Financing Series

Financing Small-Scale Irrigation in Sub-Saharan Africa

Part 2: Country Case Study Kenya

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gtz

On behalf of
Federal Ministry
for Economic Cooperation
and Development

THE WORLD BANK

Table of Contents

Annex:

List of Figures

List of Tables

Acronyms

AFC	Agricultural Finance Corporation
AFRACA	African Rural and Agricultural Credit Association
AGRIVET Shop	Local Store Selling Agricultural Inputs and Veterinary Medicines
AMFI	Association of Microfinance Institutions
ASCA	Accumulating Savings and Credit Association
ASAL	Arid and Semi-Arid Land
CBCP	Commodity Based Credit Provider
CBFO	Community-based Financial Organization
CBK	Cooperative Bank of Kenya
CBO	Community-based Organization
DFID	Department for International Development
DFI	Development Finance Institution
DIU	District Irrigation Unit
EBL	Equity Bank Ltd.
EBL	Equity Bank Limited
ERS	Economic Recovery Strategy
EurepGAP	European Retailer Produce Working Group on Good Agricultural Practises
FAO	Food and Agricultural Organisation
FC	Financial Cooperation
FFBS	Family Finance Building Society
FI/FIs	Financial Institution(s)
FINSRC	Financial Sector Reform Credit
FOSA	Front Office Service Activities
FSA	Financial Service Association
FSDP	Financial Sector Deepening Program
GDP	Gross Domestic Product
GOK	Government of Kenya
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HCDA	Horticultural Crops Development Authority
IDD	Irrigation and Drainage Department (in MoWI)
IFAD	International Fund for Agricultural Development
IPRSP	Interim Poverty Reduction Strategy Paper
JICA	Japan International Cooperation Agency
KADET	Kenya Agency for the Development of Enterprise and Technology
KARI	Kenya Agricultural Research Institute
KCB	Kenya Commercial Bank
KDA	K-Rep Development Agency
KfW	Kreditanstalt für Wiederaufbau
K-REP	Kenya Rural Enterprise Programme
KERUSSU	Kenya Rural Savings and Credit Cooperative Societies Union
KSh	Kenya Shilling
KUSCCO	Kenya Union of Savings and Credit Cooperatives
KWFT	Kenya Women Finance Trust
MFI	Microfinance Institution
MIS	Management Information System

MoA	Ministry of Agriculture
MoALD	Ministry of Agriculture and Livestock Development
MoWI	Ministry of Water and Irrigation
MoWRM&D	Ministry of Water Resources Management & Development
MSE	Micro and Small Enterprises
NBFI	Non-Banking Financial Institutions
NGO	Non-Governmental Organisations
NIB	National Irrigation Board
NPL	Non-Performing Loan
OBA	Output-Based Approach
O&M Cost	Operation & Maintenance Cost
PPP	Private-Public-Partnership
RMFI	Rural and Micro Finance Institutions
PIU	Provincial Irrigation Unit
ROSCA	Rotating Savings and Credit Association
SACCO	Savings and Credit Cooperative Society
SIPMK	Smallholder Irrigation Program Mount Kenya
SISDO	Smallholder Irrigation Scheme Development Organisation
SME	Small and Medium Enterprise
SMEP	Small and Micro Enterprise Program
SRA	Strategy for Revitalizing Agriculture
SSA	Sub-Saharan Africa
SSIU	Small-Scale Irrigation Unit
TC	Technical Cooperation
UNOPS	United Nations Office for Project Services
USAID	United States Agency for International Development
WUA	Water Users Association

Exchange Rate

1.00 US$ = KSh 75.00

1 Introduction

The World Bank commissioned GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit - GTZ - GmbH) to undertake this study on 'financing small-scale irrigation in Sub-Saharan Africa'. The study is being carried out in a process of three consecutive steps:

- step 1: the initial desk study examined the accessible literature and reviewed it with regard to current experiences in the use of financial services in expanding the application of small-scale irrigation (SSI) technology in Sub-Saharan Africa (SSA);
- **step 2: a country case study** carried out in Kenya was designed to gather practical experience on the role of financial services in SSI implementation**;**
- step 3: final report with summary of the results of the literature review and country case study and preparation of concepts and strategies for strengthening financial services to the promotion of SSI in countries of SSA.

This country case study took place in Kenya between July 23 and August 5th, 2006. During the course of the mission, the country offices of the World Bank, Japan International Cooperation Agency (JICA), GTZ, Kreditanstalt für Wiederaufbau (KfW), and Deutscher Entwicklungsdienst (DED) were visited. Contacts were established and discussions were held with representatives or staff of other donors such as the International Fund for Agricultural Development (IFAD), the Department for International Development (DFID), the United Nations Office for Project Services (UNOPS), the United States Agency for International Aid (USAID) as well as relevant Kenyan ministries including Ministry of Water and Irrigation (MoWI), Ministry of Agriculture (MoA), Ministry of Finance, Ministry of Cooperative Development. Discussions with the management of leading financial institutions in Nairobi and Embu (Cooperative Bank, Equity Bank, K-Rep Bank, Kenya Women Finance Trust - KWFT, Kenya Agency for the Development of Enterprise and Technology - KADET Ltd.) gave important insights about the financial sector in the country, especially the rural sub-sector. Financial infrastructure institutions such as Oikocredit, the African Rural and Agricultural Credit Society - AFRACA, and K-Rep Advisory services were also visited. A field visit to Embu and Meru districts allowed to gather practical insights into the planning and operation of community irrigation projects as well as SSI systems used by individual small-scale farmers. The trip also provided an opportunity for discussions with the Agricultural Finance Corporation (AFC), the Embu district cooperative office and the Embu district irrigation office. In a final meeting in Nairobi, an 'expert round table' was organized were the preliminary results of the study were shared and feedback was obtained for further conceptual development.[1]

The scope of the study covers according to the terms of reference the following aspects:

- analyse within the context of the general framework conditions of the country - the current situation and major development trends in the demand and supply of SSI;
- review in the sectoral development context importance and potential of small-scale farmers and water user groups in irrigation development;

[1] References of the literature review are provided at the end of the document; the mission schedule is provided in Annex 3.

- provide by type of relevant irrigation systems/technologies typical examples on the related establishment, maintenance and operation costs, how these are financed and the related demand for financial services;
- assess the supply side of financial services including the institutional set-up and policy as well as regulatory aspects;
- analyse existing performances and experiences together with already existing best practices and innovative technologies in financial service provisions to water user groups and individual farmers active in SSI activities;
- review relevant sectoral government programmes, policies and strategies;
- provide information on the support to the sector by donors;
- identify/analyse key constraints and need for improvement and support on the different levels (macro, meso, micro levels) of the financial system;
- develop and review options for financing approaches towards SSI development;
- prepare a concept with key strategies in a financial system development approach for the introduction, strengthening and scaling-up of financial services in the SSI sector which are specifically geared towards the conditions, demand and financing needs of water user groups and SSI farmers in the partner country. In the process of concept and strategy preparation relevant general and sectoral financial service experiences as well as the results of the country case study workshop were to be taken into account;
- identify complementary services such as extension and training in organisational-technical aspects, and measures for quality-assurance as well as other supporting measures on the side of the enabling environment in the irrigation and financial sectors;
- provide recommendations on the potential roles of national stakeholders and donor organizations in development concepts.

This report is divided into eight chapters. Chapter 1 provides the background and objectives of the study. Chapter 2 gives a brief overview of Kenya's development strategies. Chapter 3 gives the background on the scope and challenges of SSI implementation in Kenya. In chapter 4, the demand and supply of financial services to SSI farmers is outlined as well as the strengths and constraints faced by the rural financial sub-sector. Chapter 5 analyses the current progress and strategies for the use of financial services in SSI. Chapter 6 gives an overview of the most relevant donor initiatives. Chapter 7 provides conclusions on the actual situation in Kenya, followed by proposed concepts with key strategies in chapter 8.

2 Major Development Policies and Strategies

2.1 Background – Development Challenges

The 1999 census established a population total of 28.7 million. Given an annual growth rate of about 2.5% the total population is now estimated to be in excess of 33 million people, of which a high rate of about 56% live below the national poverty line. Over 80% of households affected by poverty live in rural areas. It is estimated that more than 50% of all Kenyan households are food-insecure. To address this deficit, the government alone spends US$ 40 - 65 million annually on famine relief. (24)

Kenyan post-independence economic history can be divided into two eras. The first from 1963 to the beginning of the 1980s is characterized by strong economic performance and enormous gains in social outcomes. Economic growth of more than 6% on average contributed to substantial real per capita income increases that were two-thirds higher in 1980 than in 1963. A second period from the 1980s to the early 2000 is typified by sluggish or negative growth, mounting macroeconomic imbalances and significant losses in incomes and social welfare with negative effects on poverty and life expectancy. (45) Failure to reform and the increased role of politics over policy are the main reasons of this structural break. (45)

In recent years the Kenyan economy has started to recover from what has been the countries longest recession and is growing in spite of the negative effects of resurgence of drought, the high price of oil and a sharp deterioration in the terms of trade again at average rates of about 5%. (3) The average per capita income in this low income country amounts to about US$ 400 (2004).

2.2 Relevant Policies and Development Strategies

2.2.1 General Policies

(1) The 'Economic Recovery Strategy' (ERS)

The economic performance of the country's economy has been well below potential for many years. In an attempt to turn the tide, the National Rainbow Coalition administration that took office on 30 December 2002 embarked on reforms aimed at jumpstarting the economy in order to create additional jobs, improve governance, and reduce poverty levels. In June 2003, the government put in place the ERS for 2003 – 2007, which, as part of a broader reform agenda, aims to create opportunities for productive employment. (1) This is to be achieved by rebuilding sound governance structures, addressing the country's main macroeconomic vulnerabilities – particularly the weak budgetary position, large domestic debt, and strained financial system – and reforming the parastatal sector, labour markets and the trade system to foster a more competitive economy.

ERS and agriculture: the *ERS* sees agriculture as the backbone of the national economy and an important vehicle to create employment and reduce poverty. The sector contributes directly 26% of the gross domestic product (GDP) and adds indirectly through manufacturing, distribution and service-related sectors another 27%. At the same token 60% of the export earnings are derived from agriculture. The

strategy stresses the potential role of the private sector in agricultural development, especially in production and value addition.

ERS and the financial sector: the government has identified poor access to farm credit and financial services as contributing factors to the decline in agricultural productivity. One of the pillars of the ERS is to foster economic growth, supported by reforms in the financial sector. The strategy to achieve these reforms is to strengthen the intermediation role of the financial sector. The major problems referred to in the ERS include:

- an excessive ratio of non-performing loans in some major banks;
- ineffective competition in the banking sector and in the non-banking financial institutions (NBFI);
- persistence of wide interest rate spreads and so a high cost of credit;
- insufficient quantities of credit;
- insufficient depth of access to banking services for the Kenyan public;
- absence of vibrant institutions for long term finance;
- weak legal arrangements creating long delays in contract enforcement and dispute resolution.

In the months following the publication of the ERS, the government implemented various policy actions to address the problems. However, the solutions offered have mainly been specific to particular aspects of the problem with only a limited recognition of the interdependent nature of most of the issues listed above. The development of a comprehensive and integrated banking strategy for the medium term is now under preparation. (66) The privatization of state-influenced banks is another priority.

ERS and microfinance: the ERS identifies microfinance as one of the sectors that will facilitate economic recovery, and it outlines various measures that will be undertaken to facilitate the development of the sector. Key among them is the passage of the Microfinance Bill, which will provide a legal and regulatory framework for the industry. The Bill is expected to be enacted into law by the end of 2006.

(2) The 'Interim Poverty Reduction Strategy Paper 2000 - 2003' (IPRSP)

More than half of Kenya's population lives in poverty. The problem is most pronounced in the western part of the country. The IPRSP analyses the different aspects of poverty and has set as major policy objectives:

- to facilitate sustained and rapid economic growth;
- to improve governance and security;
- to increase the ability of the poor to raise their incomes;
- to improve the quality of life of the poor;
- to improve equity and participation.

From these objectives flows a wide array of activities aiming to improve the different facets of life important for poverty reduction (e.g. income, literacy, health, access to resources, etc.). The IPRSP identifies agriculture as the main engine for economic growth. It states that the agricultural sector needs to grow by 5 to 6% annually in order to lead to broad-based economic development. Such a growth rate can only be achieved through the intensification of agricultural production especially using irrigation, but also through increased use of farm inputs and the availability of better extension services to the farmers. The strategy identifies the lack of access to finance as one of the major constraints. A large number of Kenyans derive their

livelihood from small-scale farming as well as micro and informal business enterprises. Their lack of access to adequate finance limits their ability to emerge from poverty through productive activities. (22)

Financial institutions offering innovative financial products tailored to the socio-economic conditions of this particular clientele are depicted in the IPRSP as important partners of the government.

(3) The 'Water Act of 2002'

The Water Act (23) reorganizes the institutional set-up in the water sector with the objective of clarifying and delineating roles and enhancing accountability by the various institutions involved. The implementation of the water sector reforms commenced in March 2003 following the enactment of the Water Act. The Act provides for the following reforms:

- improved management of water resources;
- reduction of the role of government in direct service provision;
- provision for greater community participation in the management of water resources and provision of water supplies.

The new water policy has provided for an integrated approach to water development. Most significant is the inclusion of the responsibility for irrigation into the MoWI's portfolio of responsibilities. Although, the water policy does not deal with irrigation per se, it lays the foundation for the institutional framework that regulates and manages water use in all its facets across all sectors. The Water Resources Management Authority established under the act bears the overall administrative responsibility for the management of all the country's water resources on the basis of the following powers and functions (23):

- to develop principles, guidelines and procedures for the allocation of water resources;
- to monitor, and from time to time reassess, the national water resources management strategy;
- to grant and monitor permits for water use and to determine charges to be imposed for the use of water from any water resource;
- to regulate and protect water resources quality from adverse impacts;
- to manage, monitor and protect water catchments and liaise with other stakeholders;
- to advise the Minister concerning any matter in connection with water resources.

The Water Act regulates the hierarchy for different development objectives that prioritizes state objectives over community objectives and individual plans respectively. Without mentioning irrigation specifically the Water Act defines a wide range of procedures that govern the access of all water users to this scarce resource.

2.2.2 Agricultural Policies

Kenya has a total land area of 582,646 km², of which about 116,000 km² receive adequate rainfall. About 60% (70,000 km²) of this medium to high potential land is mainly used for agricultural and horticultural production. These fertile regions are largely used by small-scale farms with an average farm size of about 1 ha who account for 75% of the total agricultural output and 70% of the marketed agricultural produce.(24)

Kenya has in the past mainly relied on rainfed agricultural production to meet its food requirement. The country has meanwhile even in years with normal rainfall a shortfall of production in maize, wheat, oil crops and sugar and relies on supplementary imports in several staple food commodities. Whilst staple food production stagnates is the cultivation of cash or commercial crops on the increase. Especially the horticultural sector has expanded, making it the second most important foreign exchange earner after tea. Export volumes of fresh horticultural produce grew from about 57,000 tonnes (value KSh 2.5 billion) in 1992 to 121,000 tonnes the year 2002 (value KSh 26.7 billion). (52)

Strategy for Revitalizing Agriculture 2004 - 2014 (SRA)

The SRA aims at creating a vibrant agricultural sector. It proposes far-reaching policies and institutional changes by involving civil society, individual farmers, farmers' organisations and the private sector. The following five areas have been identified as crucial intervention fields:

- reform of the legal and regulatory framework governing operations for farmers, processors, and of other agro-related activities;
- promotion of research and technology development;
- reform of the extension service system and its respective linkages;
- development of a market-based agricultural credit and input system;
- promotion of domestic processing of agricultural produce providing opportunities for value-addition, employment creation and foreign exchange earnings.

Under increasing population pressure the available medium to high potential land per capita is steadily on the decrease. As farm sizes are getting smaller the proportion of rural households with insufficient income levels to even secure their basic food needs and the number of people living in poverty is steadily on the increase. Land use intensification in the medium to high potential areas, for which considerable potential exists, continues to be one of the key strategies to be supported.

The arid and semi-arid land areas (ASAL), accounting for nearly 80% of Kenya's land mass, are largely used for livestock production. They have at present a comparatively low population density but are expected to absorb in areas with development potential an increasing stream of landless immigrants from the high potential areas. The potential in the intensification of production in the ASAL is planned to be tapped through the following measures:

- accelerated irrigation and drainage development and management;
- water harvesting for livestock and crop production;
- improved range management.

The SRA proposes to encourage the development of financial institutions through the enactment of facilitative legislation and to encourage commercial banks to set up operations in the rural areas by providing appropriate incentives. (37)

2.2.3 Irrigation Policy

The government in all its recent policy statements and strategies identified irrigation as a key element for the intensification and expansion of agricultural production, for achieving national food security and for increasing the country's market share on the international markets. These objectives are to be attained through the intensified use of the country's water and land resources especially also in ASAL regions.

The overall responsibilities for irrigation with all its facets lie with the MoWI which is governed in its activities by the Water Act 2002. The operations of the National Irrigation Board (NIB) and its activities in the large-scale schemes of the country are being governed by a specific act. The area under the jurisdiction of the NIB currently accounts for less than 10% of the irrigated land in the country.

An irrigation policy is presently under preparation by the government. A draft policy paper on irrigation and drainage was prepared in 2003. The adoption and implementation of the irrigation policy is expected to lead to 'improved performance in the agricultural sector arising from expansion of the irrigation and drainage sub-sector … leading to improvement of food self-sufficiency, generation of incomes, creation of employment opportunities and improvement of the socio-economic status of the rural population … with pronounced impact on poverty alleviation.' (53)

The government attaches high importance to the realisation of these strategic goals. It is therefore of paramount importance that the government finalizes the regulatory framework (irrigation policy) for guiding irrigation development in the country.

3 Current Situation in Small-Scale Irrigation

3.1 Major Development Trends, Importance and Potential of Small-Scale Farmers and Water User Groups in Irrigation Development

Irrigation development in Kenya was mainly started with the construction of large schemes based on political objectives to settle landless households. Such large schemes were to be seen as political signals that the government was addressing the growing landlessness of the African population. In the seventies the MoA started to embark on small-scale group irrigation schemes organised by water user groups or Water User Associations (WUA) to address famine in the remote parts of the country, which then led to a process where such schemes were also implemented in the fertile highland regions. In addition, the liberalisation of horticultural marketing in the late 1980s offered new economic opportunities for commercial production which has since fuelled irrigation development through the private sector also with the increasingly strong participation of small-scale farmers. This is especially the case in the fertile central region of Kenya north of Nairobi which is characterized by comparatively high rainfall resulting in numerous little streams and rivers contributing to the three main catchments of the Tana, Athi and Ewaso Ng'iro rivers. The availability of surface and groundwater provides the basis for a rapidly expanding horticultural export sector (Table 1) largely depending on SSI technologies. The proximity to Nairobi with its export-enhancing infrastructure (e.g. international airport, cooling and packing facilities, and a reasonable road network) provides a sound basis for the growth of broad-based smallholder irrigated horticultural production.

Table 1: Export of Fresh Horticultural Produce

Year	Volume in '000 tonnes	Value KSh billion
1999	99.0	14.2
2000	99.2	13.9
2001	98.9	20.2
2002	121.1	26.7
2003	133.2	28.8
2004	166.1	32.6

Source : Kenya Bureau of Statistics, August 2007.

The statistical information provided in Table 2 shows that smallholder schemes and private irrigation development mostly undertaken by small-scale farmers have risen to the challenges and opportunities of the market. Together they have nearly doubled their areas under irrigation in the period between 1985 to 1998 from a combined area of about 40,000 ha to more than 75,000 ha.(53) More recent reports state that since 1998 another 20,000 hectares of land has been developed for irrigation (5), with the areas of the public schemes stagnating.

Table 2: Comparative Irrigation Development Status for 1985 and 1998

Scheme type	Area (ha)		Major crops
	1985	**1998**	
Public schemes	11,500	12,000	Rice, cotton, horticulture
Smallholder schemes	17,500	34,650	Rice, maize, horticulture
Private sector	23,000	40,700	Coffee, pineapples, horticulture
Total	**52,000**	**87,350**	

Source: Ministry of Water and Irrigation.

For a more detailed review of the development trends in the irrigation sector the three categories of irrigation development as distinguished in Kenya can be used:

(1) Public schemes

Public schemes are the classical larger-scale schemes developed and managed by government agencies such as the NIB. Farmers only have tenancy rights. Some families are already farming in the schemes the second generation. As Table 3 indicates many of the schemes supported by NIB experience operational problems, with only part of the land being cultivated. (53)

Table 3: Design Parameters and Utilization of the Facilities in NIB Schemes

Irrigation scheme	Area (ha) 1998	No. of families settled	Operational area (ha) 2002 **
Mwea Irrigation Settlement	6,000	3,392	4,500
Perkerra Irrigation Scheme	350	495	415
Ahero Irrigation Scheme	860	519	200
West Kano Irrigation Scheme	900	600	0
Bunyala Irrigation Scheme	213	132	0
Hola Irrigation Scheme *	870	684	-
Total	**9,193**	**5,822**	**5,115**

Source: Ministry of Water and Irrigation.

* Not operational any more since the river changed its course away from the pump station.

** Cultivation of principal crops for which the schemes were developed.

The development of such schemes usually takes place on public land. The design is based on consolidated irrigation areas, where tenant-farmers are allocated up to 2 ha of land. They were originally designed for the production of specific crops e.g. Mwea - rice, Ahero - sugar cane. The schemes usually extend in overall size between 200 ha and 6000 ha and are managed by a central management unit.

The high construction costs of these large schemes were mainly financed with public funds. With increasing budgetary problems the state has not invested in the development of new perimeters for several decades. The latest trend appears to be that government is more likely to invest in smaller community projects which might be cheaper per unit land developed.

Services (extension, loans for inputs, etc.) are provided by the central NIB scheme management, although of late there are changes where farmers' representative structures started to take over some of the management and service functions. Tenants do not any longer want to adhere to the recommended crop management practises, but try to grow other cash crops for the market, and also crops for their own consumption.

These changes have also led to the involvement of financial institutions (FI) in some of these schemes where they have started to finance seasonal loans. Tenant farmers in these schemes are organised in irrigation blocks (command areas), and this together with the fact that there is one main crop as loan security, suffices the main conditions for lending. It is a highly commendable move as it will acquaint FIs with the complexity of agricultural lending.

(2) Smallholder community irrigation schemes

Smallholder community irrigation schemes are owned, operated and managed by the farmers' through their respective WUAs. They are being developed in different land tenure systems, and may vary in terms of irrigated area from 20 to 200 ha. In most cases the development takes place on private land where farmers hold individual titles to the land. In these cases individually owned plots may vary considerably in size for different holdings (e.g. Mitunguu Scheme: 0.2 - 15.0 ha), in such cases the government may set a limit for irrigation plot size per holding. These vary considerably between schemes often ranging between 0.2 ha and 0.4 ha. The size of the irrigated plot will also influence the decision about the contribution of an individual farmer towards the overall costs of a scheme. The smaller the irrigated individual plots are, the greater the cost ratio between in-field investment versus supply infrastructure investment (weir, settling tanks, distribution and control infrastructure, etc.).

The selection of an area for irrigation development is based on political, social and economic criteria. It allows targeting specific poverty pockets that have no access to any source of irrigation water within their vicinity. Because there is a strong social element in area selection, government provided in the past the full initial investment for the schemes, including the on-farm investment cost (infield equipment). Nowadays developments are based on a cost-sharing formula agreed upon between the beneficiaries, the government and other development partners (see chapters 3.3 and 5.1).

Track records show that the infrastructure in these schemes is very robust and some of them are already in operation for more than twenty years. From that point of view such investment represents a low risk to the respective investor (farmer), but there is still a tendency amongst prospective irrigation farmers that they can not afford to take out such big loans. Though Kenya has a long track record with such schemes there is little research information available on farmers decision making in this context.

(3) Private sector irrigation development

Government provides no direct financial support to private sector irrigation development. Commercial farmers and small-scale operators alike have to finance their own investments and operations, respectively have to access loans for their financing needs. Government support to the industry comes in administrative support such as the allocation and administration of water permits. Irrigation engineers advise on the use of different technologies and agricultural extension officers render advice

on production techniques and provide market information. For that purpose they keep technical personal posted at the districts and at some decentralised offices.

As outlined above during the last 15 years there has been a tremendous increase in irrigated area based on private investments. The growing demand for horticultural produce internationally and the ability of the Kenyan horticultural sector to secure an increasing share of it, has led to the fast expansion of horticultural production based on irrigation. On the side of SSI on small-scale farms three different developments can be distinguished:

- *SSI expansion based on a secure market – 'contract farming' (low risk):* there are a number of reputable exporters of horticultural produce operating in Kenya who increasingly engage with the small producers on contract farming arrangements. Farmers undertake to cultivate certain agreed areas of specified crops. In a number of cases the exporters provide all inputs and the required technical advice. For the investment in irrigation equipment and other production costs some companies operate their own loan scheme, but in other cases they are willing to collaborate with established FIs, including the arrangement of making farmer-approved deductions from sales for loan repayment. 'FRIGOKEN', producing canned French Beans, has a local producer base of more than 25,000 small farmers; the company requires daily 60 tons of fresh produce. 250 – 300 farmers are grouped around a buying centre, from where the company also provides technical advice and support through their 700 field staff. 50% of the small producers are EurepGAP-certified (European Retailer Produce Working Group on Good Agricultural Practices).
- *Expansion due to access to affordable SSI technology (medium risk):* Kenyan farmers recognized the potential of the treadle pumps more than 15 years ago. Since then different technical variations such as 'hip pump' (hand-operated piston pressure pump), the 'super / money maker pumps' (two / one piston treadle pressure pumps) have been in high demand. The growing market led to the local production of these pumps in Kenya. SSI technologies have in the last two decades been adapted to suit the socio-economic conditions of a broad spectrum of poor small households around the world. Kickstart, a Kenyan NGO, as the main distributor of the pumps has an interest to see their customers linked to FIs and also to canners and exporters. In many cases they were able to facilitate the necessary business contacts. There are concepts being tested where local AGRIVET shops, the main distributors for all sorts of farm inputs, are being linked to FIs to obtain the required finance in order to sell the pumps to the farmers on credit.
- *Larger private investments (high risk):* larger private irrigation investments are undertaken by small-scale commercial farmers as well as larger commercial farmers and estates who are mostly using motorized-pump irrigation systems together with sprinklers or drip systems to produce high-value horticultural crops mainly for the export and urban markets. Larger commercial units handle in many cases all aspects of production and marketing in one business management unit. In some cases (win-win) they even have smallholder outgrowers who produce specific crops on contract farming arrangements in the framework of their export contracts.

For the further expansion of the SSI sector a good potential exists as long as the strong demand for high value agricultural/horticultural products continues and grows.

Further refinements and adaptations to the SSI technology should result in further reductions of equipment costs which will then in turn open up new economic avenues even into the production of basic food stuffs. The private sector, commercial and small-scale farmers, will continue to raise their own capital for irrigation development for intensification of production and the expansion of area under irrigation and/or have to access loans to complement their own resources.

Institutional support to irrigation development: there exists a dual system of government support to the irrigation sector. Large schemes are mainly being supported and managed by the NIB (founded in 1966) providing technical and financial support to its tenants. The MoWI through its Irrigation and Drainage Department (IDD) manages all the support to the smaller schemes and the private sector. The IDD promotes the development of sustainable farmer-owned and managed irrigation and drainage projects with the full participation of the respective target groups. The objectives are to address issues such as food security, poverty alleviation, and employment creation.

Every province has a Provincial Irrigation Unit (PIU) coordinating all planning functions regarding irrigation and drainage issues. The PIUs further backstop the district offices on administrative and technical matters. On district level the District Irrigation Units (DIU) are responsible for providing the services to the department's customers namely: identifying potential areas for irrigation development, carrying out surveys, designs for small schemes, supervision of civil works, and the provision of irrigation water management and training. The IDD has meanwhile a strong professional presence in all districts with irrigation potential, where it mainly compiles inventories of potential irrigation schemes. What is now required is the full commitment of the government to support the implementation of these plans also in terms of financing. Especially it will be required that the government looks into the financing aspects of irrigation development in remote areas of ASAL where social aspects of development may sometimes override short-term economic thinking. These remote areas are net importers of basic food and large sections of the population rely on famine relief food for their survival. Irrigation development and water harvesting schemes in such areas would primarily have to aim at achieving a higher degree of food self-sufficiency.

Budget allocations for different irrigation programmes: the budget allocations over the last decade signify changes in policy and action. The financial support to NIB-operated large schemes has not been increased over the years and has in the 'development' budget in 1999/2000 even shrunk further to about 60% of the allocation two years earlier (Table 4). At the same time the recurrent cost and development budget allocation has nearly trebled within the two years under review for schemes supported by the IDD. The significant increase in recurrent costs reflects the commitment of the government to strengthen its personal infrastructure in the provincial and district irrigation offices in order to provide technical support to private and public irrigation initiatives.

Table 4: Budgetary Allocations to Irrigation Development (53)

Institution	1997 / 1998		1999 / 2000	
	Recurrent K£ 1)	Development K£	Recurrent K£	Development K£
Irrigation Drainage Section	794,578	547,560	2,089,002	1,405,812
NIB	1,182,000	1,878,000	1,300,000	1,152,080
TOTAL	**1,976,578**	**2,425,560**	**3,389,002**	**2,557,892**

Source: Ministry of Water and Irrigation

1) 1 K£ = 20 KSh

3.2 The Irrigation Potential

In Kenya only 2% of the arable land is irrigated compared to 5.5% in SSA. Much of the water sources have not been harnessed and large quantities of peak run-off leave the country unutilized. Despite its favourable hydrological conditions Kenya's dam capacity is only 4,079 million m³ (compare Morocco's - 16,091 million m³). Current storage capacity is 60 m³ per capita in contrast to South Africa's 746 m³ or Australia's 4,729 m³.(5)

Analysis of the hydrological information and land suitability for irrigation identified a potential of more than 539,000 ha for irrigation and 600,000 ha for drainable areas / flood protection respectively. Out of the potential area available for irrigation only about 20% are currently utilized (Table 5).

Table 5: Irrigation Potential by Basin

Basin	Irrigation potential (ha)	Developed area, 2002 (ha)
Tana River	205,000	68,700
Athi River	40,000	11,000
Lake Victoria	200,000	10,700
Kerio Valley	64,000	5,400
Ewaso Ng'iro	30,000	10,000
Total	**539,000**	**105,800**

Source: Ministry of Water and Irrigation

The irrigation potential is spread over a vast area of the country. Substantial parts of the irrigable land resources lie outside the 'high potential highland areas'. The development of these areas would be an important step to bring economic development into the remoter parts of the country. However, current water abstraction for agricultural use in the upper catchments has in several locations already reached the limit and water rationing in irrigation projects is already becoming a reality during the dry season. Stringent water management measures are therefore required in the upper catchments to allow the development of the large land potentials further downstream. Besides strict water management procedures the government would also need to massively invest in storage capacity. (51)

Agriculture is the major user of water in the country and currently accounts for about 75% of all water used.(5) A growing population and an expanding industrial base will

also have increasing needs for water. It is therefore paramount to control the use and distribution of water to the different user groups.

3.3 Typical Examples of SSI Systems

In the following paragraphs typical examples of SSI systems common in Kenya are briefly described. Estimates on investment as well as on operation and maintenance costs of typical SSI systems and their financial returns to the farmer are provided in chapter 3.6. Information on the resulting demand for financial services and on the financing of SSI systems are provided in chapter 4.

(1) Intermediate technology systems

Bucket and drum kit drip irrigation systems (Figure 1) have been specifically developed to suit the conditions of low income households who have only limited access to land. They are typically used in home garden situations in peri-urban and small rural households. The layout of both systems is very versatile and can be modified to fit different shapes of the garden.

For a bucket kit most local plastic buckets are suitable, the crucial element is a quality filter preventing silt and other small debris entering the drip line / tape and blocking emitters. The bucket for a 50 m² unit may require a refill 2 - 3 times a day.

The drum kit is a very versatile device which can be scaled to fit a range of plot sizes between 80 – 500 m². Larger drum kit systems (500 m²) are finding increasing use in combination with different water provisioning systems (pumped and gravity supply) where a regular water supply in connection with the cultivation of high value crops is essential.

Both technologies, bucket as well as drum systems are being promoted by the Ministry of Agriculture/Kenya Agricultural Research Institute (KARI) and the equipment is sold on a commercial base in order not to undercut private sector distributors. These standardized products are also available with some private suppliers. The prices for the bucket and drum units are still comparatively high in Kenya. But it can be assumed that in time local 'jua kali' (informal) engineering ingenuity will adapt the technology to fit local conditions and wallets. Also such low-cost investments require a careful financial analysis. For example, the profitability may be threatened, if a farmer has to procure the irrigation water at a relatively high price, e.g. when it has to be procured from the public water system.

(2) Manually operated pump systems

The rope-and-washer pumps (Figure 2) have been introduced in some smallholder irrigation areas as a cheaper alternative to the treadle pumps. They are constructed by 'jua kali' mechanics out of local materials and second-hand spare parts. The pump is a simple water lifting device that can be used for a variety of water sources. The pumps are reportedly being preferred by very small horticultural farmers who can not afford to invest into any of the treadle pumps.[2] With a maximum lift of about 4 - 5 metres it delivers water without pressure to the surface, which must then be channelled by gravity to the respective plots. Water can be provided for an irrigation area of up to about 2000 m², topography of the field permitting.

[2] Personal communication by FRIGOKEN.

Figure 1: 'Bucket Kit' and 'Drum Kit' Irrigation with Drip Lines

Bucket Kit:

Drum Kit:

Investment costs:

- Bucket kit / drip lines: US$ 3.00 / 12.00
- Drum kit / drip lines: US$ 40.00 / 60.00

Technical features:

- Bucket or drum with a filter unit at the outlet
- Drip tape and / or drip lines with slow release emitters
- Very water efficient

Water source:

- Rivers, public water supply, roof water collection, etc.

Technical requirements:

- Operating on low head, but need reasonably level ground

Cropping pattern:

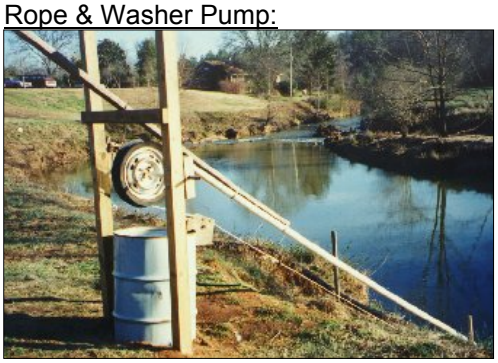
- Both systems are adaptable to a wide range of crops: vegetables, tree crops, etc.

Farmers organization:

- Farmers own such systems individually, there is therefore no need for a cooperation with other farmers using the same technology

Figure 2: Rope-and-Washer Pump

Rope & Washer Pump:



Investment costs:

- Material / structures: US$ 30.00 / 10.00

Technical features:

- Lifts water 4 - 5 meters only, distribution from there on by gravity
- Can work either in vertical position (large diameter wells) or operate at angles up to 45°

Water source:

- Rivers, lakes, open wells

Technical requirements:

- Pump should be at the highest point in the field
- Requires level fields as water needs to be channelled to all farm sections by gravity

Cropping pattern:

- Very versatile: food and cash crops, tree crops,

Farmers organisation:

- No requirement, the pumps are mostly individually owned

Treadle pumps: Kickstart, who has been coordinating the manufacturing of treadle pumps in Kenya, has been at the forefront in the development of an appropriate range of low-cost pumps for different farm sizes and uses (Figure 3).

The 'Hip' pump is a single piston hand operated 'pressure' pump. It lifts enough water to irrigate about 2000 m². The 'Moneymaker' is a single piston treadle 'pressure'

pump that has sold well in Kenya. It can provide water for approx. 0.4 ha. Great demand has led to the development of an improved version, a double-piston treadle pump. This 'Super-Moneymaker', is according to Kickstart capable of providing enough water for five low-pressure sprinklers. It can cover an area of up to about 0.6 ha.

This product range of pressure pumps is very suitable to many parts of Kenya. An important positive aspect is that these type of pumps deliver water with a head in order to also cover the higher parts of irrigation fields.

The Kenyan series of treadle pumps[3] are designed as pressure pumps since pumps are required besides sucking water from depths up to seven metres to deliver water in many cases to higher grounds or even to sprinklers. Their performance characteristics vary therefore considerably in different topographical settings, with the result that the higher the suction and delivery level of the water the less is being pumped. This impacts directly on the pumping times of the different units (see also Annex 2).

Figure 3: Pressure Pumps – 'Hip' and Treadle Pump

Hip Pump:

Treadle Pump:

Investment costs:

- Hip pump/piping-sprinkler: US$ 34.00 / 39.00
- Treadle pump/piping-sprinkler: US$ 55.00 / 57.00
- Super treadle/piping-sprinkler: US$ 95.00 / 90.00

Technical features:

- Hand / foot operated pump with suction pipe
- Infield equipment: sprinklers, drip irrigation systems

Water source:

- Rivers, lakes, wells, tube-wells

Technical requirements:

- Abstract water from water tables up to 7 m deep
- Deliver water with a 7 – 10 m pump head
- Plot to be irrigated should not be more than 15-17 m above the water source

Cropping pattern:

- Very versatile: food and cash crops, tree crops,

Farmers organisation:

- Farmers operate usually as individuals using a water source they have access to – no WUA required
- Farmers may form producer groups for better marketing and access to credit

Produce marketing:

- Approaches vary from individual to group marketing, depending on the product. Contract farming is widely practised by many of these small producers

(3) Motorized pumps

Reports from the DIUs suggest that motorized pumps (Figure 4) are on the increase, they are seen by small-scale farmers as an 'upgrade' from the different treadle pump

[3] In Asia treadle pumps are designed to lift more than 1.5 l/sec. from shallow water tables mainly into paddy fields.

models saving manual labour. Due to their substantially higher pump head they allow a farmer to irrigate a larger area where topographical conditions place limits on treadle pumps.

Figure 4: Motorized Pump with Sprinkler System

Picture: Practica Foundation - Netherlands

Investment costs:

- 4-HP pump/piping-sprinkler: US$ 350.00 / 260.00

Technical features:

- Petrol or diesel powered circular pump
- Infield equipment: sprinklers, drip irrigation systems
- Can deliver water to very undulating terrain

Water source:

- Rivers, lakes, wells, high-yielding tube-wells

Technical requirements:

- Abstract water from water tables up to 7 m deep
- Deliver water with a 30 – 40 m pump head

Cropping pattern:

- Very versatile: food and cash crops, tree crops

Farmers organisation:

- Only if farmers' share a common resource may there be a need for a WUA

Produce marketing:

- Approaches vary from individual to group marketing, depending on the product
- Supports larger production area, therefore marketing of produce may proof to be a challenge

(4) Community irrigation schemes

Government supported community schemes do not fall into the classical definition of SSI technology as it is widely used. However, their inclusion into this study is warranted by their 'modus operandi', because once constructed the farmers in such schemes are individual and independent small-scale irrigation operators. They face the same challenges regarding access to finance as users of other SSI systems do.

The early projects were modelled around the NIB irrigation approach with tenant farmers being allocated a piece of land. Since the early 1980s the MoA started to integrate irrigation development also into existing land tenure systems. The availability of water for complementary irrigation has proven to stabilize livelihood systems and to provide a potential for economic growth creating employment opportunities for the region beyond the farm boundaries. Farm households in such schemes require less irrigated area than cultivators in a consolidated irrigation area, where they depend entirely on the output from the irrigated plot.

In communal schemes gravity-fed irrigation systems are in many circumstances the preferred option. Mechanical problems with engines and pumps and difficulties in maintenance and repairs - especially in remote areas with their poor technical service infrastructure - pose always a threat to the continuous functioning of the water supply. There are two types of community schemes implemented to fit the prevailing

physical and socio-economic conditions. Where the topographical conditions are favourable *gravity-fed sprinkler irrigation schemes* are predominantly used. In the more flat alluvial plains along permanent or seasonal streams in the ASAL areas *gravity-fed furrow irrigation systems* are mainly constructed.

The design for example of a gravity-fed sprinkler irrigation scheme includes bulk infrastructure such as intake weir, sediment settling tanks, main supply pipelines, and pressure control devices. Installations on farm level include a farm hydrant and movable equipment such as piping and sprinklers. This scheme type is more costly because the infrastructure layout for a 40 - 100 ha irrigation area may be embedded into a farming area of 200 - 500 ha of land with each of the 100 - 300 farmers receiving water for a plot of 0.2 - 0.4 ha. Such schemes incur high initial investment costs of between 4,000 to 5,500 US$/ha irrigated area (Figure 5).

Figure 5: Community Irrigation Schemes

Intake structure:

Sprinkler use in mixed farming:

Investment costs: ***Unit 0.4 hectares/per farmer***

- Infrastructure/Piping-Sprinkler: US$ 1335.00 / 330.00

Technical features:

- Gravity-fed piped distribution system
- Weir, settling tank, pressure control structures
- Infield equipment: sprinklers, drip irrigation systems

Water source:

- Rivers

Technical requirements:

- Natural gradient of land and water source to build up the required pressure

Cropping pattern:

- Very versatile: food and cash crops, tree crops,

Farmers organisation:

- Farmers' share a common resource 'water' and the distribution system and therefore require a regulatory/ management body such as a WUA

Produce Marketing:

- Approaches vary from individual to group marketing, depending on the product.

In the past all development costs were generally born by the state. This policy turned out to be not sustainable also in view of the high costs for the government. It had especially also negative effects on the development of ownership by farmers and resulted often in weak WUAs with unsatisfactory performances in scheme management and operations as well as on-farm level. A policy review in 1992 recommended that in future farmers in such schemes should bear the full development costs of the scheme. The implementation of this recommendation resulted in a situation where for nearly ten years there was no development of community schemes. Rural households operating near the poverty level often cannot afford to accept a financial liability of such a magnitude, although it would be sound economic investment. In the last ten years participatory financing models have been introduced whereby farmers contribute up to 20% of the total investment costs

receiving water for 0.2 ha (IFAD program). More recently a KfW-supported program requires farmers to contribute up to 50% of the overall investment costs with 0.4 ha of their farm developed for irrigation. There is at this stage no uniform policy guiding these approaches.

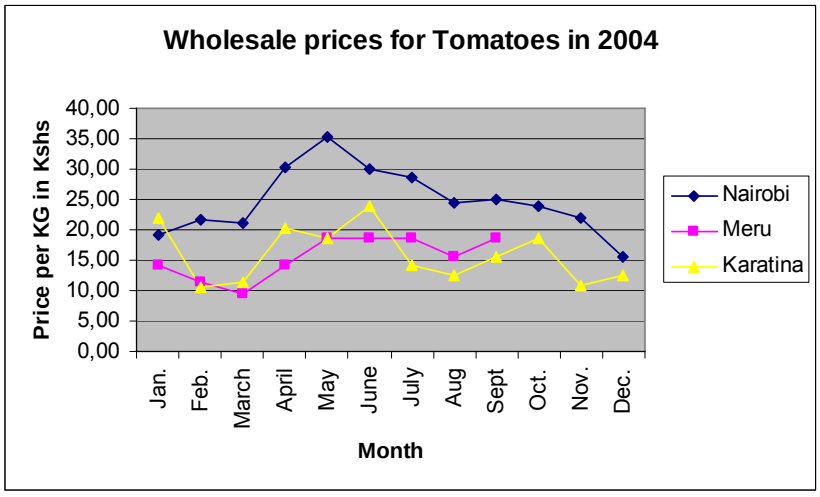
3.4 Agricultural Support Services

3.4.1 Marketing

The massive expansion of private irrigation development in Kenya is largely based on the demand for horticultural produce. The export statistics (Table 1) of horticultural produce indicate a steep increase in tonnage as well as in monetary value. These trends have attracted many small farmers to partake in this boom.

Commodity prices vary considerably during the course of the year and for the different markets (Figure 6). (38) 'Up-country' markets operate on a considerably lower price level than the country's largest consumer market Nairobi. One of the reasons for the difference may lie in the fact that the capital's fresh produce market works much closer to equilibrium between demand and supply. The up-country markets are producer markets where supply often outstrips demand, hence the lower prices. Furthermore local prices must also accommodate the transport costs of the agents / middlemen, who buy locally and sell to the larger consumer markets on national level.

Figure 6: Regional Commodity Prices

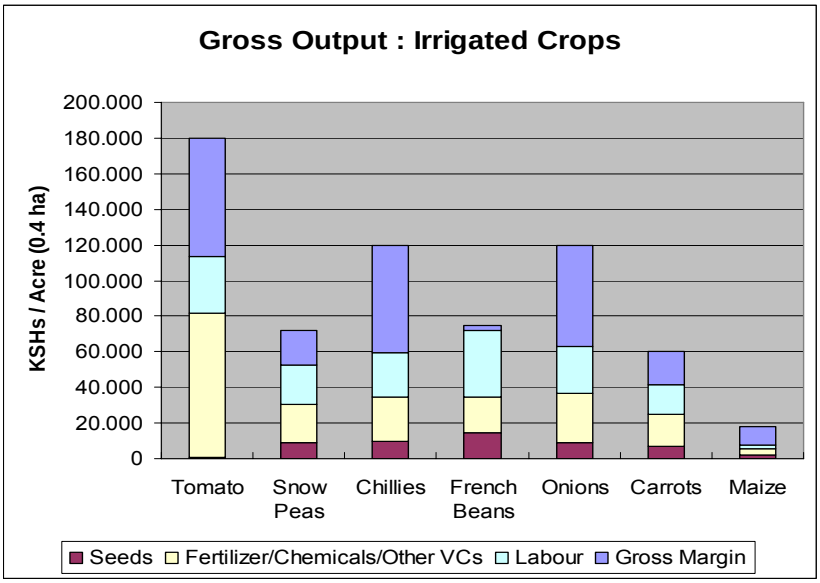


Data source: (38)

3.4.2 Production

Market indices give an indication of the price development throughout a given period and are an important factor in production planning. Integrating such details into gross margin calculations for a farm cropping design gives a reliable assessment of the comparative advantages of the different enterprises (Figure 7)

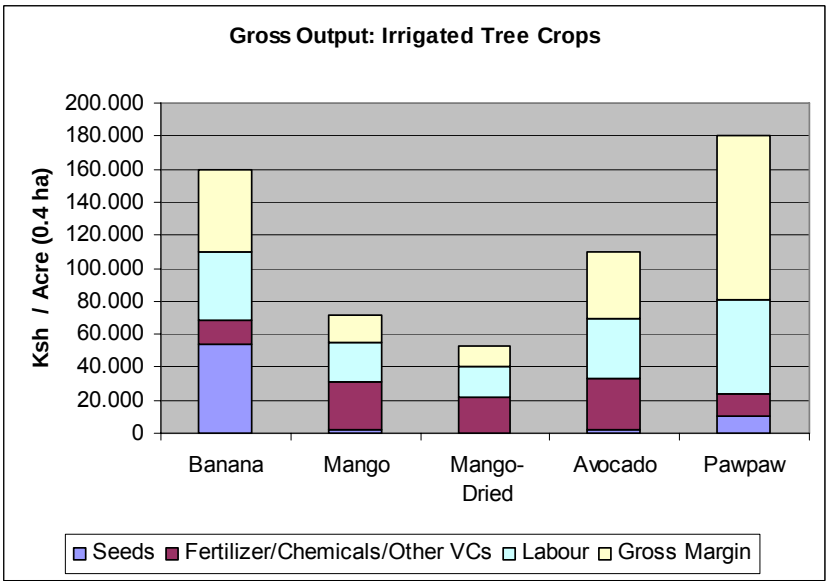
Figure 7: Variable Production Costs and Expected Gross Margins for Selected Vegetables in the Mt. Kenya Region



Data source: (8)

However, farmers' decision making may not just be based solely on such a rationale, a secure market and the chance of a crop advance may tempt them into production systems that have a considerably lower margins. Besides the margin a farmer will consider the shelf life of a product once it has been harvested, where is the best market for it, and how to get it there?

Figure 8: Variable Production Costs and Expected Gross Margins for Selected Tree Crops in the Mt. Kenya Region



Data source: (39)

The production risk stemming from an insecure market has in some irrigation schemes such as Mitunguu led to a major shift in the cropping pattern. There, labour-intensive field crops such as French beans were replaced with banana. According to farmers experience it is a low risk crop, for instance it is only harvested when the dealer has bought the produce. An other aspect mentioned was that with the impact of HIV&AIDS farm labour availability is considerably strained and bananas do not exert the same labour peaks as other field crops may do. The availability of irrigation water widens the decision-making options for a farmer considerably and allows reacting more selectively in matching external market opportunities to the production

environment on the farm. Tree crops may provide complementary options for optimizing farm income.

3.5 Demand and Supply of SSI Technologies

In close cooperation with the donor community the government was largely responsible for the expansion of the irrigation area under smallholder schemes. But at the same time government has created an 'enabling environment' in which private initiative could access necessary resources, land and water, and pursue the opportunities the agricultural crop market offered.

Crucial in this process is access to adequate financial services that offer customers the opportunity to invest in more productive technologies that enable them to produce crops economically.

In the last 15 years about 35,000 treadle pumps of different sizes have been sold in Kenya. The use of the manually operated pumps led to an increase in irrigation area of nearly 14,000 hectares. This technology alone covers meanwhile about 50% more irrigated area than the NIB with all its schemes together. It involves about 35,000 households compared to the 5,800 families settled on the large NIB-schemes.

Kickstart has been largely responsible for facilitating the manufacturing and distribution process of these pumps in Kenya and has started to support the same in other SSA-countries. It facilitates the manufacturing and distribution process. Pumps are built by a company at Thika. From there Kickstart takes over distribution throughout the country. Whilst the pump production and marketing is based on a purely commercial approach, Kickstart provides detailed monitoring services and facilitates marketing as well as financial services to its customer base. These aspects are also being supported by various donor programmes.

The national research organisation KARI has been responsible for the import, assembly and distribution of bucket and drum kit irrigation systems. The following equipment has been sold by KARI over the last ten years:

- bucket drip irrigation systems (30 – 50 m²) 10,000 units;
- drum drip irrigation systems (120 m²) 5,000 units;
- drum drip irrigation systems (500 m²) 1,500 units;
- drum drip irrigation systems (assorted) 500 units (orchards/ nurseries).

The sold units are estimated to operate in about 17,000 households and cover an irrigation area of about 180 hectares.

Based on its experiences in the sector the marketing section of Kickstart has observed a steadily increasing demand and estimates that SSI technologies could be suitable for about 360,000 households in the country. Together with the existing potential area for irrigation of more than 400,000 ha of irrigable land (Table 5) these figures provide an indication of the considerable expansion possibilities for SSI systems.

3.6 Economic Aspects of SSI Systems

A farmer's choice for a specific technology is primarily guided by the cost of the equipment, the size and characteristics of the plot, and the source of water. SSI technologies have been designed to fit a wide range of different circumstances.

There were no published data available on the financial returns of investments into various SSI systems for Kenya and its actual financial impact on farm level. For the purpose of this study an indicative financial analysis of typical SSI systems was carried out (Annex 1, Tables 1 and 2). Key results are summarized in Table 6. The agricultural production system was based on a mix of four crops only. The prices for the crops used in the calculations were based on the lowest prices in an annual price cycle; yield projections were also based on conservative estimates. Cost for labour and water have not been considered in the calculations as it was assumed that family labour is freely available on the farm. It was further assumed that a farmer manages to raise two crops a year.

Table 6: Schedule of Indicative Costs and Gross Margins Related to Typical Units of SSI Systems

SSI system	Area coverage	Investment costs	Operation & mainten. cost	Variable prod. cost	Gross margin
	in m²	US$/unit	US$/year/unit	US$/year/unit	US$/unit/year
Bucket kit	50 m²	15	1	18	25
Drum kit	500 m²	110	5.5	184	250
Rope-and-washer pump	2 000 m²	40	2	585	863
Hip pump	2 000 m²	73.	3.65	585	861
'Moneymaker'-treadle pressure pump	4 000 m²	112	5.6	1,177	1,723
Super-money maker - treadle pressure pump	6 000 m²	185	9.25	1,756	2,585
Motorized pump 4 HP	10 000 m²	610	30.05	2,927	4,293
Gravity communal systems	4 000 m²	1 665	83.25	1,171	1,646

Source: Own estimates based on personal communication; for details compare Annex 1, Tables 1 and 2.

The results of the analysis indicate some robust production systems that offer rural households substantial income opportunities from investments in SSI technologies when family labour is freely available. The following examples support this:

- on a per hectare basis in all analysed SSI systems very attractive gross margins can be achieved ranging mostly between US$ 4,000 to 5,000 per year (in comparison the returns from rainfed production systems are often below US$ 1,000 per ha);
- on a per unit basis the smallest 50 m² bucket drip system yields a gross margin of US$ 25 (investment US$ 15). This can be increased for a drum kit system covering an irrigated area of 500 m² to US$ 250 (investment cost US$ 110);
- on the side of treadle pumps the most popular type is the 'moneymaker' which can irrigate up to 0.4 ha. The unit can yield a substantial annual gross margin of US$ 1,723 (investment cost US$ 112).

In case a farmer would have to hire labour for all operations related to irrigated production then the different scenarios would, however, result in considerably lower gross margins.

Since SSI technologies have played and continue to play an important role in the development of the country's irrigation potential some systematic research into the economic viability of the different systems would be justified. Sensitivity analysis based on different regional cropping patterns and varying cost/price scenarios should reveal the suitability of the diverse systems in different regional and socio-economic settings.

3.7 Environmental Aspects of SSI Development

Irrigation development is driven by market forces. The massive expansion of the irrigated area with SSI systems has meanwhile benefited many people. On the other hand the water sources in many areas are slowly being used up and less or no water reaches the plains during parts of the year. Current user patterns upstream certainly threaten the livelihoods of thousands of people who depend on the river water further downstream.

More stringent regulations alone are not likely to solve the problem. There is an urgent need to address the lack of dam capacity to harness the excessive peak runoff during the rainy seasons. Dams provide the opportunity to control water flow in downstream river systems, thus accommodating the needs of all waters users along a river system.

3.8 The Role of Water Users Associations

Most SSI technologies are tailored to the specific conditions of smallholdings. They are purchased and used by individuals in their respective farm settings who have individual access to a water source like a river or a lake. Where this is technically not possible individuals may in locations with shallow groundwater resources have to dig their own well to gain access to water.

WUAs are required for the organisation of community schemes. They have to be registered with the Department of Cooperatives in order to take on financial service functions for its members.

Since most financial intermediaries are willing to provide group credit under the label 'home development loan' individual SSI farmers may team up with other households in their immediate vicinity to access loans rather than with some other water users living further away. The amounts granted under such loan schemes are large enough to purchase SSI equipment.

4 Demand and Supply of Financial Services to SSI farmers

4.1 Overview: Financial Service Provisions in Kenya

The financial sector in Kenya exhibits greater financial depth and more institutional variety than most other SSA countries. The formal banking sector comprises of 43 commercial banks and two building societies which are regulated by the Central Bank under the Banking Act. One of the latter is transforming into a bank. In addition, the Post Office Savings Bank (Post Bank) provides deposit services through its nation-wide network. (30)

With the exception of four banks and one building society, the formal financial sector has never played any role for the rural poor. Traditionally, they exercise conservative lending policies and invest large amounts in risk-free treasury bills. Furthermore, most operations are geared towards urban and peri-urban businesses. In financing the rural areas for agricultural purposes, they mainly target the large estates and big agro-related businesses. (30) The Kenyan banking system is burdened by sizable non-performing loans, amounting to about 28% of the loan portfolio as of December 2004. The problem is particularly dire in banks with public interest (28% of system assets). (74)

Besides the banks, there are over 100 organisations, including about 50 non-governmental organizations (NGOs), practising some form of microfinance business in Kenya.(59) Their organizational form varies (companies limited by shares or by guarantee, private companies or NGOs) and they are licensed under different acts of parliament. Some NGOs practicing microfinance, however, are not licensed at all. About 20 of these institutions concentrate solely on microfinance while the rest practice microfinance alongside social welfare activities. They do not have the right to on-lend savings and their lending activities are mostly financed by donor grants.(30) According to information from the Central Bank, six of these NGO-MFIs have the potential to play an important role in future in the Kenyan financial market.

The parastatal AFC has been instrumental for providing subsidized credit mainly to larger farmers in many government and donor supported programs. Since the early 1990's, AFC experienced operational difficulties due to poor governance and political interference and had meanwhile repeatedly to stop lending operations. Despite large government allocations, its share of agricultural credit has only been 1.3% in 2004 (37). Its outreach is low and sustainability is not given. The continuous presence of such an 'out-of-date' model may crowd out the provision of financial services by private sector players.

To complete the picture, the Kenyan Government has established a number of specialist financial institutions and programmes with a development objective. Besides AFC, the development finance institutions (DFI) include Kenya Industrial Estates, Industrial and Commercial Development Corporation, Industrial Development Bank and the Kenya Tourist Development Corporation. However, all of them face serious financial problems and without a significant shift in government policy towards the DFIs it is likely that their operations will continue to undermine, rather than promote, market development. (17)

Savings and Credit Cooperative Societies (SACCO), first introduced in 1964, are the main financial service providers in Kenya. Their popularity and outreach in the country is exceptional, with some SACCOs having more than 100,000 members. With an estimated number of 2,600 active SACCOS the cooperatives reach

approximately one million people (30). They are most active in the central and western regions of the country.

Financial Service Associations (FSA) or village banks were introduced by the K-Rep Development Agency (1997), KWFT and Catholic Relief Services in an effort to reach areas that are not covered by mainstream financial service providers. Mostly located in remote areas with moderate access to markets, their significance for SSI farmers is marginal at present but can be of rising importance in the future.

According to the Tegemeo household survey (37), the agricultural credit market is dominated by commodity-based credit providers such as exporters, input suppliers, or marketing cooperative societies especially for tea, sugarcane and French beans, whose provision of credit to farmers has increased from 53% in 2000 to 63% in 2004. Although the details of the survey are not known and the results should be treated carefully, it indicates that almost two thirds of agricultural credit is not provided by financial intermediaries but by private sector players who are involved in the value chain.

After analyzing the demand for financial services in the next chapter, chapter 4.3 will analyse in depth the supply of financial services to SSI farmers.

4.2 Demand for Financial Services

4.2.1 Results of the 2004 Tegemeo Survey

Results from the Tegemeo rural household survey (2004) shows that only 39% of households surveyed sought credit. The main reasons for the demand were farming (71%), consumption (10%), school fees (12%), medical (3%) and business (5%). 82% of credit demand was granted. (37) This implies not only that farmers' demand for loans is lower than generally suggested but also that besides farming there is also demand for consumption, health, education and small business development.

Off-farm income sources are becoming an increasing contributor to the aggregate household income. Yaron et al. (2004) report that large parts of the farming households in Kenya obtain more than 50% of their income from non-primary agriculture operations. (75)

4.2.2 Farmer's Perceptions and Constraints

Poor farmers are risk averse and don't like to break from tradition when they are confronted by uncertainty. In other words, with their limited ability to absorb risks (mainly related to price and yield of crops produced), poor and low-income farmers opt for low-risk / low yield patterns of production (75). Adopting new technologies and switching to more profitable crops is conceived to be very risky. Especially in the ASAL areas rainfed crop cultivation is faced with high probabilities of failure, and even water sources for irrigation are often unreliable. Only areas with permanent river flows have seen private investment in irrigation development.

An important constraint on growth and enhanced productivity for farmers is the access to markets as well as technological and production issues. According to the National Micro- and Small Enterprise (MSE) Baseline Survey (1999) rural MSEs ranked the importance of 'lack of access to credit' only in position five, behind four other more pressing constraints. (75)

Not only Kenyan farmers but also agricultural advisers have the perception that loans from formal or semi-formal financial institutions are too costly. This can be related to (i) the presence of various subsidized and directed credit programs that do still exist today; and (ii) the low productivity of farming in general. Further, the repayment of so-called 'soft loans' was often not seriously enforced. This created a mentality that is not compatible with serious banking or 'best practices' of the financial service industry. *Therefore, while the demand for subsidized credit may be very high, the demand for market-driven loan products appears to be far lower.*

Most farmers in Kenya do have land titles but are not *willing* to secure a loan with it. First, they fear to loose their land – and see therefore their livelihood threatened – and second, the process of title verification is time-consuming and costs for it may exceed the requested loan amount relevant for the SSI target group. If the option is available, SSI farmers choose to secure a loan by group solidarity mechanisms instead of using the land title as collateral.

Another important constraint of SSI farmers is the lack of information about credit institutions and their products, but also their low level of education. Most farmers are not aware of the rising number of financial intermediaries and their respective products. Better information, proximity of services and a customer-friendly product range that is simple to understand are required in order to mitigate that constraint.

4.2.3 Financial Demand with Regard to Investments in SSI

Financial requirements of SSI farmers can be summarized as follows:

Type of loan:	A. **Seasonal working capital loans** for agricultural inputs and to cover operation and maintenance costs of the irrigation system	B. **Investment loans** for the construction of irrigation facilities and acquisition of equipment
Maturity:	SHORT TERM[4]	SHORT / MEDIUM TERM[5]
Frequency:	Annually or seasonally	Once or gradually
Purpose:	• Seeds, fertilizer, other inputs • Fuel oil, maintenance, repairs • Hired labor, if not provided by farm household	Depending on SSI system/technology chosen: Treadle pump, diesel pump, bucket, drum, pipes, etc.
Typical costs: (see chapter 3.6 and Annex 1)	Depending on SSI and cropping system as well as intensity of production: Per SSI unit ranging mostly between US$ 18 to about US$ 3,000 On a per ha basis mostly ranging between US$ 1,000 to 3,000	Depending on SSI system (all systems include infield equipment costs): Low-cost systems: 50 m² - 6000 m² US$ 15 -185 per unit Motorized pumps: up to 1 ha plot US$ 610 per unit Gravity-fed schemes: (0.4 to 1 ha plot) US$ 1,665 to 4,300 (includes costs for infrastructure and infield equipment)

[4] Up to one year.
[5] One to five years.

***Seasonal working capital loans**:* the demand for working capital recurs generally once or twice per year for each agricultural season. The required amount is highly dependent on the cropping system, the technology used and the availability of own resources. Labor-intensive low cost technologies such as bucket and drum irrigation kits as well as treadle pump irrigation systems are characterized by low operation and maintenance costs of the irrigation system, especially when the required labor is provided by the family. Mechanized irrigation systems on the other hand are characterized by relatively high operation and maintenance costs which may require additional access to finance.

Very important for SSI farmers is the *timely availability of finance* because agricultural activities need to be done at specific points of time without delays.

Repayment is ideally tailored to the production period and requires *flexible financing mechanisms*. Therefore, short-term loans for production must be flexible within a time frame and should be adapted to cash inflows. Ideally, the 'household approach' is used to determine the repayment schedule of the loan. For crops with high price fluctuations it should be considered to store the produce for a certain period of time in order to realize higher prices later in the season. Another option to mitigate price fluctuations is the concept of warehouse receipt.

***Investment loans**:* are required for the purchase of irrigation equipment in the case of individual farm development. Low-cost technologies have the advantage that farmers can gradually expand their activity. This may to a certain extent even be financed out of existing cash-flow surplus. For example, a SSI farmer who wants to establish the moneymaker treadle pressure pump SSI system needs to invest about US$ 55 for the pump and US$ 57 for sprinklers and piping for an area to be irrigated of about 4,000 m^2. Farmers may be in a position to at least partly finance such investments out of own resources, especially if they operate in the high potential areas where they can rely on income from some anchor crops.

SSI deals usually with small land areas. The establishment of perennial tree crops is a gradual process, where farmers purchase seedlings and intercrop such plantations till they reach maturity. Such developments do not require huge sums of investment and there is therefore no need for long term finance.

In Kenya, low cost irrigation systems such as bucket and drum kits as well as different kinds of treadle pumps are locally produced, country-wide distributed and available to farmers at reasonable prices. The terms of the loan depends on the amount of the investment and expected returns (examples see chapter 3.6) and must be assessed for each borrower. In such assessments it has to be taken into account especially that: (i) an 100% increase of productivity can most probably not be realized in the first years; (ii) the profitability of agricultural crop enterprises varies considerably due to various farm endogenous (e.g. the skills of the farmer) and exogenous factors (e.g. markets and prices); and (iii) the production and marketing risks may influence the success or failure of the activity. Therefore, for a loan decision, a very conservative appraisal needs to be done. The adaptation of loan terms and conditions must be client-oriented and has to reflect the repayment capacity of SSI farmers.

Low cost SSI systems are not a solution for all situations. A widely adopted irrigation system involving small-scale farmers is sprinkler irrigation in gravity fed communal systems. These serve in most cases a larger number of about 150 to 250 small-scale farmers per scheme with irrigation areas per farmer often around 0.2 to 0.4 ha. Such schemes require more complex and costly infrastructure (headwork's, major

distribution network) that amounts per farmer for example for a 0.4 ha irrigation plot to about US$ 1,500 to 2,000. These costs have been mostly 100% grant finance in the past. Recently, some donors (e.g. KfW) support the implementation of a cost-sharing model where farmers have to finance up to 50% of total investment cost with the help of a bank loan. Such models for a mix of grant and term finance are currently being tested, the success of this approach will in future create a substantial demand for medium term finance for agricultural purposes. From a financial sector point of view such arrangements that need massive donor interventions are problematic. The topic will be further treated in chapters 7.6 and 8.3.

In summary, investment loans that are either short term or medium term are adequate to satisfy the financial requirements associated with the establishment SSI technologies. Long term loans with maturities of more than five years are not required and are therefore not subject of this study.

4.3 Supply of Financial Services to SSI Farmers

4.3.1 Access of the Rural Population to Financial Services

Access to rural financial services (*as defined by processing any type of account)* is skewed and primarily concentrated in the so-called 'high potential areas'. 2002 figures show that in the Central Highlands, the SACCOS and cooperatives specialising in single commodities (mainly tea, coffee, and dairy) provide 67% of household's access to accounts. Another 22% of the rural population has bank accounts and 3% have an account with the Post Bank. Therefore, an astonishing high 92% of households have in this region access to financial services. The picture changes outside of the Central Highlands, where less than 50% of households have any form of account. (75)

Access to agricultural *credit* is also skewed towards the more productive agro-ecological zones. The Tegemeo survey report points out, that better access to credit is a result of embedded credit components for perennial cash crops such as sugar, coffee and tea. In 2004, 70% of producers in the Central Highlands received credit as compared to around 45% in the Western Highlands. The low rainfall areas of the Eastern and Coastal Lowlands have in comparison a very low access to credit with only 6% and 5% respectively. (37)

Despite some recent improvements, there is general consensus in most of the reports and studies reviewed on the situation in Kenya that the access of poor rural households to financial services remains in most areas of the country very limited.

4.3.2 Financial Intermediaries Relevant for SSI Farmers

4.3.2.1 Commercial Banks Focusing on the Lower Income Market

A very positive development is the emergence of commercial banks that focus on the lower income market namely Equity Bank, K-Rep Bank and Family Finance Building Society. They target the economically active low-income population and apply sector relevant 'best practices'. They are regulated and supervised by Central Bank and have been highly successful in achieving growth and remarkable outreach. Each institution is briefly reviewed below:

Equity Bank Limited (EBL)[6]*:* EBL started its operations in 1984 as an Equity Building Society. In the early 1990s the society changed its focus to the low-income market to meet an identified need for financial services among the underserved, poor population. In December 2004 the institution converted into a bank. In July 2006, EBL listed its shares on the Nairobi stock exchange. EBL's mission is 'to mobilise resources and offer credit to maximise value and economically empower the microfinance clients by offering customer-focused quality financial services'.

EBL is a retail bank whose target market includes salaried workers, farmers, SMEs and other low-income populations. With over 750,000 customers EBL holds more than 28% of all bank accounts in Kenya. In the first six months of 2006, EBL has acquired 30,000 new customers monthly. Table 7 shows the bank's enormous growth in recent years, which is characteristic for many of Kenya's financial institutions competing in the lower market segment.

Table 7: Growth of EBL 2000 – 2005

	2000	**2005**
No. of staff	117	884
No. of depositors	71,700	556,000
No. of borrowers	8,100	110,100
Savings (US$ million)	12.5	108.2
Gross loan portfolio (US$ million)	6.2	81.2

Source: The MIXmarket (48)

EBL has expanded its branch network nationwide and now consists of 36 branches and 56 mobile banks (2002 figures: 13 branches and 18 mobile units). The mobile banking units are set up in remote, but densely populated rural areas which are usually serviced twice a week by a unit.

EBL has a range of savings products which are delivered through service channels as well as demand-driven loan products for individual clients. The bank is growing rapidly and wants to expand its business to the agricultural sector and is especially also interested in serving SSI farmers. Micro-loans to rural smallholders (average outstanding loan size: US$135) are mainly short-term and account for 6.5% of the loan portfolio; however this client segment represents 27% of all borrowers. For farm input loans EBL bases its lending decision on a contract between the farmer and a marketing organization. First experiences in term-lending to WUAs are expected to be acquired when the KfW-supported irrigation programme in Meru will start this year.

Family Finance Building Society (FFBS)[7]*:* Since 1984, FFBS has been offering financial services to a rapidly growing clientele of savers and borrowers across the country. In this year, FFBS will convert into a bank (new name: Family Bank) and is currently reviewing all its products to better suit customer needs. The core loan products are: personal loans, business loans, residential plot purchase loans, group land purchase loans and agricultural loans to acquire farm inputs, equipment, livestock feeds, labour finances, farm houses and irrigation networks. (16) In 2002, 53% of the portfolio was rural.

[6] Information based on personal conversations, annual report (14), rating (47) and investor briefing (13).
[7] Information based on internet sources (16).

Development-wise, the FFBS has followed a similar path as EBL. The society has achieved positive results but on a smaller scale. (30) In 2004, FFBS had 255,000 clients. The number of branches have increased meanwhile to 27 (2002: 12) and the society expands aggressively especially in small-scale cash crop financing. (6) Today, it is the main competitor of EBL and both institutions are active in the same market segment.

K-Rep Bank[8]: K-Rep was founded as an intermediary organization in 1984 providing funds to NGOs for on-lending to micro enterprises. In 1997, K-Rep Bank Limited was formed as a subsidiary of K-Rep Group and in 2000 it became the first commercial bank in Kenya that directly targeted low-income clients. The mission of K-Rep Bank is 'to provide banking and microfinance services to low-income people on a commercially viable basis'. (48) The Bank currently serves 120,000 clients (2004 = 40,000).

The bank offers a wide range of both loan and savings facilities coupled with other banking services. The loan products include group loans for individuals or SMEs, individual loans (retail and consumer loans, overdraft facility), and wholesale loans made to financial intermediaries, co-operative societies and other associations, who in turn, on-lend to the low-income population. As of December 2003 the portfolio composition was as follows: group loans 51%, individual loans 17%, wholesale loans 29% and staff loans 3%. Whereas the group loans are secured by peer pressure and group guarantee, individual loans are secured mainly by land titles and other collaterals. Maturity of loans is mainly short-term. Medium term loans range up to 36 months.

4.3.2.2 Other Formal Financial Institutions Relevant for SSI Farmers

Kenya Commercial Bank (KCB)[9]: The government owned KCB is one of the largest banks in Kenya. It has the widest network of outlets in the country comprising 95 full-time branches and 35 satellite branches. The bank actively advertised its small-scale rural lending schemes in 2004. This had, however, until now not much effect and the outreach and impact of the bank in rural areas remains low. Lack of innovative ideas and standardised modes of operations render KCB-activities rather unattractive for smallholders. (30) The bank reports to be profitable since 2004 but has still a large share of non-performing loans (NPL). With plans for privatisation under way the bank has to undergo a process of privatisation and restructuring which is expected to take time. The significance of the bank for SSI farmers is at present marginal.

Cooperative Bank of Kenya (CBK)[10]: The CBK is incorporated in Kenya under the Co-operative Societies Act, and is also licensed to do banking business under the Banking Act. CBK exists 'to provide financial services primarily to the co-operative movement and other selected customer segments through an established country-wide network within Kenya in a socially responsible yet profitable manner'. The Co-operative Bank is 100% privately owned (65% Co-operative Societies, Unions and 35% individual members of co-operatives) and is the largest local private bank in Kenya. It has 35 branches and three agencies spread all over the country with a concentration in the economically high potential areas. Currently the bank serves 450,000 individual and institutional customers. About 60% of its funds go to agriculture.

[8] Information based on personal conversations, internet (34) and the MIXmarket (48).
[9] Information based on internet sources (42).
[10] Information based on personal conversations, annual report (11), and internet (12).

On the deposit side, CBK offers to its institutional and individual clients a full range of commercial banking products including savings, fixed and current accounts as well as money transfer products. (30) Micro and small enterprises (MSE) can receive short-term or medium-term individual loans. Wholesale lending to SACCOs (overdraft, one year, 36 months, 60 months) is the core business of CBK.

CBK is partnering with donor agencies to carry out different development programs (e.g. IFAD, KfW). The bank has also been instrumental in capacity building efforts in the rural SACCO movement and provides training and consultancy services.

In 2000, CBK experienced large losses due to writing-off of NPLs. The financial situation has improved since 2002 due to serious cost-cutting measures and since then the bank's profits have been on the increase. The bank's portfolio being dependent in its quality also on the financial health of the SACCOs (see below) remains, however, vulnerable even after the serious write-off's in the year 2000. (30)

Kenya Post Office Savings Bank (Post Bank)[11]: The wholly government owned Post Bank is an important provider of deposit facilities. Its mission is 'to sustainably provide savings and other financial services to our customers through a wide branch network, by use of modern technology in the delivery of efficient and effective customer service to the satisfaction of all stakeholders'. The Post Bank offers its savings and money transfer services through a network of 67 own branches and over 400 savings locations operated on agency basis which are spread throughout the country. As of December 2003, the bank had over two million customers and total deposits of US$ 125 million. For SSI farmers it provides a save and convenient facility to place cash surpluses and to accumulate funds.

4.3.2.3 Microfinance Institutions (NGO-MFIs)

NGO-MFIs do not operate under the Banking Act, presently there is no appropriate policy and legal framework in Kenya guiding their operations. They are registered under different acts of Parliament (see 4.4). Some of them have been mobilizing savings with the condition that funds are not used for on-lending. This practice has so far been tolerated in view of the new Microfinance Bill that is under preparation. The total number of clients served by NGO-MFIs is estimated at around 300,000. The main players (clients >20,000) that are relevant for SSI farmers are presented below.

Kenya Women Finance Trust Limited (KWFT)[12]: KWFT is registered as a company limited by guarantee. It was founded in 1981 to set up a 'women serving, women led bank'. It is the largest and only MFI exclusively for women. It is built on the belief that women can transform their lives, and those of their families through entrepreneurship. The broad objective of KWFT is to access financial and non-financial services to women with small and micro enterprises to enable them to develop their businesses, increase income and generate employment.

KWFTs strategy is based on aggressive expansion. It operates seven regional offices and 75 field offices from where it serves meanwhile more than 100,000 members. The services include: (i) working capital loans, (ii) consumer loans provided to the existing clients to cater for school fees and emergencies such as hospital bills or fire at business premises, and (iii) the encouragement of women to organize themselves into groups and to organize their own self help activities so as to support one another in all ways. Women are also encouraged to save for future needs.

[11] Information based on internet (41) and the MIXmarket (48).
[12] Information based on personal conversations, brochures, internet (40).

KWFT does not require any of the conventional securities such as title deeds. KWFT provides character loans to groups, where clients guarantee each other and individual loans, if any form of collateral is available.

Faulu Kenya[13]: Faulu Kenya Ltd. was established in 1992 and is registered as a public company with limited liability under the Companies Act. Majority shareholder is Food for the Hungry International. The mission of Faulu Kenya is to be a 'leading provider of financial services'. Its clients are the economically active poor.

Currently Faulu Kenya has 16 branches and is serving 40,000 clients who are mainly engaged in commercial activities such as service business, agriculture and manufacturing. The rural - urban mix is about 60% - 40%. It provides two categories of loans: business and consumer loans to individuals within groups. Business loans range from US$ 13 to US$ 13,000 with maturity periods of 12, 18 and 24 months. Recently, Faulu Kenya has ventured into a number of partnerships with local corporate key players to develop loan products targeted to various market niches. Further, Faulu Kenya is addressing the rising demand of its clients for training and business development services.

Kenya Agency for the Development of Enterprise and Technology (KADET)[14]: KADET LTD. was established in 2000 by World Vision. Its mission is 'to professionally provide financial services to the low income entrepreneurs thereby contributing to poverty reduction by supporting small and micro enterprises to promote justice and the establishment of the Kingdom of God'. The organisation has been self-sustaining after the first year of operation and is committed to 'best practices'. KADETs target clientele are MSEs and farmers. It uses the group lending methodology and offers a range of eight loan products to its clients, out of which two are specifically geared for agricultural producers and small agro-business. Loan term is mainly short term. Further, KADET provides health education, health insurance and business training.

Small and Micro Enterprise Programme (SMEP)[15]: Before its registration as a company limited by guarantee in April 1999, SMEP operated as a small project of the national Council of Churches of Kenya since 1975. SMEPs mission statement is as follows: 'We are committed to improving the standard of living of Kenyans through the provision of affordable credit and non-financial services by mobilizing resources through catalystic leadership, innovation, networking and teamwork. We strive to continuously improve the viability of MSEs in Kenya'.

SMEP has a national network with operations in rural, urban and peri-urban areas. In December 2005, SMEP served roughly 22,000 clients through thirteen branches.

SMEP's main product is a working capital loan. A product was introduced for smallholder farmers in 2003. In addition, consumer loans for medical costs, school fees, burial expenses and emergency business loans are offered. Loan terms vary between 6 to 18 months. For all loan products, group solidarity method is used.

4.3.2.4 Rural Savings and Credit Societies (SACCOs)[16]

SACCOs are member-based organizations regulated by the Co-operatives Societies Act. They represent one of the most important sources of financial services for the poor. Currently, there are country-wide 4,200 SACCOs registered out of which about

[13] Information based on internet (19) and the MIXmarket (48).
[14] Information based on personal conversations, brochures and the MIXmarket (48).
[15] Information based on annual report (71) and the MIXmarket (48).
[16] There are some concerns about the reliability of data from the co-operative sector. (17)

2,600 societies are active. Many rural SACCOs[17] are organized around agricultural commodities. The most active rural SACCOs are generally located in the high potential agricultural zones, the marginal low rainfall agricultural areas are hardly covered. Many smallholder farmers depend on SACCOs as their primary source of financial services (17). One of their main advantages is the high acceptance by the population.

The services offered by SACCOs include sale of shares as well as savings and credit facilities offered to members. A number of societies have also started to provide retail banking services, such as deposits and checking accounts, based on what is popularly known as Front Office Service Activities (FOSA). These societies accept savings from non-members but do usually not lend to non-members.(75) The collection of savings from the public and the legitimacy of such operations is a critical issue. (57) The core of rural SACCO credit business, in the past and to date is in cash crop and production and marketing loans to male heads of household and loans for school fees, medical services and emergencies. (61)

The core lending product establishes members' access to credit on the basis of a multiple of savings (typically three times) and at a fixed interest rate. The loan term varies but rarely exceeds 12 months. The outcome is often significant credit rationing and terms that do not correspond to client needs. (17) One of the challenges that rural SACCOs face today is an increased competition from the banking sector and other financial intermediaries which have a number of competitive advantages. In general, Kenyan SACCOs have been slower to embrace change, to develop a better client orientation and to adopt modern management practices. (61)

Yaron et al. (75) assessed the role and situation of the cooperatives as follows: 'the SACCOs in light of their membership base and volume of savings and loans constitute the main microfinance providers in Kenya. In fact their outreach is a primary achievement of the system. In contrast, when sustainability and financial performance are applied, the picture is reversed. The SACCOs suffer from substantial deficiencies with regard to governance, financial performance and financial reporting and are *virtually unsupervised*, despite their important role in financial intermediation.'

Nevertheless, their future role for financing SSI development can be significant if existing weaknesses of the sector are addressed properly. This requires a comprehensive approach on all levels and extensive donor support.

Also on the part of government there is now a perceived need for the creation of a framework of adequate prudential rules and regulations for the SACCOs sector, a standardized accounting system and the development of an independent regulatory agency. (61)

4.3.2.5 Community-Based Financial Organizations (CBFOs)

There is a wide range of CBFOs owned and managed by their members. These include rotating savings and credit associations (ROSCA), accumulating savings and credit associations (ASCAs) and various forms of village bank and financial service associations (FSAs). (17)

The complexity of these organizations varies significantly according to scale and product offer. Evidence indicates that they are able to offer greater depth of outreach

[17] There are currently some mapping studies under way to identify all of the SACCOs (rural and urban / active and inactive) in the country because no one has a clear idea of the actual figures. (61)

than formal financial service providers both in terms of poverty level and geographical reach in marginalized areas. Limitations of CBFOs often include (i) vulnerability of groups; (ii) rudimentary product range and (iii) insecurity of savings. (17)

For SSI farmers the CBFOs may be a starting point in several locations where the access to markets (e.g. due to poor infrastructure) is not a limitation for utilising the potential for irrigation.

4.3.2.6 Commodity Based Credit Providers (CBCPs)

As already mentioned agri-marketing companies have a share of 63% of the agricultural credit market. In the Kenyan horticulture sector, there are about 300 marketing companies that actively participate in export activities. The Horticultural Crops Development Authority (HCDA) estimates that in 2003 at least 100,000 smallholders participated in these activities. (29)

A very elaborate system of advancing credit, especially in-kind such as agricultural inputs (seeds, fertilizers, pesticides etc.) has evolved over the years in the horticulture, sugar and tobacco sectors. Especially the horticulture sector has some good examples of seasonal advances (Box 1) in the form of comprehensive input and extension packages offered mostly by private sector exporting companies. (20)

Box 1: Contract Farming in Kenya

Frigoken Ltd: Horticulture contract farming in Kenya

Frigoken relies in its production almost entirely on genuine low-income smallholdings. For French beans cultivation, the company developed a standard package that is applied on every participating farm. Each plant bed is 225m² and constitutes only a small part of the farm. A farmer may cultivate a number of plant beds, but will be advised to stagger planting, in order to distribute labour peaks, costs, and income over a longer period of time. Each farmer signs an individual contract with the company. As an advance each farm gets a standard package of seeds, fertilizer and pesticides for a value of about US$10.

In 2002, Frigoken collected about 7,500 tons of French beans from smallholder outgrowers. The annual disbursements on input advances amounted to US$ 400,000. In 2003, the number of active farmers in the scheme was between 15,000 to 20,000 depending on the season.

Source: adapted from IFAD, 2003 (29) and personal communication

The range of financial services provided, however, is very narrow. It primarily consists of seasonal credit and short-term advances. These arrangements are not designed for term-investments in equipment or facilities to expand or start new operations.

For CBCPs, lending is most often not seen as a profit centre and seldom run as a profitable business. It is an activity that enables the companies to pursue their business and to ensure quality of the produce. Not much information is available about the sources of financing, since such activities are part of the normal business transactions of the respective companies. It is assumed that financing is generated from the overall business and partially financed by loans from commercial banks. Some of the CBCPs are seeking for donor funds and technical assistance to carry

out the lending activity. More options of ‘financing value chains‘ are discussed under para 8.5. (Private-Public-Partnerships).

A common problem in these arrangements is the phenomenon of side-buying and side selling as well as weak law-enforcement capacity of the contractual partners in the current legal system. (20)

4.3.2.7 Equipment Suppliers

In order to increase business, there are some input suppliers that are providing credit on irrigation equipment. However, reliable information on these arrangements were not available.

4.3.3 Financial Products Available to SSI Farmers

In Kenya, the availability of financial services in rural areas has significantly improved during the last years. In Table 8 information on the main players are summarized.

Increased competition in the financial sector has resulted in an improved access to financial services in rural areas which is benefiting also SSI farmers. Although the concentration of branches is in the rural centres and cash crop areas of the medium and especially the high potential zones, the trend goes towards a better coverage of areas also outside the main rural towns. EBS, followed by FFBS and K-Rep Bank, already operates 56 mobile branches to address the problem and to attract the rural segment of the population.

In fact, the entire banking industry has extracted maximum growth from its existing customer base. Banking the *mass at the lower end* is the next frontier. Banks have closed loss-making branches and most commercial banks have exited rural areas. Nowadays, it is believed that the retreat is over and the direction of the movement is tilting the opposite way: towards banks opening more channels to serve and reach their clients. (46) Therefore, there is hope for more competition also from the traditional commercial banking sector in rural areas.

Another notable impact has been the reduction of investments by banks in treasury bills. Because of interest rate decrease this risk-free investment is not profitable enough any more and banks are becoming more interested in lending again. Therefore, the banks are looking for new client groups, including the under-exploited segments of the market such as the rural population.

Table 8: Summary of Major Financial Products Available to SSI Farmers by Financial Service Providers

	Institution	No. of branches	Savings	Individual loans	Group loans	Short-term (up to 1 year)	Medium term (up to 60 months)	Long term (< 5 years)	Interest in rural expansion and SSI / comments
Commercial banks with focus on the lower income market	EBL	36 + 56 mobile branches	√	√	-	√	√	No[1]	High
	Family Finance	27	√	√	√	√	√	N/A	High
	K-Rep Bank	18 + 10 agencies	√	√	√	√	√	No[1]	High
Commercial banks	KCB	95 + 35 satellites	√	√	√	√	√	No[1]	Plans for privatisation and restructuring not yet finalised
	CBK	35 + 3 agencies	√	√	√	√	√	√[1/2]	High
	Post Bank	67 + 400 agencies	√	-	-	-	-	-	
NGO-MFIs	KWFT	82	√[3]	√	√	√	√	-	Medium to high
	Faulu Kenya	16	√[3]	-	√	√	√	-	Medium
	KADET	7	√[3]	-	√	√	-	-	Medium to high
	SMEP	13	√[3]	√	-	√[4]	-	-	Medium
	SACCOs	No reliable data available	√	√	-	√	√	-	High
	CBFOs	N/A	√	√	-	√	-	-	High
	CBCP	N/A, estimate 100-200	-	√	N/A	√	-	-	High

Source: Own estimates and personal communication.

[1] Only in specialised programs that are supported by donors.
[2] SACCOs only.
[3] Mainly compulsory savings.
[4] 6 - 18 months.

With regard to loan maturity the following trends are evident:

- short-term loans are widely available from all institutions. Not only commercial banks, NGO-MFIs, SACCOs and CBFOs are providing short-term loans to their clients, but also agri-marketing firms that play a major role in providing farm inputs;

- medium term loans (12 - 60 months, but usually 36 months) are also available in the market. However, their share of the overall portfolio is rather moderate. Many rural financial institutions are rather hesitant to provide other than short-term, working capital loans. The only institution providing medium term loans above 36 months is AFC. However, interest rates are subsidised, its future is uncertain and lending is not available at present;
- long term loans (>five years) are at present only available from five institutions that have entered into collaboration with donors. The availability of long term funds is mainly restricted to project participants and for agricultural purposes of smallholders not available.

Deposit facilities are available in all banks, SACCOs and the Post Bank. NGO-MFIs have not played an important role in savings mobilisation. The Post Bank has a nation-wide network with 467 outlets.

Interest rates have decreased over the last five years. Low-income clients are able to get loans in the range of 16% to 24% per annum from the banks. NGOs charge usually higher rates. CBFOs are at the higher end charging between 3% and 6% per month.

Lending methodologies comprise individual and group lending approaches. While the NGO-MFIs are leading in group methodologies, the SACCOs and the banks, notably EBL, address individual clients. K-Rep has started with group lending, recognizing that this is the best way to address farmers. NGO-MFIs have more advanced systems of group lending methodologies than banks by using the graduation process and / or having the savings-first policies in place. In addition, training is often provided to groups.

Collateral requirements are standard in individual lending using land titles and other securities. However, as was mentioned before the rural population in Kenya has to a high degree land titles. Nevertheless, many people are very reluctant to offer their title to a financial institution with the result that only a minimal share of medium term finance is provided to the sector. If they have the choice, farmers rather use group lending mechanisms to avail a loan. In general, if group lending methodology is used the members of the group guarantee for each other. In most cases, this is the only form of collateral. However, this form of collateral has its limitations for term lending.

4.3.4 Availability of Subsidized Loan Products

Subsidies still prevail in the Kenyan financial market and cause a serious problem for the development of rural financial markets (see also chapter 7.6).

The most important source is the parastatal AFC that provides directed, subsidized credit (at present 10% interest rate per annum) to the agricultural sector. However, AFC did not succeed in contributing to raise rural incomes. In contrast, many years of access to subsidized, scarce public resources that were channelled through AFC to the rural sector resulted in enormous NPLs, a virtually bankrupt DFI, and an unserved target group who lost trust in the institution. (75) Further, the availability of subsidised lending created an *over-demand* for credit that resulted in credit rationing, benefiting the more influential and wealthy clients instead of the poor. (75) Generally it can be assumed that only relatively few SSI farmers have benefited from AFC-loans.

More important are the direct subsidies provided to SSI farmers in the financing of gravity-sprinkler community irrigation schemes (see also chapter 3.5). Subsidies have been extended in various forms but usually include the infrastructure measure (headworks, major distribution networks), sometimes the in-field equipment and rarely the operational and maintenance cost. The presence of subsidies has also created an over-demand for the schemes. Consequently, farmers are often not willing to finance the entire costs through a loan at their risk even if long term financing is available. The reason is the relatively high cost of the capital investment for the infrastructure measure that often exceeds the annual household income and the 'horizon' of smallholders. Farmers are risk averse and even if projections promise good returns the up-front investment is usually too high. Further reasons are capacity constraints to fully exploit the production potential and uncertain market prospects.

4.4 The Meso-Level Infrastructure

On the meso-level, the following institutions, relevant for rural financial service provision, appear to be important role players in the future: the Association of Microfinance Institutions (AMFI), K-Rep Development Agency (KDA), AFRACA, Oiko-Credit, and the SACCO Apex institutions.

AMFI was created in 1999 by 11 MFIs. AMFI's mission is 'to develop a microfinance industry and an institutional framework that serves poor and low income people in Kenya'. The organisation is currently actively promoting the microfinance legislation process as well as to increase membership in the network among MFIs. (7)

KDA is the research and development arm of the K-Rep group. Its mission is '…to build the field of microfinance through the development of appropriate microfinance products and services to create economic opportunities for low income people and contribute to eliminating poverty.' (35)

AFRACA was established in 1977 as an association of banks and financial institutions which are directly or indirectly involved in providing financial services for rural development. Its mandate is 'the promotion of rural development by: fostering cooperation among governments and financial institutions in the field of agricultural credit and banking, improving the planning and management of financial arrangements aimed at rural and financial development, and establishing appropriate relationship with the international organisations and donor agencies as well as act as a link between these organisations and AFRACA members.' (4)

Oikocredit is an ecumenical co-operative financial development institution that provides credit to economically disadvantaged people. Oikocredit finances cooperatives, NGO-MFIs and viable enterprises. (48) In addition, it provides training to partner institutions.

A noteworthy contribution for the development of high-quality affordable market-led financial services is the work of MicroSave. The programme has developed vital know how in developing and delivering financial products which meet the needs of poor people. Micro-Save is providing a series of toolkits, publications and training materials which are available to the industry in East Africa. The organisation is building the capacity of local business service providers to expand and sustain access to its work. (18)

The Kenya Union of Savings and Credit Cooperatives (KUSCCO) was registered in 1973. As of December 2004, 4,000 SACCOs (membership of about 3 million) were members of KUSCCO. The mission of KUSCCO is 'to promote and develop SACCOs

in Kenya by providing unique and diversified quality products and services that are capable of promoting the economic interests and general welfare of their members in accordance with the co-operative principles in a changing environment'. (43) KUSCCO plays the advocacy and representational role for the SACCO movement and was the driving force for the SACCO Act which is currently under preparation. It organises trainings and provides support for consultancy courses. (30)

The Kenya Rural Savings and Credit Cooperative Societies Union (KERUSSU) was registered in 1998 and is the umbrella national cooperative organization for rural SACCOs. Membership in 2004 was 45 rural SACCOs with over 1.2 million members and account holders (61) Its mission is 'to be a provider of appropriate and efficient services to rural SACCOs with the aim of improving the economic and social well-being of their members'. (44)

Neither KUSCCO nor KERUSSO have any legal authority over primary societies under the current legislation. Their impact is at present rather weak. In order to assume more efficiently the role of a second-tier institution a merger of KUSCCO and KERUSSU should be considered.

4.5 Policy and Regulatory Aspects

The financial sector in Kenya is facing a number of constraints that need to be addressed in order to achieve outreach and sustainability. The major limitation to the development of the financial market focusing on the lower income market in Kenya is lack of specific legislation and a set of regulations to guide operations. The so-called MFIs[18] are registered under eight different acts of parliament (NGO Co-ordination Act, Building Society Act, Trustee Act, Societies Act, Cooperative Societies Act, Companies Act, Banking Act and the Kenya Post Office Savings Act). Most of these acts do not address issues regarding ownership, governance, and accountability. Lack of performance standards and limited access to funds are further constraints that need to be addressed. (59)

An important milestone for the improvement of the legal and regulatory framework conditions in the country is the '*Savings and Credit Co-operative Societies Bill*' (SACCO Bill) which is now being considered by parliament. Under the new legislation SACCOs would be required to keep larger amounts of funds in reserves and would have to comply with stronger prudential norms. The importance of the proposed Act is to provide for an independent regulatory mechanism for the SACCO movement. A grace period of up to five years may be considered for the SACCOs to comply with the new legislation. The proposed SACCO Bill is expected to provide for:

- registration and licensing of SACCOs,
- prudential requirements,
- standard forms of accounts,
- co-operative governance,
- amalgamations, divisions and liquidations,
- SACCO regulatory authority,
- savings protection insurance,
- central liquidity fund,
- sharing of information,
- transitional provisions. (31)

[18] including all financial institutions that focus on the lower income market such as commercial banks, SACCOs, NGO-MFIs and CBFOs.

An other new legislation relevant for the sector is, the '*Deposit Taking Microfinance Bill*'. The draft bill has been developed over the past years by the government with the support of the Central Bank of Kenya and AMFI and is expected to be passed by Parliament within the next six months.

The draft Bill takes into account the need to regulate NGO-MFIs that mobilize savings and provides them with a legal framework. This gives the opportunity to MFIs to raise funds from the public and to on lend them to their clients. It is expected that with the implementation of the Act the competition among financial institutions focussing on the lower income markets will further rise. Further, institutions will have more stable funds to finance the portfolio and may enter into term lending. Both will most probably have a positive impact on the SSI sector.

A *financial sector strategy* is still under development. The objective is to: '(i) increase the soundness and resilience of the Kenyan financial system; (ii) improve the governance of the financial system; (iii) improve the depth, breadth and efficiency of the system; and (iv) reduce opportunities for the large scale misallocation of financial resources'. (74) The strategy preparation is part of the proposed Financial Sector Reform Credit (FINSRC) from the World Bank which will include structural reforms on the side of: (i) restructuring and privatisation of state-influenced banks; (ii) reducing the stock of non-performing loans in the financial system; and (iii) reforming DFIs. (74)

4.6 Strengths of the Kenyan Rural Finance Sub-Sector

Kenya's financial sector is one of the most diversified and developed in SSA. The financial services industry focussing on the lower income market comprises of a number of dynamic institutions that apply 'best practices' which supports the development of increased competition.

Rural outreach has been improved in recent years by the financial services industry. It remains, however, highly skewed towards the more productive agro-ecological zones. Commercial banks focussing on the lower income market are competing with each other as well as with the SACCO sector and NGO-MFIs in the same market segments and have to find their niches. The institutions have recognized the potential in serving the rural active poor, which will have a positive effect also on SSI farmers.

Agri-marketing companies are providing a notable share of short-term financing to the agricultural sector. They are market-driven and have the potential to further being involved into rural financing mechanisms. At the same time, the Post Bank operates a network of nearly 500 outlets. This means that the rising demand for deposit facilities can be met on a country-wide level.

4.7 Development Constraints and Risks Faced by the Rural Finance Sub-Sector

4.7.1 Macro-Level and Enabling Environment

The SACCO sector currently operates without an appropriate enabling regulatory and legal framework. Despite this void rural SACCOs have filled the gap in serving the rural population with financial services and have achieved significant rural outreach. If a good framework and supervision model can be established rural SACCOs have a great potential to serve SSI farmers. The '*SACCOs Bil'* proposes the creation of a

Societies Regulatory Authority for SACCOs. However, the Bill is still pending and the capacity to supervise many institutions has to be build-up; this takes time and requires extensive capacity building efforts. The greatest challenge in this regard is the establishment of an adequate regulatory framework (prudential rules) and a professional supervisory board with adequate resources to carry out this mandate.

Development constraints in the enabling environment are:

- inconsistencies on the policy level regarding subsidies to the agricultural sector (see also 4.3.4);
- legislation regarding contract enforcement. Agri-marketing companies and rural financial intermediaries could do a multiple of business if the legal framework would allow faster processing of contracts if things go wrong;
- legislation regarding the use and eligible forms of collateral;
- the inadequate real sector infrastructure in the medium and low potential areas such as bad road conditions or inadequate telecommunications infrastructure.

4.7.2 Meso-Level

The meso-level infrastructure consists of promising institutions, notably AMFI and KDA that have done a tremendous work in the past. However, the industry needs more professional institutions that promote, support and finance rural financial intermediaries. Key areas include:

- training to build-up human resource capacities;
- refinancing facilities to buffer liquidity shortages and term-mismatch of funds;
- control mechanisms to assure financial soundness of business and the security of savings;
- research for product development.

Unfortunately, the SACCO Apex organisations still play only a minor role for the development of SACCOs. The main player in supporting the primary cooperatives in terms of training and refinancing is at present the CBK. The meso level infrastructure is critical for the future success of the SACCO sector, therefore, their role should be significantly strengthened in order to support the SACCOs movement.

Besides Oikocredit, the K-Rep Bank, some commercial banks and the CBK provide wholesale lending to rural financial intermediaries.

For SSI farmers in Kenya, trade associations and marketing firms are of crucial importance because they provide large amounts of short-term financing to the agricultural sector and are directly involved in the marketing of agricultural production. Successful financial intermediation in rural Kenya is also depending on functioning marketing structures. Therefore, the players in the value chain of horticultural production also play a key role in complex rural systems that concern SSI farmers.

4.7.3 Micro-Level

Rural financial intermediaries are the backbone of rural financial systems. At present, they provide only limited services to the rural clientele. The product range consists mainly of ordinary savings accounts and short-term lending. Moreover, services are not really tied to the specific needs of SSI farmers in terms of delivery mechanism and methodologies. Not only capacity building is required but also market research.

Rural financial intermediaries need to better understand the needs, requirements and constraints of their potential clientele and to adopt their products and methodologies accordingly.

The capacity in doing so will create competitive advantages and decide which institution will gain the main market share in future. In the present competitive environment it is expected that a significant number of institutions will try to enter into the rural markets.

In Kenya, the institutional variety is large. In order to address the financial requirements of SSI farmers different institutional models offer different opportunities for outreach and scaling up. The most important are summarized below:

- the SACCO sector suffers from substantial deficiencies in terms of governance, financial performance and internal / external control that need to be addressed; the narrow product offer does not satisfy the need for diversified financial services of SSI farmers;
- commercial banks have only little experience in lending to rural smallholders and require assistance in product development;
- the more experienced NGO-MFIs are suffering from lack of stable funds which can be addressed by assisting them in getting a license from Central Bank, once the new legislation has passed (upgrading).

Marketing of financial services in rural areas has as of yet not been given a high priority in Kenya. Farmers are not aware of the rising number of institutions and have very limited knowledge of the services that are offered, even in the so-called high potential areas. Bias against banks and antiquated opinions are prevailing. Therefore, financial institutions need to promote themselves in innovative ways and to change a whole range of mind-set.

5 Financing of SSI: Experiences, Best Practices, Innovative Approaches, Major Constraints and Options for Improvements in Financial Service Provision to SSI

In this chapter information will be provided according to:

- rural financial services related to the economic potential of different areas;
- rural financial services related to different SSI systems and their technologies.
- financing practices of selected service providers.

5.1 Rural Financial Services Related to the Potential of Different Areas in Rural Kenya

Kenya's agricultural land extends from the shores of the Indian Ocean up to the rainforests on the slopes of Mt. Kenya. Different climatic conditions with a large variety of rainfall result in a number of diverse Agro-Ecological Zones (AEZ), which lead to a great variety in farming systems. For the purpose of this study they have been grouped into three categories:

- high potential areas;
- medium potential areas;
- ASAL areas.

As mentioned before, access to rural financial services is highly skewed to the more productive agro-ecological zones. In Table 9 major characteristics of different land categories with relevance to SSI and its financing are summarised.

Table 9: Major Characteristics of Different Land Potentials with Relevance to SSI and its Financing

Land categories	Important characteristics
High potential Estimated potentials for SSI development: *Lake Basin:* 50 000 ha *Other catchments:* 10 000 ha	• Water availability: high rainfall provide a large number of farmers with direct access to water for irrigation from streams and groundwater sources. • Land use: fertile soils, great variety of horticultural crops are already grown under irrigation, 'anchor' crops (coffee, tea) provide the economic backbone of the rural economy. • Farm organisation: farmers have mostly a commercial orientation. • Financial services: Financial intermediaries operate in most of the market centres and are in many locations very accessible; commodity-based cooperatives are established in most of the region, farmers have access to short-term loans. • Topography: moderate slopes, water abstraction by gravity limited. • Land tenure: farmers hold titles to their land. • Settlement pattern: densely populated with easy access to market centres • Infrastructure: good road and communication infrastructure, up to 4 hours drive from Nairobi (export market). • Market: reliance largely on outside market (national, international). **Kenya context:** these conditions can be found in large parts of Central Province, the tea and coffee zone on the upper slopes of Mt. Kenya in Eastern Province, several regions in western Kenya and a few selected locations along the coastal belt.

Moderate potential Estimated potentials : *Lake Basin:* 150 000 ha *Other catchments:* 100 000 ha	• Water availability: moderate rainfall, limited no. of farmers have direct access to water for irrigation from streams, limited groundwater sources. • Land use: fertile soils, limited experience with irrigation, emphasis on food security, no dominant cash crops. • Farm organisation: mainly subsistence oriented producers, some farmers with commercial orientation, farmers have very limited access to loans. • Financial services: very few cooperatives, financial intermediaries operate in most of the larger market centres, limited accessibility to financial services. • Topography: moderate slopes, allowing some water abstraction by gravity. • Land tenure: farmers hold titles to their land. • Settlement pattern: densely populated mostly with good access to market centres • Infrastructure: moderate road and communication infrastructure, up to 8 hours drive from Nairobi (export market). • Market: more reliance on local and regional markets. **Kenya context:** these conditions can be found in parts of Central Province, the lower slopes of Mt. Kenya in Eastern Province, several regions in Western Kenya and a few selected locations along the coastal belt.
ASAL region Estimated potentials : *Various catchments:* 150 000 ha	• Water availability: low and unreliable rainfall, localized access to a few perennial and seasonal streams, groundwater only along alluvial plains. • Land use: predominantly semi-nomadic pastoralism, very limited fertile pockets of alluvial soils along a few perennial and seasonal rivers, irrigated crop production on a very limited scale. • Farm organisation: predominantly livestock farmers, very limited experience in subsistence crop production. • Financial services: few financial intermediaries operate in some district capitals. • Topography: flood plains, water abstraction and distribution by gravity canals and pumps possible. • Land tenure: mostly state land, few individual titles. • Settlement pattern: sparsely populated with very limited access to market centres, e.g. average 100 – 200 km between small settlements. • Infrastructure: road and communication infrastructure is very limited. • Market: limited access to regional markets, no access to export market. **Kenya context:** represents 80% of land area in the north and north-east.

Source: Own estimates and personal communication.

5.1.1 High Potential Areas

In the high potential areas the favourable agro-ecological conditions combined with the availability of divers water resources, good physical and institutional infrastructure at least for the provision of short-term finance, the availability of the necessary equipment components of various SSI systems at affordable prices in local markets, and the access to national and international markets for high value agricultural products (especially horticultural products) are the key supporting factors for the fast expansion of SSI. The region has for the same reasons also a high potential for further SSI development. Areas fitting these framework conditions can be mainly found in large parts of Central Province, the tea and coffee zone on the upper slopes of Mt. Kenya in Eastern Province and several regions in Western Kenya. Some of these areas are traditionally supplying the Nairobi market with fresh fruits and vegetables. The expanding demand for horticultural crops for exports and agro-processing created the opportunity for the further expansion and intensification of the production for which in many cases investments in SSI were carried out mainly by commercially oriented small-scale farmers.

The most commonly used SSI systems in these areas are treadle pressure pumps (about 25,000 units are estimated to be already operated in the area), followed by rope-and-washer pumps and drum and bucket kit systems. Engine-powered pumps are also on the increase and are perceived by farmers as an upgrade from the labour-intensive treadle pumps. Gravity irrigation schemes with piped distribution network and sprinkler irrigation do exist in several locations around Mt. Kenya. Schemes range in size from 20 to 80 ha irrigated area. In this region most of the irrigation is carried out by individual farmers.

Access to rural financial services in the high potential areas has significantly improved in recent years and as already mentioned a high share of rural households are already operating an account (mostly with cooperatives). In 2004, about 70% of producers received loans. (37) The main share of agricultural credit goes to coffee, tea and dairy producers. The better access to loans is in many cases a result of contract farming arrangements between farmers and CBCPs and cooperative societies. This positive development is clearly based on the expansion and profitability of commercialised agriculture. The cultivation of cash crops like tea and coffee is financed as 'anchor crops' that are sold under contract arrangements exclusively through local marketing organisations respectively the cooperative societies. Besides seasonal production loans cooperatives also extend consumption loans to their members, allowing farmers to address their private and other farm investment needs.

Reliable information on how SSI farmers finance their investments, operation and maintenance costs of the irrigation system and other variable costs of irrigated production are not available. Specific financial products aiming at the financing needs of these farmers are not existing and therefore specific information on performances, best practices, innovative approaches related to the financing of SSI farmers are also at present not available. It can nevertheless be safely assumed that in many locations of the high potential areas SSI farmers use for financing besides their own resources short-term loan products to which they have already access to via CBCPs and SACCOs but also increasingly via commercial banks. Even villages that are far from main roads are becoming nowadays better serviced by mobile banking units. Medium term finance is, however, rarely available.

The main constraint in the provision of financial services to SSI farmers in this region is not the absence of financial institutions. During the last years also commercial banks focusing on the lower income market such as K-Rep, Equity Bank and Family Finance are becoming increasingly present in district towns and even smaller market centres of the high potential areas and are now competing with the traditional financial service providers. FIs have started to see small-scale agriculture as an important customer segment with substantial growth potential.

SSI farmers are a new customer segment and FIs have little experience in dealing with it. The scale and outreach of specific financial services to SSI farmers is still limited. The major reason's include: (i) FIs are concentrating on financing inputs for crop production; (ii) they still lack experience with SSI farmers and horticultural production; (iii) the product range and methodologies are not adapted to SSI farmers, especially the availability of medium term finance is very limited; (iv) there appears to be a bias of farmers towards formal financial institutions; (v) there is very limited knowledge of SSI farmers about services and products FIs can provide.

To overcome these constraints, options for improvement include:

- financial institutions need to approach SSI farmers at proximity and should undertake active marketing;
- financial institutions should develop demand-driven, customer-focused approaches with regard to financial products and delivery mechanisms;
- risk-reducing measures (e.g. loans secured by contractual agribusiness payments) need to be explored not only for anchor crops but where possible also for the production of SSI farmers;
- SSI farmers need to be enabled to understand the different financial products available to them and should be able to compare between different financial service providers.

Existing institutions in these areas need to be further strengthened in order to scale-up their product range for SSI farmers. Institutional capacity building is a proven tactic to effectively support sustainability and growth of rural financial institutions.

The gravity-fed community schemes in this region continue on the side of investments to be partly financed by the government respectively by donors. An interesting novelty are the participation of CBK and the Equity Bank in the programme financing the farmers' contribution. Precondition for the commencement of the construction of these schemes is that farmers raise 10% of their total contribution and deposit it with either of the two banks. Besides for the establishment costs farmers will need access to financial services in order to provide for their seasonal credit requirements.

5.1.2 Medium Potential Areas

In the medium potential areas farmers are generally facing less favourable conditions for SSI development mainly caused by the limited agro-ecological potential, reduced availability of water resources and the lack of institutional infrastructure for providing financial services to farmers. Local and regional markets can generally be easily accessed. Mainly due to distances and related transport costs the access to the national and international market is more expensive and a key factor for the lower competitiveness of the medium potential areas. Areas fitting these framework conditions can mainly be found in parts of Central Province, the lower slopes of Mt. Kenya in Eastern Province, several regions in Western Kenya and a few selected locations along the coastal belt.

In the medium potential areas generally the same technical SSI options are applicable as in the high potential areas. Due to the substantially lower water resource base, the lack or limited access to finance and limited and insecure horticultural markets the irrigated area as a ratio of the overall farm land is much smaller in these regions. The use of low-cost SSI technologies is not yet widespread. Horticultural production from SSI is partly for subsistence and partly sold in the local and regional markets.

Due to the lower importance of cash crops in the medium potential areas the infrastructure for financial services is far less developed. The percentage of account holders and farmers that receive credit is much lower in these areas. Meanwhile financial intermediaries are also discovering the potential of these areas for financial

service development and first FIs have started the process of establishing themselves in main market centres. The absence of a specific anchor crop limits FIs to a much smaller portfolio for agricultural production.

At present, in many areas of the medium potential areas SSI farmers have limited or no access to loans due to the absence of an adequate institutional infrastructure. Also where FIs exist the use and access to financial services is often low. Large sections of the community are still unaware of the financial services and respective loan options on offer. Financial institutions are often also still reluctant to lend to SSI farmers. Contributing are that technical know-how and productivity of SSI farmers are relatively low. Furthermore, market prospects are often insecure.

Unreliable rainfall and frequent crop failures are making parts of the medium potential areas to regular recipients of famine relief supplies. Government therefore targets specific settlements where conditions are technically and economically feasible for the development of gravity irrigation schemes. Preferred options are sprinkler systems, for they have lower maintenance and water management requirements. Design and financing modes of gravity-fed community schemes in this region are the same as in the high potential areas

Also in these medium potential areas considerable potential exists for further market oriented agriculture and SSI development. This would also provide the basis for the necessary better coverage of the areas by FIs. Due to the generally lower profitability of agricultural and horticultural production systems investments in these areas in SSI systems should especially favour lower-cost solutions. A key aspect for better service coverage is the support to institutional capacity building. Flexible rural delivery mechanisms such as mobile banking need to be developed. The support of new technology for example through the introduction of mobile banking units may justify initial subsidies for institutions that are interested to penetrate the area. Furthermore, capacities of SSI farmers need to be strengthened and markets need to be developed.

5.1.3 Low Potential Areas

The sparsely populated ASAL region is in many parts dominated by semi-nomadic production systems and settlement patterns. Water sources are limited to seasonal and very few perennial streams. The physical and institutional infrastructure also for financial services is poorly or not at all developed. There is a very limited access to markets for agricultural production. The area is generally characterized by relatively low levels of economic activities with low input/output levels and high risks and relatively undiversified economies. Repeatedly large fractions of the resident population depend on famine relief. The low potential areas cover about 80% of the land area of the country. They are largely located in the North and the North-Eastern region of the country and include also parts of the Eastern and Coastal Lowlands.

In most of the ASAL region rainfall is erratic and unreliable and for crop production farmers depend entirely on irrigation. The different SSI systems available in the country are basically also applicable in the ASAL region. Government favours community gravity schemes with furrow irrigation while some individual farmers are investing in motorized pumps for lifting water from perennial streams or groundwater into canals with furrow irrigation as the preferred technical options in irrigation development.

As a result of the general production system, its limitations and risks these areas have proved unattractive markets for FIs. The low potential zones have with only 5% to 6% a very modest access to agricultural credit and, in general, the access to financial services is very low if not non-existent. The main providers of financial services in these areas are CBFOs (ASCAs, ROSCAs, FSAs) that have established themselves in the communities but providing only a rudimentary range of financial services.

There is presently no evidence on the use of financial services in irrigation development in ASAL regions. Under the general design of the community irrigation schemes in these areas the government is providing the investment costs and the tenant farmers are required to cover the operation and maintenance costs. The beneficiaries of the government schemes are in most cases recipients of famine relief aid and a tenantship in a scheme is to provide them with a basis to sustain their livelihoods. Such schemes usually have a WUA responsible to oversee the operation and maintenance of the perimeter. These organisations could become in cooperation with FIs intermediaries for financial services to scheme members using group loan mechanisms.

The motorised pumping systems are generally established by rich livestock owners and traders who normally use their own financial resources for the irrigated production of crops for their own needs and for sale on local markets.

The ASAL region with its long distances between centres, low population density, and limited resource base have difficult framework conditions for the development of viable and sustainable rural financial intermediaries. Especially limiting is the absence of markets for higher value agricultural products. Under such circumstances, the provision of financial services on a sustainable base remains a challenge.

The government is committed to foster irrigation development through community schemes in these areas which will as a priority address the chronic undersupply with staple food existing in the respective area. A possible entry point for FIs would be via the WUAs addressing the current lack of finance for seasonal production costs. Once an operational nucleus is established in these schemes, groups and individual farmers can be targeted in the vicinity. With the area under irrigation expanding other crops could be introduced which have the potential for agro-processing. Such agro-industrial development will require innovative financing mechanisms.

5.2 Rural Financial Services Related to SSI Technology

5.2.1 Technology Level 1: Low-Cost Irrigation Equipment

Examples of relevant SSI systems: bucket kit, drum kit, rope-and-washer pumps, treadle pumps, hip pump. The cost can be as low as US$15 and does generally not exceed US$ 200 (see chapter 3.6 and Tables 1 - 2 in Annex 1).

The country has seen an astonishing increase of private investments in low-cost irrigation technologies. There is no systematically collected information available on the modes of financing of SSI development and operations. However, the information collected from different sources suggest that the main share of the investments related to low-cost irrigation equipment is likely to have been financed out of savings and a smaller part was financed out of savings in combination with short-term loans. Most common are currently :

- financing through savings and micro loans secured via group arrangements: farmers can obtain small loans under standard group schemes or finance the purchase of irrigation equipment under the available standard consumption loans. For group schemes it is necessary that such a farmer applies for the loan as part of a group; these are presently normally mixed groups consisting of irrigation farmers and other rural households;
- financing through savings and individual short-term loans in combination with a loan guarantee by a produce buyer: farmers with contract farming arrangements can obtain loans as individuals from financial institutions with the purchaser of their produce acting as guarantor. In such cases farmers need to agree that the produce buyer repays an agreed amount of the loan to the FI;
- financing through savings and individual loans through private AGRIVET shops (product still under development) supplying inputs to farmers: a substantial percentage of treadle pumps are distributed through AGRIVET shops. Farmers often have credit arrangements with these traders and in cases where they have a good repayment discipline a storekeeper may decide to advance the pump on credit.

Especially in the high potential areas where anchor and horticultural crops are produced, many SSI farmers have the financial capacity and technical know-how to invest into new technologies and to expand their production through irrigation. Most farmers in these regions are likely to be able to finance the equipment with short-term loans in combination with own capital from savings. In medium potential areas, observations in the field revealed a low use of low-cost irrigation equipment. The main reason appears to be lack of access to finance but also an unreliable horticultural produce market.

The financial service industry is able to cover the demand for financial services with regard to low-cost irrigation equipment. The coverage of rural financial intermediaries decreases with the economic activities of the area as pointed out in chapter 5.1. Therefore, emphasizing institutional capacity building in combination with the introduction and scaling-up of financial services is the best approach to support long term growth of financial service providers and their sustainability.

The recommended financing mode for low-cost irrigation equipment is clearly short-term loans in combination with own resources. Where required and appropriate the investment loan can be combined with a working capital loan.

5.2.2 Technology Level 2: Medium-Cost Irrigation Equipment

Example: Motorized pump with an investment cost of about US$ 610.

Motorized pumps represent a considerable investment for smallholders. MoWI estimates that the highest concentration of this pump type in the country is in the high potential areas of Central Province. The investment into this SSI system in this development region is mostly done by farmers with the aim of crop intensification and diversification and especially to produce horticultural cash crops for the national and/or international market. These areas have a good rainfall and a pump is therefore purchased for complementary irrigation to cover seasonal irregularities, but also to extend production into the dry season. It is increasing farmer's choice and contributes to the optimisation of overall farm income.

Many farmers in the high potential areas grow coffee and tea and have therefore not only access to credit via their respective cooperatives but also a higher savings potential and therefore a better self-financing capacity.

Similar to the situation outlined for investments and operations for low-cost technologies also this SSI system is at present financed by savings in combination with mainly short term loans provided by SACCOs and other FIs as well as loans by pump retailers. The investments are suitable for medium term loans that are, however, rarely available at present. Reasons include: (i) medium term products are usually not available for SSI farmers because they are perceived as too risky; (ii) farmers are not willing to secure a loan with their land title. While liquidity within the Kenyan banking sector is for most of the commercial banks not the problem, NGO-MFIs and financial cooperatives suffer from the lack of stable funds for extending medium term loans. In general, only a small percentage of the loan portfolio of financial intermediaries is composed of term-finance and even a smaller percentage of agricultural term finance.

Financial intermediaries have started to see small-scale agriculture as an important customer segment with substantial growth potential. Since there is little experience available FIs are entering this economic sector through special commodities such as tea and coffee. These commodities have specific marketing channels and are therefore considered 'safer' than horticultural production. However, they provide a good learning ground for FIs about the dynamics of smallholder agriculture. Under this 'commodity approach' it is possible for farmers to get individual loans with the crop being used as collateral.

The recommended financing mode is either short term loan or medium term loan – both in combination with own resources. Another interesting option for financing these technologies is leasing. Although some companies such as MicroKenia Ltd are providing leasing in Kenya, no experience has been reported for microleasing to SSI farmers.

FIs need to scale-up their product range towards term-financing and / or microleasing. This can be achieved through better availability of refinancing funds and intensive capacity building efforts of experienced financial intermediaries, notably the SACCOs.

5.2.3 Technology Level 3: Irrigation Schemes

Example: Gravity - fed sprinkler irrigation scheme; investment cost US$ 4,200 per ha, thereof infield equipment US$ 825. Schemes vary in size between 40 to 100 ha and individual irrigation plots vary currently in size between 0.2 - 0.4 ha.

The concept of communal irrigation schemes comes to bear in regions with a lower development potential with few water sources. Beneficiaries are mostly low income rural communities living in fragile agricultural production environments who are also regular recipients of famine relief support.

In the schemes in medium to high potential areas (mostly gravity-fed sprinkler irrigation systems) farmers normally own the land and are therefore meanwhile required to contribute to the overall investment costs on a pre-determined ratio (currently either 20:80 or 50:50). These financing modes have attracted private sector banks who are to provide medium term (secured by a guarantee from donors) respectively short-term loans for the farmers' shares in the investment costs and also for seasonal loan requirements. The new participatory financing model where farmers

pay for up to 50% of the investment costs and the private banking sector supports farmers with loans to finance investments and seasonal production costs is a big step forward in the more appropriate participation of farmers in financing scheme development costs which will also considerable relief the limited government budget. From a financial sector perspective this new approach bears considerable risk (compare chapters 7.6 and 8.3).

The schemes in ASAL areas (mostly gravity-fed furrow irrigation systems) are usually constructed on state land with the farmers having tenant status. They therefore cater only for their seasonal production costs and the investment costs are covered by the owner of the land, i.e. the state. Tenant farmers have mostly a stock farming background and will require close technical support in managing their new assets. Since a considerable share of the country's irrigation potential is situated in the ASAL region a substantial number of these schemes are planned to be implemented. The finance required for their implementation will be by far in excess of what the government can raise. Creative modelling, e.g. giving tenants full land titles, provides a chance to adapt the financing models to the specifics of the ASAL region and also raise private sector finance for the construction.

In the past, the investment costs of communal irrigation schemes were fully paid by grant. The participation of private sector banks in financing farmers' shares in the costs of the irrigation infrastructure in schemes in the medium to high potential represents an important milestone in an area that has always been the sole domain of government finance often supported by international donors. However, the fact that different schemes with different financing modes within the country and even within the same region are operating parallel may hamper positive developments (see also chapters 3.3 and 5.1). Further donor harmonization is required.

Generally it can be concluded, that the trend goes clearly towards larger contributions by farmers. A common policy within the water and agricultural sectors needs to be formulated regarding the treatment of subsidies/grants for financing capital intensive community irrigation schemes taking into account the development potential and socio-economic conditions of different areas in which the following essential questions are to be answered:

- Is the provision of such an infrastructure (intake, distribution system) for a limited number of smallholders a function of government?
- Can the government provide enough funds for it?
- Are grants and subsidies a suitable instrument?
- What is the best design of irrigation schemes with regard to financing within the framework of the financial systems development approach?

5.3 Financing Practices of Selected Service Providers

In this chapter information is provided on financing practices of selected institutions in Kenya that are committed to expand financial services to agricultural producers. Experiences are presented also if such services do at present not specifically target SSI farmers[19]. Agricultural loans are usually not extended for specific purposes because they are classified as 'agricultural' or 'production' loans. The decisive criterion is the collateral, in most cases either agribusiness contracts for anchor crop producers or solidarity groups. It can be assumed that a substantial share of

[19] As already outlined there are at present no specific financial services for SSI-farmers and therefore no specific experiences and best practices to be reported.

financing is used for SSI investments but the database does not provide the information.

SACCOs are still the second important provider of financial services to the agricultural sector. Their product range is narrow but highly accepted by the rural population. Most rural SACCOs have been slow to adapt to an increasingly competitive environment and lost some clients. Opportunities to expand membership include the penetration of areas that are not dominated by major crops and to reduce the risk profile associated with a single commodity or employer.

Equity Bank provides financial services to more than 750,000 low-income clients mainly in Nairobi and the neighbouring Central Province. The bank has meanwhile extended its branch network nationwide. In order to expand its client outreach in rural areas, EBL developed demand-driven products for farmers. Two new products were specifically developed to meet the needs of agricultural customers: a crop advance loan and a farm input loan. These loans range in size from US$ 21 to $820 and are made to tea, coffee and dairy farmers[20] on terms of up to one year. To mitigate risk, the loans must be secured by agribusiness contracts and are made only to farmers receiving regular payments by produce processing and marketing companies. In order to reach clients living in more remote locations, mobile banking units (Box 2) were introduced in the late 1990's. These units make regular visits to the communities and provide most services available at the branches including processing and administering five different savings products, several loan products, and general financial services.

Box 2: Mobile Banking with Equity Bank

Mobile banking at EBL involves taking banking services to the rural areas using an equipped mobile van, 2-3 times a week. Other requirements of a mobile bank include (i) permanent premise, (ii) motor vehicles, (iii) at least two banking staff and (iv) two security personnel. One mobile unit requires to have at least 1,500 clients and handles between 250 and 300 transactions per day. The mobile bank charges an addition to a fixed monthly charge of KSh. 50. Mobile units are demand-driven and have in most cases converted into fully fledged branches in less than a year when the critical mass has been reached.

Source: (37)

K-Rep Bank, the first commercial bank in Kenya that directly targets low-income clients serves currently 120,000 clients countrywide. The bank uses the solidarity group approach that builds on peer pressure. Loans to the groups (on average 25 members) are disbursed on graduation principle, starting with initial loans of about US$ 400 per individual, second loan US$ 600 etc. Loan duration is at maximum one year. Instalments are due weekly, monthly or upon request in one bullet payment. 20% of the loan must be held in a savings account. K-Rep is committed to process loan applications within 48 hours. Group members have the possibility to graduate and to become individual clients. In this case, they are able to receive loans up to 36 months against securities, usually land titles.

Another notable example are the individually owned and operated AGRIVET shops. These private input suppliers are also dealing with irrigation equipment. A substantial percentage of treadle pumps are distributed through local shops of these input dealers. Farmers often have credit arrangements with their local input supplier and in

[20] While the anchor crop serves as a guarantee, the utilisation of the loan is not monitored. This is also generally the reason why only little information on finance for irrigation equipment is available. Therefore, farmers engaged in the anchor crops have access to short-term finance and can use a loan for expansion into SSI.

cases where they have a good repayment discipline a storekeeper may decide to advance for example a treadle pump on credit. Kickstart, the main treadle pump distributor in Kenya, aims to foster agreements for credit lines between AGRIVET shops and FIs. Although the loan products are still under development and the data base is incomplete, it can be expected that financing for investments in irrigation equipment and facilities via the private sector will be available on a larger scale in future.

Lesson's learned:

The above examples show that customized financial services from private financial service providers are in principle available for agricultural production purposes and therefore also for SSI farmers. Without question, outreach and financial depth need to be improved but the following lessons can be drawn: irrigation does not require a special product range but different financing mechanisms and delivery channels. Farmer's entrepreneurial activities are diversified and different activities can be hardly separated from each other. This is in line with the general experiences available from agricultural finance programs. These experiences recognize that farming households have multiple sources of income as well as multiple sources for loan payments.

Important key elements on access to financial services for SSI-farmers are:

- timely availability, fast processing and customer-friendly procedures;
- flexibility within the product range, especially with regard to repayment mode and collateral requirements;
- the combination of loan products and savings;
- proximity of financial institutions or delivery mechanisms that allow easy access to financial services.

6 Relevant Donor Support Programs

Kenya receives technical and financial assistance from a large range of donor organisations. Several programmes target specifically the financial sector, the irrigation sector and aspects of horticultural production and marketing. Some of the most relevant activities are summarized below:

- The Financial Sector Deepening Program (FSDP) is a main actor in the Kenyan financial sector. The FSDP was established in early 2005 to 'support the development of financial markets in Kenya as a means to stimulate wealth creation and reduce poverty'. Working in partnership with the financial services industry the goal of the program is to 'significantly expand access to services among lower income households and smaller scale enterprises'. It operates as an independent trust and its main funders are the UK's Department for International Development (DFID) and World Bank. (17)
- UNDP provides support to strengthen Kenya's trade negotiating capacity in order to derive optimal results at upcoming WTO negotiations, and other post-Cancun issues. Very relevant to irrigation development is the training of small scale horticulture exporters to better meet market demands.
- JICA has over many years supported the implementation of SSI on various levels. Besides organisational support to the government's irrigation coordination unit, it has provided hands-on support on strategic issues as well as assisted with analysing SSI performance and with the appraisal of new project sites.
- German development cooperation provides assistance in the implementation of the new water policy. Through KfW Germany supports also the implementation of a large irrigation development programme covering up to a total of 700 ha spread over ten different sites.
- USAID contributes towards the strengthening and deepening of the financial sector to expand the client base, products and services. Trade support to increase domestic, African and international trade in various agricultural commodities (dairy, horticulture, maize) is also part of the portfolio. Interventions are multilevel and aim to improve productivity, trade, market links as well as the access to financial and business services of smallholder farmers and their respective organizations.
- The African Development Bank supports the development of the financial sector by strengthening specifically the meso-level.

Besides the major programmes mentioned there are numerous other bilateral and multilateral donor activities that contribute to related areas such as trade, market development and capacity building in a wide range of institutions and on different levels.

7 Major Conclusions

7.1 Technological Solutions

SSI irrigation is of increasing importance in the Kenyan smallholder farming systems and contributes especially in areas with lower and erratic rainfall conditions substantially to the increase of agricultural incomes, employment and reduction of poverty and malnutrition. Irrigation farmers are less vulnerable to weather conditions which reduces agricultural production risks considerably. Irrigation supports the intensification and diversification of the farming system and improves significantly agricultural productivity also by reducing the effects of seasonality. It allows farmers to cultivate crops with diverse vegetation periods not only during the conventional rainy season but also in the off-season. Such staggered planting is especially important for the production of high value vegetable crops, it allows a longer and stronger presence in the market with positive effects on prices and incomes and a more even cash-flow thus contributing to a reduction of credit risks.

SSI development from a technical point of view can be distinguished into three categories:

- Low-cost irrigation technologies allow SSI farmers with a relatively modest investment to develop small areas under irrigation and hence to increase production and productivity and become less vulnerable to weather conditions. Such investments are often the first attempt to change traditional production patterns and provide an ideal ground for knowledge generation and building-up experiences. Low-cost irrigation technologies are private investments of individual farm households.
- Medium-cost irrigation technologies that require more substantial investment especially into motorized pumping units. Such an investment allows farmers to develop a larger area under irrigation and to increase production and productivity substantially. The technology requires not only technical know-how to operate and maintain the equipment but also to use more advanced production techniques. To a great extend, such technologies are explored by advanced individual farmers or micro-entrepreneurs who operate under commercial terms and conditions.
- High cost irrigation technologies depend on a more costly common scheme infrastructure. They are constructed for a number of farm households, on average 150 to 250 farmers, that are organized into WUAs to manage, operate and maintain the communal system. While the access to water is a joint initiative, production on individual farm plots is an individual entrepreneurial activity of small-scale farmers.

7.2 Special Factors Enabling SSI Adoption by Smallholder Farmers

The impetus for the success of the current expansion in irrigation development originates from the national and international horticultural produce market. The most important driving force of the massive development in the SSI sector has been the fast expanding export market. The dynamic growth in Kenya's irrigation development stems from the close interaction of the agro-processing and exporting sector with small-scale horticultural producers.

This ‘pull effect’ of the market has facilitated the mobilization of private capital without any institution formally guiding or supporting the process, which is thus purely market-driven. SSI systems meanwhile account for an impressive share of the country’s irrigation area. The adoption of SSI technologies is based on individuals seeing it as an opportunity for economic advancement and finding the resources to act on it.

The following aspects can be identified as crucial supportive factors for the current SSI expansion:

- High agricultural potential: The bulk of treadle pumps are being used in areas with high agricultural potential characterized by fertile soils and comparatively high rainfall, where crops require mainly supplementary irrigation. The extent of available water resources led to a high concentration of farmers in a given area. This proofed very attractive to produce traders, because they can buy the required produce in a cost saving manner in a geographically confined area. Large exporters maintaining their own extension staff and buying centres in a production zone can operate more efficiently and with less overhead costs.;
- Commercially oriented smallholders: Most farmers in this area are already used to cultivate major cash crops such as tea and coffee and have know-how in yield increasing production techniques. These ‘anchor’ crops have specific (monopolistic) marketing channels through their respective cooperative societies who buy the crops from farmers, and provide inputs in advance. The technical competence of the farmers to produce quality products is a valuable asset for further crop diversification and intensification and especially when entering the very competitive horticultural market.;
- Access to individual loans: It is a big advantage that commodity-based financial cooperatives extend loans to their individual members to address other financial and investment needs. Horticultural producers are small entrepreneurs who need various loan products (especially seasonal loans but also term finance) tailored to their individual business plans which can complement their own resources.
- Availability of affordable and suitable SSI technologies and related equipment: Especially the local production and successful marketing of treadle pumps in Kenya made SSI technology readily available for farmers. The equipment is adapted for different local conditions and more affordable than imported equipment. Further strengths of these low-cost technologies are that they are owned by individual farmers, can be easily operated, maintained and repaired and can be used to irrigate from a variety of water sources.
- Availability of water on farm: The area of high adoption has numerous perennial streams and/or considerable ground water resources availing many farmers access to irrigation water on their own holding.
- Access to markets: The proximity to a market is a precondition. Farmers will only invest in SSI development if they are satisfied that the increased output in crops can also be sold at prices and returns providing sufficient incentives for his/her additional efforts. Good road and communication infrastructure allows traders to come directly to the farm or the respective settlement.

Since all these factors prevail only in the high potential areas irrigation development has been regionally skewed and mainly confined to these locations. Due to the availability of finance in the farmers' environment rural financial intermediaries other than cooperatives and CBCPs have until now only played a limited role in the establishment and operation of SSI.

Anchor crops with established marketing channels linked to the respective marketing agency/cooperative societies as a source of finance do not exist in the other regions of the country. In the areas with 'lower' potential and in the ASAL region the availability of financial services will be crucial for the development of SSI. The recently improved presence of financial intermediaries in the rural areas is a key factor for the further expansion of SSI.

SSI farmers are individual entrepreneurs and as such may see their neighbours as competitors. Water Users Associations have therefore so far not played any role in the acquisition of SSI devices or in credit acquisition for them.

The potential for achieving an attractive profitability and contributions to the household income from SSI is generally especially good in all systems which can produce in intensive production systems with family labour high value agricultural/horticultural products. The framework conditions to achieve this are especially good in the high potential areas with good market access. The economic viability of SSI decreases when labour and water are also to be costed and less productive cropping patterns combined with lower production techniques are to be applied as is often the case in the areas with lower potential and especially in the low potential areas of the ASAL region.

There is generally a lack of researched analysis on the actual SSI production systems and their financial performance under the different agro-ecological and socio-economic conditions of the country.

7.3 Ability of the Financial Market to Provide Financial Services for SSI Development

Kenya's financial sector is one of the most diversified and developed in SSA. The financial service industry focussing on the lower income market has achieved considerable growth rates and faces a healthy competition. A number of dynamic institutions are committed to 'best practices'.

Rural outreach has been improved in recent years by the financial service industry. The emergence of commercial banks focussing on the lower income market and other financial intermediaries has led to more competition in the market and to a moderately better service for the rural population in terms of accessibility and availability of rural financial services. Three other factors may have positive effects on the development of the industry. First, the banking industry has experienced significant growth over the past years and will most probably expand towards the lower end of the market. Second, the enactment and subsequent application of the SACCOs Bill is expected to result in better performances and further expansion of financial cooperatives. Third, new legislation will allow NGO-MFIs to operate in a legal and regulated framework and to mobilise savings.

Therefore, increased competition is likely to result over the next years in better outreach to the economically active rural poor, including SSI farmers.

Rural outreach remains, however, highly skewed towards the more productive agro-ecological zones. The coverage decreases with the economic potential of different zones:

- In the high potential areas, the coverage of financial service providers is significantly better than in the other areas. The main constraint in the provision of financial services to SSI farmers is a huge information gap on both sides and the need for better client orientation and customized products. Further, the availability of medium term finance is very limited. To overcome these constraints, financial institutions operating in these areas need to be strengthened in order to scale-up their product range for SSI farmers and agricultural production in general.
- In the medium potential areas, the coverage of financial service providers is much lower. In addition to the constraints mentioned above, financial institutions are still reluctant to lend to SSI farmers that suffer from low productivity, lack of technical know how and insecure markets. To overcome such constraints capacities of SSI farmers need to be strengthened and markets need to be developed. At the same time, the introduction of financial services towards SSI farmers may be necessary. In addition to institutional capacity building efforts, flexible rural delivery mechanisms need to be developed.
- In the low potential areas, the problem is not only the quasi absence of financial services but also the difficult and costly access to markets especially for higher value products. As a result, these areas have proved unattractive markets for financial institutions.

The product range offered to the rural population for agricultural production at present is rather narrow and limited to short-term financing and simple savings accounts. The availability of medium term-finance for investments in irrigation equipment is limited. Although medium term loans are offered by a number of institutions, their share in agricultural lending is minimal at present. The challenge is to broaden the product range for SSI farmers, both, with regard to loan terms and repayment modes.

7.4 Financial Requirements for SSI Development

SSI farmers are smallholders who irrigate areas up to five hectares, but typically less than one hectare. Often they are relatively resource-poor, rely heavily on family labor and are weak in bargaining power. Their SSI development potential depends largely on the natural and economic conditions prevailing in their respective location. High potential areas have a relatively high degree of economic potential with several development options. On the other side low potential areas are due to unfavorable natural conditions limited in economic potential and generally have only few development options. The same applies for the access to financial services.

In areas with SSI development potential the demand for irrigation equipment and facilities is generally very high. The presence of subsidies in the sector has created in some areas a hyper-demand for capital intensive community irrigation schemes with high grant elements provided by public funds. In contrast, SSI farmers using low and medium cost technologies invest their own capital as far as possible and demand complementary financing services for SSI investments if they have reliable markets to sell their production. SSI farmers are risk-averse – the same as for all agricultural

producers around the globe – and will limit their risk exposure to manageable amounts of external finance. Therefore, low-cost solutions suit better the capacity of low income small-scale farmers as they allow to gradually expand and to learn with experience. In the absence of term-finance, low-cost irrigation solutions become even more important.

Irrigation development and expansion does not depend on special financial products for the dissemination of the technology. Irrigation agriculture is basically an entrepreneurial activity that requires the facilities and products the rural financial markets should provide on a sustainable base:

- secure savings facilities;
- short term working capital loans;
- short term investment loans
- medium term investment loans or leasing.

In Table 10 the financial service requirements for examples of different technology levels are detailed.

Table 10: Financial Service Requirements for Different SSI Technology Levels

Technology level	**Financial service requirements**
Level 1: Low-cost Examples: bucket kit, drum kit, rope-and-washer pump, treadle pump, hip pump. Investment cost per unit can be as low as US$15 (bucket kit for 50 m²) and does generally not exceed US$ 200 (treadle pressure pump for 0.6 ha).	(1) Savings. (2) Short term working capital. (3) Short-term investment loans.
Level 2: Advanced or medium-cost Example: motorized pump unit for 1 ha. Investment cost: US$ 610.	(1) Savings. (2) Short term working capital. (3) Short term investment loans or medium term investment loans or leasing.
Level 3: Irrigation schemes Example: gravity - fed sprinkler irrigation scheme for 200 farmers with 0.4 ha under irrigation/farm or a total of 80 ha irrigated area for the overall scheme. Investment cost per farmer for 0.4 ha US$ 1,750 (per ha US$ 4,000), which includes cost for infield equipment of US$ 330. For 200 farmers the scheme investment costs amount to US$ 0.35 million. Under 50:50 cost sharing arrangements the farmer is required to finance 50% of US$ 1,750 = US$ 875.	(1) Savings. (2) Short term working capital loans. (3) a) in medium to high potential areas for schemes with owner operated individual farms government finance is required for 50% of the scheme investment cost; for the contribution of the farmer access to medium term investment loans is required. b) in ASAL areas in communal schemes to be operated by tenants the government would provide 100% of the investment costs.

Source: Own estimates and personal communication; compare also chapter 3.6 and Tables 1 and2, Annex 1

In summary, SSI farmers do need a whole range of financial services, especially a combination of savings and loans for financing SSI development. SSI farmers do not

need special products but different financing mechanisms. They need institutions that have enough capacity and flexibility to adopt terms and conditions of existing and innovative products to the specific needs of agricultural production.

An exemption is the financing of capital intensive community irrigation schemes. Unless the access to markets for SSI produce can be assured it is unrealistic to expect financial markets to provide the required financing on a commercial base.

7.5 Proposed Approach

The future development of the SSI sector is dependent on a number of factors. An important aspect is the access to financial services.

SSI farmers need not just loans but a variety of financial services. The financial services industry, notably the banks, the SACCOs, and those institutions that will be registered under the 'Deposit-Taking Microfinance Bill' are best suited to provide such a range of financial services on a sustainable base. The increasing number of commercial banks focussing on the lower income market, the importance of financial cooperatives and the expected number of deposit-taking MFIs give a good basis for the assumption that the demand for financial services of SSI farmers can be met on a larger scale.

Competition in the Kenyan financial sector had already positive effects that are important for the expansion into agricultural lending such as:

- increased efficiency;
- decreasing interest rates;
- new delivery methods such as joint liability groups;
- new delivery channels such as mobile banking units, phone banking.

Further, the emergence and success of low-cost irrigation technologies provides a sound base for entering into SSI financing. Cost and risk of on-farm investments are substantially reduced.

The financial sector in Kenya has its own dynamics. What is important at this stage is not to disturb positive developments. Directed credit and subsidised interest rates should be phased out where they still exist. 'Burning' issues such as the establishment of a suitable legal framework and regulatory environment of the SACCOs and their apex institutions and the enactment of the Microfinance Bill should be solved.

The rural financial market will not work in isolation. Traders, processors, input suppliers and exporters, insurance companies play a critical role for inter-linking arrangements to reduce the risks associated with agricultural lending.

7.6 Limitations and Risks of the Financial Sector for the Provision of Financial Services to SSI Farmers

There are several risks and limitations for the financial sector to provide financial services to the SSI sector.

Political interference and influence: The agricultural sector is highly politicised and prone to political interference. Subsidized lending rates do still prevail in the sector and have the effect that commercial financial institutions will limit their operations in the rural sector in view of the 'unfair' competition. If directed credit and subsidized

interest rates are channelled to rural areas, the development of the rural financial sector is hampered.

Low potential areas: The provision of financial services in low potential areas with low population density and limited economic potential remains a challenge worldwide. Financial Intermediaries can hardly operate on a cost-covering base and can therefore often not meet the aim of sustainability. Promising approaches include the emergence of CBFOs, but their impact for SSI remains very limited. Not only the rudimentary product range of CBFOs but also the lack of other preconditions (e.g. markets, services) will make it very difficult to enhance SSI development in these regions especially for individual small-scale farmers. Another option is the linkage approach where informal or semi-formal self-help groups are linked to the formal banking sector.

In general, the provision of credit is not the right instrument to assist very poor populations who lack access to economic opportunities and are too vulnerable to take risk.

Community irrigation schemes: Capital-intensive community irrigation schemes have mainly for socio-political reasons always been subsidised in the past. The high initial investment cost also exceeds clearly the financing capacities of smallholders. The financial sector is not willing to extend term-lending to agriculture with large grace periods. Risks are high and FIs would not lend to smallholders such large sums. First attempts to alter this situation are recent donor interventions that require the smallholders to contribute 20% or 50% of the investment costs with the support of a loan. A guarantee fund is provided to the bank by the donors to cover parts of the credit risk.

The emergence of more cost-effective technical solutions and the development of markets can positively influence decisions of FIs to provide the required financing on a commercial base. However, changes cannot be expected in the near future.

The question of financing capital intensive community irrigation schemes through commercial sources is a step forward regarding irrigation development but bears the high risk of non-conformity with the financial systems development approach. First, the construction of irrigation schemes is rather a political decision as compared to purely market-driven and private investment decisions. Financial institutions may be pushed into lending to the beneficiaries of the scheme although their systems or strategy may not be compatible with it. Second, beneficiaries within a scheme vary considerably in entrepreneurial ability and financial strength. The risk of overstraining the capacities of single smallholders within the scheme is high, because the contribution is determined on a pre-determined ratio but not adapted to the individual household situation. Third, the absence of financial sector expertise in the planning process of irrigation schemes may lead to unsolicited terms and conditions such as subsidized interest rates or the like.

8 Interdisciplinary Concept with Key Strategies for the Introduction, Strengthening and Scaling Up of Financial Services for the Promotion of SSI

8.1 Overall Concept under Consideration of the Financial Systems Approach

The overall objective is to expand the access to financial services to individual farmers and WUAs for improving the financing of SSI development. This is expected to contribute to the increase of agricultural incomes, employment and reduction of poverty and malnutrition.

The overall concept for strengthening the financial services and financing of SSI development focuses in an interdisciplinary approach primarily on financial intermediaries that are operating in rural areas and that are able to offer a full range of financial services, notably deposit services and financing. In Kenya, it focuses primarily on (i) commercial banks with focus on the lower income market; (ii) the SACCO sector; and (iii) advanced NGO-MFIs that will be licensed by Central Bank.

The general focus is thus on institutions that are committed to serve the low income population to which SSI farmers belong. The decisive factors include:

- the presence of a number of promising financial intermediaries in the country that are able to extend not only financing but also deposit services;
- the already healthy competition in the financial sector;
- the interest of financial intermediaries to better penetrate rural areas, to gain market shares and to discover new client segments among the rural poor;
- smallholders and therefore SSI farmers belong to the low-income and economically active population and therefore fit into the target clientele of many financial institutions;
- the rise of low-cost irrigation technologies results in a large demand for financial services, notably short- and medium term loans, secure savings facilities and transfer services to receive remittances.

The overall concept recognizes in an interdisciplinary approach also the importance of complementary services as well as the players being part of the value chain. It promotes linkages between SSI farmers, traders, processors, input suppliers, exporters, service providers and financial intermediaries.

The concept promotes market-driven approaches that build on the dynamics of the financial sector and agricultural markets. The focus is on demand-driven irrigation development and financing irrigation development without direct subsidies, which implies that farmers have to take the full responsibility for their investment and operating cost.

The concept adheres to the financial systems approach that has the dual aim of creating infrastructure for the provision of effective financial intermediation services and creating efficient and viable financial institutions. Key aspects are outreach, sustainability and performance with due emphasis on market orientation, decentralization and savings mobilisation.

8.2 Key Factors that Enhance the Provision of Financial Services to the SSI Sector

The following chapters will outline concept elements and key strategies for expanding the provision of financial services to SSI farmers that operate under market-conditions. It focuses basically on the financing of low- and medium cost irrigation technologies. The financing of capital intensive community irrigation schemes is addressed in chapter 8. 3.

8.2.1 Closing the Information Gap and Improving the Commitment of Financial Service Providers to Serve SSI Farmers

The degree to which financial service providers are able to serve the SSI sector is dependent on a strategic choice of financial intermediaries to enter into agricultural smallholder lending. Traditional microfinance is mainly urban centred and has made substantial progress in providing finance to rural off-farm micro-enterprises and for the so called 'consumption needs' (health care, school fees, emergencies). An expansion to rural smallholders implies greater flexibility within the product range and adaptation of lending methodologies. It requires also a good knowledge about rural livelihoods and agricultural features.

In the competitive Kenyan environment the main players in the financial market have to define their market niches and to discover new client segments. In this situation, a focus on SSI farmers comes timely. The emergence of low-cost irrigation technologies and the respective demand for financial services can be met if the industry recognises the large potential. Therefore, rural financial intermediaries should be convinced to move into SSI lending.

Why should rural financial intermediaries provide financing to SSI farmers?

- Irrigation improves substantially agricultural productivity, provides reliable income and thus increases the borrowing capacity of smallholders.
- SSI farmers belong to the economically active poor. They are an interesting clientele if new market segments need to be identified.
- SSI reduces agricultural risks. SSI farmers are less vulnerable to weather conditions, which reduces the climatic production risk substantially.
- Irrigation reduces the effects of seasonality, provides a more even cash-flow and allows a stronger presence at markets.
- The emergence of low- and medium cost irrigation technologies has opened a whole range of new investment opportunities for SSI farmers. The demand for financial services is high.

At the same time, a whole range of mind-set of rural smallholders has to be changed. Bias against financial institutions, unawareness of financial services or of the conditions under which they are available and financial illiteracy but also the reluctance to secure loans with land titles have to be overcome. Therefore, it is necessary that rural financial intermediaries present themselves in different ways, that procedures and financial products are kept simple and that fundamental financial

information is provided. Improving smallholder's bankability and financial management skills will benefit both parties and help to close the gap between financial institutions and the rural poor. Beside the institutions themselves, agricultural extension staff should also play an important role in the provision of information especially on the financial service options available to SSI farmers.

8.2.2 Financial Broadening by Widening the Range of Financial Products to the SSI Sector

As already outlined SSI farmers need savings, working capital loans and short to medium investment loans to finance production and investments into low and medium cost SSI systems (see Table 10). Their requirements to financial services include:

- timely availability, fast processing and customer-friendly procedures;
- flexibility within the product range especially with regard to repayment mode and collateral requirements;
- proximity of financial institutions or delivery mechanisms that allow easy access to financial services.

These requirements must be balanced with the overall requirement of financial institutions to operate viably. Transaction costs in serving SSI farmers are high compared to urban areas mainly due to SSI farmer's dispersion and relatively small amounts involved in transactions.

SSI farmers need not only timely financing. Ideally, they would develop durable relationships with their FI to better manage the heterogeneity of lending needs and to smoothen irregular income streams through savings.

In the absence of financial intermediaries that provide both, savings and credit services a combination of different actors is possible. A crucial role in such arrangements could play the Post Bank that is represented country-wide with nearly 500 outlets.

8.2.2.1 Client-Orientation and Knowledge of the Irrigation Sub-Sector

Expanding into new markets requires employing new methodologies or modifying existing ones. An essential requirement is to know what SSI clients require/want. It is also essential for financial intermediaries to gain sufficient knowledge about the characteristics of the farming and production system such as regional/local development potential, production potential, intensity and returns on production, cropping patterns and notably markets and market channels. This allows to assess the production and market risks and opens possibilities for inter-linked credit arrangements. Product research and development are required to adopt or design products[21] that best fit the requirements of SSI farmers and at the same time protect the integrity and viability of the institution.

[21] Loan products for SSI farmers are basically short or medium term loans that the rural financial market is supposed to provide. Therefore, it has been stated before that SSI development and expansion does not depend on special financial products for the dissemination of the technology. However, lending methodologies, delivery channels as well as collateral requirements may significantly vary compared to other loan products. If institutions just enter the rural markets they may decide to design new loan products and/or introduce term lending. For the purpose of better marketing

8.2.2.2 Delivery Channels and Lending Methodologies

A lending methodology is the way in which a lending institution structures relationships with its clients. When working with SSI farmers, the following must be considered:

- SSI farmers live in dispersed locations;
- income and investment cycles of SSI farmers are different to typical microfinance clients;
- most farmers in the high and medium potential areas do have land titles.

Financial intermediation services must reach smallholders in their dispersed locations. The use of new technologies such as mobile van banking, palm pilots, phone banking, and smart cards needs to be explored. These technologies open a whole range of possibilities to reach SSI farmers in their locations and at the same time contribute to the reduction of transaction cost.

An important feature in dealing with SSI farmers is the adaptation or introduction of financial products that fit the income and investment cycles of SSI farmers. Loan products need different repayment options that fit the income flow of SSI farmers. This requires a large amount of flexibility within the system and at the same time qualified bank staff that can handle such loan products. In fact, individual repayment schedules have to be developed taking into account the household income and cropping patterns.

'Graduation' is a concept that takes into account increasing management capabilities. For SSI farmers that have never dealt with FIs this is a very adapted approach. Especially low-cost irrigation systems allow farmers to start small and to expand to larger units with higher income potential gradually. This practice is not only useful for SSI farmers to build-up a track record with FIs but also to better manage the risks associated with agricultural production.

There have been many discussions internationally about individual lending versus group lending methodologies. Without doubt, SSI farmers in Kenya need both:

- for SSI farmers who just start with low-cost irrigation systems, a group scheme may in most cases be the most appropriate methodology. Amounts required for financing are small and farmers may not have any other form of collateral. This approach also reduces the transaction cost of micro lending and provides a guarantee mechanism;
- for other micro entrepreneurs, notably those with growing business and especially those with interest in investing in medium-cost irrigation systems the group approach may not fit. Financial service providers that work exclusively with the group lending methodology should introduce individual loan products to retain their best clients that have 'graduated' and to attract new ones.

8.2.2.3 Loan Collateral

In Kenya, individual lending to SSI farmers can become a very important line of business. Most SSI farmers in the high and medium potential areas do have land titles. Important constraints at present are lengthy and costly procedures for registration that need to be streamlined. Further, most farmers are not willing to

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it may also be an option to provide very specific products such as 'treadle pump loan' or 'money maker loan'.

secure a loan with their title. This is also a problem of mentality that needs to be addressed by creating confidence and management capabilities of SSI farmers.

With regard to loan collateral, rural financial intermediaries that deal with SSI farmers should also explore all kind of supplementary collateral such as blocked savings or third party guarantees as well as inter-linked (tripartite) loan arrangements with exporters, agri-business firms or contractors. Under contractual arrangements with marketing organizations the buyer of the produce will pay directly to the financial institution that will deduct the loan amount.

Collateral substitutes such as reputation, savings track record and group lending should also be enhanced not only for access to financing but also to build-up savings.

8.2.2.4 Standard Financial Products

Below an overview is provided of financial products that are relevant and needed to support SSI expansion and outlines specific features applicable for SSI farmers:

(1) Flexible short term working capital and investment loans for low and medium-cost irrigation systems: The availability of low-cost irrigation technologies and related equipment is increasing the demand for financing significantly. Short term loans are the most important source of finance for SSI farmers. SSI farmers have different investment needs and may require access to seasonal and / or investment loans.

SSI farmers may apply for seasonal production credit more than once a year, depending on their cropping pattern. Irrigation allows farmers to cultivate different crops with diverse vegetation periods not only at the traditional planting season but also in the off-season. Timely availability and flexible financing mechanism are essential. Ideally, a special credit line or an *overdraft* would be provided not only to reduce transaction cost but also to serve SSI farmers in the most efficient way.

Short- and medium term investment loans for irrigation equipment need an assessment of economic feasibility and market demand. Therefore, the FI needs to be familiar with the local economy to be in a position to carry out an appraisal. Ideally, the 'household approach' is applied where not only the income from the investment is considered but all diverse income sources of the farm household. If the group-lending methodology is applied, the financing institution may be satisfied with the guarantee mechanism within the group and can forgo on individual appraisal.

(2) Medium term investment loans for more advanced irrigation systems: Investments into more costly irrigation equipment require on the side of the producer appropriate know-how and experience in more advanced levels of farming, familiarity with FIs and an established market demand for the products to be produced. The loan size must be considered as affordable under the real socio-economic situation of the micro entrepreneur. It also requires a long-standing relationship or track-record with the FI.

Risks are related to the duration of loans since the uncertainty of farm incomes and the probability of losses increases over longer time horizons. An established track record results in better information about the SSI farmer and increases confidence in the farmer's management capabilities.

Term finance is rarely available in Kenya. Non - deposit taking NGO-MFIs, SACCOs and CBFOs have not enough stable funds to engage into term-lending and often lack

the required know-how. Formal banks do offer medium term loans but are reluctant to extend them to the agricultural sector.

To overcome these constraints it is necessary to provide long term refinancing to the sector, notably to SACCOs and CBFOs. Further, non-deposit taking NGO-MFIs need to be encouraged to 'upgrade' and to get licensed with the Central Bank in order to be able to on-lend client savings.

The most important constraint is lack of knowledge of the irrigation sector and the perceived risks with term-lending to SSI farmers. This can be overcome by:

- adopting a relationship approach where SSI farmers establish a 'social capital' with rural financial intermediaries. A positive history and savings track record will provide information to the lender on the character, cash flow and management skills;
- the use of substitute collateral, supplementary collateral but also conventional collateral such as land titles.

An ideal combination for SSI farmers seems to be the relationship approach in combination with interlinked contract arrangements with a buyer/marketing organisation.

***(3) Deposit facilities**:* Deposit facilities are of crucial importance for SSI development and are at present available mainly from banks, SACCOs and FSAs. With the new legislation it is expected that at least six NGO-MFIs will get a license with the Central Bank and start savings operations on a larger scale.

Especially where well performing rural financial intermediaries are absent, the Post Bank is a valuable option for savings mobilisation in Kenya. Options should be explored to use the savings at Post Bank as a guarantee for loans.

From an institutional perspective, savings improve sustainability of financial intermediaries by developing relatively stable means to finance the portfolio; this may contribute to expansion into term lending.

8.2.2.5 Innovative / Other Financial Products to Support SSI Development

(1) Microleasing: Microleasing is an attractive instrument to finance farm equipment and is in particular attractive for the acquisition of motorized diesel pumps. It is an alternative to standard medium term loans for equipment. Leasing is of interest for SSI farmers because security for the transaction is provided by the leased asset itself. Financial lease arrangements are therefore able to remove the collateral constraint.

Basic principles include that (i) the financial institution continues to own the equipment until it has been fully paid; (ii) the lessee is monitored through the duration of the lease; (iii) usually 25% down payment is required; (iv) in the event of default, the financing organization can repossess the equipment without any specific litigation. (32)

The administration and monitoring of large numbers of small value lease contracts will generate high transaction cost. Equipment suppliers are in a good position to provide technical training and after-sales services. Linkages can be created to reduce overheads and to alter the risk of break-down of machinery.

Microleasing institutions should seek linkages with buyers of agricultural produce (leveraged leasing). Leveraged leasing is especially relevant to SSI farmers that

produce on a regular and predictable basis for larger companies within the value chain where both parties have incentives to increase investment in productive capital.

Not only financial institutions but also equipment suppliers can engage into leasing of SSI equipment. Requirements for institutions to engage into leasing are reliable technical structures and solid financial resources.

(2) Wholesale lending: Financial institutions can provide indirect lending to the SSI sector by financing the private sector within the value chain or smaller community-based financial intermediaries that use the loan for financing their clients.

- Equipment suppliers are of increasing importance in the provision of credit to SSI farmers. They use deferred payments or leasing to promote the sale of equipment. In addition, they are in a good position to provide technical training and after-sales services.
- Processors or marketing cooperatives might be interested in financing farm level investments to ensure reliable quality and quantity of horticultural produce. They secure the marketing outlet and can additionally provide support services such as input and extension to the farmer.
- Input suppliers provide short-term advances to farmers in kind.
- Community-based financial intermediaries such as village banks, financial service associations or self-help groups provide financing to members that are not reached by financial institutions.

All of the above institutions need to finance their activities. Wholesale lending to private sector players and community-based financial intermediaries reduces significantly transaction costs for financial institutions and benefits SSI farmers directly.

(3) Non-credit financial services: Non-credit financial services include domestic and international money transfers such as remittances. They can play an important role for smoothening seasonal income flows of SSI farmers and also for investments into SSI equipment and facilities.

8.2.2.6 Financing Mechanisms to Reduce Risk and / or Transaction Cost

(1) Combination of financing and insurance: The linkage of insurances and loans are instruments to reduce production risks. Well designed insurance products can substitute traditional collateral and allow farmers to access loans. Insurances can be quite costly and the feasibility of the different schemes require careful analysis based on a specific crop in a given region during a certain season. Specifically in the Kenyan case there is a wealth of analysed production and weather data available that could provide a good basis for the introduction of such insurance products.

First experiences in Kenya have been made by DrumNet with the Transaction Insurance Fund that links smallholder horticultural producer groups to a commercial bank. A contribution to the Transaction Insurance Fund serves as collateral for a credit line for farm inputs. This interesting model should be further explored for an extension to financing irrigation *equipment*.

(2) Tripartite arrangements: For SSI farmers and FIs, tripartite or inter-linked arrangements with exporters, agribusiness firms or other contractors are an interesting choice. The provision of loans is closely to be related to the marketing of agricultural produce. The advantage of such arrangements is two-fold: SSI farmers

need to establish market demand before they start production and FIs can substantially reduce risks, especially if the produce buyer pays directly to the loan account. Such arrangements do exist at present mainly for seasonal loans but could also be extended for investment loans if trustful relationships are established.

(3) Warehouse receipts: The concept of warehouse receipts refers to the practice of depositing agricultural produce in a warehouse and receiving a certificate. This receipt can be used as collateral for availing a loan. This is an interesting concept that allows farmers to reduce the effect of price fluctuations and to increase profits on sale of agricultural produce. For investments into SSI equipment the warehouse receipt has only limited impact because (i) horticultural produce is difficult to store (exemption: onions, potatoes) and (ii) it serves only to overcome a short period until the prices go up. Nevertheless, increased profits can be used by interested farmers in self-financing irrigation equipment. At present, USAID promotes warehouse receipts in Kenya for maize producers. Maize as the main staple is widely cultivated and harvested across the country in a short period of time therefore causing a glut on the market resulting in low prices.

8.2.3 Financial Deepening by Increasing the Outreach of Financial Institutions to SSI Farmers

The challenge is to take into account the special characteristics of financing SSI development and to attend to a larger number of SSI households without impairing the sustainability of rural financial intermediaries. This objective can be reached only if a three level financial system approach is strictly applied.

Kenya's agricultural potential and economic activities vary significantly among different regions. SSI farmers find different conditions that need to be considered for the introduction, strengthening and scaling-up of the provision of financial services to the small-scale irrigation sector.

The high potential areas have the best potential to develop sustainable financial institutions because the pre-conditions for an effective financial intermediation are given, notably access to markets for horticultural produce and the presence of a whole range of private sector actors that are part of the value chain. The strategy will be to focus on existing rural financial intermediaries and strengthen their capacity for better outreach through scaling-up their product range specifically geared to the demand of SSI farmers as described above, increasing efficiency and transparency as well as human resource development. The aim must be sustainability and growth. This can be reached through 'upgrading'[22] or 'downscaling'[23] promising institutions as well as through a comprehensive assistance to the SACCO sector. Instruments will vary according to different institutional solutions.

In the medium potential areas the above strategies are also to be applied. This region has a considerable potential for SSI development; the development of a favorable market environment has to be supported, however, simultaneously. Once rural financial intermediaries are well established in the high potential areas and have reached satisfactory financing technology and operational performances such institutions will in search of new markets gradually expand into less developed regions. The development of community-based financial intermediaries, the extension of SACCOs and branch networks of commercial banks as well as piloting

[22] 'Upgrading' refers to the transformation of NGOs into regulated FIs.
[23] 'Downscaling' refers to commercial banks that want to enter new client segments on the lower end.

new technologies (e.g. mobile banking units, smart-cards etc.) in areas with lower development potential may justify initial support measures/subsidies for institutions that are interested to penetrate into such areas.

The low potential ASAL areas have the least potential for the development of sustainable financial intermediation. The problem is not only the absence of financial services but also the absence of markets for agricultural production and basic infrastructure. Although some promising examples from Mongolia exist, where formal FIs are providing financial services to low population density areas profitably, the challenge remains to serve such areas on a viable base. In the absence of formal financial institutions the support and creation of community-based financial intermediaries and the linkage approach seems to be an interesting option.

Financial systems development cannot work in isolation. A sustainable access to rural financial services can only be created if other sectors also develop favorably. Market development and value chain development is at least as important and have to develop simultaneously.

With the considerable share of poor rural households with unsatisfactory access to financial services, existing institutions have a great growth potential. In this situation it is important to support the *sustainable growth* of promising institutions. Institutional capacity building efforts, improving management information systems, support to the introduction of new technologies are proven strategy elements to support gradual extension in a sound manner. In Kenya the focus will be on institutions that are able to offer a whole range of financial services; notably these are commercial banks with focus on the lower income market, the SACCO sector and deposit-taking MFIs. They have the best prospects to provide such services on a long term perspective and to develop a valuable partnership with SSI farmers.

Recommended measures in support of institutional strengthening on the different levels of the financial system required for the promotion of outreach and scaling up of financial services are summarized in Table 11 for the three relevant institutional models.

Table 11: Recommended Measures for Different Institutional Models

	Micro level	Meso level	Macro level
Commercial banks	Downscaling, product development	Research, refinancing, training	
SACCO sector	Institutional strengthening, governance, financial management, MIS, internal control, product development	Support to apex institutions, CBK, research, refinancing, training	Creation of an enabling legal and regulatory framework and supervision, support to the future supervisory authority.
NGO-MFIs	Upgrading, product development	Support to apex institutions, research, refinancing, training	Enactment of the Microfinance Bill and support to Central Bank for implementation

Source: own compilation.

An interesting option in Kenya to increase significantly outreach of financial services to SSI farmers would be to support the Post Bank in transforming to a commercial bank that is able not only to mobilize savings but also to provide other financial services. With its large branch network, the Post Bank has a great potential to play an important role in future SSI development.

Non-financial service providers such as suppliers, traders and processors may also require support in the design of suitable lending methodologies and procedures as well as reliable sources of financing.

8.3 Financing of Capital Intensive Community Irrigation Schemes

Experiences have shown that supply-driven and capital intensive community irrigation schemes had often only limited success in the past (see chapters 3 and 5). With the availability of a range of promising lower-cost SSI technologies that are suitable for individual farmers and work under market conditions the importance of communal schemes has decreased in irrigation development. Wherever technically feasible, preference should in future always be given to such market-driven individual initiatives.

However, such lower cost solutions suitable for individual farmers do not work in conditions where the water source is not bordering the agricultural area to be developed and the cost advantages of gravity systems are to be utilized. In such cases there is the need for capital intensive infrastructure investments which are under conditions of small-scale farming only economical if a minimum number of farmers participate in such schemes.

The implementation of community irrigation schemes is supported by the government primarily in suitable locations of regions with a lower development potential and high level of poverty. Beneficiaries are mostly rural communities living in fragile agricultural production environments who are also regular recipients of famine relief support.

The design of community irrigation systems is far beyond solving technical solutions only and demands an integrated approach. Taken into account the past experiences there are some key aspects which need to be taken into account in the design of communal schemes (see also checklist below):

- the access to markets has to be ensured;
- the demand for financial services needs to be addressed. The availability of financial services is a condition to enable SSI farmers to finance seasonal loans and their share in investment costs, if any. This includes also the appropriate integration of savings into the system. The creation of CBFOs or the initial support of existing institutions to expand their branch network to a scheme area is a valuable option if increased economic development is expected.
- furthermore, technical know-how and management skills of SSI farmers need continuous improvement. Irrigation systems require strong and viable WUAs that are able to manage and maintain the system. To advice and support farmers and the WAUs a competent and well performing extension service is essential. The access to specialized services like repair services has also to be ensured. Interesting in this context are the so-called output-based

approaches (OBA)[24] that link the grant element to the performance of the system.

For the financing of communal irrigation schemes it has to be taken into account that the high initial investment clearly exceeds the financing capacities of potential beneficiaries who are often living in poverty and are even repeatedly depending on famine relief. Nevertheless, farmers should for the maximum creation of ownership contribute substantially to scheme development at least in labor and kind (e.g. locally available building materials) but also in financial contribution. The financial contribution should be based on the expected financial performance and viability of the respective perimeter and the socio-economic situation of the beneficiaries. The financing of operational production costs as well as repair, maintenance and replacement costs should always be the responsibility of farmers for which they need access mainly to short-term loans. It is important that the setting of criteria for farmers' contributions is uniform and transparent throughout the different development zones.

Checklist of key aspects to be reviewed in the design of communal irrigation schemes:

√ Feasibility of use of low-and medium cost SSI systems? – If yes, reject the proposal.

√ Can access to markets be ensured in a viable way?

√ Can competent extension services for technical and institutional advice to farmers and WUA be developed?

√ Are financial services available or can they be established in a viable way?

√ Can technical back-up services for equipment and facilities be ensured?

√ Can a strong and viable WUA be developed?

The current policy of the Kenyan Government already implemented in KfW-supported irrigation perimeters appears to be at this stage of development in the country an appropriate solution for co-financing arrangements of investment costs by farmers and the government for most of the owner operated communal irrigation schemes in the medium to high potential zones. In such perimeters farmers should be required to contribute to 50% of the scheme development costs whereas the government (where relevant supported by a donor) provides 50% of the development costs on grant. Besides their own financial resources farmers need access to term loans to finance their contributions. The availability will depend on financing arrangements with existing banks.

Scheme development in the low potential ASAL areas, where beneficiaries are tenants and have no titles to the land, will need - also considering the socio-economic conditions and generally lower financial viability to be expected in these remote locations - a special approach based on full grant funding. Under this condition even more emphasis has to be put on labor and in kind contributions by farmers in order to support participation and the development of ownership.

From a financial sector perspective, the creation or provision of financial services to beneficiaries of communal irrigation systems is not unproblematic (compare chapter

[24] OBA is a mechanism for providing subsidies to support the delivery of basic services in different sectors (water and sanitation, electricity, telecommunications, transportation, health and education) where policy concerns – such as limited affordability for some customers, the desire to capture positive externalities, or the infeasibility of imposing direct user fees – justify public funding to complement or replace user fees.

7.6). While the demand for savings and seasonal short-term loans is just the same than for SSI farmers that invest into lower cost technologies, the difference is the high contributions to scheme development costs. Medium term loans on a commercial base are not available in the market and massive donor interventions are necessary to create them. While the reasons for failure of directed credit have been widely analyzed elsewhere[25], important lessons need to be considered. Designer's of irrigation systems are often not familiar with the financial systems approach and are only interested to ensure one-time financing and do not take into account the need for financial viability of institutions. The risk to return to discredited approaches is high, if the guiding principles summarized in the box below are not strictly applied.

Guiding principles for the implementation of new irrigation schemes:

√ Strict separation of grant element and commercial financing.
√ Don't subsidize interest rates to end-clients.
√ Ensure maximum contribution by farmers in labor and kind to promote ownership.
√ Base financial contribution of farmers to investment costs on expected repayment capacity and socio-economic situation of beneficiaries. Use very conservative projections[26] for expected performance of the irrigation perimeters.
√ Ensure that financial institutions involved are not violating their business strategy and that institutional capacities exist to manage administration and follow-up.
√ Operational production costs and scheme maintenance, repair and replacement costs are always the responsibility of farmers.
√ Enhance entrepreneurial skills of the farmer.
√ Ensure arrangements for repair and maintenance of the systems.
√ Include financial sector expertise in the design of irrigation projects.
√ Consistent policies on national level for the use of subsidies.
√ Promote donor harmonization.

[25] See Agricultural Finance Revised: Why? Page 1-6 (15)
[26] In such assessments it has to be taken into account that: (i) a 100% achievement of the planned or potential productivity increases is generally not realized in the first years; (ii) the profitability of agricultural crop enterprises varies considerably due to various farm endogenous (e.g. the skills of the farmer) and exogenous factors (e.g. markets and prices); and (iii) the production and marketing risks may influence the success or failure of the activity. Therefore, for a loan decision, a very conservative appraisal needs to be done.

8.4 Intervention Areas with Special Focus on Financing SSI

The following chapters will outline specific intervention areas that are important for the sustainable provision of financial services to SSI farmers.

8.4.1 Macro Level and Enabling Environment

Financial sector regulations and supervision:

- regulatory and legal framework and supervision of SACCOs;
- development of procedures for its effective enforcement;
- creation of an independent supervisory body for SACCOs;
- enactment of the Microfinance Bill and its implementation.

Enabling environment:

- support the improvement of rural infrastructure to better reach dispersed SSI farmers in remote locations;
- enhance the efficiency of court systems;
- streamline land and property registries;
- create legal frame conditions for leasing, especially a framework for easy and fast repossession of leased assets, clarify definitions and ensure clarity in allocating responsibility.

Interdisciplinary concerns:

- ensure that financial sector expertise is included on any questions of financing for SSI development
- eliminate any interest rate subsidies for agricultural lending;
- promote donor harmonisation and cooperation in sectoral activities and programmes.

8.4.2 Meso Level

On the meso level, viable networks and professional support institutions are needed that promote, support and finance rural financial intermediaries. Important functions include (i) training to build-up human resource capacities; (ii) refinancing facilities that buffer liquidity shortages and term-mismatch of funds; (iii) control mechanisms to assure financial soundness of business and the security of savings; and (iv) research for product development.

The meso level infrastructure is key for the successful development of rural financial intermediaries. The role of donors is of crucial importance in the support to the creation and strengthening of the meso-level infrastructure, especially in the SACCO sector.

8.4.3 Micro Level

On the micro level, rural financial intermediaries should be supported in financial broadening and deepening as described in chapters 8.1 to 8.3.

Special attention needs to be given to the SACCO-sector that suffers from substantial deficiencies in terms of governance, financial performance and internal / external control. Being one of the most important providers of financial services in rural areas, the SACCOs play an important role in providing financial services to SSI farmers.

8.5 Promotion of Private Sector Partnerships in SSI Development

8.5.1 Opportunities for PPP in SSI Implementation

The growing international demand for horticultural produce is closely linked to high quality standards. Private extension services from the exporting companies appear at the moment to be the better guarantors for quality production and marketing of horticultural produce than the state's extension service. Some exporters have already succeeded to get about 50% of their small-scale producers EurepGAP accredited; this is due to intensive technical support at farm level.

Potentials for Private-Public-Partnerships (PPP) exist in the following areas:

- Export standards: some exporters take it upon themselves to train farmers in production and crop husbandry methods to meet export quality standards. In such cases the costs are borne by the companies, who will have to charge these expenses to the producers often in terms of lower product prices. State and donor support could co-finance the establishment costs of such measures. Such an investment should assure in the end high quality standards which would subsequently result in higher farm gate prices for the producers.
- Research in SSI technology use: currently there is little research focussing on the use and impact of SSI technology on farm level. The treadle pump distributor maintains an extensive database on the sales of their pumps. Given the economic importance of this technology segment for the national economy it warrants systematic research to provide a decision making platform for the massive expansion of the irrigation area planned for the future. Cooperation between state, universities and private research capacities should be supported with the aim to further improve the efficiency of the SSI systems and increase the private sector's share in irrigation development.
- Value chain development: with the massive expansion of irrigation planned it can not be assumed that all the farmers involved would secure a slot in the lucrative export market. The increased use of ASAL potentials and the resulting long distance to the export centers will require new approaches. The cultivation of products with a longer shelf life or agro-processing potential might be an alternative. Planners should pursue an approach aiming at PPP-based solutions. Value addition in the area of production will create additional employment and cheaper labor in the remote locations might compensate a private investor for higher transport costs.

  Especially the development of new value chains aiming at a diversification of local cropping patterns and the agro-processing of produce that can not be absorbed by the existing markets will need some initial financial support from the government or donor organizations. This is even more so if such processing plants are to built in areas away from the market, these are then cases where public money can cushion the risk of private sector investment.

  Financial support from a government or donor perspective can take several different forms and depending on the circumstances could apply to the full range of the financial sector instruments.

8.5.2 Support to the Strengthening of the Cooperation between Marketing Organizations, SSI farmers and FIs

The horticultural produce market is the main driver for the massive expansion of the SSI sector. In the following areas further strengthening of the cooperation between SSI farmers, marketing organisations and FIs is possible:

- Processors, exporters: these formal companies depend on high quality produce to fulfil the quality standards of the countries they are exporting to. Such companies often enter supply contracts with their producers specifying type, quality, and time of purchase and provide besides the inputs also technical advice through their own field services with the objective to produce high quality. Farmers can use such contracts as collaterals and access credits individually from FIs for SSI system development or other financing needs. It requires the consent of the farmer and purchaser of the produce to make such arrangements work.
- Freelance traders: this business sector supplies parts of their traded commodities to the export market and parts they sell on the large Kenyan wholesale and consumer markets. Some of these traders make verbal arrangements with producers for the purchase of their products, but they rarely offer advances. Farmers selling under such an arrangement have only access to loans through the standard 'group credit products' of FIs.
- Facilitative support: 'third parties' such as government, development organisations, and NGOs can play a vital role in market analysis, product refinement, and most importantly technical training of the target group. But most importantly these organisations can play a stronger facilitative role in strengthening the linkages between farmers and traders as well as with FIs.

8.6 Complementary Government Services

8.6.1 Extension Services

The extension support to farmers cultivating horticultural crops for the international market varies considerably. 'Contract farmers' usually receive intensive support from their respective partner companies ranging from inputs to qualified advice on all aspects of crop husbandry.

It falls upon government to provide extension support to the majority of producers which need to be intensified especially in the following areas:

- provision of market information on annual price trends and seasonal prices at relevant market centres, this helps farmers to decide which crops to select and when to plant;
- qualified technical advice on cultivation/husbandry methods and techniques continue to be crucial to many farmers for successful crop production in a very competitive market;
- extension services should facilitate farmers' access to traders / exporters prior or during the cultivation period so that the farmer knows the traders and equally important that a trader gets to know the place where the produce comes from.

8.6.2 Research

An economic sector as important as irrigated horticultural production justifies a more systematic research programme providing feedback to farmers, extension service and planners especially on various economic aspects of the production system. Some of the areas that should be pursued are:

- Economic/financial impact of different irrigation technologies on household but also national level. Included in such an investigation should be an analysis of the impact of the different technologies in the three development regions. An important result of this work should also be the compilation of gross margins for the prevailing crops in each zone to give SSI farmers advice on the comparative advantages of different crops
- Technology analysis: Regional aspects of SSI technology use, which systems are suited to certain physical and socio-economic conditions prevailing in a given area. There is little information available on which technology suits best a certain natural or socio-economic condition / situation. Experiences need to be analysed, documented and disseminated. This activity should be carried out in close cooperation with manufacturers and distributors of these technologies who should play a leading role in the process.
- Marketing: Information is also lacking on which crops are being produced for which market and where do farmers sell the different crops and at what prices. Such information is an important ingredient for the formulation of development concepts for a given region, but also for the design of specific irrigation projects.
- Value chain analysis: The development of irrigated land might eventually outpace the absorption capacity of the local and Kenyan export market for fresh produce. It is therefore crucially important to analyse which crops can be further processed in the country and even more importantly in the respective location where they are being produced. This is already a real necessity in the ASAL region where export markets can not be reached and the local market can only absorb a limited quantity of fresh produce.

8.6.3 Regional Planning

To address poverty as one of the biggest challenges the country faces, it requires a holistic approach to planning across all levels of government how the available resources are best used. Irrigation development has been identified as one of the strategies where a large number of people can be reached and considerable impact can be achieved at community level, but also on national level. However, for this to happen it requires a coordinated approach and the inclusion of a wide spectrum of actors into the planning and implementation process. Major issues that need to be addressed in an integrated planning approach are:

- Water use: Currently water management plans identify potential use of a water source and optimal abstraction rates at different river segments. There is at this stage little planning of how the water source can be most optimally utilized by using different irrigation technologies. Small-scale irrigation development in Kenya has reached a magnitude where it can no longer be considered in isolation from the macro-level planning in the water sector. A vastly growing demand for water already now limits irrigation expansion in several regions. In

this context it is of high importance that the state supports the development of water storage capacities to create an improved and sustainable supply for all water users.

- Irrigation design: What potentials exist in the different locations and how and when are they to be developed? Who are the potential users in a given area? Which technologies are to be used to access the water?
- Services: Which services are required by farmers e.g. agricultural extension, irrigation engineering, financial service provisions, etc.? Especially irrigation schemes are growth centres and attract many other people including labourers and small business entrepreneurs: which services need to be provided to an increasing population including schools, health, electricity, water, sanitation, etc.?
- Cropping pattern: Which crops are likely to be grown and how will it impact on the local and national economy? Are there options for agro-processing?
- Infrastructure: Which infrastructure is required to access produce markets or to be accessible? Communication links?

It is important that such an integrated planning approach follows the principles of subsidiary, meaning that the level or institution closest to the 'problem' is also the one who takes the leadership in planning the measures and the implementation of that particular aspect of development. It is important also to include the private sector and financial institutions into such planning and implementation processes as they know best how to create a conducive environment for the private sector to play its full role.

8.7 Potential Roles of National Stakeholders and Donor Organizations in the Development Process

8.7.1 Role of the Government

Besides the specific planning and service provision tasks already mentioned above the government needs to provide support in the following areas:

- Policy development and implementation: Government is responsible for the formulation and implementation of policies. Particularly relevant in the context of the financing of SSI development is the finalization of the SACCO Bill and the formulation of the irrigation policy.
- Development planning and coordination: Central government has to carry out and guide the national planning and development coordination process setting national strategic goals. This is in particular important with respect to water use. For instance most river catchments spread over two to three provinces and it is therefore necessary to plan resource allocation and use nationally to ensure a balanced development throughout the country.

  A further expansion of Kenya's irrigation area must be based on improved water management on a national level. The creation of additional water storage capacity is key to any planned expansion of irrigation, but also to a secure drinking water supply for millions of citizens.
- Private sector participation: The government must continue to facilitate and strengthen the role of the private sector in irrigation development by continued

enhancement of the enabling environment and regulatory framework to attract investments and know-how to the irrigation sector in general, but more specific to SSI development.

- Donor coordination: The country receives technical and financial support from a wide circle of donor countries and institutions also in SSI development and related sectors. The contributions range from support on grass root project implementation level to the formulation of policies and their respective implementation strategies. Since many of these programmes come with considerable resources it is important that the objectives of donor programmes are aligned with national goals

8.7.2 Role of the Private Sector

The private sector has already manifested its important role for the development of SSI. This needs to be further enhanced especially in the following three areas:

- Provision of finance: Increased private capital is required from companies and FIs for SSI development which is a sector that has a good potential for making considerable contributions to poverty alleviation.
- Marketing of produce: Marketing of agricultural produce has been key in the fast expansion of the irrigation sector. Quality improvement and produce diversification remain critical challenges in the successful expansion of the irrigation sector in general and especially for the SSI sector.
- Private-public-partnerships: In view of the massive expansion of irrigation the fresh produce market is expected not be able to absorb all the production. The development of new products through agro-processing is necessary which will contribute to additional income and employment creation.

8.7.3 Role of Donor Organizations

Donor organizations active in SSI development and related fields should systematically harmonize their support programs and actively search for possibilities of sectoral/program networking and cooperation. The following fields of cooperation appear to be especially relevant for donor support:

8.7.3.1 Technical Cooperation (TC)

Market development: the impulses for the enormous expansion of private sector irrigation development have been given by the expanding horticultural produce market. For this trend to continue producers must adhere to stringent quality control standards for the different overseas markets. The training of local producers, traders and exporters has been an important area for TC-support and should also continue as the growing market will attract new entrepreneurs along the value chain.

Irrigation policy: It is crucial that Kenya finalizes its irrigation policy. The current draft document focuses largely on the macro level. TC has provided an important support in technical analysis of strategic and operational objectives. The formulation of implementation strategies covering also meso and micro levels would be further important aspect of a comprehensive policy.

Strategy implementation: Current policies identified the total irrigable potential, but the operationalization of the broad targets in workable programmes is still

outstanding. TC-support could contribute to the development of workable programmes that also specify implementation strategies. Such strategies will require a high degree of complexity and should also be specific on which resources are best being utilized by which SSI technology.

Financial Sector: After finalizing and passing the SACCO's Bill and Microfinance Bill in Parliament support would be required for the planning and coordination of the implementation process. Several donors are already engaged in strengthening Kenyan institutions on macro, meso and micro level to contribute to the development of the financial sector. With the two Bills passed, but also considering the impressive dynamics of the sector the demand for institution building will further grow. Importance is given to defining country needs and priorities in sustainable development through an ongoing participatory process and, in so doing, to strengthening human resource and institutional capabilities. Capacity building within the three levels of financial system has already been described in chapters 8.2 and 8.4. Related needs for TC-support includes the following major aspects:

- Policy dialogue and policy advise to create an enabling environment.
- Institutional strengthening measures for the creation of a conductive meso-level infrastructure.
- Institutional strengthening measures to support financial broadening and deepening. Efforts should concentrate on 'upgrading', 'downscaling', 'greenfielding' and the 'linkage approach'.

The anticipated expansion of the country's irrigation development programme will create a demand for qualified local engineers, agricultural economists, finance specialists, etc. to partake in the implementation, but also in the operation and management of these additional potentials. Technical cooperation should support the efforts of the country to create the professional cadres required.

8.7.3.2 Financial Cooperation

An accelerated dissemination of SSI technologies will also require financial support from 'outside' the spectrum of Kenyan role players. For instance the new concepts such as a credit scheme for the dissemination of treadle pumps to be implemented via the AGRIVET input dealers will require funding that covers the risks of these small dealers.

Selected use of guarantee funds, credit lines and equity participation - in combination with technical assistance – are valuable instruments to support the financial system in its efforts to financial deepening and broadening.

Massive financial development cooperation will be required to assist the country to construct additional water storage capacity in order to translate its hydrological potential into economic development which would benefit most economic sectors.

A considerable share of the remaining irrigable land potential will need to be developed by constructing community irrigation schemes. Such schemes require a substantial amount of finance for construction and it is beyond the investment capacity of Kenya to engage into such a comprehensive development programme without the support of the donor community. Furthermore, the innovative support to local FIs in the KfW-supported Mt. Kenya irrigation programme or World Bank's output based assistance approach in water infrastructure should be extended and

adapted for a broad-scale application. Both approaches have raised a large percentage of the overall investment costs through local financial institutions.

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ANNEX 1: Table 1: Investment and Annual Operation & Maintenance Costs per Technology Unit

Irrigation Technology	Area Coverage	Investment Costs			Operation & Maintenance Costs [27] (O & M Cost)	Depreciation	
		Cost per Unit	Cost Auxiliary Equipment	Total Costs			
	m² / ha	US $	US $	US$ Unit (US$ ha)	US$/Yr./Unit O & M	Years	US$/Yr./Unit (US$/Yr./ha)
Bucket Kit – Drip Irrigation	**50** m² (0.005 ha)	Bucket/filter: 3.00	Drip tape: 12.00	15.00 (3 000.00)	1.00	3	**5.00** (1 000.00)
Drum Kit – Drip Irrigation	**500** m² (0.05 ha)	Drum/tank 40.00	Drip lines: 60.00	110.00 (2 200.00)	5.50	3	**37.00** (733.00)
Rope-and-Washer Pump	2 000 m² (0.2 ha)	30.00	10.00	40.00 (200.00)	2.00	3	**13.00** (66.00)
Hip Pump	2 000 m² (0.2 ha)	34.00	Sprinkler: 4.00 Piping: 35.00	73.00 (246.00)	3.65	3	**25.00** (80.00)
Moneymaker-Treadle Pump	4 000 m² (0.4 ha)	55.00	Sprinkler: 12.00 Piping: 45.00	112.00 (280.00)	5.60	3	**37.00** (73.00)
Super-Money Maker Pump	6 000 m² (0.6 ha)	95.00	Sprinkler: 20.00 Piping: 70.00	185.00 (308.00)	9.25	3	**62.00** (103.00)
Motorized Pump 4 HP - Diesel	10 000 m² (1.0 ha)	350.00	Sprinkler: 60.00 Piping: 200.00	610.00 (610.00)	30.05	4	**153.00** (153.00)
Gravity Systems Systems vary in size: 40 – 150 ha	4 000 m² (0.4 ha)	1 335.00	Sprinkler: 100.00 Piping: 230.00	1 665.00 (4 162.00)	83.25	5 (infield) 15 (main system)	**66.00** (165.00) **89.00** (222.50)

[27] O & M costs are calculated as 5% of total costs.

Table 2: Indicative Gross Margin and Variable Costs Calculation for Typical SSI – Production Units

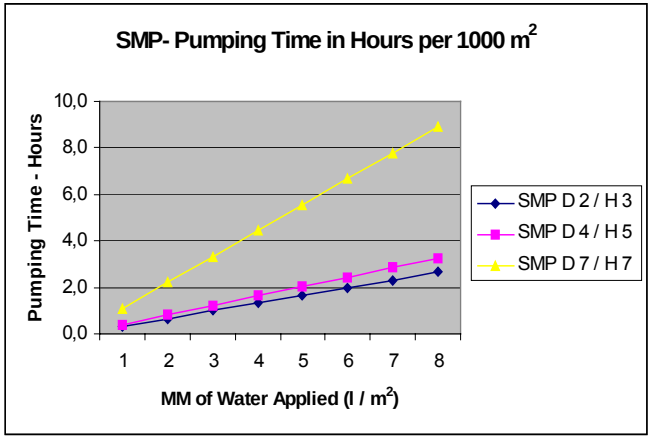
Irrigation Technology	Area Coverage	Gross Margin		Cropping[28] Pattern	Variable Costs Crops and O & M Cost of SSI	Farm - Gross Margin per Unit
	m² / ha	Crop	US$ / Unit	%	US$ / Unit	US$ / Unit
Bucket Kit – Drip Irrigation	(30) – **50** m² (0.005 ha)	Tomato Chillies French Beans Carrots	16.00 14.00 7.00 6.00	100 40 - 60	18 1 17	25
Drum Kit – Drip Irrigation	(80)– **500** m² (0.05 ha)	Tomato Chillies French Beans Carrots	164.00 143.00 68.00 58.00	100 40 - 60	184 6 237	250
Rope-and-Washer Pump	**2 000** m² (0.2 ha)	Tomato Chillies French Beans Carrots	657.00 570.00 270.00 232.00	50 50 50 50	585 2 587	863
Hip Pump (hand operated – single piston)	**2 000** m² (0.2 ha)	Tomato Chillies French Beans Carrots	657.00 570.00 270.00 232.00	50 50 50 50	585 4 589	861
'Moneymaker' Treadle Pump (single piston)	**4 000** m² (0.4 ha)	Tomato Chillies French Beans Carrots	1 313.00 1 141.00 541.00 464.00	50 50 50 50	1 171 6 1 177	1 723
Super-Money Maker Treadle Pump (double piston)	**6 000** m² (0.6 ha)	Tomato Chillies French Beans Carrots	1 970.00 1 711.00 811.00 696.00	50 50 50 50	1 756 9 1 765	2 585
Motorized Pump 4 HP - Diesel	**10 000** m² (1.0 ha)	Tomato Chillies French Beans Carrots	3 283.00 2 852.00 1 352.00 1 160.00	50 50 50 30	2 927 30 2 957	4 293
Gravity Systems Up to 200 ha (0.4 ha per farmer)	**4 000** m² (0.4 ha)	Tomato Chillies French Beans Carrots	1 313.00 1 141.00 541.00 464.0	50 50 50 50	1 171 83 1 254	1 646

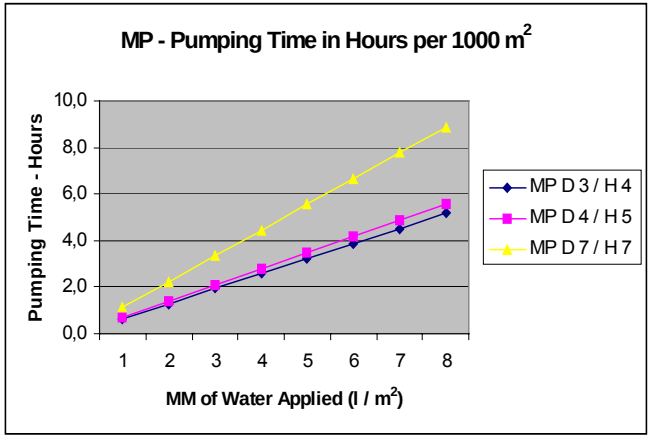
[28] Assumption: two crops per year are being cultivated (200% cropping intensity); it is assumed that units larger than 0.4 ha will also produce other crops – therefore cropping =< 200%

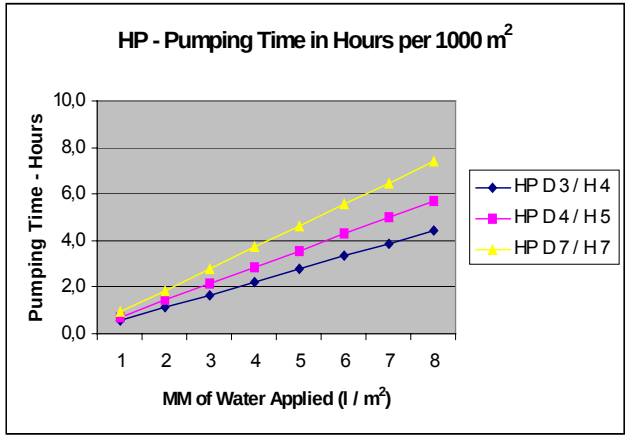
ANNEX 2: Performance Characteristics of Different Treadle Pump Types

Super Money Maker Pump (Double-Piston-Treadle-Pressure-Pump)			Super Money Maker Pump (Single-Piston-Treadle-Pressure-Pump)			Hip Pump (Single-Piston-Hand-Pressure-Pump)		
Suction Depth (m)	Pressure Head (m)	Output L / Sec.	Suction Depth (m)	Pressure Head (m)	Output L / Sec.	Suction Depth (m)	Pressure Head (m)	Output L / Sec.
2	3	0.84	3	4	0.43	2	3	0.50
4	5	0.68	4	5	0.40	4	5	0.39
7	7	0.25	7	7	0.25	7	7	0.30

Data Source: KICKSTART International. Nairobi, Kenya







Annex 3 : Mission Schedule

Date	Institution	Person contacted
23-07-2006	**ARRIVAL**	
24-07-2006	DED Country Director DED Rural Development Coordinator KfW Country Director GTZ-Sector Coordinator 'Water' GTZ-Sector Coordinator 'Agriculture'	M. G. Ehmsen Mr. A. Glaeser Dr. J. Dux Mr. R. Werchota Mr. R. Hoffmann
25-07-2006	KICKSTART / APPROTEC Min.of Water & Irrigation Equity Bank DIFID / FSD	Mr. John Kinaga / Mr.Nick Moon Mr. Onjoke / Mr. Muchangi Mr. Mbaabu Muchiri Mr. David Ferrand
26-07-2006	Min.of Agriculture/IFAD Irrigation Programme Min.of Agriculture/Director Marketing World Bank – WSP KREP – Bank JICA Cooperative Bank of Kenya KWFT Central Bank of Kenya	Mr. Nkanya Mr. Ayuko Mr. K. Virjee Mr. M. Banda Mrs. Masuko, Mr. Mwathe Mrs. Lucy Murumba, Mr. M. Muchee Mr. Githaiga M. Mr. Bokea C., Mr. Chebii
27-07-2006	TRAVEL TO EMBU Small-scale Irrigation Project Mt Kenya Cooperative Bank – Embu Branch District Cooperative Officer - Embu Agricultural Finance Corporation – Embu K-Rep Bank – Embu	 Mr. Mark Crocker Mr. A. Nyaga Mr. SCJ Mburia Mr. Shanana Mr. Kaguamba M.
28-07-2006	Embu District Irrigation Officer Kamavindi Irrigation Project Kapingaza Irrigation Scheme Muregwa Village	Mr. Njiru , Mrs. Margaret Mbogo Mr. N.M. Tarciscio, Committee Committee Members Mr. M. Kinua, other farmers
29-07-2006	Mitunguu Irrigation Scheme: - Scheme Manager - Irrigation Engineer - Cooperative Society	 Mr. Swania Mr. Kivuti Chairman, Committee Members
30-07-2006	TRAVEL TO NAIROBI DED – Marketing Adviser / Embu	 Mr. H. Kamprath
31-07-2006	GTZ Country Director Heritage Consultants KREP – Advisory Services Ministry of Water & Irrigation UNOPS / IFAD	Mr. K. von Mitzlaff Mrs. Beatrice Sabana Mrs. S. Chepkirui, Mr. A. Bett Mr. Muchangi Mrs. Miriam Cherongony
01-08-2006	Ministry of Water & Irrigation Kenya Agricultural Research Institute (KARI) US AID Ministry of Water & Irrigation	Mr. R. Werchota, A. Lemmerding Mr. Sijali Mr. M. Makonnen Mr. Muchangi
02-08-2006	World Bank US AID Ministry of Finance – Economic Secretary KARI (Irrigation Trial Site)	Mrs. Meera Mehta Mr. Z Ratemo, Mr. H. Mukhongo Mr. K. Thugge, Mr. J Mutual, Mr. J Omino Mr. Sijali

03-08-2006	Expert Round Table World Bank Water Services Trust Fund	12 PAX: Hoffmann (GTZ), Gläser (DED), Kinaga (Kick-Start), Murumba (Cooperative Bank), Staschen, (KWFT), Dr. Andrew Karanja Mr. S. Mwangi, Mr. K. Ochuka, Mr. S. Alima
04-08-2006	Promotion of Private Sector Development in Agriculture Oikocredit KADET Ltd. Economic Consultant AFRACA FRIGOKEN Ltd.	Mr. R. Hoffmann Mrs. J. Ngarachu Mr. D. Ruchiu Mr. Stefan Staschen Mr. Ouedraogo, Mrs. D. Kipsang Mr. Peter M. Mwangi
05-08-2006	**DEPARTURE**	

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