	<a href="mailto:mnyirenda@sadc.int">mnyirenda@sadc.int</a>	SADC
30	Dr. Calvin Nhira	Coordinator	Land and Water Programme SADC Secretariat, P/Bag 0095, Gaborone		SADC

**E. EU MOZAMBIQUE**

31	Bernard Lynnoaz	Regional Food Security Expert	European Union Delegation in Mozambique		EU/ Mozambique
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**D. EU MALAWI**

32	Mr. Paul Ginies	Food Security Expert	Food Security Programme, European Union P.O. Box 30102, Lilongwe 3	Paul.GINIES@cec.eu.int	EU/Malawi
33	Claire Barrault	Information and Communications Office	Food Security Programme, European Union, P.O. Box 30102, Lilongwe 3	<a href="mailto:Claire.BARRAULT@cec.eu.int">Claire.BARRAULT@cec.eu.int</a>	EU/Malawi
34	Bart Massime	Rural Development Advisor	European Union, P.O. Box 30102, Lilongwe		EU/Malawi
35	Mia Frick	Financial Officer	European Union, P.O. Box 30102, Lilongwe		EU/Malawi

No	NAME	TITLE	CONTACT ADDRESS	E-MAIL ADDRESS	COUNTRY/ INSTITUTION
36	Tomaida Msiska	Food Security Project Manager	European Union, P.O. Box 30102, Lilongwe 3		EU/Malawi
37	Adriaan Esterhuizen	Programme Manager	Government of Malawi/European Union Public Works Programme, P.O. Box 1071, Lilongwe	<a href="mailto:adriaan@pwp.co.mw">adriaan@pwp.co.mw</a>	GoM/EU Public Works Programme
38	Rose Bell	Forestry and Irrigation Manager	Government of Malawi/European Union Public Works Programme, P.O. Box 1071, Lilongwe	<a href="mailto:roseb@pwp.comw">roseb@pwp.comw</a>	GoM/EU Public Works Programme
39	Moses Mumba	Deputy Irrigation Manager	Government of Malawi/European Union Public Works Programme, P.O. Box 1071, Lilongwe	<a href="mailto:moses@pwp.co.mw">moses@pwp.co.mw</a>	GoM/EU Public Works Programme
40	Timothy Mahoney	Environmentalist	Government of Malawi/European Union Public Works Programme, P.O. Box 1071, Lilongwe	<a href="mailto:moses@pwp.co.mw">moses@pwp.co.mw</a>	GoM/EU Public Works Programme

#### F. FAO

41	Dr. T. Zaw	Irrigation Expert	FAO, P.O. Box 30750, Lilongwe 3		
42	Mr. C. Ferrand		FAO, P.O. Box 30750, Lilongwe 3		
43	Ms. C. Caron				

#### G. JICA

44	K. Matsushima	Project Formulation Advisor	JICA Malawi Office, P.O. Box 30321, Lilongwe 3	<a href="mailto:jicamw@jicamw.org">jicamw@jicamw.org</a>	JICA/Lilongwe
45	K. Hashiguchi	General Manager	Sanyu Consultant, JICA Malawi Mission Study, P.O. Box 30321, Lilongwe 3		
46	Matthews M. Ngwira	Assistant Irrigation Officer	JICA Study Mission, P.O. Box 30321, Lilongwe 3		
47	James Chikhungu	Irrigation Officer	JICA Study Mission, .P.O. Box 30321, Lilongwe 3		

#### H. OTHER DELEGATES FROM MALAWI

No	NAME	TITLE	CONTACT ADDRESS	E-MAIL ADDRESS	COUNTRY/ INSTITUTION
48	Roger Wilson	Head of DFID	DFID, British High Commission, P.O. Box 30042, Lilongwe 3	<a href="mailto:r-wilson@dfid.gov.uk">r-wilson@dfid.gov.uk</a>	DFID/Lilongwe
49	Dr. G. Chinkhuntha	Executive Director	Tikondwe Freedom Gardens, P.O. Box 70, Lumbadzi	<a href="mailto:drchinkhuntha@hotmail.com">drchinkhuntha@hotmail.com</a>	Farmer/Lilongwe
50	Dr. Charles Matabwa	Principal Secretary	Ministry of Agriculture, Irrigation and Food Security, P.O. Box 30134, Lilongwe	<a href="mailto:cjmatabwa@globemw.net">cjmatabwa@globemw.net</a> <a href="mailto:cjmatabwa@mw.celtelplus.com">cjmatabwa@mw.celtelplus.com</a>	Ministry/Lilongwe
51	Charles Kambauwa	Deputy Director – Regional Integration	Ministry of Foreign Affairs and International Cooperation, P.O. Box 30315, Lilongwe 3	<a href="mailto:cjkambauwa@yahoo.com">cjkambauwa@yahoo.com</a>	Ministry/Lilongwe
52	Andrew Mzembe	Agriculture Coordinator	World Vision Malawi Smallholder Food Security Project, P.O. Box 31983, Blantyre 3	<a href="mailto:Chrispin_Magombo@wvi.org">Chrispin_Magombo@wvi.org</a>	NGO/Blantyre
53	Zwide D. Jere	Country Director	Total Land Care, P.O. Box 2440, Lilongwe	<a href="mailto:sdi@malawi.net">sdi@malawi.net</a>	NGO/Blantyre
54	Redge Masupayi	Deputy Executive Director	Media NGO, The Story Workshop, P/Bag 266, Blantyre	<a href="mailto:masupayi@sdp.org.mw">masupayi@sdp.org.mw</a>	NGO/Blantyre
55	Lance Ngulube	Editor of Tilime Newsletter	National Initiative for Civic Education (NICE), P/Bag 387, Lilongwe	<a href="mailto:lancengulube@yahoo.co.uk">lancengulube@yahoo.co.uk</a>	NGO/Lilongwe
56	N.J. Mulenga	Director	Land Resources Conservation, P.O. Box 30291, Lilongwe 3	<a href="mailto:landcons@malawi.net">landcons@malawi.net</a>	Ministry/Lilongwe
57	Dickxie Kampani	Project Coordinator	Emergency Drought Recovery Project, P.O. Box 30778, Lilongwe 3	<a href="mailto:dkampani@edrpmw.com">dkampani@edrpmw.com</a>	NGO/Lilongwe
58	Diane Gooche	Country Representative	COSPE – Development of Emerging Countries, P.O. Box 125, Salima	<a href="mailto:cospengolowindo@mw.celtelplus.com">cospengolowindo@mw.celtelplus.com</a>	NGO/Salima
59	Harold Msusa	Agronomist	Malawi Enterprise Zone Association P/Bag 91, Lilongwe	<a href="mailto:veza@malawi.net">veza@malawi.net</a>	NGO/Lilongwe
60	Harris Mfune	Country Representative	Harvest Help/Find Your Feet, P/Bag B495, Lilongwe 3	<a href="mailto:hhyf@malawi.net">hhyf@malawi.net</a>	NGO/Lilongwe
61	Rodolph Galeotti	Project Coordinator	COSPE – Development of Emerging Countries, P.O. Box 125, Salima	<a href="mailto:cospengolowindo@mw.celtelplus.com">cospengolowindo@mw.celtelplus.com</a>	NGO/Lilongwe

No	NAME	TITLE	CONTACT ADDRESS	E-MAIL ADDRESS	COUNTRY/ INSTITUTION
62	Andrea Ambroso	Country Co-ordinator	COOPI – Cooperazine Internazionale, Lilongwe	<a href="mailto:lilongwe@coopi.org">lilongwe@coopi.org</a>	NGO/Salima
63	Edson Musopole	Food Security Policy Coordinator	ActionAid Malawi, P.O. Box 30735, Lilongwe 3		NGO/Lilongwe
64	Jim Yiannakis	Project Agronomist	Movimondo, P.O. Box 194, Mangochi	<a href="mailto:movimalawi@yahoo.com">movimalawi@yahoo.com</a>	NGO/Mangochi
65	Everton Muwalo	Technical Coordinator	GTZ Kajikhomere Kulima Concept Project, P.O. Box 228, Rumphi	<a href="mailto:Kulima-concept@malawi.net">Kulima-concept@malawi.net</a>	NGO/Rumphi
66	Darwin D. Singa	Lecturer – Irrigation Engineering	Bunda College of Agriculture, P.O. Box 219, Lilongwe	<a href="mailto:dodoma@bunda.sdnw.org.mw">dodoma@bunda.sdnw.org.mw</a>	University/Lilongwe
67	Felix Minjale	Agriculture Coordinator	Eagles Relief and Development Programme, Blantyre	<a href="mailto:eagles@malawi.net">eagles@malawi.net</a>	NGO/BT
68	Michael Ching'amba	Training Consultant	Natural Resources College, P.O. Box 143, Lilongwe	<a href="mailto:ncr@malawi.net">ncr@malawi.net</a>	College/LL
69	Everson Kalonga	Programme Manager	Africare, P.O. Box 2346, Lilongwe	<a href="mailto:everson@africare.mw.org">everson@africare.mw.org</a>	NGO/LL
70	Ian Kumwenda	National Coordinator	Malawi Agricultural Sector Investment Programme, P/Bag 8, Lilongwe	<a href="mailto:iankumwenda@malawi.net">iankumwenda@malawi.net</a>	NGO/LL
71	Boniface Kumwenda	District Coordinator	Concern Universal, P.O. Box 1535, Blantyre	<a href="mailto:cuka@sdnp.mw.org">cuka@sdnp.mw.org</a>	NGO/BT
72	Joseph Nagoli	Project Manager	Concern Universal, P.O. Box 1535, Blantyre	<a href="mailto:joseph.nagoli@concern-universal.org">joseph.nagoli@concern-universal.org</a>	NGO/BT
73	Dr. B. Munthali	Controller of Agricultural Extension and Technical Services	Controller of Agricultural Extension and Technical Services, P.O. Box 30134, Lilongwe 3	<a href="mailto:brucemunthali@hotmail.com">brucemunthali@hotmail.com</a>	Ministry/Malawi
74	Mr. E.E. Lodzeni	Director of Finance and Administration	Ministry of Agriculture, Irrigation and Food Security, P.O. Box 30134, Lilongwe	<a href="mailto:lodzenie@yahoo.com">lodzenie@yahoo.com</a>	Ministry/Malawi
75	Grange Antony	Programme Officer	Food Security, Dan Church Aid, P/Bag 282. Lilongwe	<a href="mailto:dca@malawi.net">dca@malawi.net</a>	NGO/Malawi

No	NAME	TITLE	CONTACT ADDRESS	E-MAIL ADDRESS	COUNTRY/ INSTITUTION
76	C.M. Kanyenda	Director of Agricultural Extension Services	Ministry of Agriculture, P.O. Box 30134, Lilongwe		Ministry/Malawi
77	Rev. L.C.H. Katundu	Irrigation and Food Programme Manager	Nkhoma Synod, Lilongwe		Mission/LL
78	Mr. Sandram C.Y. Maweru	Director of Irrigation Services	Irrigation Department, P.O. Box 30797, Lilongwe 3	<a href="mailto:irrigation@sdpn.org.mw">irrigation@sdpn.org.mw</a> <a href="mailto:smaweru@sdpn.org.mw">smaweru@sdpn.org.mw</a>	Ministry/Malawi
79	Trent Bunderson	Regional Director	Total Land Care	<a href="mailto:sdi@malawi.net">sdi@malawi.net</a>	NGO/Lilongwe
80	Joseph Chidanti Malunga	Lecturer	Bunda College, P.O. Box 219, Lilongwe	<a href="mailto:jdanti@bunda.sdpn.org.mw">jdanti@bunda.sdpn.org.mw</a>	College/Lilongwe
81	Dr. A. R. Saka	Assistant Director of Research	Ministry of Agriculture, P.O. Box 30134, Lilongwe 3		Ministry/Malawi
82	Patrick Kabambe	Director of Planning	Ministry of Agriculture, P.O. Box 30134, Lilongwe 3		Ministry/Malawi
83	Dr. Muloza Banda	Irrigation Lecturer	Bunda College , P.O. Box 219, Lilongwe	<a href="mailto:irrigation@sdpn.org.mw">irrigation@sdpn.org.mw</a>	College/Malawi
84	E.P. Ching'amba	Programme Manager	Karonga ADD		Ministry/Malawi
85	Dr. G. Mtitta	Deputy Programme Manager	Lilongwe ADD		Ministry/Malawi
86	A.J.L. Khonje	Deputy Director of Irrigation Services	Ministry of Agriculture, P.O. Box 30797, Lilongwe 3	<a href="mailto:irrigation@sdpn.org.mw">irrigation@sdpn.org.mw</a>	Ministry/Malawi
87	Prof. Z.M. Kasomekera	Professor in Water Resources Engineering	National Water Development Project, Lilongwe		
88	Aggrey Mfune	Executive Director	Malawi Enterprise Zone Association P/Bag 91, Lilongwe	<a href="mailto:veza@malawi.net">veza@malawi.net</a>	NGO/Lilongwe
89	Charles Kambauwa	Deputy Director Regional Integration	Ministry of Foreign Affairs and International Cooperation, P.O. Box 30315, Lilongwe 3	<a href="mailto:cjkambauwa@yahoo.com">cjkambauwa@yahoo.com</a>	Ministry/Lilongwe

**I. MEDIA**

No	NAME	TITLE	CONTACT ADDRESS	E-MAIL ADDRESS	COUNTRY/ INSTITUTION
90	W.R. Kapindu	Technician	Agriculture Communication Branch, Ministry of Agriculture, P.O. Box 30134, Lilongwe 3		Ministry/Malawi
91	D.L. Yona	Chief Agriculture Communications Officer	Agriculture Communication Branch, Ministry of Agriculture, P.O. Box 30134, Lilongwe 3		Ministry/Malawi
92	Andrew Mahiyu	Agriculture Radio Programmes Officer	Agriculture Communication Branch, Ministry of Agriculture, P.O. Box 30134, Lilongwe 3		Ministry/Malawi
93	F.S. Chagwera	Photographer	Agriculture Communication Branch, Ministry of Agriculture, P.O. Box 30134, Lilongwe 3		Ministry/Malawi
94	Austin Kachipeya	Reporter	Television Malawi		Media
95	Montgomarley Phimba	Cameraman	Television Malawi		Media
96	George Ntonya	Senior Reporter	Nation Newspaper		Media
97	Rabbecca Chimjeka	Reporter	UDF News		
98	I. Mkandawire	MBC Reporter	Malawi Broadcasting Corporation		Media
99	Peter Luhanga	Journalist	FM 101 Power		Media

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Appendix 12.2: Programme for the AU-EU Regional Workshop on Irrigation Farming for Small and Medium Scale Farmers, Le Meridien Capital Hotel, Lilongwe, Malawi 18<sup>th</sup> to 20<sup>th</sup> November, 2003

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TUESDAY, 18<sup>th</sup> NOVEMBER 2003

0800 HRS	:	WELCOME, INTRODUCTIONS AND ADMINISTRATIVE ANNOUNCEMENTS (DIRECTOR OF CEREMONIES – DR. BRUCE MUNTHALI, CONTROLLER OF AGRICULTURAL EXTENSION AND TECHNICAL SERVICES)
0900 HRS	:	PRESENTATIONS/KEYNOTE ADDRESS <ul style="list-style-type: none"><li>• THE EU (MR. PAUL GINIES, FOOD SECURITY EXPERT)</li><li>• SADC (MS. MARGARET NYIRENDA, SUPERVISOR-FOOD, AGRICULTURE AND NATURAL RESOURCES)</li><li>• NEPAD (PROF. RICHARD MKANDAWIRE, AGRICULTURE ADVISOR)</li></ul>
1045 HRS	:	TEA BREAK
1100 HRS	:	GROUP PHOTOGRAPH
1045 HRS	:	COUNTRY PRESENTATIONS
1300 HRS	:	LUNCH BREAK
1430 HRS	:	CONTINUATION OF COUNTRY PRESENTATIONS
1500 HRS	:	PRESENTATIONS <ul style="list-style-type: none"><li>• THE EU PUBLIC WORKS PROGRAMME (MR. ADRIAN ESTERHUIZEN, PROGRAMME MANAGER)</li><li>• JICA (MR. K. HASHIGUCHI, SANYU CONSULTANT, JICA STUDY MISSION LEADER)</li><li>• FAO (DR. T. ZAW, IRRIGATION EXPERT)</li></ul>
1630 HRS	:	TEA BREAK
1700 HRS	:	OFFICIAL OPENING OF THE WORKSHOP <ul style="list-style-type: none"><li>• WELCOME REMARKS BY MS. SUSAN SIKANETA, EXECUTIVE SECRETARY, AFRICAN UNION SOUTHERN AFRICA REGIONAL OFFICE</li><li>• REMARKS BY THE EUROPEAN UNION ACTING HEAD OF DELEGATION, MR. LELLIS BRAGANZA</li><li>• OFFICIAL OPENING BY THE 2<sup>ND</sup> VICE PRESIDENT OF THE REPUBLIC OF MALAWI AND MINISTER OF AGRICULTURE, IRRIGATION AND FOOD SECURITY, HON. CHAKUFWA CHIHANA</li></ul>
1900 HRS	:	RECEPTION IN HONOUR OF THE DELEGATES

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THURSDAY, 20<sup>th</sup> NOVEMBER 2003

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0800 HRS	:	<b>KEY NOTE ADDRESS BY THE COMMISSIONER FOR RURAL DEVELOPMENT AND AGRICULTURE OF THE AFRICAN UNION COMMISSION, MRS. ROSEBUD KURWIJILA (READ ON HER BEHALF BY DR. IBRAHIMA DIALLO, DIRECTOR OF RURAL ECONOMY AND AGRICULTURE, AFRICAN UNION COMMISSION)</b>
0830 HRS	:	<b>PLENARY SESSION TO DISCUSS IRRIGATION SCHEMES VISITED</b> (FACILITATOR: DR. BRUCE MUNTHALI, CONTROLLER OF AGRICULTURAL EXTENSION AND TECHNICAL SERVICES)
0930 HRS	:	<b>DEMONSTRATIONS OF TREADLE PUMPS BY TOTAL LAND CARE, MG INDUSTRIES AND FAO</b> (FACILITATORS - MR FERRAND - MS CARON)
1030 HRS	:	TEA BREAK
1045 HRS	:	<b>GROUP DISCUSSIONS ON LESSONS LEARNT, IMPACT, CONDITIONS FOR SUCCESSFUL SCHEMES AND THE WAY FORWARD</b> (FACILITATOR: DR. Z. KASOMEKERA, IRRIGATION ENGINEER)
1230 HRS	:	LUNCH BREAK
1400 HRS	:	<b><u>GROUP REPORTS AND PLENARY DISCUSSIONS</u></b> (FACILITATOR: DR. B. MUNTHALI, CONTROLLER OF AGRICULTURAL EXTENSION AND TECHNICAL SERVICES)
1530HRS	:	<b>ADOPTION OF CONCLUSIONS, RECOMMENDATIONS AND PLAN OF ACTION</b> (FACILITATOR : DR. B. MUNTHALI, CONTROLLER OF AGRICULTURAL EXTENSION AND TECHNICAL SERVICES)
1700 HRS	:	<b><u>OFFICIAL CLOSING</u></b> (THE DEPUTY MINISTER OF ECONOMIC PLANNING & DEVELOPMENT, HON. KHWAULI MSISKA, M.P.)

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