

Towards Sustainable Smallholder Irrigated Businesses (SIBU)

(KAR Project R7810)



Report OD 149
March 2003

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Derek Shepherd - University of Reading
Martin Upton - University of Reading

DFID

Department For
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Development**

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Preface

Creating sustainable smallholder irrigated farm businesses (SIBU)

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Irrigation is seen as a means of raising agricultural productivity and rural incomes. However, historically, many smallholder irrigation schemes failed to produce the expected results and cannot sustain their running costs or fund further development. It is important to improve our understanding of the constraints to profitability and sustainability, particularly as the urgency for governments to withdraw financial and managerial support gathers momentum.

In Phase 1 of this project 15 smallholder irrigation schemes were investigated jointly with in-country researchers in South Africa, Swaziland and Zimbabwe. These represented a range of situations from small subsistence food plots to large smallholder schemes, potentially suited to enter the commercial markets. The study concerned crop choice, methods of sale and key limiting factors using interviews with samples of farmers, key informant interviews and focus group discussions. Many different types of household were included to reflect the needs of poor and not so poor, men and women, and old and young irrigators.

1. Findings in Phase 1

The scheme profiles show moderate success and illustrate the positive impacts of irrigation on rural livelihoods, but also identify the great potential for further improvement. Lack of clear objectives makes prioritising the many practical management issues that arise, difficult and hinders decision-making.

Strikingly, most marketing is undertaken individually, despite the fact that farmers must co-operate and work together to acquire and share water. They are in direct competition with one another in selling their crops, seldom combining to reduce transaction costs. Contract growing is still uncommon, is individually arranged, and generally unsatisfactory due to poor regulation, misunderstanding or misinterpretation of the terms and conditions. Most farmers grow both subsistence and commercial crops, according to tradition, season and market demand, but few act together to acquire inputs or services.

The Phase 1 workshop brought together farmers, researchers and irrigation agencies to address questions that arose from analysis of the case studies, such as:

- Who are the stakeholders?
- How can they get the best from available assets and facilities?
- What support services are needed?

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- How could the support identified be provided?
- What planning is necessary to ensure continued development?

The main issue that emerged was the need for a strong commercial focus. Discussion considered the important issues that might change existing expectations and behaviour among farmers to foster stronger links and development of a 'business mindset'. However, the importance of marketing and participation consistently overshadowed other elements.

In schemes, where most of the farmers participate regularly, there is more involvement in management, greater understanding of the reasons for and more support for group decisions resulting in better performance. Good marketing is crucial to profitability, enabling farmers to manage and maintain infrastructure and equipment, and to invest in technology and inputs. Consistent profit and steady gradual capital accumulation protects poor farmers from variations in physical and economic climate that easily swamp them. In other words, their livelihoods become more sustainable.

2. Phase 2

Phase 2 activities recognised firstly the vital role of marketing in releasing money to finance and sustain infrastructure and secondly the complexity farmers face in responding to the market situation, and at the same time managing water, and accessing services, inputs, credit and labour. Good decision-making is needed at all levels, in each farm, in each group, for the scheme as a whole and in the various government support agencies if such multi-tasking is to be successfully achieved.

Pre-conditions for good decision-making include:

- Clarity about objectives;
- Access to relevant good quality information; and
- Realistic estimate of the support that can be expected for given decisions.

The process of development at New Forest and Dingleydale schemes, which are part of Limpopo Province's pilot programme for the revitalisation of small-scale irrigation, was studied. These pilot schemes are important in providing a model for schemes in other provinces. The investigation aimed to shed light on how decision-making was handled. A complementary study of market aspects and information delivery considered the experiences of irrigators in the sugar and vegetable sectors in Swaziland and looked at how their different market situations affected the decisions they faced. The findings formed the basis for discussion and formulation of guidance for smallholder irrigation businesses at the workshop in January 2003.

3. Key Issues

The importance of financial and institutional sustainability lies at the core of small-scale irrigation development. In the past, irrigation was part of a top-down,

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production-orientated approach. This approach was applicable in political and economic conditions that no longer exist in Southern Africa; conditions that have not prepared irrigators for sustainable development but have rather induced dependency and poor practices. Thus irrigators that are now expected to drive forward irrigation development have to rethink their behaviour and responsibilities. However, there is uncertainty about the best way for institutions and farmers to change their behaviours and the nature of their relationship, to satisfactorily espouse commercial success while still promoting equality and poverty alleviation. Nor is it clear how best to organise the support that will be required in the period of change.

The research identified a number of significant concerns, namely:

- Achieving clarity in determining the degree of central decision making required for effective management of infrastructure and water.
- Understanding the dynamics of the different types of household that make up a scheme, in order to better cater for their needs and assess their contribution.
- Developing clear strategies to achieve participation in and commitment to agreed action.
- Understanding the process of validation needed for a committee to be seen by smallholder irrigators as 'the' relevant authority, and recognising the timeframe in which this can realistically occur.
- Developing decision-making skills while providing an adequate degree of protection and guidance.
- Reconciling the expected level of efficiency in water management and maintenance with resources and capacity.
- Understanding the stated need for marketing solutions against the background of the different types of household
- Tapping commercial and provincial expertise to provide a range of solutions.
- Developing new management's capacity to address issues that will arise in planning ahead, particularly relating to assessing strategies for self-financing at scheme level.
- Developing and financing an on-going support mechanism to minimise the risk of failure for farmer managed schemes.

What has become abundantly clear in the course of the investigation is the importance of governance in smallholder irrigation to provide an enabling environment for businesses. Good governance is essential to establishing and sustaining businesses that provide farmers with reliable and affordable water for crops. Good governance also provides an environment of regulation and opportunity for entrepreneurial activities undertaken by individuals or groups of farmers using shared water sources.

Although Phase 2 was concerned directly with the South African case and Swazi markets, the commonality of problems identified throughout the region in Phase 1, indicates that the principles in the recommendations are relevant throughout the region. The detailed findings of Phases 1 & 2 are presented in Annexes to this report. The research adds to a growing body of knowledge to inform policy, and provides a resource for Ministries, Water User Associations and farmer managers.

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Acknowledgements

The research team acknowledges the valuable contributions of the in-country research partners, without whom none of this work would have been possible. The partners include Rural Integrated engineering Co., South Africa, the Institute of Agricultural Engineering, ARC, and Northern Province Department of Agriculture, South Africa, Loxton Venn Associates South Africa, AGRITEX and CARE, Zimbabwe, and Ministry of Agriculture and Co-operatives, NAMBOARD and RSSC Swaziland.

During Phase 1 many individuals made significant contribution to data collection and to the analysis and workshop activities that prioritised the research findings and led the way into Phase 2. From Zimbabwe, Anyway Mouroriarwa and Jubilee Zharare; from Swaziland Leonard Ndlovu, Dumile Sithole and Patrick Khumalo; and from South Africa Massoud Shaker, Dr Jon Rutherfoord, and Chris Stimie, lead their colleagues in participation in the research. We also thank all the members of these groups for their relevant, knowledgeable and lively contributions.

We are particularly indebted to the many irrigators and extension staff on the fifteen schemes we investigated. They gave freely of their time and knowledge to contribute to the research. We also thank all their representatives who participated in the workshop to help form the recommendations in this report.

In Phase 2 we acknowledge the continued contribution of the above, particularly in South Africa, and in addition the contribution of IWMI through Marna de Lange and the contribution of The University of Pretoria through Sylvain Perret. In this Phase we have been particularly indebted to the committee members and irrigators of Dingleydale and New Forest who have responded to our comments, questions and requests with great patience and forbearance. We wish them well for the future.

Executive Summary

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Smallholder irrigators are not generally the poorest of the poor. However, the success of irrigation has widespread positive livelihood benefits in poor rural communities, improving access to food, increasing employment and providing effective demand for agricultural and non-farm businesses and services, often attracting businesses and service providers to the area.

The creation of sustainable smallholder irrigated businesses is complex. It depends essentially on the encouragement of entrepreneurs. Appropriate irrigation policy can encourage entrepreneurs by helping to provide an economic and regulatory environment in which enterprises can respond to market demand whilst maintaining non-exploitative relationships with the surrounding social, physical and natural environment.

The ideal set of conditions will vary from place to place. However, this study finds two aspects to be of key importance over a wide range of smallholder schemes in the Southern African region. They are:

- ***Decision-making and***
- ***Marketing***

Decision Making

The quality of decision-making and the commitment that irrigators are willing to accord group decisions depends on factors such as:

- ***Governance***
- ***Participation***
- ***Information***

Governance

The institutional framework must allow for the separation of the business of supplying water for growing food on a reliable and cost effective basis from the business of profitable irrigated farming. Separation of these functions allows the farmers concerned to define clear objectives, without which decision-making becomes complex and the subject to conflict.

Executive Summary continued

Where the institutional arrangement for farmer water management consists of a farmer committee, workloads to which this commits farmer members must be realistic and maintain a separation between executive and enabling functions in order to facilitate accountability.

In the case of irrigation management transfer, clarification of objectives and processes is essential among farmer committees, agencies handing over rights and responsibilities, and all other stakeholders.

Participation

Participation must be organised in an inclusive manner. Simply calling public meetings has not proved sufficient to ensure that typically marginalised groups, such as women, ethnic or religious minorities and disabled people, are included. Good communication is backed by information about participants.

Participation must be planned and budgeted for, to allow sufficient commitment and contribution to ensure an irrigation scheme is sustainable. It is important to identify the most effective entry-point for introducing development projects to a community. Involvement of existing interest and pressure groups is an essential first step. Disruption from outside by parties who feel snubbed or ignored is difficult to rectify.

Information

Participation and adherence to rules is improved where clear understanding of objectives and processes is achieved. It is important that the management of a scheme understands the limitations of different types of household in receiving information and checks the understanding of members on a regular and systematic basis. By doing so it provides itself with important management information.

Marketing

Profitable and reliable marketing depends on adequate:

- ***Information and commercial linkages,***
- ***Production and quality control***
- ***Recourse to enforceable, fair, regulations***

Information and commercial linkages

External support is needed to promote commercial marketing from smallholder irrigation schemes. Support on a significant scale is likely to be required over a number of years after the establishment of farmer management and will require government to provide advisory services, training and promotion of private/public partnerships and mentorship schemes. Smaller-scale farmers, many of whom are women, market locally and would benefit from practical improvement in local infrastructure and publicity that can be addressed at scheme level.

Executive Summary continued

Production and quality control

Farmers must respond to market demands for quality and consistency and to do so will rely on the effective conduct of water management as well as on arrangements to take advantage of the economies of scale in the production process. The public sector must also provide an enabling environment in relation to credit. More studies of alternative ways of financing the expansion of smallholder production are needed.

Regulatory framework

Smallholder irrigators are commercially disadvantaged due to the small size of their enterprises and the scattered nature of their existence. They need protection from aggressive commercial bodies through the creation and enforcing of a regulatory framework for negotiation and conduct of contracts. They should be encouraged to seek protection of numbers within their own community, or scheme, by forming co-operative, or collective, marketing groups. They may need assistance in formulating the necessary constitutions and bylaws to promote confidence in such arrangements.

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TOWARDS SUSTAINABLE SMALLHOLDER IRRIGATION BUSINESSES

1. INTRODUCTION

- 1.1 Throughout the developing world there is increasing pressure for states to reduce and even end altogether subsidy or financial support and advisory services to smallholder irrigators. Many countries have embarked on programmes of Irrigation Management Transfer (IMT) with varying degrees of success which have been discussed and analysed at length in email conferences organised by international bodies such as FAO and the World Bank. In countries in Southern Africa the challenge to succeed with such a programme is increased by the history of lengthy dependence of smallholders on government direction and provision, and neglect of farmer education in agronomic and technical skills. Smallholder farmers have been denied access to the world of business management, market analysis and contracts. The most extreme examples are found among small schemes in the former homeland areas of South Africa. Thus the programme for Irrigation Management Transfer recently begun there deserves particular attention.
- 1.2 Many of the small schemes built in South Africa in the period roughly between 1950 and 1980 were built to improve food security in order that the people would remain in their designated homeland areas. The state bore the costs of development, operation and maintenance and many of the agricultural cost such as those of mechanisation services and input delivery. The plots were generally small sufficient only to provide food for a family with perhaps a small saleable surplus. Many have deteriorated and fallen into disrepair, but some remain as recoverable. The National Department of Agriculture (NDA) has declared the intention of assisting people living on these schemes to participate in a revitalisation and rehabilitation programme. The revitalised schemes will ultimately be transferred to farmers to manage on a group basis. In this way, farmers will have the freedom of self-determination and the state will reduce the financial burden it now bears. However, Government is committed to support of smallholder and emerging farmers and to policies of poverty alleviation and rural development. Thus the Department of Agriculture, Land and Environment in Limpopo Province (LPDALE) planned a pilot intervention in order to address the steep learning curve it foresaw for implementers of the process and for smallholder farmers. The programme has been in operation for five years and has achieved considerable developmental change in the early pilot schemes and many lessons have been learned.
- 1.3 At the same time another wing of government, the Department of Water Affairs and Forestry (DWAF), is implementing the National Water Act of 1998 is promoting the establishment of Water User Associations (WUA). This has direct implications for smallholder irrigation schemes and provides a route for their establishment as legal bodies, which would open up other development possibilities to them. The prime function of the WUA is to manage the water allocated to it for the members in a sustainable and financially viable way. It is also required to carry out these functions in an equitable and gender-sensitive manner and provide welfare benefits to historically disadvantaged groups. All water users, not only agricultural users, are encouraged to be active in WUA structures.
- 1.4 The Water Care Programme presently provides for rehabilitation and revitalisation of irrigation schemes with a view to their eventual registration as WUAs. The programme works in a participatory manner and brings together farmers and their elected representatives with DALE staff, extension staff, contractors and consultants, and to a lesser extent Municipal and Tribal Authorities, to develop new skills, new methods and new institutions to achieve turnover and WUA establishment. However there remain major problems for the process, many of which relate to the ability of the smallholders to make sufficient money from irrigation to finance the upkeep and development of their scheme in a sustainable manner.

1.5 It is important that the governance arrangements for these schemes are clear, for without clarity farmers will be unable to decide and plan strategies for sustainable development. Resources are generally scarce in rural areas and farmers are not able to absorb risks. Improvements in irrigation should increase their resilience, however, there is a real risk to survival if these schemes fail. One of the greatest threats they face is in engaging in the totally new areas of management and business. A further complication arises from the pressure to act together as a 'scheme' to achieve economies of scale and market recognition, which is a totally new concept for all the farmers.

1.6 The following chapters:

- Debate issues about the structure of WUAs and Irrigation Schemes and the relationship between them that will best serve the needs of smallholder irrigators in establishing business, and
- Recommend actions for the various stakeholder groups involved on the basis that a WUA may not be the best option for all schemes,.
- Identify marketing issues revealed by the study
- Recommend strategies to support marketing in the medium and long-term.
- Identify issues and related actions appropriate to the 'scheme' level.
- Recommend strategies by which support agencies can provide an enabling environment for increasing capacity and action in rural and commercial communities.

2. INSTITUTIONAL STRUCTURES

- 2.1 Most smallholder-irrigated farms are found within some kind of ‘scheme’ of shared or interdependent irrigation water access and management. The origin and initiation of these schemes may be described as either ‘Voluntary’ or ‘Imposed’. Voluntary schemes are those formed through the active participation of a group of farmers, with or without external assistance, who have chosen to join together to create a joint venture for their individual and collective economic benefit. However, most smallholder irrigation schemes in Southern Africa are neither indigenous nor local farmer driven developments, but creations of the state, associated with resettlement and/or production modernisation policy. They are imposed in the sense that the members are there through force of circumstances and their decision-making is, or has been, constrained by central scheme management.
- 2.2 Generally the ‘Voluntary’ schemes created by farmers for themselves, are the most successful. This is one reason why policy now favours handing over schemes to their occupiers or members for them to own and run and be responsible for their futures. The state benefits from reduced costs for taxpayers and the scheme members benefit from direct control over resources of production to engage in and benefit from the market economy.
- 2.3 Transferring the resource and responsibility of the scheme to the members may be seen as development based on the freedom and capacity to identify and make choices, to be independent and self-reliant. However, the fact that the farmers/occupiers are now the owners does not provide the same basis or motivation for creating a ‘scheme’ relationship between members as when schemes are created by voluntary self-interested collective action. In the case of transferred ownership, to create some form of cooperative or shared ownership and/or usage rights institution to organise and manage the irrigation resource (if not the land resource) as a common pool resource (CPR), collective action is an imperative not a matter of choice. The farmers or occupiers are there and unless they chose, and are able, to leave, they must find some framework for working together.
- 2.4 The transfer of a “commons” resource involving rights and responsibilities then drives this process. Following Agrawal and Gibson’s (2001) discussion of common property, the notion of the schemes as a “commons” will be given meaning by an institution that establishes rights of access and use (exclusivity that creates “property”) and some degree of cooperation or communal constraint on individual behaviour. However, it is not self evident what the nature and extent of the rights and responsibilities are or how the “commons” will be owned. The State, as previous ‘owners’ must clarify this situation and the irrigators who take over this “commons” must learn what it is they now own and how it is going to be able to work
- 2.5 At a minimum level a collective institution is required to organise and manage the common pool irrigation resource. However, it has been argued elsewhere (IWMI Research Report 60, 2002) that irrigation management transfer (IMT) alone will not be enough to achieve viable sustainable smallholder irrigation schemes. It is argued, and our observations and experience endorse this position, that the only successful smallholder schemes are those that mirror the integration of large commercial farms by developing organisational and management systems to handle input, credit and market constraints, as well as the co-ordination and delivery of irrigation water.
- 2.6 This means that the nature of the collective institution necessary to give meaning to the transferred resources must be one that links the farmers or occupiers together as some form of collective and legal business or economic association. Part of the process of transfer must be understanding and acceptance on the part of the farmer irrigators that joining together in a legal body is the only possible context for the transfer of resources. They must be willing to understand and agree those,

individual farms or plots on the scheme cannot be treated as completely separate and independent from the wider scheme.

- 2.7 The precise nature and terms of reference for a scheme legal association needs to reflect the particular socio-economic and technical conditions applying on a scheme. This must provide the basis for owning and managing the shared irrigation infrastructure but, as we have argued above, it must provide the framework for seeking and securing resources, and access to the market that will allow the members to more effectively compete with the commercial farming sector. On the smaller schemes we would argue that the 'water commons' and a 'shared economic entity' are best achieved through a single business association. However, on the larger schemes, it may be appropriate to create two levels of legal business association; the overall scheme level (Level1) being constituted as legal owner of the irrigation infrastructure with the task of operating the business of maintaining the infrastructure. Level 1 would thus concentrate on the business of distributing/selling the water to the second level production/marketing associations operating at a sub-unit level. The sub-units would be defined by the characteristics of the scheme as discussed and illustrated in Appendix 1
- 2.8 It needs to be made very clear that for a transferred scheme to more effectively compete with the commercial farming sector economies of scale must be realised. This implies that the process of transfer must recognise that individual farms or plots on the scheme cannot be treated as completely separate and independent from the wider scheme, not just with respect to use of water but with respect to seeking and securing resources and access to the market. We would further argue that the transfer process must achieve understanding that the collective institution must be one that links the occupiers together in some form of legal business or economic association. Otherwise, there is a poor basis on which to seek and develop the commitment from the farmers, and other stakeholders, necessary to formulate objectives and strategies and implement appropriate institutional arrangements. Where the transfer process neglects to make the situation clear the establishment of the legitimacy of the new institution and the authority of its leaders and officers is hindered. What has emerged from the interactive process to establish managing committees, and other structures currently used on the schemes, is that the State and the support agencies must take a proactive role in clarifying the institutional basis of the transferred schemes. Whilst this is important *per se* The National Water Act (Act 36, 1998) in South Africa, and the consequent emergence of the institution of WUAs, has increased the local urgency for this clarification.
- 2.9 It is being proposed in parts of South Africa that the institutional framework for transferred schemes should be that of the WUA. We would argue that this is inappropriate because:
- a) As indicated above, it is necessary to indicate a clear intention that the schemes under their new 'ownership' are to be some form of collective business oriented association. Even where the size of the scheme may require two levels to deal with common irrigation water management and collective agricultural production and marketing business, both over time will be largely engaged with the arrangements of the market place rather than the co-ordinating and statutory responsibilities of the state. A WUA is designed to manage local water infrastructure and to ensure fair and reliable water supply to its members and this is not compatible with the institutional arrangements necessary to own and achieve economic viability with irrigation infrastructure or to establish a collective agricultural production and marketing system. The institutional framework for a WUA allows for secondary functions such as joint purchasing of agricultural services or inputs but this is envisaged to consist of facilitation rather than the formal arrangements that will be necessary to establish a collective agricultural production and marketing business.

- b) As a framework for development, access to and management of water is no more logical than say land tenure arrangements or access to credit. The production/marketing business, on the other hand, offers a framework to integrate these and other elements of the development process.
 - c) Instituting a WUA at a level 'higher' than a scheme makes it possible to include as members, as is intended, any 'legal persons' receiving water through the WUA infrastructure or in its area of operation, or whose livelihood depends on the successful operation of the WUA.
- 2.10 We have not specifically addressed land tenure and land ownership issues because we must await determinations of the institutional arrangements for land ownership and use being considered at national and political levels before their impact on small holder schemes can be assessed. However, it is important to note that the current conditions that determine the allocation and use of communal land will affect the exact nature of the institutional arrangements employed to establish a collective agricultural production and marketing system.
- 2.11 If schemes are to emerge as legally constituted then there must be means to constrain individual behaviour that might otherwise affect their viability. The most obvious threat must come from those who do not pay their water dues (however these are finally determined) and/or those who do not make appropriate use of their land. In the first instance this will raise the costs for all other irrigators and, if sufficient numbers default, may lead to the collapse of the scheme, or a particular part of it. It may be argued that appropriate land uses is a matter for the individual, as long as the water fees are paid (possibly by selling on the water), but this would defeat the development objectives of the investment, i.e. increased production and productivity through irrigation.
- 2.12 In either case, the scheme needs to possess the constitutional authority to ensure the degree of co-operation required, if necessary as far as removing rights of access and use. Appropriate procedures in the case of non-payment for irrigation water may have to be determined with the WUA, but in the case of land this, under the current dispensation, will have to be determined with the tribal and/or municipal authorities. It is important, therefore, that all relevant institutions are made fully aware of the institutional arrangements to be achieved in the transfer process. They must be fully committed to supporting this process – particularly with respect to establishing the legitimacy and authority of the managing committees and the officers of the institution. (See Appendix 1)

Recommendations

- 2.13 The outcome of the transfer process should be a legally constituted "commons" business entity transferred to and owned by scheme membership. This will be the framework for 'ownership' and the economic development of the scheme and its members. The formation of statutory Water Users' Association institutions should be a concurrent but separate process from that of the formation of "commons" business entities, with the WUA drawing its membership from all water users within its area and being responsible for overall water management.
- 2.14 The appropriate form of the legally constituted "commons" needs to be determined for each scheme. In some cases primary and secondary co-operatives or farmer associations might be appropriate; in others it may be more appropriate to use some form of legally constituted Community Based Organisation (CBO).

- 2.15 The form of the “commons” must be determined in consultation with all stakeholders. However, it is important that the State and its advisors clarify to scheme members as soon as possible that the intended outcome of the transfer process is a “commons” that will constrain individual behaviour and require some form of cooperative structure. This will provide the basis for the formulation of ‘scheme’ objectives and associated strategies.
- 2.16 It is important that the State invests resources to explain to members why this is the case. Many members will require explicit and specially prepared help in learning about commercial practices and business approaches. This will provide the basis for the formulation of ‘scheme’ objectives and associated strategies to allow effective engagement with the commercial world.
- 2.17 Other institutional stakeholders should also be advised as soon as possible of the intended outcomes of the transfer process and the implications of these for their responsibility and authority. This is crucial to engage their support the transfer process, particularly with respect to establishing the legitimacy and authority of the new scheme institutions and their management and administrative structures.

3. MARKETS AND MARKETING

- 3.1 Sustainability of irrigation development is dependent on the generation of sufficient income to cover all the costs of operation and maintenance, crop production and scheme management. Ideally a scheme should generate additional income to yield a return on the investment, or on the investment in rehabilitation. However, this is unlikely to be achieved in the short term.
- 3.2 The costs faced by farmers on an irrigation scheme include **not only**:
- (a) Costs of production; seed, chemicals, machinery services etc. **and**
 - (b) Support for household members (the main labour force) **but also**
 - (c) Water charges; to cover costs of operation and maintenance of the irrigation system **and**
 - (d) Management (currently met by a few scheme members on a voluntary basis).
- 3.3 There is therefore likely to be a need for scheme farmers to raise their incomes above current levels in order to meet all these costs. Support may be needed for an extended period to enable schemes to become self-supporting on a sustainable basis.
- 3.4 Product marketing is an important activity that has a major impact on the level of income earned. Surveys of schemes in South Africa, Swaziland and Zimbabwe, conducted in Phase I of the study, showed that:
- farmers see marketing as the key issue,
 - operate almost entirely on an individual basis with no group marketing activity, and
 - rely mainly on selling in “local” markets close to the scheme.
- 3.5 Maize is widely produced, both for home use and for sale as cobs or grain. Maize production may prove sufficiently profitable to be retained as a key crop, particularly if cobs can be marketed out of season, earlier than those from rain-fed production. In drought years, such as 2001-02, when grain prices are high, so too are incomes from sales of grain. However, markets are not assured and, in times of plenty, prices and profitability must fall.
- 3.6 Winter cropping is important to ensure productive use of water throughout the year and to supplement income from summer crops. Crops grown include tomatoes, onions, spinach, cabbages, carrots, squash, peppadew, paprika and others. Choices of what to grow are made individually and produce is sold in small lots in competition with other scheme members. There is little or no co-operation in marketing. Sales are made on the scheme to consumers or traders, or produce is transported to nearby towns for sale.
- 3.7 There are poor links to commercial markets at all levels; wholesale, retail or directly with consumers. Particular problems arise for smallholder producers since they are not only in competition with each other, but also with large-scale commercial crop producers. Smallholder producers may have advantages, in terms of lower labour- and other-costs of production, but the commercial producers have advantages in terms of bulk supply, knowledge and experience of market institutions and information regarding market outlets.
- 3.8 Competition from commercial producers is less intense where sales are made directly to local traders and consumers. However, large large-scale buyers such as supermarkets, even in the locality, may prefer to deal with commercial producers who can supply a quality standard commodity in bulk.

- 3.9 The problems discussed above do not arise where there is already a well established market for a particular cash crop, through which smallholder irrigators' produce may be sold; sugar being a good example. In the Low Veldt of North Eastern Swaziland, where the Simunye and Mhlume sugar mills are in operation, there is sufficient surplus milling and export market capacity to justify expansion of production by establishing smallholder sugar out-grower schemes. The Royal Swaziland Sugar Corporation that owns and runs the Simunye sugar estate and mill has already organised an associated smallholder out-grower scheme by providing inputs, managerial support and an assured market for cane. Furthermore, a total area of 7400 hectares of irrigated smallholdings is being developed under the Swaziland Komati Project Enterprise (SKPE). The majority of the smallholders will grow sugar cane (5500 hectares) to supply the Mhlume Mill, which will be expanded for the purpose.
- 3.10 In situations like this, where the processing and marketing facilities are already available, smallholders are not faced with the daunting problems of finding, organising and managing the markets for their produce and supplies of their inputs. Contracts for delivery of produce to the agency and of inputs to the farmers are then built into the design of the smallholder irrigation project.
- 3.11 The conclusion drawn is that smallholder farmers are not well organised and lack the necessary information, skills and experience for dealing with commercial produce buyers, other than in cases like that of sugar just discussed. Thus farmers are at a serious disadvantage, first in finding potential buyers, then in negotiating just, fair and feasible contracts and then in ensuring that the buyer fulfils his or her side of the bargain.
- 3.12 Although smallholders, and their chosen representatives, may eventually develop the necessary skills and experience for dealing with outside commercial agencies, this will take time and really depends upon achieving some initial successes on which to build. Thus, for SIBUs to become established on a financially viable and sustainable basis, outside professional assistance in marketing is needed.
- 3.13 Attempts have been made by commercial buying agencies, to arrange contracts with groups of farmers for the bulk delivery of produce, at Dingleydale. The first, for the production of peppadews, was co-ordinated by the Bushbuckridge Small Business Development Unit. The second, for paprika production, was negotiated by DKW, a processing company. Both schemes involved contracts with advances paid to the farmers, in return for contractual delivery of produce. Both schemes collapsed, the first at an early stage, largely because the contracts were negotiated with a sub-group of farmers while bypassing the Management Committee and misunderstandings between farmers and the buying agency.
- 3.14 In Swaziland, the National Agricultural Marketing Board (NAMBOARD) was established to provide market support to fruit and vegetable growers and cereal and poultry producers. It has provided three main types of service. First it regulates imports by issuing import permits and charging import levies and thereby gives some support to domestic producer prices. Second, the Board has provided market facilities for local produce at the Swaziland Fresh Produce Market since 1987. Private agents were used to sell produce on commission. Agents found the income from commissions was inadequate and all have left. Producers find the urban municipal markets more convenient, so the NAMBOARD market is now only used as a last resort. Third, NAMBOARD acts as a market agent, by entering supply agreements with farmers under the Farmer Support and Development Scheme has been run on a trial basis for a few years but is restricted to carefully selected farmers within a 50 km radius of Manzini. Farmers enter contracts to deliver specified quantities of selected crops, which NAMBOARD buys at a predetermined agreed price. For various reasons problems have been faced on both sides in fulfilling contracts. Government funding is being reduced and NAMBOARD is being privatised. Progress has been limited and scaling up of the activity to national level appears unlikely.

- 3.15 The activities of NAMBOARD represent an admirable attempt at promoting smallholder production and marketing. Their declining importance illustrates the limited scope and inefficiencies associated with import control, remote location of the Fresh Produce Market, and the operational and funding problems faced by a state run produce buying agency.
- 3.16 Non-government (NGO) activity may contribute to the marketing and promotion of smallholder horticultural production. For instance Usuthu Farm in Swaziland, established in 1998, as a joint venture by the Anglican Church and World Vision, is organising the export to France of horticultural produce from a smallholder irrigation scheme along with produce from the home farm. Hortico in Zimbabwe operates another programme with out-grower schemes. However, questions arise as to the sustainability of the programme without outside support and the problems of “scaling-up” to have a larger national impact.
- 3.17 Marketing issues, involving transactions with commercial suppliers arise for essential farm inputs, such as tractor services, seed, and agri-chemicals as well as credit and technical advice. Availability of these inputs was seen as a problem by many smallholders on the irrigation schemes studied.
- 3.18 In situations where farmers are able to enter a market contract for the sale of their produce, as in the case of sugar cane out-growers and that of the paprika producers at Dingleydale, the delivery of inputs on credit is generally included as part of the agreement. The buyer may also provide information and advice to the growers with the aim of ensuring adequate quantity, quality and timeliness of supplies. Thus the input supply and delivery problem is largely overcome for production under contract.
- 3.19 In other situations the purchase of inputs involves the transaction costs of information gathering on sources of supply, negotiating contracts and enforcing the contract for delivery, with commercial input suppliers. There are potential advantages from group buying, which reduces the transaction costs for individual group members and may result in price discounts. On the New Forest Scheme many farmers have recognised these advantages and are buying inputs as a group through a traditional (MudyaXihi) organisation, separate from the scheme management.
- 3.20 At Dingleydale, a private multi-national company, Syngenta, encouraged by the Agricultural Extension Officer, has established a marketing agency (Lehlabile) on the scheme, which buys seeds and agricultural chemicals in bulk and sells on in small quantities to farmers. Thus links are already being formed between commercial input suppliers and smallholder-producers. Facilitation of input delivery to farmers helps to promote increase in productivity and incomes.
- 3.21 Technical extension advice is provided by Government Officers. Many lack the facilities and equipment needed for effective communication with farmers, who therefore often have to rely on other sources of information. For some groups of farmers this is a serious disadvantage.
- 3.22 Some limited seasonal credit facilities are offered to smallholders by the Land-Bank.
- 3.23 These are widely thought to be inadequate. However, the high costs and risks of lending to smallholders for agricultural production are well known and not easily overcome. Once reliable markets are established for smallholder production credit provision will become less of a problem.

Recommendations

- 3.24 External support is needed in promoting commercial marketing of the produce from smallholder schemes. Assistance should extend beyond provision of training courses and advice on technical issues such as processing, packaging, storage and transport. More importantly support is needed in the promotion of commercial links and possibly partnerships, overseen by government. Marketing support is likely to be a priority area for many years.
- 3.25 Promotion of commercial links involves providing market information (for example, location of markets, patterns of demand, competition from other suppliers), assisting farmers in the negotiation of contracts and ensuring compliance with the terms of the agreement on both sides. It is important to make farmers aware of their responsibilities in meeting their side of the contract, as well as requiring that the buyer meets his. The potential for vertical integration, such as that between sugar out-growers and the mill, that benefits both farmers and commercial buyers, should also be explored. For these purposes a marketing advisory service is required.
- 3.26 Marketing advisors are required at scheme level, separate from the existing agricultural advisory service. The training and experience of marketing advisers will be completely different from those of the agricultural extension officers. Scheme level marketing advisors will need support from a central marketing agency. The agency will not only co-ordinate the activities of the scheme level advisors, but also provide legal advice on contracting and communicate market information to them. Serious consideration should be given, by the Government, to the establishment and initial funding of such a marketing advisory service to assist smallholder irrigators in establishing wider markets for their produce.
- 3.27 Whilst public sector funding is needed for the establishment of the marketing advisory service, a private sector company might be encouraged to provide the service. External funding could gradually be reduced over time by permitting the agency to charge a commission on sales.
- 3.28 The public sector must also promote an enabling environment for the provision of credit to smallholder producers. More studies, or pilot projects, are needed to explore alternative ways of financing the expansion of smallholder production. NGOs might contribute to the testing of alternative forms of micro-finance institutions. The problems and risks associated with lending to smallholder farmers could be reduced by (a) group-lending within the legal framework of the scheme organisation and/or (b) linking credit provision with produce marketing undertaken by the marketing agency.
- 3.29 The appropriate level at which to link marketing and production will depend largely on social and entrepreneurial/commercial factors and is likely to be on or below scheme level. In the case of large schemes a number of market interest groups will be likely to emerge and may operate either independently of the infrastructure related groupings or use those groups as a basis for market activity.

4. SCHEME LEVEL ISSUES

- 4.1 Phase I revealed that smallholders on most schemes had difficulty in clearly identifying their aims and objectives. This problem featured more prominently on imposed schemes than in farmer initiated types where co-operation among farmers was more common. (Table 6, Annex 1). In Phase II, in South Africa difficulties around aims and objectives are exacerbated by the lack of clarity in the institutional framework identified above in Chapter 2. Farmers in transition from a position at the lower end of a command hierarchy to a position of self-determination and responsibility, face an already steep learning curve, which is complicated by the simultaneous need to improve agricultural performance and assume the task of water management. Group activity for water management is accepted whereas marketing continues to be an individual activity. It may be argued as in Chapter 3 that marketing should be the driver of both production and water management and deserves attention at scheme level.
- 4.2 There are aspects of internal behaviour and organisation that promote or limit the organisation's ability to represent the aims and objectives to serve the main groups, or typologies, of farm family that make up a scheme (Merle, Oudot and Perret, 2000). Although most irrigating farmers are female, information flows on schemes largely use male-dominated networks and, as was observed in Phase II, reach farmers whose commercial activity is already higher than average in the scheme (Annex 2, Phase II Investigation on Communication, Table 4).
- 4.3 It was found that, although only a small percentage of the farmers sampled were totally ignorant of scheme developments, a much larger proportion lacked clear understanding of what the development was about (Annex 2, Phase 2 Investigation on Communication, Table 5). The proportion may be considerably larger than that suggested, if non-farmers were given equal consideration in the study. There is, therefore, a danger of the development resources and effort bypassing the very people targeted by the policy.
- 4.4 The direction of the revitalisation activities is significantly influenced by the practicalities of engaging the community. Phase II investigated the constraints to decision-making within irrigation scheme organisations through interaction with the ordinary scheme members and engaging with committees, extension staff and Water Care Project staff in discussions on participation strategies, communication, training and marketing. A significant issue is identification of the level at which it is appropriate to begin the participatory process. One point of view is that it is important in terms of community perception to work through farmers who already have some degree of standing in the community and who can bring the community with them. The poor may be bypassed unless great care is taken in working in this manner.
- 4.5 Another view is that democratic structures, such as the model suggested for smallholder schemes in South Africa, should have origins among the community poor whose need for livelihood improvement is most pressing. There are undeniable difficulties in implementing an approach based on this premise because the poor are often unable to respond for a variety of social and financial reasons. Arguably failure to engage the poor indicates poor participatory project design. The Water Care Project has developed a dual approach that addresses the basic requirement for food security and simultaneously seeks to build organisational and management capacity within the scheme. The approach works well on small irrigation schemes but is difficult to implement on large schemes. Social and economic history is of key importance and influence both farmers' reception of new ideas and the level of trust they can accord to in-comers and development consultants.
- 5.6 In Southern African schemes generally, former boundaries and conflicts are major constraints to development approaches. Where irrigation schemes straddle or sit close to old boundaries, old rivalries may have a major influence. The cohesiveness of the community also influences the

effectiveness of information networks. Networks are under threat for a number of reasons in addition to geographic dispersion, such as the barriers thrown up by disparity in income, education, gender, health, access to land and productive resources, political affiliations and religion. It is important then that initial approaches inviting participation are made on a broad front and encourage inclusiveness. Development budgets are often limited by a parsimonious approach to early participatory costs. This very often proves to be a false economy. Stakeholders who are left out initially can pose a significant threat to development efforts and when eventually incorporated may be perceived as an underclass by the founder members. Not only is their contribution and effort lower than it might otherwise have been but also the extra cost of making progress without them has been borne by founder farmers and the supporting agency.

- 4.7 Other studies identify a relationship between performance and a highly developed sense of connectedness among farmers (IWMI, Research Report 60). This is sometimes expressed as ‘ownership’ (of the irrigation infrastructure) although it does not necessarily imply ownership of land, which in this case remains with the State through the Tribal Authority. The presence of feelings of ‘ownership’ is often evident in the way the farmers come together to support, or defend, their scheme. Good performance of an irrigation system in turn enables farmers to make money and contribute to the operation and maintenance of the scheme upon which agricultural businesses can be established. This is the key to sustainability and reliability of the water supply in the future. Established businesses allow WUA members to have confidence in future income and invest in improved systems. It is therefore essential that farmers and their representatives understand the importance of good communication and inclusiveness in developing this sense of ‘scheme’ or ‘ownership’. It is by using these strategies that adequate levels of participation are achieved and people realise the benefits of acting together to achieve recognition, and economies of scale. It is important too that supporting agencies appreciate the difficulties that the community may face in achieving efficient and inclusive networks and offer relevant and timely advice and assistance. Support agencies rely to a great extent on the farmers to alert them to their needs in this respect.
- 4.8 Neither farmers nor support agencies have experience in managing schemes in an economically viable manner. Support agency managers relied on centrally subsidised services to a large extent, although financial considerations were part of their management remit. No reliable cost figures are available for schemes in the transition process. The Development of ‘A Simulation-based Approach to Assess the Economic Viability of Smallholding Irrigation Schemes (SMILE) software addresses this gap. SMILE is more than an advisory tool and is aimed at providing an interactive analysis that supports scheme managers in decision-making with models and scenario testing budgets. The model allows a scheme to be simulated by entry of site-specific particulars to allow users to pose ‘what if’ questions. The tool is valuable in bringing together simulation of change in water availability, participation and market outcomes (Perret and Touchain, 2002.) Even with assistance of this sort, farmers will face a steep learning curve for many years while the turnover process is happening and for some considerable time thereafter. They will still face the problems of young institutions and companies with the added complication that participation has been forced to some extent. Participation will continue to require extra effort until such times as the agricultural and water management operations are sufficiently sustainable and profitable to provide an attractive investment.
- 4.9 As discussed in Chapter 2 the intentions of the state must be clear to scheme members. Until this is the case members and their representatives will face major difficulty in developing clear objectives. Another major source of difficulty is in adopting objectives or strategies that reflect the needs of different subgroups. Reconciling the need for a business mindset and the concept of poverty alleviation is particularly difficult for management. The difficulties are reduced by effective participation but also require that the management committee, or representative body, has the authority to fulfil a conciliatory role and can command the respect and trust of the major groups. In order to do this it may need to pursue a number of strategies simultaneously.

Commercialisation is easily linked to the scheme need for financial viability however if only 10% of farmers achieve commercial success then they are unlikely to be able to carry 90% of farmers.

- 4.10 The majority of farmers must be enabled to improve performance. Arguably a small improvement in the livelihoods of the poor is developmentally more significant, and may contribute more effectively to the financial health of the scheme than a large increase for the small number of farmers who already are able to return profits. Many studies demonstrate that the poor are more reliable contributors than more prosperous groups (Mayoux, 2002). A key central decision will be the basis on which fees are charged for water delivery and how that addresses the needs of the seriously disadvantaged sub-groups. Participation of all groups and household typologies encourages attention to their needs and is crucial to spreading the benefit of development widely, thus reducing the number of farmers who continually fail to contribute. Amelioration of the resource access of poor people may be achieved by their coming together in some form of collective action within the scheme framework.
- 4.11 There is always a danger that objectives become merely ‘wish lists’ and bear little relation to what is organisationally and financially possible. Capacity for realistic planning is part of the Water Care Programme and significant progress has been made in the maintenance sector using a modular approach to the costing and planning. Similar processes might be applied to other aspects of the managerial task such as participation and communication and administration. Progression through the current transition stage will enable development of the planning skills needed to fulfil the demands of WUA functions
- 4.12 Management committees are essentially elected bodies. However, at the start of the development, or transfer, process it may be practically impossible to mobilise the electorate. Lack of clarity about ownership and cultivation rights, lack of good communication networks, and lack of trust, on the part of the irrigators, all contribute to the difficulty encountered. Thus it is often the case that the members of the first committee(s) are either appointed or elected using sub-optimal procedures reaching only a proportion of the total electorate. This may be the best option but poses a number of problems relating to the recognition of the authority of the committee and support for its activities. Nonetheless, developers and ministries perceive the establishment of committees to represent irrigators’ interests as essential to negotiation of terms and conditions with the outside world and facilitation of centrally agreed decisions.
- 4.13 In the past committees often existed to assist the agency, but the role was always secondary to agency management of the schemes. The main function was to channel instruction to farmers, and farmer needs to the agency. These committees became irrelevant as government became less and less able to manage the schemes effectively due to lack of resources and in a climate of negative political will. Their extinction was gradual and informal with no proper disbanding process. This left an unsatisfactory situation for past committee members and new committees alike and inhibits progress. Reconciliation and inclusion of such bodies is required.
- 4.14 Committees face significant challenges in shouldering responsibility for a scheme. The territory is relatively uncharted. The ideal model of successful farmer-managed smallholder irrigation schemes is elusive. The state itself has failed. The market is highly competitive and the resources of irrigators are usually sparse and unreliable. Lack of resources is not only a problem for those who have volunteered for committee duties but also poses problems for the outgoing agency. In this case the Department of Agriculture, and the consultants they employ, face serious budget limitations in determining the options for and delivery of the support that is required for irrigators to establish new community-based irrigation businesses.
- 4.15 Revitalisation has so far only dealt with market links at a level that might be best described as assistance to emerging farmers. In scheme terms emerging farmers are something of an elite and constitute a small percentage of the total membership (Merle and Oudet, 1999). The potential

exists for improving remaining members' knowledge of marketing strategies, but the present initiative does not address the divers livelihood strategies being followed within the scheme. Improved participation, however, could give a voice to those not yet catered for.

Recommendations for scheme Level

4.16 **Participation** is essential to a committee's sustainability and capacity to implement collective decisions. If sections of the irrigating community are not included they are unlikely to contribute physically or financially and thereby may threaten the sustainability of the scheme. At worst they may undermine the development effort. It is hard to achieve the desired level of participation without a good communication system

- a) Categorising attendance at meetings helps identify those who are not represented so that action can be taken. Regular assessment of progress towards the desired level of participation, in collaboration with extension, also helps.
- b) People have different capacity to receive messages so it is important to identify the capacity of the various subgroups in the scheme and the barriers to communication that might apply to each one. Barriers might consist of one or more of a variety of factors, such as:
 - Distant location
 - Different language
 - Disability
 - Gender
 - Poor literacy skills
 - Political or religious affiliations
 - Social divisions
- c) Different information channels provide access to different groups of people. If individuals receive information by more than one route the chance of their responding is higher. Once a communication system is in place it may require some checking, updating or adjustment from time to time.
- d) It is important to differentiate between presence and participation. Silent acquiescence may in fact be mutiny. Techniques for sensitive conduct of meetings to promote inclusive decision-making should be adopted. Committees might request training in participatory techniques to increase their capacity in this respect.
- e) Participation in decision-making requires organisation and resources and tends to be slow if a high level of agreement is required. A key strategy is to achieve sufficient initial participation to lead into a situation of full participation. Once this is achieved it becomes possible to identify which decisions must be taken with full participation, and which can be delegated to representatives or professionals, within an agreed set of rules.

4.17 **Clear specification of aims and objectives** is essential to the sustainable business and may be promoted by:

- a) Transforming smallholder schemes into businesses or WUAs and requiring that farmers look critically at their objectives, and at how, and when, specifically, they need or want to achieve them. The transformation process should be used to lobby for assistance to develop new and amend existing constitutions that meet the different needs of as many of the users as possible.

- b) Particular attention should to be given to equity and poverty alleviation if schemes are to remain sustainable in the long run. Experience from other irrigation or development situations can be helpful to groups and committees in reviewing how to deal with these issues. Organisation of exchange visits with other schemes stimulates the committee to think about equity issues on their own scheme as well as the scheme being visited.
- c) Recognition and legitimacy must be accorded to the objectives of different groups and the management committee must take a clear role in approving negotiations between groups whose objectives conflict.
- d) Members should consider the level at which co-operation for mutual benefit is appropriate but there may be some issues that are best dealt with at scheme level. Major tasks such as operation of shared infrastructure and minor tasks such as display of notices at the entrances and signs in and around the scheme may fall into this category.

4.18 **Monitoring and resource** development must be planned and needs resources to be allocated:

- a) The quality of decisions will be affected by the quality of information available to those responsible for the decision. Gathering information requires resources and has to be budgeted and carefully planned.
- b) The human skills needed to handle interpretation of data may have to be developed over some considerable time. Interpretation, experience and confidence are key factors in determining the quality of decisions. In the development process there must be some mechanism for assisting individuals and committees to deal with the outcomes of poor decisions.

5. RECOMMENDATIONS FOR SUPPORT AGENCIES

- 5.1 This concluding section draws together the main recommendations for support agencies. Action in these key areas is needed to promote sustainable development of smallholder irrigation schemes in Southern Africa as effective business units.
- 5.2 Many different agencies are likely to be involved in the development of these schemes. These include Government Departments such as, in South Africa, Limpopo Province Department of Agriculture, Land & Environment (LPDALE), Department of Water Affairs and Forestry (DWAF) and the Public Works Department; in Zimbabwe the Department of Water and AGRITEX; and in Swaziland, the Ministry of Agriculture. Private sector agencies such as Development Consultants and Commercial Commodity Traders such as the Swaziland Sugar Association may also be involved. However, in the initial stages, Governments must provide much of the initiative, and funding. In particular Departments of Agriculture carry the main responsibility for the successful hand-over of smallholder irrigation schemes and the establishment of viable smallholder business units. These recommendations are therefore directed mainly at the Department of Agriculture, Land and Environment for Limpopo Province in whose area Dingleydale and New Forest lie and the corresponding agencies in other provinces and countries.
- 5.3 Management Transfer of smallholder irrigation schemes to the farmers themselves is a difficult and complicated process. Successful management of any business unit involves both effective decision-making and an adequate level of control of resource allocation and finance. Participatory management of a smallholder scheme further complicates decision-making and control. Furthermore the scheme represents a community with social needs that must be considered within the management structure. The first recommendation is therefore that management transfer must be a long and cautious process. Even the current South African nine-year time-horizon may prove inadequate.
- 5.4 The legal framework of a Water Users' Association is designed to serve many different types of users; including domestic water supplies, industrial users and groups of large-scale commercial farmers previously organised as Irrigation Boards. For small-holder irrigation schemes, careful consideration should be given to the legal separation of responsibility for business development of the scheme from that of water allocation and distribution, the latter being the clear responsibility of the Water Users' Association. A possible framework for this separation of responsibility has been outlined in Chapter 2.
- 5.5 Land tenure is an issue that has not been clearly resolved. In irrigation schemes, water allocation is closely linked with land. It is very difficult for a Management Committee to ensure effective water allocation and use and to collect water user fees, without also controlling the allocation of land. Control of land allocation may be necessary to ensure that all irrigated plots are cultivated, all plot holders contribute to the upkeep and maintenance of canals and pay the necessary water fees. Efficiency might be improved if plot-holders were able to rent out their plots to others. Currently plots are allocated and occupiers are issued with Permission to Occupy (PTO) certificates through the tribal authority. Apparently such certificates were abolished in 1991 (Abolition of Racially-based Land Measures Act 1991), but in fact are still in use. Traditionally the tribal chiefs made the allocations, although now the Department of Agriculture is officially responsible. The situation needs to be clarified, most importantly in giving Management Committees greater control and the scope for disciplining those who fail to contribute to the upkeep of the system and who fail to pay water user-fees. Payment will be essential when the WUAs are registered and required to pay fees to the Catchment Management Agencies as well as meeting operating and management costs of the scheme.

- 5.6 A key recommendation is that further Government support should be given to smallholder managed irrigation schemes, for an extended period. For reasons given above, smallholder schemes are likely to be at a disadvantage in competition with large-scale commercial producers. Financial and technical support may be needed to keep the small schemes viable. From an economic point of view, the major investments involved in establishing water storage, pumping and distribution systems are now sunken and unavoidable costs. Some continuing financial support to maintain the systems in operation may be preferable to allowing them to decline and fail, with associated write off of the past investment. While initially support is most likely to be provided by Government Departments, every effort should be made to promote links and co-operation by NGOs and Commercial Businesses. The assistance should include provision of training courses and extension advice on technical issues of water management and crop production.
- 5.7 A particular area where further support is necessary is that of marketing. Ideally an agency is required which would seek out market opportunities, locally, in major urban centres and overseas, establish the legal contractual framework, possibly provide some transport and storage facilities and help to enforce compliance on both sides of market agreements. Marketing advisers should serve on individual schemes in parallel with the agricultural advisory service. The possibilities of private sector involvement in the provision of the marketing advisory service and of cost recovery through levies on sales should be explored.
- 5.8 Training of smallholder scheme managers is needed in financial management and accounting techniques. Regular external audit will be necessary and possibly some assistance in account keeping.
- 5.9 There is a need for Government to promote the provision of credit to smallholder producers. Improvements may flow from further trials of alternative approaches, including micro finance, group lending to schemes and linking lending to the use of marketing services.
- 5.10 At the scheme level, efforts must be made to promote widespread participation in the management and decision-making process, effective communication of information and representation, of the various sub-groups within the scheme, in the decision-making process. These efforts may require support from government.
- 5.11 Formulation of aims and objectives, or strategies for scheme development provides a basis for objective management decision-making. Particular attention should be given to equity and poverty objectives and reconciling the conflicting objectives of different groups within the scheme.
- 5.12 Performance monitoring is an important management tool, allowing adjustment for mistakes and the opportunity to build on success. Resources should be made available for the on-going collection of relevant records and their interpretation and use in decision-making.

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Appendix

Appendix 1

‘Water’ and ‘business’ institutions

Appendix 1 ‘Water’ and ‘business’ institutions

1. The idea of separate appropriate ‘levels’ for WUAs and the relationship between WUAs and the schemes as collective irrigation and agricultural production/ marketing business is perhaps best illustrated diagrammatically. Below are diagrams of three actual schemes showing their relationship to a WUA. Irrigation structural levels are used to indicate the relationship between (level 1) household/field, (level 2) farms/neighbours on shared common sub-canals, (level 3) dams or main canal units serving groups of farmers, and (level 4) the overall irrigation scheme and (level 5) the different sector needs served by the main capture and distribution infrastructure. The number of levels will vary from scheme to scheme depending on the type and complexity of the irrigation technology and physical boundaries within the scheme area. The nature of these boundaries provides the basis for formulating the scheme as a collective irrigation and agricultural production/ marketing business, and relating these to the ‘level’ of the WUA. We do not suggest that the way we have defined the scheme levels are the definitive structural boundaries within the schemes that we have used as examples, or between these schemes and the WUAs. Our suggested boundaries only illustrate why we believe that it important to separate WUAs from the scheme as a communal business.

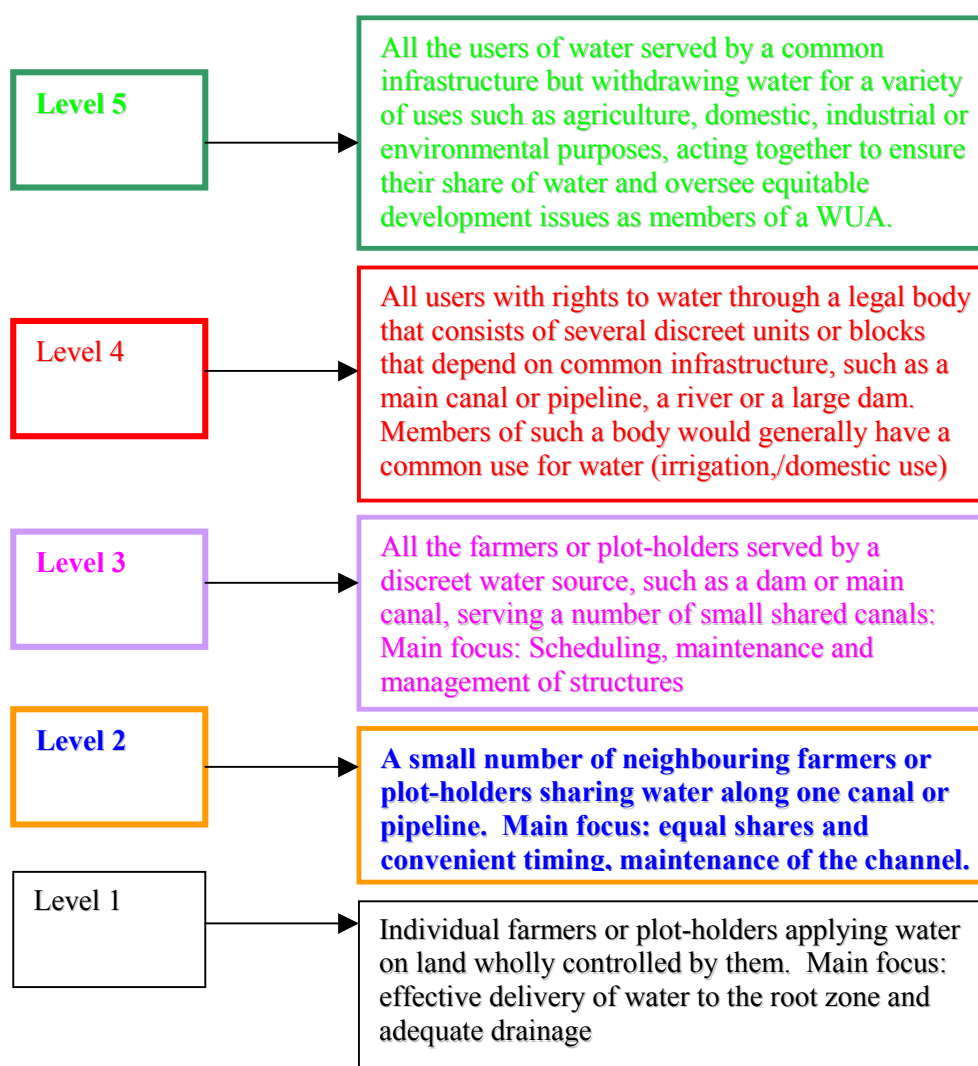


Figure 1: Irrigation Structural/Water Management levels¹

¹ Not all levels are used in all cases

2. The first example is of 'Thabina Scheme', so far the only scheme in Limpopo Province to secure WUA status. The scheme is a relatively small gravity fed system with some 120 members. There are supplementary pumps but, as indicated in Figure 2 below, the primary system is a single main canal and storage-dam with secondary canals draining back to a river.

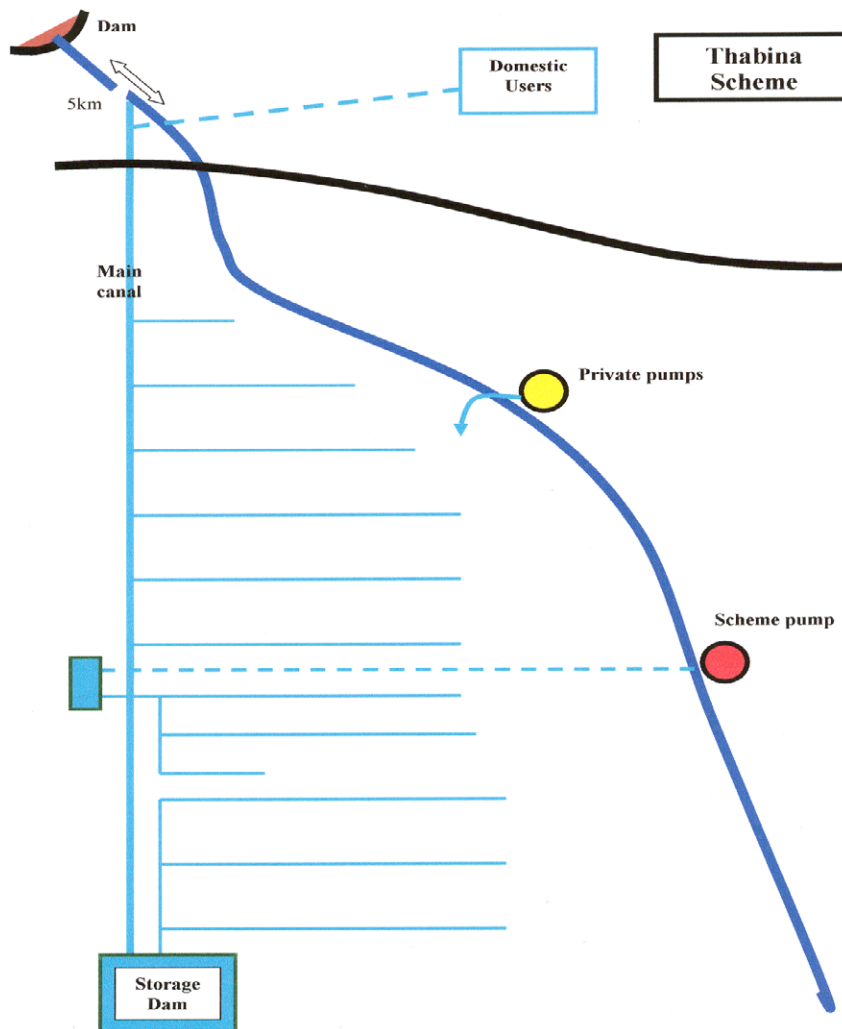


Figure 2: Thabina Scheme

3. From an institutional perspective, the 'scheme' of Thabina is now defined as a WUA. This means that the WUA provides the institutional framework for the scheme as a common property resource with rights of access and use, as in Figure 3 below (the WUA at level 4 with the WUA green boundary defining the WUA and the 'scheme', indicated in dashed red lines). We have argued above that this is an inappropriate basis for developing a collective business, whether for irrigation or for agricultural production, but in this case there is also an issue with respect to water use and WUA membership. It is intended that water users should be the members. In the case of Thabina however, membership is restricted to Scheme/PTO members. Yet 'users' include those 'informal' (non-member) users drawing water from the main canal for domestic purposes and may also be

considered to include anyone drawing water in the 5km between the main river supply dam and the main scheme canal. The domestic users and others below the main dam may not be scheme members but they do depend on a common water supply with the scheme and as such have legitimate interests in how this water is used and managed. They have a case then to be members of the WUA, but they have no place on the governing body of the scheme.

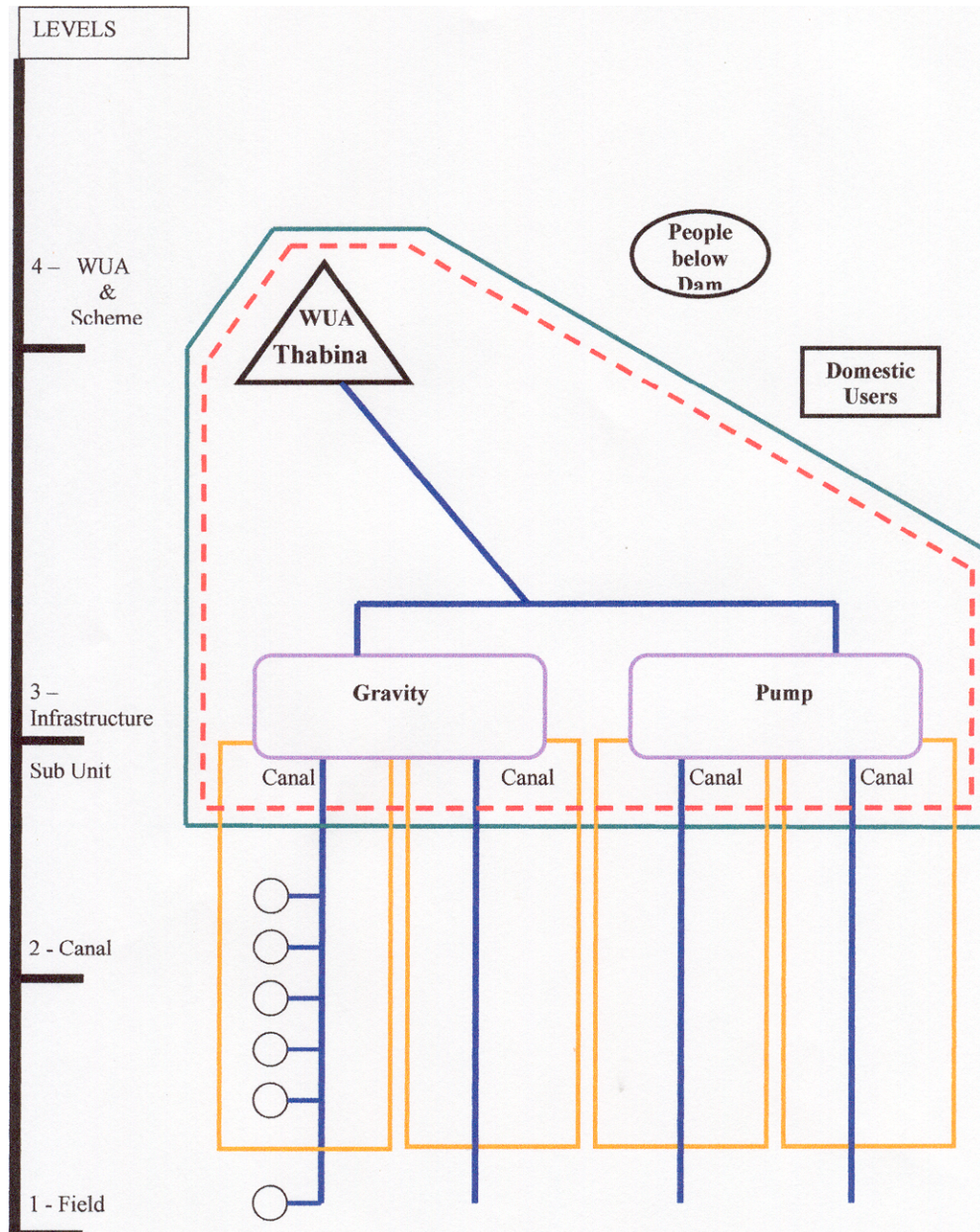


Figure 3: Thabina - Current position²

² Blue lines indicate water distribution route

4. There is then a need to redefine and separate the boundary of the WUA from that of the scheme as illustrated below in Figure 4. The WUA (within the green boundary) is now 'elevated' to outside the scheme (level 5), with membership or representation from the scheme, and the people from below the dam and the domestic water users. There are different ways in which these people could be represented but one way would be for the WUA to be made up of 'legal body' representatives from the 'scheme' members (however this is constituted) and from groups or associations determining the 'below dam people' and the 'domestic users'.

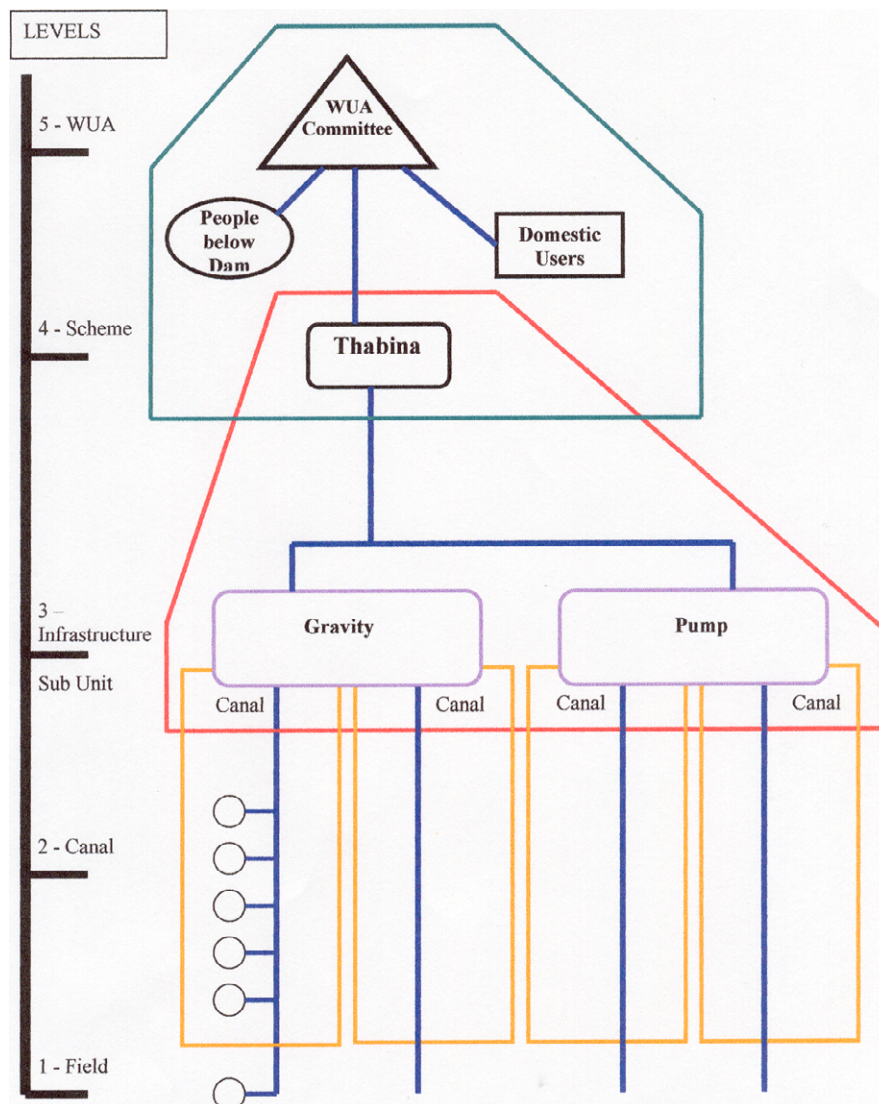


Figure 4: Thabina – WUA (Thabina Scheme + Domestic + Below-dam Users

5. The second example, which is not yet registered as a WUA, is the Cape's Thorn Scheme. This is also a small scheme and is mainly gravity fed, but a sub-section is pump fed, and a commercial farm has rights to use water from the dam primary water source.

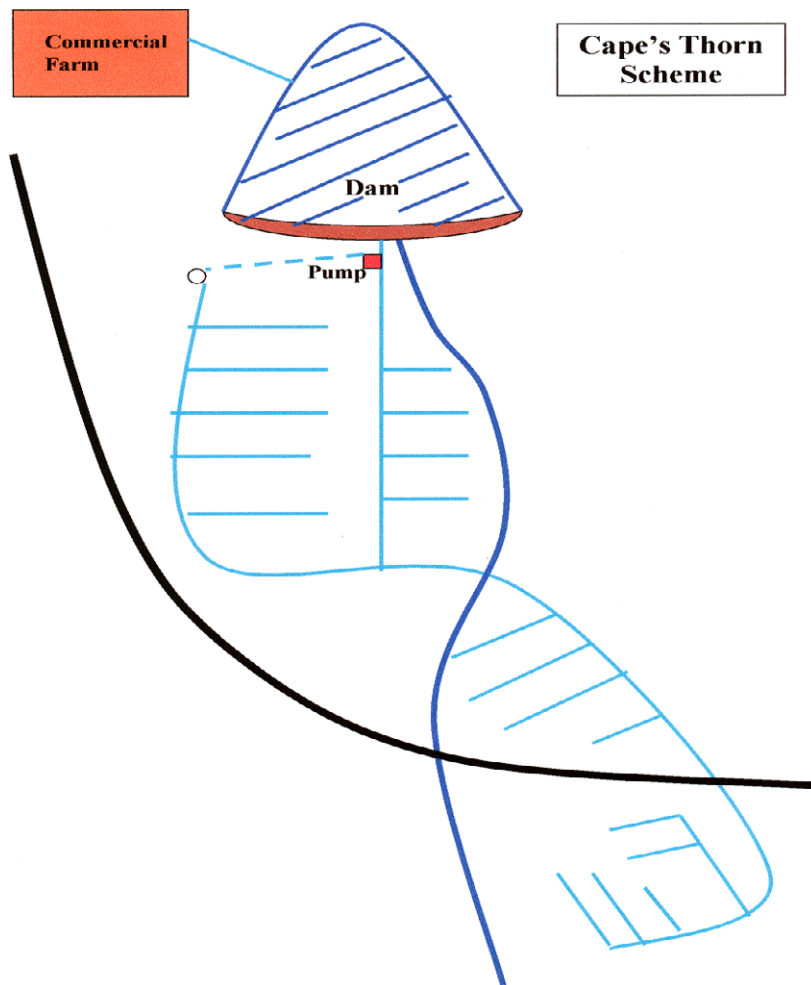


Figure 5: Cape's Thorn Scheme

6. Again there is a case to set up the WUA beyond the scheme boundary in order to include others with interests in the supply and management of the water, in this case a commercial farm. The WUA membership will then include the commercial farmer and scheme representatives depending on how the scheme is constituted. However, we understand that the commercial farm makes so little use of the dam water supply that it is thought unnecessary to include the farmer in the WUA. If this was the case then the WUA would be made up only of the scheme or the scheme membership. However, as indicated in Section 2, we would argue that the WUA should not constitute the scheme. Rather, the situation should be that the scheme is a legal communal business that has taken on the role and responsibilities of a WUA. If the Scheme consists of one single business then the scheme and its relationship with the WUA may be represented as in Figure 6.

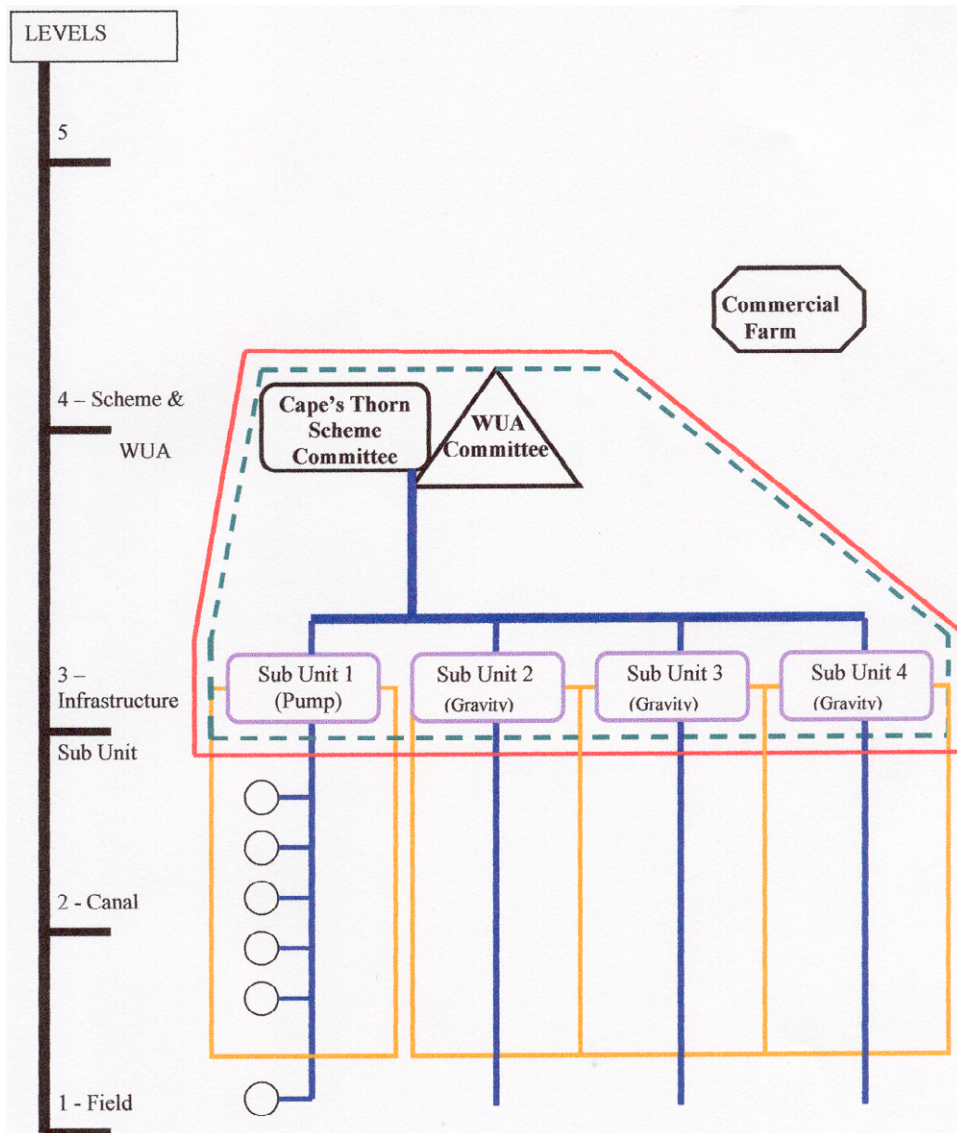


Figure 6: Cape's Thorn –WUA

7. In the above example the scheme operates as a single unit business at the fourth level, with the role of WUA also indicated at this level because there are no other members outside the scheme. If, however the scheme consisted of say two separate businesses, the WUA would have to operate at the fifth level to represent them and the commercial farmer, if now included, as indicated in the diagram below.

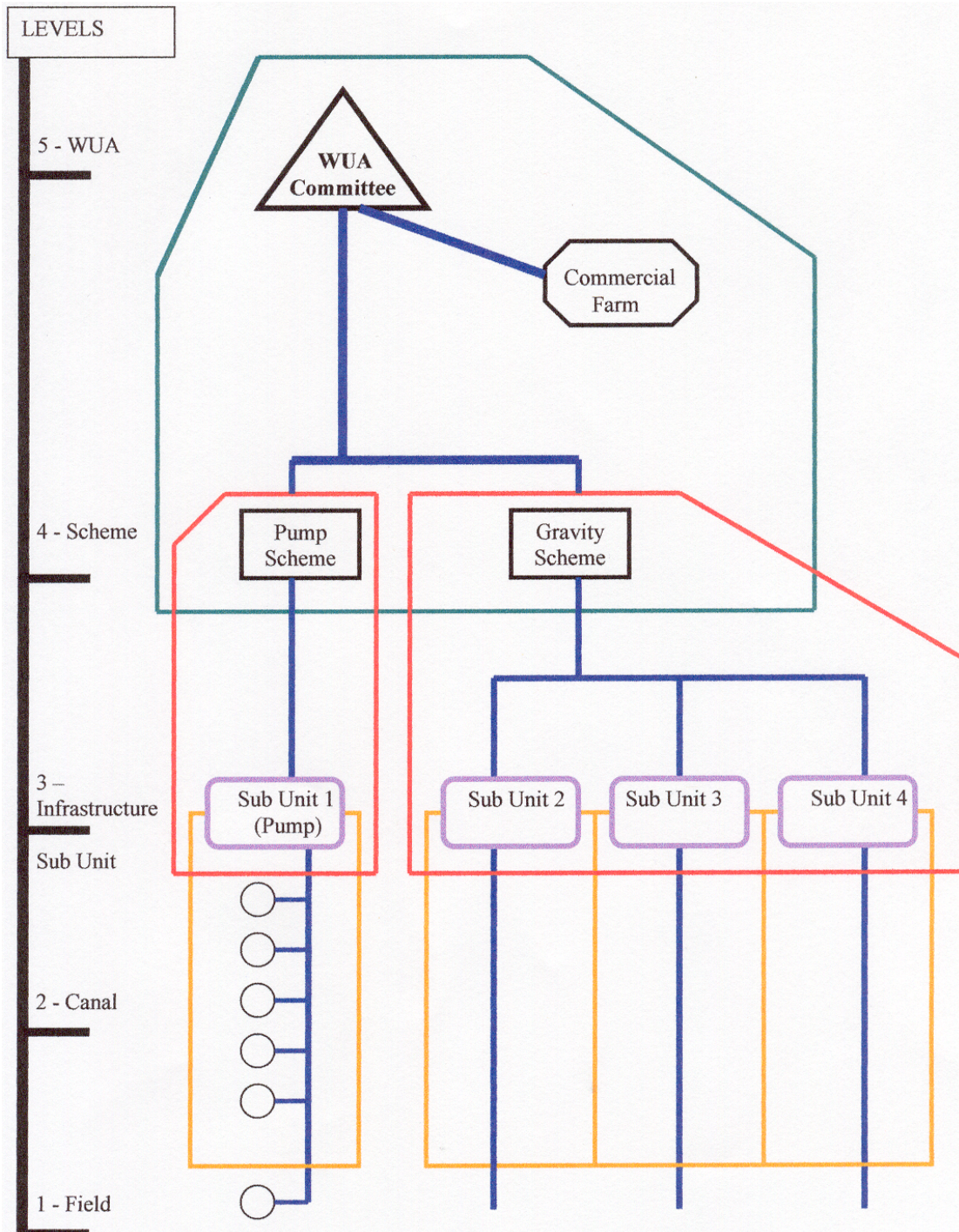


Figure 7: Cape's Thorn - WUA consists of Scheme and Commercial Farmer

8. The final example is of the Dingleydale and New Forest Schemes. Figure 8 below shows the physical layout of the scheme. From this it is clear that the two schemes are interconnected and interdependent, principally thorough the Orinoco dam, which receives excess water from both schemes and provides water to some parts of the New Forest scheme. The commercial ex-ARDC farm Champagne is also irrigated from a scheme source while some domestic water supplies are provided for both Dingleydale and New Forest villages and elsewhere.

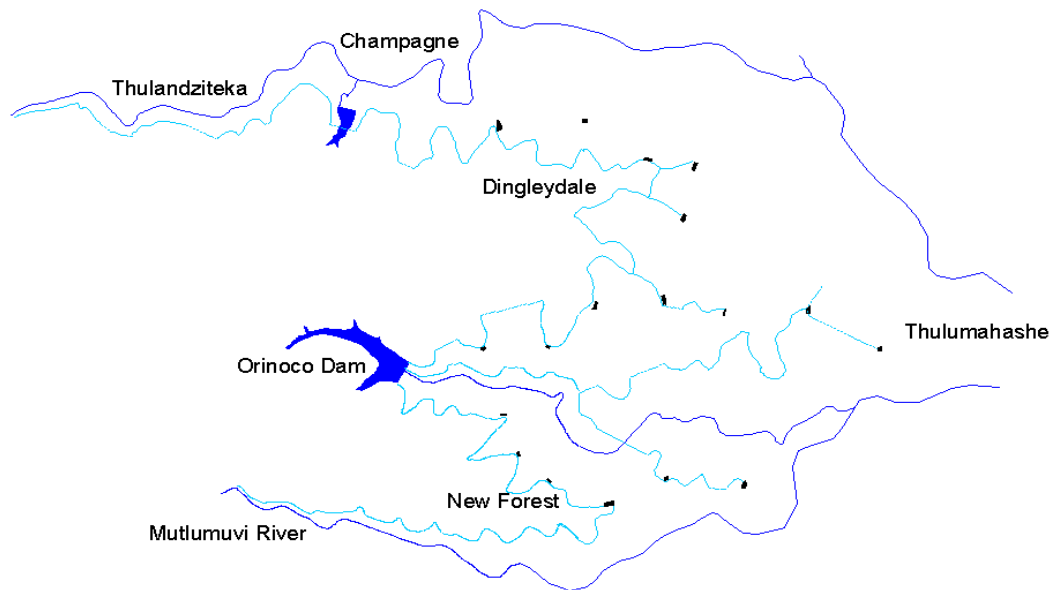


Figure 8: Dingleydale and New Forest schemes

9. Dingleydale and New Forest are large schemes totalling some 1600ha with probably 5000-8000 people dependent on them for some or all of their livelihoods. Given that Dingleydale and New Forest schemes are both large, and that they share water resources with both a large commercial enterprise as well as with domestic users, there appears to be an overwhelming case to separate the schemes as businesses from the WUA. Separation would then establish the WUA as the appropriate body for managing the supply of water to multiple and various users. As indicated in Figure 9 below, Dingleydale and New Forest would exist as independent businesses (within the red boundaries) and join with Champagne and the domestic user representatives as the members of the WUA (within the green boundary). The precise boundary of responsibility and ownership between the WUA and the 'Scheme' will need to be defined as part of the transfer process. Also, as outlined in Section 2, large/complex schemes suggest a need for a two level business structure within the 'scheme'. The first, 'scheme' level would be responsible for the irrigation water business within the schemes, while the second level would be concerned with the production/marketing business functions (with a secondary water management role if needed) developing at balancing dam or similar level (the purple infrastructure sub-unit in Figure 9). The 'scheme' level (level 4 in Figure 9) management committees would be responsible for distribution between balancing dams and any other functions required and agreed by the lower level dam groups or associations to be undertaken at 'scheme' level.

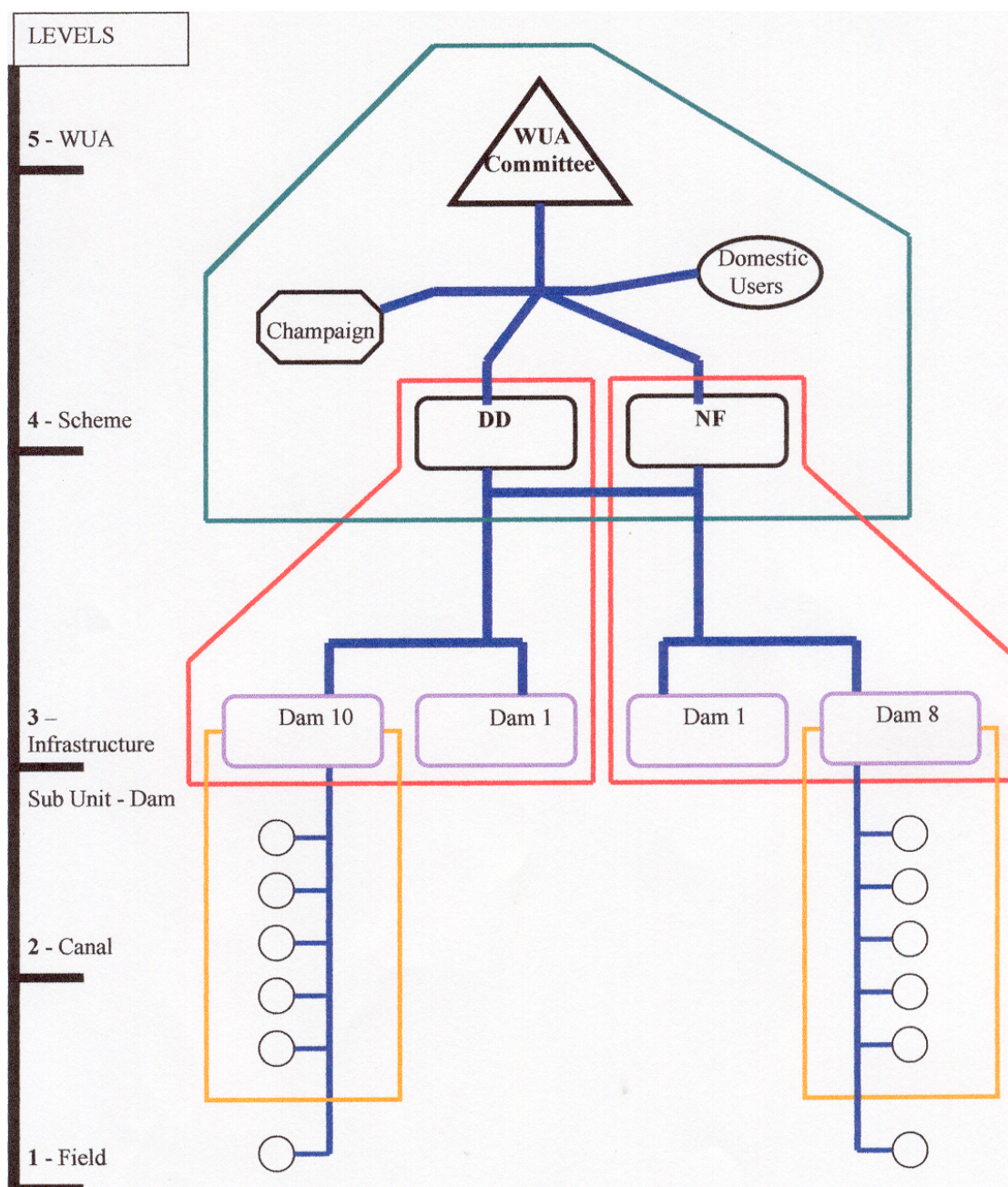


Figure 9: Dingleydale and New Forest Schemes and the area WUA

Recommendations

- It is inappropriate to impose a single model for the transfer of smallholder irrigation schemes from the state to farmer management. However, a generic approach that links the institutional arrangements to water management tasks, as they are dictated by the infrastructure to be transferred, should be used to guide the process.
- The outcome of the transfer process in Southern Africa should be a legally constituted communal business entity transferred with legal rights to scheme membership. This will be the framework for scheme membership and the economic development of the scheme and its members. The formation of statutory Water Users' Association institutions should be a concurrent but separate process from that of the formation of communal entities, with the WUA drawing its membership from all water users within its area and being responsible for overall water management.
- The appropriate form of the legally constituted business unit must be determined for each scheme. In some cases primary and secondary co-operatives or farmer associations might be appropriate; in others it may be more appropriate to use some form of legally constituted Community Based Organisation (CBO).
- The form of the business unit must be determined in consultation with all stakeholders. However, it is important that the State and its advisors clarify to scheme members as soon as possible that the intended outcome of the transfer process is a communal business unit that will constrain individual behaviour and require some form of co-operative structure.
- It is important that the State invests resources to explain to members why this is the case. Many members will require explicit and specially prepared help in learning about commercial practices and business approaches. This will provide the basis for the formulation of 'scheme' objectives and associated strategies to allow effective engagement with the commercial world.
- The earlier other institutional stakeholders are advised of the intended outcomes of the transfer process and the implications of these for their responsibility and authority, the better. This is crucial to engage their support for the transfer process, particularly with respect to establishing the legitimacy and authority of the new scheme institutions and their management and administrative structures.

Towards Sustainable Smallholder Irrigated Businesses (SIBU)

DFID KAR Research Project R 7810

ANNEX 1: Phase 1 Research findings

**Report OD 149 - Annex 1
March 2003**

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Summary

This document gives an account of the proceedings of the workshop ‘Creating sustainable smallholder irrigated farm businesses’ which was funded by DFID as part of KAR project R7810 of the same name. The objective of this workshop was to identify the needs of the smallholder irrigation community in the region for research to assist in improving the capacity of smallholders to run sustainable businesses and to identify policy options that would promote success and innovation and concluded Phase 1 of the research. Investigations made in fifteen schemes in the region suggest that on average the returns to smallholder irrigation are lower than predicted, that schemes as opposed to individuals lack clear objectives which limits their effectiveness and that farmers lack information and ready market access. In virtually all the schemes marketing was identified as the key constraint although generally not the only constraint.

The account provides summaries of the working group responses to questions arising from discussion papers presented in the sessions. These discussion papers are provided in this document. Descriptions of the fifteen irrigation schemes investigated in the preliminary phase of the research were provided for participants in the Workshop folders. Tabular summaries of these findings are presented within this document.

The final section of the document presents the broad research needs identified in the workshop. In addition this section has benefited from the expressed interests of the Northern Province Department of Agriculture (South Africa) in relation to research. Finally the bare bones of a programme that might address some of the issues is presented.

We would like to thank all the participants who gave time to comment on the draft version. All comments have been taken into account although they may not appear in the exact form in which they were originally submitted due to the need to take a consensus of comments received.

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1. INTRODUCTION

Investigation of smallholder irrigation indicates that farmers ability to grow crops is constrained by lack of cash for inputs and maintenance costs. This problem to some extent arises from the difficulty faced by the smallholders in finding markets for their produce: exacerbated in some cases by production of poor quality produce which does not attract buyers in a competitive market.

There are other, fundamental, causes for marketing difficulty associated with the way in which smallholder irrigation schemes were originally set up. The initial objective of many existing schemes was a political rather than economic. Many schemes were situated in remote areas and served to assist in the resettlement of people in new, less agriculturally attractive areas. More recently established schemes were initiated to improve living standards of rural dwellers, to provide food security. These welfare functions were heavily subsidised by the state not only in the form of capital costs but in the recurrent costs of operation and maintenance and the staff costs associated with management and training.

Governments can no longer afford this level of subsidy and are steadily withdrawing support, devolving costs to farmers. These farmers naturally face escalating costs and must develop strategies to restructure their businesses to make them sustainable in the long run. They are hampered in their efforts by lack of links with the commercial sector and by the scattered small nature of smallholder developments often poorly served by road and rail infrastructure making the transport of perishable produce expensive and risky. The surrounding local population is seldom sufficiently affluent to provide consistent high demand that would relieve irrigators from having to market over distances. Lack of information and lack of training in business methods further hamper them. Nonetheless irrigators are keen to improve the viability and profitability of their businesses.

Another fundamental problem for smallholders is having to co-operate with fellow irrigators to source and share water, while competing with them in selling produce. Where should the line be drawn between these spheres and what is the impact of change on the sustainability and performance of the schemes in meeting the needs of farmers? Individuals, families, groups, and committees have to take decisions that give actions direction and value. In many ways it is illustrated that individuals are clear about their objectives whereas 'scheme committees' are not. Many farmers avoid group decisions for reasons of low trust. Institutional arrangements to foster trust are often inadequate.

It is also important that communities as a whole are party to the decision making processes for they too are stakeholders in the business viability of the irrigators although they are not always recognised as such.

The workshop discussions take place with these fundamental issues in mind.

2. OPENING SESSION

The workshop opened with a very warm welcome to everyone and thanks for the enthusiasm people have shown in turning out in such large numbers. The organisers appreciate the effort that goes into attending such a workshop and hope that all fifty-five participants will leave with new experiences and approaches to consider in relation to their own part in smallholder irrigation development.

The researchers, many of whom are outsiders, are not here to criticise, judge or tell anyone what to do: they are aware that many issues identified by investigation so far are already being addressed. The intention is to offer assistance, to help identify gaps in knowledge and look at ways in which research can help both those who are developing and implementing policies and farmers who are selecting technologies, developing businesses and establishing commercial links.

It is hoped that the workshop can be of assistance in bringing people together from the three countries participating in the research to exchange and share experiences. If our research contribution can be defined so that it is a useful contribution to the work that is already going on in the southern African region, then our objectives will be met.

We are pleased to welcome four main groups: those who contribute from the government departments and agencies in South Africa, Swaziland and Zimbabwe; those who farm on smallholder irrigation systems in South Africa and Swaziland; those NGO staff, consultants and companies who work in irrigation development and the researchers themselves. The researchers include individuals from HR Wallingford and Reading University in the UK, Institute of Agricultural Engineering in South Africa, Ministry of Agriculture, Royal Swazi Sugar Corporation, and NAMBOARD in Swaziland and CARE and AGRITEX in Zimbabwe. Between them they represent social, participatory, economic, institutional, agricultural and engineering backgrounds as they are applied to smallholder irrigation.

What we present to you as a basis of discussion is the output from what has been done so far. That is a brief investigation of 15 smallholder schemes in the region, through background information gathering, a brief survey of a sample group of farmers at each scheme and a series of focus group discussions at a few schemes. The collection of data has been difficult in some ways and this in itself signals that insufficient information is available or is forthcoming. Clearly lack of information limits the capacity of schemes or groups to make effective plans and decisions. It is the impact of this type of limitation that we will explore in the days to come. Our findings will be detailed in a later session, but to provide an introductory comment the strong impression is of enormous change in the irrigation sector in the region from one where top-down management prevailed to one in which irrigators must decide and provide for themselves. There are huge challenges facing the farmers and professionals alike. This workshop provides an opportunity to work together towards solutions.

3. THE STUDY'S FINDINGS TO-DATE

3.1 A background to irrigation in the study area

The session opened with the following paper on the background to irrigated agriculture in the study area.

Background paper on irrigated agriculture in South Africa, Swaziland and Zimbabwe

Introduction: In all three countries included in this study, the Republic of South Africa, Swaziland and Zimbabwe, smallholder irrigation is seen as an important component of agricultural and rural development.

The historical backgrounds differ between the three countries, not least in the substantial time lags in achieving democratic majority self-determination, between Swaziland the first and South Africa the last. There are also significant differences in the structure of the national and the agricultural economies (see Table 1).

Table 1 Some features of the national and agricultural economies of the three Countries

	South Africa	Swaziland	Zimbabwe
GNP per capita \$(PPP)	7,190	4,200	2,240
Agriculture as % of GDP	5	10	19
Agricultural popl'n as % of total	15	34	63
Agricultural land per 100 rural popl'n (ha)	1,670	390	280
Irrigated land per 100 rural popl'n (ha)	22.7	20.5	1.6
Irrigated land as prop'n of all agric. %	1.35	5.19	0.57

South Africa has a much higher National Income per capita than the other countries but with agriculture making a much smaller contribution to the total. (It should be noted that in all countries, the food industry, which depends on agriculture, employs a larger percentage of the population). The rural resource base, in terms of hectares of agricultural land and hectares of irrigated land per head of the rural population appears highest in South Africa and lowest in Zimbabwe. Swaziland has the highest proportion of agricultural land under irrigation.

These national estimates provide little guidance, however, as to the average resource base of smallholder farmers, in particular since substantial areas are devoted to large-scale commercial farming in all three countries. Furthermore big differences are likely between regions within countries. The South Africa component is limited to Northern Province.

Despite the large historical economic and resource differences between the three countries, each of the National Governments is committed to the promotion of smallholder irrigation, with increased farmer participation in the operation and management of schemes. Further information on policies and projects is presented below country by country.

South Africa

In South Africa small-scale irrigation has a long tradition, particularly over the last century. Several large irrigation projects were established to serve white farmers, while since 1940 the Government established several large schemes in the former Bantustans, to promote economic growth and development. However, most were focussed on the production of staple foods (maize and wheat) with the aim of achieving local food self-sufficiency and were subject to external management with little or no community participation. More recently some schemes were adapted to settle project farmers under central management (Mpahlele, Malakalaka & Hedden-Dunkhorst 2000).

Following the return to majority rule in 1994, government support, in terms of credit and service provision has been reduced substantially. The centrally managed and government supported projects have been

turned over to farmer participation in project control and management. The policy objective is to promote irrigated farming as an element of agricultural development, whilst increasingly devolving decision-making responsibility to the farmers. New support services are being designed and implemented. Three of the schemes being studied, Strydkraal, Thabina and Dingleydale, are all of this nature. The fourth scheme though launched with the aid of an NGO (the Rural women's Association) is now effectively managed by the farmers themselves.

The aims of agricultural development, recently set out by the **Director General of the Ministry of Agriculture** are to facilitate economic growth by raising yields and incomes at the same time as satisfying food security at the household level, on a sustainable basis. "Linked to that of course is the economic and entrepreneurial character which African agriculture needs to take on". Within this context, there are many agencies involved in encouraging and improving farmer participation in the management of smallholder irrigation schemes (e.g. Agricultural Research Council, Water Research Commission, MBB Consulting Engineers, Loxton-Venn & Associates).

Swaziland

Sugar is regarded as Swaziland's most valuable export. Until the advent of the Simunye Estate and Mill, companies outside Swaziland carried out all development. Swazi smallholder involvement started in 1962 with the establishment of Vuvulane Irrigated Farms, which today involves 260 smallholders. Estates and mills such as Simunye have started to encourage smallholder out-grower production.

The Komati Basin Development Project was conceived in the early 1980s to provide irrigation water for farm development in South Africa and Swaziland. In Swaziland this involves the construction of the Maguga Dam, the development of 7,400 hectares of smallholder irrigated farms downstream and the expansion of a sugar mill to accommodate an additional 80,000 tonnes of sugar annually. The project is administered and implemented on behalf of the Swaziland Government by the Swaziland Komati Project Enterprise (SKPE). This scheme was not included in our survey but its development serves to illustrate the importance given to smallholder sugar production, in agricultural expansion and the alleviation of rural poverty.

However, there is a National debate in progress, regarding the possible dangers of becoming too highly dependent on sugar alone. The Government of Swaziland is already promoting smallholder vegetable production under irrigation, in the Malkerns Valley and elsewhere.

Zimbabwe

Zimbabwe's agricultural sector is a major contributor to national food security, foreign currency earnings from exports, employment and industrial raw materials. Historically, large-scale commercial farms benefited from public investment and the provision of government support services. The recently launched Zimbabwe Agricultural Policy Framework (ZAPF) is aimed at redressing the balance and improving productivity and incomes among smallholder farmers. This now incorporates the National Irrigation Policy and Strategy (NIPS).

Irrigation has contributed to agricultural growth from the early 1950s, but after independence the Government intensified its efforts to promote irrigation development among smallholders. Initially it was justified, in many cases, on social welfare grounds, but more recently economic problems and the Structural Adjustment Programme have led to reduction or removal of subsidies and the need for irrigated agriculture to become self-supporting. The development of the Water Resources Management Strategy (WRMS) is expected to improve access to irrigation water for smallholders and increase their participation in planning water resources and promoting more equitable distribution of water rights than in the past. National policy objectives include:

1. Growth in the irrigated area particularly in the smallholder sector with minimal negative impacts on the environment and human health;

2. Equitable allocation and efficient use of water resources;
3. Establishing a water pricing structure which is consistent with cost and social efficiency;
4. Establishing an effective institutional structure; and
5. Implementing efficient drought mitigating strategies.

Strategies to be followed in implementing these policies include:

1. Priority to be placed on farmer-managed and operated systems. Government will assist in development and farmers will retain responsibility for operation and maintenance (O & M) of irrigation systems;
2. Effective water user's associations will be encouraged and facilitated;
3. Institutional capacity for development will be encouraged in both the public and private sectors. Within the public sector, better co-ordination will be achieved particularly between Agritex (the Agricultural Extension Service) and the Department of Water Resources (DWR), (Republic of Zimbabwe 1998).

Between 1912 and 1980, 74 smallholder schemes were established, ranging in size from 2 ha to 400 ha. Since independence many more have been created, although some have ceased operation because of siltation and other problems. Today there are now over 300 smallholder schemes. Apart from government support provided by Agritex, donors such as Danida, KFW (German Aid), and NGOs such as CARE International, have been involved in smallholder irrigation development. FAO/UNDP have also provided support, mainly in training.

Problems identified include:

- a) Excessive Government control;
- b) Unprofitable production;
- c) Farmers' reluctance to pay water charges;
- d) High development costs;
- e) Lack of farmer participation;
- f) Changing and uncertain objectives;
- g) Too many Government institutions involved.

In summary, it appears that, despite differences between nations, in the historical background and the individual development of schemes, they are all attempting to promote the development and improvement of smallholder irrigation, and face similar problems in promoting that development.

3.2 The data obtained from initial field surveys

To facilitate comparison of the fifteen study schemes, five summary tables were produced using data from the surveys, background information from country key informants, other secondary data sources and also our own impressions from visiting selected schemes. Scheme data have been sorted by: *Country, Plot size, Commercial activity, Key constraint and Management style*

There are still gaps in the tables where there is not as yet sufficient information, or where there is uncertainty about the reliability of the data (partly due to survey method and partly to farmers' lack of clear data on their own activities).

Table 2 Schemes sorted by country

	South Africa				Zimbabwe							Swaziland			
	Thabana	Dingleydale	Apel	Strydakraal	Deure	Tawona	Wenimbi	Negomo	Garl	Tsviyo	Chendebvu	Mbekelweni	Namkuphi	Lilanda	Maplotini
BACKGROUND															
Local population density (High/med/low)	H	H	H	H	?	?	?	?	M	M	M	?	?	?	M
Roads and railways (Good/Poor)	G	G	P	G	G	P	G	G	P	P	P	?	?	P	G
Rainfall (mm/annum)	700	600	400	400	4-500	4-500	8-900	750-1000	?	?	?	800?	800?	800?	800?
Frost free (Yes / No)	Y	Y	N	N	Y	Y	N	?	N	?	?	?	?	?	?
Access to rainfed land (Yes/No/Some)	N	Y	N	S	N	Y	Y	Y	Y	?	Y	?	?	M	?
INFRASTRUCTURE															
Scheme size (ha)	220ha	1650ha	22.8ha	338ha	302	165	36	360	?	?	?	?	?	42	71 (veg)
Average plot size (ha)	2.2	3	0.08 ²	1.2	0.8	0.8	1.6	1.2	?	?	?	0.4	0.4	1.5	N/A
No. of plot holders	143	1200	300	256	423	264	22	296	87	56	168	?	?	14	71
Water reliability (Good, Satisfactory, Poor)	S	S	P	S	S	P	G ³	G	G	G	G	?	?	G	G
Pumped / Gravity	P/G	G	P	P	G	P	P	P	G	G	G	?	?	P	P
Surface / Sprinkler / Drip/Buckets	S	S	S	S	S ⁴	S	Sp	Sp	B	B	B	?	?	Sp	D
Age of scheme (years)	40	41	9	50+	55	49	10	5	3	10	3	?	?	2	2
INSTITUTIONAL															
Management (Farmer / Agency / NGO / Private)	F/A	F/A	F	F/A	A	A	F	A	F/NGO	F/NGO	F/NGO	?	?	F/P	P
Cost recovery (High / Low)	?	?	H	?	?	?	H	L	H	H	H	?	?	H	H
Commercial links (Good/Average/Poor)	A	A	P	P	P	P	P	G	?	?	?	?	?	G	G
Support services (Good, Average, Poor)	G	G	P	P	A	A	A	G	G	G	G	?	?	G	G
Training available (Good / Poor)	G	G	P	P	P	P	G	G	G	G	G?	?	?	G	G
PRODUCTION & INCOME															
Main irrigated crop (summer)	Maize	Maize	Maize	Maize	Maize	Maize	Maize	Cotton	Sugarcane ¹	Tomatoes	?	Maize	Maize	Sugarcane	Veg
Main irrigated crop (winter)	Veg	Veg	Veg	Veg/wheat	Beans	Tom	Veg	Citrus	Sugarcane ¹	?	?	Cabbage	Cabbage	Sugarcane	Veg
Significant rainfed contribution	N	N	N	N	N	N	?	Y	N	Y	Y	N	N	Y	Y
% Cropping intensity (summer)	100%	61%	90%	70%	100	90	84	89	50% ²	?	?	?	?	100% ²	100%
% Cropping intensity (winter)	?	20% ²	?	?	100	80	27	33	50% ²	?	?	?	?	100% ²	100%
Average income from Irrigation (summer)		2,180	1,100	1,600	1,414	2,600	15,171	4,057	427	393	214	900E	1,200E	?	
Average income from Irrigation (winter)	3,532	900	460	1,500	2,557	1,814	3,257	1,700	512	579	206	1,000E	1,500E	?	16,000E
Average income from rainfed production	0	0	0	0	?	?	?	?	1,100	2,357	586	?	?	?	13000E
Average income from other sources	4,750	6,170	2,000	880	?	1,586	1,429	286	467	1,047	950	1,100E	700E	5,125E	10,000E
MARKETING															
Do farmers sell to local markets?	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
Do farmers sell to distant markets?	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
Active marketing groups for irrigation	N	N	N	N	N	Y	Y	?	N ²	N	Y	Y	Y	N	N
Proportion of maize crops sold (RF = Rainfed, GM=Green Mealie)	50%	20%	1%	50%	34%	62%	50%	44%	70% (GM)	>70% (GM)	?	80 (GM)%	60%	20% (RF)	?
Proportion of vegetables sold	60%	>60%	>60%	60%	>80%	>80%	>80%	80%	>60%	>60%	?	90%	100%	60%	100%
Proportion of cash crops sold	NA	NA	NA	100%	>50%	50%	65%	70%	70%	NA	?	?	?	100%	100%
Current use of contracts & GAs (Minimal/Widespread/None)	M	M	N	M	M	W	M	W	N	N	N	M	M	M	W
Processing & packaging (Minimal/Widespread/Some/None)	S	S	S	S	N	N	S	S	M	M	M	N	M	M	N
Grading & cleaning (Minimal/Widespread/Some/None)	M	M	S	S	M	M	M	M	M	M	M	M	S	M	W
Advertising (Minimal/Widespread/ Some / None)	S	S	N	N	N	S	N	N	M	M	M	N	N	N	N
CONSTRAINTS															
Transport (High / Medium / Low / No)	M	M	H	M	H	H	H	H	H	H?	H	M	H	M	N
Water (High / Medium / Low / No)	M	M	H	M	M	M	M	L	L	N	L	?	?	M	N
Market glut (High / Medium / Low / No)	M	L	N	M	M	?	L	L	L	L	L	H	H	N	N
Lack of co-operation between farmers (High / Medium / Low)	L	M	L	M	?	?	L	L	L	L	L?	H	?	?	N
Credit (High / Medium / Low / No)	L	M	M	L	L	L	L	L	L	H	H	M	?	L	N
Cost of inputs (High / Medium / Low / No)	L	L	H	L	H	H	M	H	L	?	?	?	M	?	N
Availability of inputs (High / Medium / Low / No)	L	L	H	L	M	H	L	L	L	L	L	?	?	N	N
Ploughing (High/Medium/Low/None)	H			H	?	?	M	?	NA	N/A	N/A	?	?	?	N
Key constraint (M= Market, T=Transport, W=Water, C=Credit)	M	M	W	MT	?	?	T	?	MT	CT	CT	M	M/T	?	Contract terms

Notes: 1. Sugarcane is grown all year on a third of the land. Tomato is the second crop
2. Average for maize plot = 0.07ha, average for vegetable garden = 0.01
3. Water is limited in the winter
4. Sprinkler being introduced on one section

Table 3 Schemes sorted by plot size

	Plots < 0.5ha						Plots 0.5 - 1.5ha				Plots > 1.5ha				
	Apel (SA)	Garl (ZIM)	Tsviyo (ZIM)	Chendebyu (ZIM)	Mbekweni (SW)	Ntamkupi (SW)	Deure (ZIM)	Tawona (ZIM)	Negomo (ZIM)	Strydakraal (SA)	Thabina (SA)	Dingleydale (SA)	Wenimbi (ZIM)	Lilanda (SW)	Maplotini (SW)
BACKGROUND															
Local population density (High/medium)	H	M	M	M	?	?	?	?	?	H	H	H	?	?	M
Roads and railways (Good/Poor)	P	P	P	P	?	?	G	P	G	G	G	G	G	P	G
Rainfall (mm/annum)	400	?	?	?	800?	800?	4-500	4-500	750-1000	400	700	600	8-900	800?	800?
Frost free (Yes/Nb)	N	N	?	?	?	?	Y	Y	?	N	Y	Y	N	?	?
Access to rainfed land (Yes/No/Some)	N	Y	?	Y	?	?	N	Y	Y	S	N	Y	Y	M	?
INFRASTRUCTURE															
Scheme size (ha)	228ha	?	?	?	?	?	302	165	360	338ha	220ha	1650ha	36	42	71 (veg)
Average plot size (ha)	0.08 ²	?	?	?	0.4	0.4	0.8	0.8	1.2	1.2	2.2	3	1.6	1.5	N/A
No. of plot holders	300	87	56	168	?	?	423	264	296	256	143	1200	22	14	71
Water reliability (Good, Satisfactory, Poor)	P	G	G	G	?	?	S	P	G	S	S	S	G ¹	G	G
Pumped / Gravity	P	G	G	G	?	?	G	P	P	P	P/G	G	P	P	P
Surface / Sprinkler / Drip/Buckets	S	B	B	B	?	?	S ¹	S	Sp	S	S	S	Sp	Sp	D
Age of scheme (years)	9	3	10	3	?	?	55	49	5	50+	40	41	10	2	2
INSTITUTIONAL															
Management (Farmer / Agency / NGO / Private)	F	F/NGO	F/NGO	F/NGO	?	?	A	A	A	FA	F/A	F/A	F	F/P	P
Cost recovery (High / Low)	H	H	H	H	?	?	?	?	L	?	?	?	H	H	H
Commercial links (Good/Average/Poor)	P	?	?	?	?	?	P	P	G	P	A	A	P	G	G
Support services (Good, Average, Poor)	P	G	G	G	?	?	A	A	G	P	G	G	A	G	G
Training available (Good / Poor)	P	G	G	G	?	?	P	P	G	P	G	G	G	G	G
PRODUCTION & INCOME															
Main irrigated crop (summer)	Maize	Sugarcane ¹	Tomatoes	?	Maize	Maize	Maize	Maize	Cotton	Maize	Maize	Maize	Maize	Sugarcane	Veg
Main irrigated crop (winter)	Veg	Sugarcane ¹	?	?	Gibbage	Gibbage	Beans	Tom	Citrus	Veg/wheat	Veg	Veg	Veg	Sugarcane	Veg
Significant rainfed contribution	N	Y	Y	Y	N	N	N	?	N	N	N	N	Y	Y	Y
% Cropping intensity (summer)	90%	50%/2	?	?	?	?	100	90	89	70%	100%	60%	84	100%/2	100%
% Cropping intensity (winter)		50%/2	?	?	?	?	100	80	33	?	?	20%/2	27	100%/2	100%
Average income from irrigation (summer)	1100	427	393	214	900E	1,200E	1,414	2,600	4,057	1,600		2,180	15,171	?	
Average income from irrigation (winter)	460	512	579	206	1,000E	1,500E	2,557	1,814	1,700	1500	3,532	900	3,257	?	16,000E
Average income from rainfed production	0	1,100	2,357	586	?	?	?	?	?	0	0	0	?	?	13,000E
Average income from other sources	2,000	467	1,047	950	1,100E	700E	?	1,586	286	880	4,750	6,170	1,429	5,125E	10,000E
MARKETING															
Do farmers sell to local markets?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
Do farmers sell to distant markets?	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y
Active marketing groups for irrigation	N	N ²	N	Y	Y	Y	N	Y	?	N	N	N	Y	N	N
Proportion of maize crops sold (FF = Rainfed, GV=Green Maize)	1%	70%(GV)	>70%(GV)	?	80%(GV)	60%	34%	62%	44%	50%	50%	20%	50%	20%(FF)	?
Proportion of vegetables sold	>60%	>60%	>60%	?	90%	100%	>80%	>80%	80%	60%	60%	>60%	>80%	60%	100%
Proportion of cash crops sold	NA	70%	NA	?	?	?	>50%	50%	70%	100%	NA	NA	66%	100%	100%
Current use of contracts & GPs (Minimal/Widespread/None)	N	N	N	N	M	M	M	W	W	M	M	M	M	M	W
Processing & packaging (Minimal/Widespread/Some/None)	S	M	M	M	N	M	N	N	S	S	S	S	S	M	N
Grading & cleaning (Minimal/Widespread/Some/None)	S	M	M	M	M	S	M	M	M	S	M	M	M	M	W
Advertising (Minimal/Widespread/Some/None)	N	M	M	M	N	N	N	S	N	N	S	S	N	N	N
CONSTRAINTS															
Transport (High / Medium / Low / Nb)	H	H	HP	H	M	H	H	H	H	M	M	M	H	M	N
Water (High / Medium / Low / Nb)	H	L	N	L	?	?	M	M	L	M	M	M	M	M	N
Market glut (High / Medium / Low / Nb)	N	L	L	L	H	H	M	?	L	M	M	L	L	N	N
Lack of co-operation between farmers (High / Medium / Low)	L	L	L	L	H	?	?	?	L	M	L	M	L	?	N
Credit (High / Medium / Low / Nb)	M	L	H	H	M	?	L	L	L	L	L	M	L	L	N
Cost of inputs (High / Medium / Low / Nb)	H	L	?	?	?	?	M	H	H	L	L	L	M	?	N
Availability of inputs (High / Medium / Low / Nb)	H	L	L	L	?	?	M	H	L	L	L	L	L	N	N
Ploughing (High/Medium/Low/None)		NA	NA	NA	?	?	?	?	?	H	H		M		N
Key constraint (M=Market, T=Transport, VA=Water, C=Credit)	W	MT	CT	CT	M	MT	?	?	?	MT	M	M	T	?	Contract terms

Table 4 Schemes sorted by degree of commercialisation

	Highly commercial				Moderately commercial			Minimally commercial						Unknown	
	Wenimbi (ZIM)	Negomo (ZIM)	Lilanda (SW)	Maplotini (SW)	Thabina (SA)	Dingleydale (SA)	Deure (ZIM)	Tawona (ZIM)	Garf (ZIM)	Tsviyo (ZIM)	Chendebevu (ZIM)	Apel (SA)	Strydkraal (SA)	Mbakelweni (SW)	Ntampakhi (SW)
BACKGROUND															
Local population density (High/med/low)	?	?	?	M	H	H	?	?	M	M	M	H	H	?	?
Roads and railways (Good/Poor)	G	G	P	G	G	G	G	P	P	P	P	P	G	?	?
Rainfall (mm/annum)	8-900	750-1000	?	?	700	600	4-500	4-500	?	?	?	400	400	?	?
Frost free (Yes / No)	N	?	?	?	Y	Y	Y	Y	N	?	?	N	N	?	?
Access to rainfed land (Yes/No/Some)	Y	Y	M	?	N	Y	N	Y	Y	?	Y	N	S	?	?
INFRASTRUCTURE															
Scheme size (ha)	36	360	42	71 (veg)	220ha	1630ha	302	165	?	?	?	22.8ha	338ha	?	?
Average plot size (ha)	1.6	1.2	1.5	NA	2.2ha	3ha	0.8	0.8	?	?	?	0.08ha ²	1.2ha	0.4	0.4
No. of plot holders	22	296	14	71	143	1200	423	264	87	56	168	300	256	?	?
Water reliability (Good, Satisfactory, Poor)	G ³	G	G	G	S	S	S	P	G	G	G	P	S	?	?
Pumped / Gravity	P	P	P	P	P/G	G	G	P	G	G	G	P	P	?	?
Surface / Sprinkler / Drip/Buckets	Sp	Sp	Sp	D	S	S	S ⁴	S	B	B	B	S	S	?	?
Age of scheme (years)	10	5	2	2	40	41	55	49	3	10	3	9	50+	?	?
INSTITUTIONAL															
Management (Farmer / Agency / NGO / Private)	F	A	F/P	P	F/A	F/A	A	A	F/NGO	F/NGO	F/NGO	F	F/A	?	?
Cost recovery (High / Low)	H	L	H	H	?	?	?	?	H	H	H	H	?	?	?
Commercial links (Good/Average/Poor)	P	G	G	G	A	A	P	P	?	?	?	P	P	?	?
Support services (Good, Average, Poor)	A	G	G	G	G	G	A	A	G	G	G	P	P	?	?
Training available (Good / Poor)	G	G	G	G	G	G	P	P	G	G	G?	P	P	?	?
PRODUCTION & INCOME															
Main irrigated crop (summer)	Maize	Cotton	Sugarcane	Veg	Maize	Maize	Maize	Maize	Sugarcane ¹	Tomatoes	?	Maize	Maize	Maize	Maize
Main irrigated crop (winter)	Veg	Citrus	Sugarcane	Veg	Veg	Veg	Bears	Tom	Sugarcane ¹	?	?	Veg	Veg/wheat	Cabbage	Cabbage
Significant rainfed contribution	Y	N	Y	Y	N	N	N	?	Y	Y	Y	N	N	N	N
% Cropping intensity (summer)	84	89	100% ²	100%	100%	61%	100	90	50% ²	?	?	90%	70%	?	?
% Cropping intensity (winter)	27	33	100% ²	100%	?	20% ²	100	80	50% ²	?	?	?	?	?	?
Average income from irrigation (summer)	15,171	4,057	?	?	2,180	1,414	2,600	427	393	214	1,100	1,600	900E	1,200E	?
Average income from irrigation (winter)	3,257	1,700	?	16,000E	3,532	900	2,557	1,814	512	579	206	460	1,500	1,000E	1,500E
Average income from rainfed production	?	?	?	13000E	0	0	?	?	1,100	2,357	586	0	0	?	?
Average income from other sources	1,429	286	5,125E	10,000E	4,750	6,170	?	1,586	467	1,047	950	2,000	880	1,100E	700E
MARKETING															
Do farmers sell to local markets?	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Do farmers sell to distant markets?	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y
Active marketing groups for irrigation	Y	?	N	N	N	N	N	Y	N?	N	Y	N	N	Y	Y
Proportion of maize crops sold (RF = Rainfed, GM=Green Medley)	50%	44%	20%(RF)	?	50%	20%	34%	62%	70%(GM)	>70%(GM)	?	1%	50%	80 (GM)%	60%
Proportion of vegetables sold	>80%	80%	60%	100%	60%	>60%	>80%	>80%	>60%	>60%	?	>60%	60%	90%	100%
Proportion of cash crops sold	65%	70%	100%	100%	NA	NA	>50%	50%	70%	NA	?	NA	100%	?	?
Current use of contracts & GAs (Minimal/Widespread/None)	M	W	M	W	M	M	M	W	N	N	N	N	M	M	M
Processing & packaging (Minimal/Widespread/Some/None)	S	S	M	N	S	S	N	N	M	M	M	S	S	N	M
Grading & cleaning (Minimal/Widespread/Some/None)	M	M	M	W	M	M	M	M	M	M	M	S	S	M	S
Advertising (Minimal/Widespread/ Some / None)	N	N	N	N	S	S	N	S	M	M	M	N	N	N	N
CONSTRAINTS															
Transport (High / Medium / Low / No)	H	H	M	N	M	M	H	H	H	H?	H	H	M	M	H
Water (High / Medium / Low / No)	M	L	M	N	M	M	M	M	L	N	L	H	M	?	?
Market glut (High / Medium / Low / No)	L	L	N	N	M	L	M	?	L	L	L	N	M	H	H
Lack of co-operation between farmers (High / Medium / Low)	L	L	?	N	L	M	?	?	L	L	L?	L	M	H	?
Credit (High / Medium / Low / No)	L	L	L	N	L	M	L	L	L	H	H	M	L	M	?
Cost of inputs (High / Medium / Low / No)	M	H	?	N	L	L	H	H	L	?	?	H	L	?	M
Availability of inputs (High / Medium / Low / No)	L	L	N	N	L	L	M	H	L	L	L	H	L	?	?
Ploughing (High/Medium/Low/None)	M	?	?	N	H	?	?	?	NA	N/A	N/A	?	H	?	?
Key constraint (M=Market, T=Transport, W=Water, C=Credit)	T	?	?	Contract terms	M	M	?	?	M/T	C/T	C/T	W	M/T	M	M/T

Table 5 Schemes sorted by key constraint

	Water		Credit/ Marketing		Marketing						Contract terms	Unidentified			
	Apel (SA)	Tsviyo (ZIM)	Chendebvu (ZIM)	Wenimbi (ZIM)	Strydakraal (SA)	Gari (ZIM)	Ntamkupti (SW)	Mbekelweni (SW)	Thabina (SA)	Dingleydale (SA)	Maplotini (SW)	Lilanda (SW)	Negomo (ZIM)	Deure (ZIM)	Tawona (ZIM)
BACKGROUND															
Local population density (High/med/low)	H	M	M	?	H	M	?	?	H	H	M	?	?	?	?
Roads and railways (Good/Poor)	P	P	P	G	G	P	?	?	G	G	G	P	G	G	P
Rainfall (mm/annum)	400	?	?	8-900	400	?	800?	80?	700	600	800?	800?	750-1000	4-500	4-500
Frost free (Yes/No)	N	?	?	N	N	N	?	?	Y	Y	?	?	?	Y	Y
Access to rainfed land (Yes/No/Some)	N	?	Y	Y	S	Y	?	?	N	Y	?	M	Y	N	Y
INFRASTRUCTURE															
Scheme size (ha)	22.8ha	?	?	36	338ha	?	?	?	220ha	160ha	71 (veg)	42	360	302	165
Average plot size (ha)	0.08ha ²	?	?	1.6	1.2ha	?	0.4	0.4	2.2ha	3ha	N/A	1.5	1.2	0.8	0.8
No. of plot holders	300	56	168	22	256	87	?	?	143	1200	71	14	296	423	264
Water reliability (Good, Satisfactory, Poor)	P	G	G	G	S	G	?	?	S	S	G	G	G	S	P
Pumped/ Gravity	P	G	G	P	P	G	?	?	PG	G	P	P	P	G	P
Surface/ Sprinkler/ Drip/Buckets	S	B	B	Sp	S	B	?	?	S	S	D	Sp	Sp	S ⁴	S
Age of scheme (years)	9	10	3	10	50+	3	?	?	40	41	2	2	5	55	49
INSTITUTIONAL															
Management (Farmer/ Agency/ NGO/ Private)	F	FNCO	FNCO	F	FA	FNCO	?	?	FA	FA	P	F/P	A	A	A
Cost recovery (High/ Low)	H	H	H	H	?	H	?	?	?	?	H	H	L	?	?
Commercial links (Good/Average/Poor)	P	?	?	P	P	?	?	?	A	A	G	G	G	P	P
Support services (Good, Average, Poor)	P	G	G	A	P	G	?	?	G	G	G	G	G	A	A
Training available (Good/ Poor)	P	G	G	G	P	G	?	?	G	G	G	G	G	P	P
PRODUCTION & INCOME															
Main irrigated crop (summer)	Maize	Tomatoes	?	Maize	Maize	Sugarcane ¹	Maize	Maize	Maize	Maize	Veg	Sugarcane	Cotton	Maize	Maize
Main irrigated crop (winter)	Veg	?	?	Veg	veg/whs	Sugarcane ¹	Cabbage	Cabbage	Veg	Veg	Veg	Sugarcane	Citrus	Beans	Tom
Significant rainfall contribution	N	Y	Y	Y	N	Y	N	N	N	N	Y	Y	N	N	?
% Cropping intensity (summer)	90%	?	?	84	70%	50% ²	?	?	100%	61%	100%	100% ²	89	100	90
% Cropping intensity (winter)	?	?	?	27	?	50% ²	?	?	?	20% ²	100%	100% ²	33	100	80
Average income from irrigation (summer)	1100	393	214	15,171	1,600	427	1,200E	900E		2,180		?	4,057	1,414	2,600
Average income from irrigation (winter)	460	579	206	3,257	1,500	512	1,500E	1,000E	3,532	900	16,000E	?	1,700	2,557	1,814
Average income from rainfed production	0	2,357	586	?	0	1,100	?	?	0	0	13,000E	?	?	?	?
Average income from other sources	2,000	1,047	950	1,429	880	467	700E	1,100E	4,750	6,170	10,000E	5,125E	286	?	1,586
MARKETING															
Do farmers sell to local markets?	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Do farmers sell to distant markets?	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
Active marketing groups for irrigation	N	N	Y	Y	N	N ²	Y	Y	N	N	N	N	?	N	Y
Proportion of maize crops sold (FF = Rainfed, GV = Green Mealie)	1%	>70% (GM)	?	50%	50%	70% (GM)	60%	80 (GM) %	50%	20%	?	20% (RF)	44%	34%	62%
Proportion of vegetables sold	>60%	>60%	?	>80%	60%	>60%	100%	90%	60%	>60%	100%	60%	80%	>80%	>80%
Proportion of cash crops sold	NA	NA	?	68%	100%	70%	?	?	NA	NA	100%	100%	70%	>50%	50%
Current use of contracts & GPs (Minimal/Widespread/None)	N	N	N	M	M	N	M	M	M	M	W	M	W	M	W
Processing & packaging (Minimal/Widespread/Some/None)	S	M	M	S	S	M	M	N	S	S	N	M	S	N	N
Grading & cleaning (Minimal/Widespread/Some/None)	S	M	M	M	S	M	S	M	M	M	W	M	M	M	M
Advertising (Minimal/Widespread/ Some/ None)	N	M	M	N	N	M	N	N	S	S	N	N	N	N	S
CONSTRAINTS															
Transport (High/ Medium/ Low/ No)	H	HP	H	H	M	H	H	M	M	M	N	M	H	H	H
Water (High/ Medium/ Low/ No)	H	N	L	M	M	L	?	?	M	M	N	M	L	M	M
Market glut (High/ Medium/ Low/ No)	N	L	L	L	M	L	H	H	M	L	N	N	L	M	?
Lack of co-operation between farmers (High/ Medium/ Low)	L	L	L ²	L	M	L	?	H	L	M	N	?	L	?	?
Credit (High/ Medium/ Low/ No)	M	H	H	L	L	L	?	M	L	M	N	L	L	L	L
Cost of inputs (High/ Medium/ Low/ No)	H	?	?	M	L	L	M	?	L	L	N	?	H	H	H
Availability of inputs (High/ Medium/ Low/ No)	H	L	L	L	L	L	?	?	L	L	N	N	L	M	H
Ploughing (High/Medium/Low/None)		NA	NA	M	H	NA	?	?	H		N		?	?	?
Key constraint (M=Market, T=Transport, W=Water, C=Credit)	W	CM	CM	M	M	M	M	M	M	M	Contract terms	?	?	?	?

Table 6 Schemes sorted by management type

	Farmer					Farmer/NGO				Farmer/Agency Farmer/Private				Agency				Private		(Ukrovi)	
	Apel (SA)	Wenimbi (ZIM)	Tsviyo (ZIM)	Cherebvu (ZIM)	Gari (ZIM)	Thabina (SA)	Dingleydale (SA)	Strydkraal (SA)	Llanda (SW)	Deure (ZIM)	Tawona (ZIM)	Negomo (ZIM)	Maplotini (SW)	Mbekelweni (SW)	Ntamkuphi (SW)						
BACKGROUND																					
Local population density (High/med/low)	H	?	M	M	M	H	H	H	?	?	?	?	M	?	?						
Roads and railways (Good/Poor)	P	G	P	P	P	G	G	G	P	G	P	G	G	?	?						
Rainfall (mm/annum)	400	8-900	?	?	?	70	60	40	80?	450	450	70-100	80?	80?	80?						
Frost free (Yes / No)	N	N	?	?	N	Y	Y	N	?	Y	Y	?	?	?	?						
Access to rainfed land (Yes/No/Some)	N	Y	?	Y	Y	N	Y	S	M	N	Y	Y	?	?	?						
INFRASTRUCTURE																					
Scheme size (ha)	22.8ha	36	?	?	?	21ha	168ha	338ha	42	312	165	30	71(veg)	?	?						
Average plot size (ha)	0.08 ²	1.6	?	?	?	22	3	12	15	08	08	12	NA	04	04						
No. of plot holders	300	22	56	168	87	143	120	28	14	423	264	26	71	?	?						
Water reliability (Good, Satisfactory, Poor)	P	G ³	G	G	G	S	S	S	G	S	P	G	G	?	?						
Pumped / Gravity	P	P	G	G	G	PG	G	P	P	G	P	P	P	?	?						
Surface / Sprinkler / Drip/Buckets	S	Sp	B	B	B	S	S	S	Sp	S	S	Sp	D	?	?						
Age of scheme (years)	9	10	10	3	3	40	41	50+	2	55	49	5	2	?	?						
INSTITUTIONAL																					
Management (Farmer / Agency / NGO / Private)	F	F	F/NGO	F/NGO	F/NGO	FA	FA	FA	BP	A	A	A	P	?	?						
Cost recovery (High / Low)	H	H	H	H	H	?	?	?	H	?	?	L	H	?	?						
Commercial links (Good/Average/Poor)	P	P	?	?	?	A	A	P	G	P	P	G	G	?	?						
Support services (Good, Average, Poor)	P	A	G	G	G	G	G	P	G	A	A	G	G	?	?						
Training available (Good / Poor)	P	G	G	G?	G	G	G	P	G	P	P	G	G	?	?						
PRODUCTION & INCOME																					
Main irrigated crop (summer)	Maize	Maize	Tomatoes	?	Sugarcane ¹	Maize	Maize	Maize	Sugarcane	Maize	Maize	Cotton	Veg	Maize	Maize						
Main irrigated crop (winter)	Veg	Veg	?	?	Sugarcane ¹	Veg	Veg	Veg/Whet	Sugarcane	Bans	Tom	Gins	Veg	Githge	Githge						
Significant rainfed contribution	N	Y	Y	Y	Y	N	N	N	Y	N	?	N	Y	N	N						
% Cropping intensity (summer)	90%	84	?	?	50%?	100%	60%	70%	100%?	100	90	89	100%	?	?						
% Cropping intensity (winter)		27	?	?	50%?	?	20%	?	100%?	100	80	33	100%	?	?						
Average income from Irrigation (summer)	1,100	15,171	393	214	427		280	1,600	?	1,444	2,600	4,057		90E	1,20E						
Average income from Irrigation (winter)	460	3,257	579	206	512	3,532	900	1,500	?	2,557	1,814	1,700	16,00E	1,00E	1,50E						
Average income from rainfed production	0	?	2,357	586	1,100	0	0	0	?	?	?	?	1300E	?	?						
Average income from other sources	2,000	1,429	1,047	950	467	4,780	6,170	880	5,12E	?	1,586	286	1000E	1,10E	70E						
MARKETING																					
Do farmers sell to local markets?	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y						
Do farmers sell to distant markets?	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y						
Active marketing groups for irrigation	N	Y	N	Y	N?	N	N	N	N	N	Y	?	N	Y	Y						
Proportion of maize crops sold (RF = Rainfed, GM=Green Mealie)	1%	50%	>70%(GM)	?	70%(GM)	50%	20%	50%	20%(RF)	34%	62%	44%	?	80(GM)?	60%						
Proportion of vegetables sold	>60%	>80%	>60%	?	>60%	60%	>60%	60%	60%	>80%	>80%	80%	100%	90%	100%						
Proportion of cash crops sold	NA	65%	NA	?	70%	NA	NA	100%	100%	>80%	50%	70%	100%	?	?						
Current use of contracts & GAs (Minimal/Widespread/None)	N	M	N	N	N	M	M	M	M	M	W	W	W	M	M						
Processing & packaging (Minimal/Widespread/Some/None)	S	S	M	M	M	S	S	S	M	N	N	S	N	N	M						
Grading & cleaning (Minimal/Widespread/Some/None)	S	M	M	M	M	M	M	S	M	M	M	M	W	M	S						
Advertising (Minimal/Widespread/ Some / None)	N	N	M	M	M	S	S	N	N	N	S	N	N	N	N						
CONSTRAINTS																					
Transport (High / Medium / Low / No)	H	H	H?	H	H	M	M	M	M	H	H	H	N	M	H						
Water (High / Medium / Low / No)	H	M	N	L	L	M	M	M	M	M	M	L	N	?	?						
Market glut (High / Medium / Low / No)	N	L	L	L	L	M	L	M	N	M	?	L	N	H	H						
Lack of co-operation between farmers (High / Medium / Low)	L	L	L	L?	L	L	M	M	?	?	?	L	N	H	?						
Credit (High / Medium / Low / No)	M	L	H	H	L	L	M	L	L	L	L	L	N	M	?						
Cost of inputs (High / Medium / Low / No)	H	M	?	?	L	L	L	L	?	H	H	H	N	?	M						
Availability of inputs (High / Medium / Low / No)	H	L	L	L	L	L	L	L	N	M	H	L	N	?	?						
Ploughing (High/Medium/Low/None)		M	N/A	N/A	NA	H		H		?	?	?	N	?	?						
Key constraint (M= Market, T=Transport, W=Water, C=Credit)	W	T	C/T	C/T	M/T	M	M	MT	?	?	?	?	Contract terms	M	MT						

3.2.1 Table 2– Country

15 schemes sorted by country: South Africa (Thabina, Dingleydale, Apel and Strydkraal), Zimbabwe (Deure, Tawona, Wenimbi, Negomo, Gari, Tsviyo and Chendebvu) and Swaziland (Mbekelweni, Ntamkuphi, Lilanda and Maplotini). The main points which can be seen are that:

- Annual rainfall varies between and also within countries. Two of the SA schemes (Apel and Strydkraal) have a low annual rainfall (400mm), and none of the SA schemes have an average rainfall greater than 700mm. The schemes in Swaziland all receive an average of 800mm, whereas in Zimbabwe where there is a greater number of study schemes covering a wider area, average rainfall is more variable, with a range of 400–1000mm.
- Where data are available, water delivery appears to be more reliable in the Zimbabwean schemes than in the South African study schemes.
- There is no significant rain-fed contribution in the South African schemes, whereas several of the schemes in Zimbabwe and Swaziland have access to rainfed plots, which contributes to farmers' annual income and food security.
- In the four South African schemes, no marketing groups were reported for irrigation, whereas such groups do exist on some schemes in Zimbabwe and Swaziland.

3.2.2 Table 3 – Plot size

15 schemes sorted by average irrigated plot size (using data from the survey). Three categories were used: average plot size less than 0.5ha (Apel, Gari, Tsviyo, Chendebvu, Mbekelweni, and Ntamkuphi), average plot size between 0.5 and 1.5ha (Deure, Tawona, Negomo, Strydkraal) and average plot size greater than 1.5ha (Thabina, Dingleydale, Wenimbi, Lilanda and Maplotini). The main points that can be seen are that:

- There appears to be a relationship between plot size and road access, whereby the schemes with small plots (<0.5ha) tend to have poor access to roads. This may arise from the fact that farmers with small plots tend to be mainly subsistence farmers, often based on schemes or small gardens developed by NGOs with the main aim of increasing food security in remote areas. Transport in these schemes may not be seen as a high constraint until farmers begin producing a surplus for marketing.
- Transport is not seen as a high constraint for most schemes with an average plot size greater than 1.5ha. This may be because farmers with more land (and therefore able to produce more) could have more 'pulling power' with which to encourage buyers to collect from the scheme. Alternatively, they could have more money with which to pay for transport. Large schemes also tend to have better road access than the smaller schemes with small average plot size.

3.2.3 Table 4 – Commercial activity

15 schemes sorted by commercialisation categories: highly commercial (Wenimbi, Negomo, Lilanda, Maplotini), moderately commercial (Thabina, Dingleydale and Deure) and minimally commercial (Tawona, Gari, Tsviyo, Chendebvu, Apel and Strydkraal). For Mbekelweni and Ntamkuphi insufficient information meant that they couldn't be included in the classification. From Table 4 it can be seen that most of the highly commercial schemes:

- have similar size plots (1.2 – 1.6ha);
- have good water reliability;
- have good access to roads and transport is not a high constraint;
- are all pumped, with water delivery by sprinkler or drip;
- have all been developed in the last 10 years (probably with farmer input & participation);
- have good cost recovery;
- have good support services and training available;
- don't appear to have problems with market glut, credit, obtaining inputs or lack of co-operation amongst farmers;
- are in Zimbabwe and Swaziland.

The moderately commercialised schemes:

- all have good road access;
- are all large schemes (220 – 1650ha) with large numbers of plot holders;
- are all over 40 years old.

The schemes with minimal commercialisation:

- all have poor road access and see transport as a high constraint;
- vary in time established between 3 and 50 years;
- have small plot sizes (less than 0.08 ha) with the exception of Tawona and Strydkraal;
- are mainly farmer managed (with assistance from NGOs/Agency).

Many of the younger schemes have been developed with commercial activity in mind (e.g. Wenimbi and Negomo), and are now seen as highly commercial. The older schemes which were developed for subsistence purposes initially (e.g. Thabina and Dingleydale) are now undertaking some commercial activity and take advantage of their good road access. On the other hand, the small garden schemes (e.g. , Gari, Tsviyo and Chendebvu and Apel), also developed initially to increase food security and eradicate poverty, are now undertaking some commercial activity but tend to suffer from poor road access.

The fact that none of the South African schemes fall into the category of highly commercial, could possibly be explained by the fact that all these schemes are reliant on irrigated agriculture with no significant contribution from rainfed agriculture (in terms of both food and income). This may result in household food requirements having to be met from irrigated produce, before any marketing of surplus produce can take place.

Although the survey has shown that pumped schemes can be commercially successful and meet the needs and costs of maintenance, pumping alone is no guarantee of success. However, it is apparent, that if a scheme is commercially successful it is more likely to be able to sustain the operation & maintenance costs associated with pumping.

3.2.4 Table 5 – Key constraint

The 15 schemes were divided into categories according to the research team's subjective assessment of the main constraints identified in the survey. Marketing and transport constraints reported by farmer respondents were merged together into the category "marketing" on the basis that where transport was highlighted as a constraint it was generally linked with market access. The main points apparent in Table 5 are that:

- Marketing is seen to be the key constraint in many of the schemes across all countries, plot sizes and levels of commercialisation.
- Although other constraints such as water and access to credit do exist they are only occasionally regarded as the key constraint.

3.2.5 Table 6 – Scheme Management

In Table 6, the 15 schemes were divided into four groups, namely: farmer managed (Apel and Wenimbi), farmer managed with assistance from NGOs (Gari, Tsviyo, Chendebvu) farmer managed with assistance from agencies or private companies (Thabina, Dingleydale, Strydkraal and Lilanda), management undertaken by agency or private company (Deure, Tawona, Negomo and Maplotini). The Management arrangements for Mbekelweni and Ntamkuphi were again unknown due to a lack of information. The main points from Table 6 are that:

- The NGO assisted schemes tend to have poor road access
- The schemes assisted and managed by agencies or private companies are mostly situated with good road access
- Cost recovery appears to be high on the farmer managed and NGO assisted schemes
- Lack of co-operation between farmers is not a constraint on farmer managed and NGO assisted schemes

Similar explanations as to those given for the plot size table can be used to explain these issues. For example, the NGO assisted schemes have often been developed for poverty eradication and food security purposes in rural areas where roads are poor, but because of the small size, farmers will probably be more co-operative.

3.2.6 Trends in numeric data

Some of the numeric data from the summary tables were presented in graphical form and used to prompt discussion. That data and the discussion that followed are set out here. It should be noted that some data sets are poor or incomplete and the picture presented is only a first indication of scheme performance at any of the sites. The discussion illustrates what might be learned by looking at data.

a) Record keeping by farmers

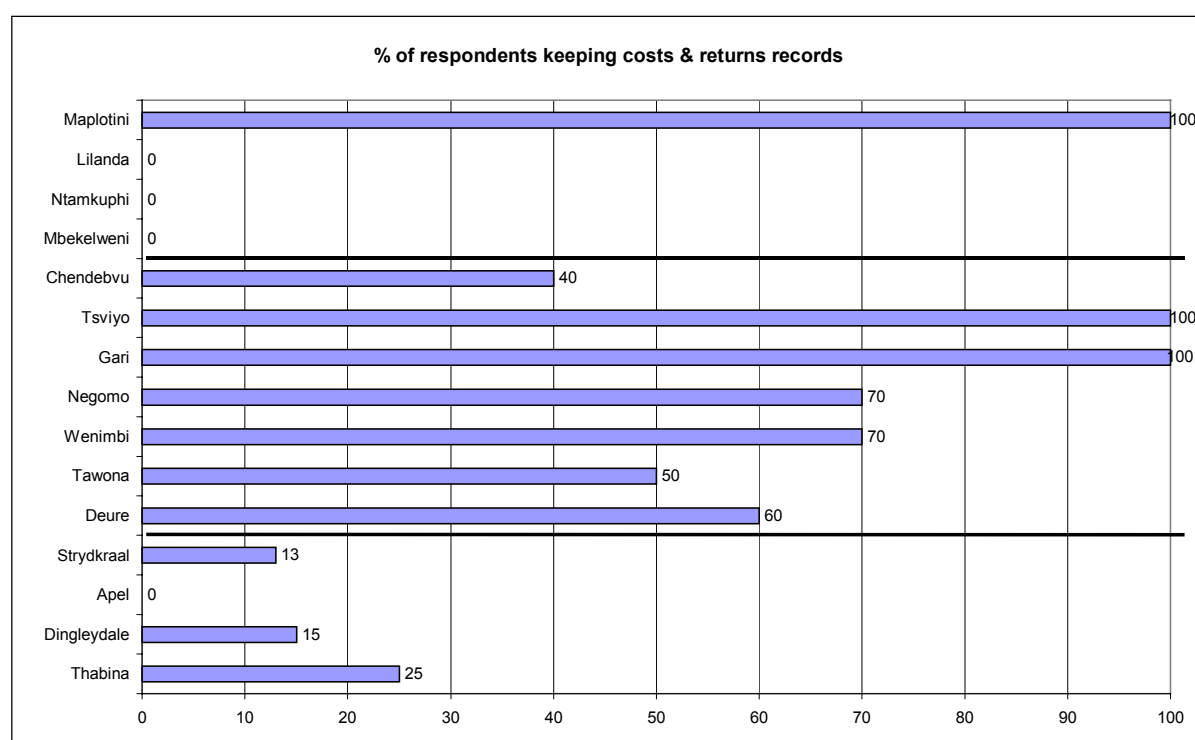


Figure 1 Percentage of respondents keeping records of costs and returns

Figure 1 shows a generally a higher level of record keeping amongst farmers in Zimbabwe than in South Africa or Swaziland. It is also true that levels of record keeping are higher in those schemes considered to be more highly commercially orientated. However, the keeping of records does not automatically indicate strong commercial orientation. Tsviyo and Gari are both small, communal garden schemes in Zimbabwe with the primary objective of improved household nutrition. Only small quantities of produce are sold, mainly into the local market. Their very high level of record keeping – apparently 100% – is a consequence of the training and support given by the NGO CARE. It is not clear whether the farmers on these schemes used their records in plot management and decision making. The general trend towards higher levels of record keeping in Zimbabwe was attributed to training and encouragement given over a long period by the extension service, AGRITEX.

b) Average household incomes

Figure 2 shows *average* declared incomes from irrigated summer and winter cropping, rainfed cropping and other, non-farm, activities. Data from Zimbabwe were converted to Rand at an exchange rate of 7 Zim\$ to the Rand.

The accuracy of the data did not justify conversion to a unit area basis as data on plot sizes were not always available. Despite this limitation, and the concern that averages conceal wide variations between individuals on a scheme, Figure 2 raises the following valuable points:

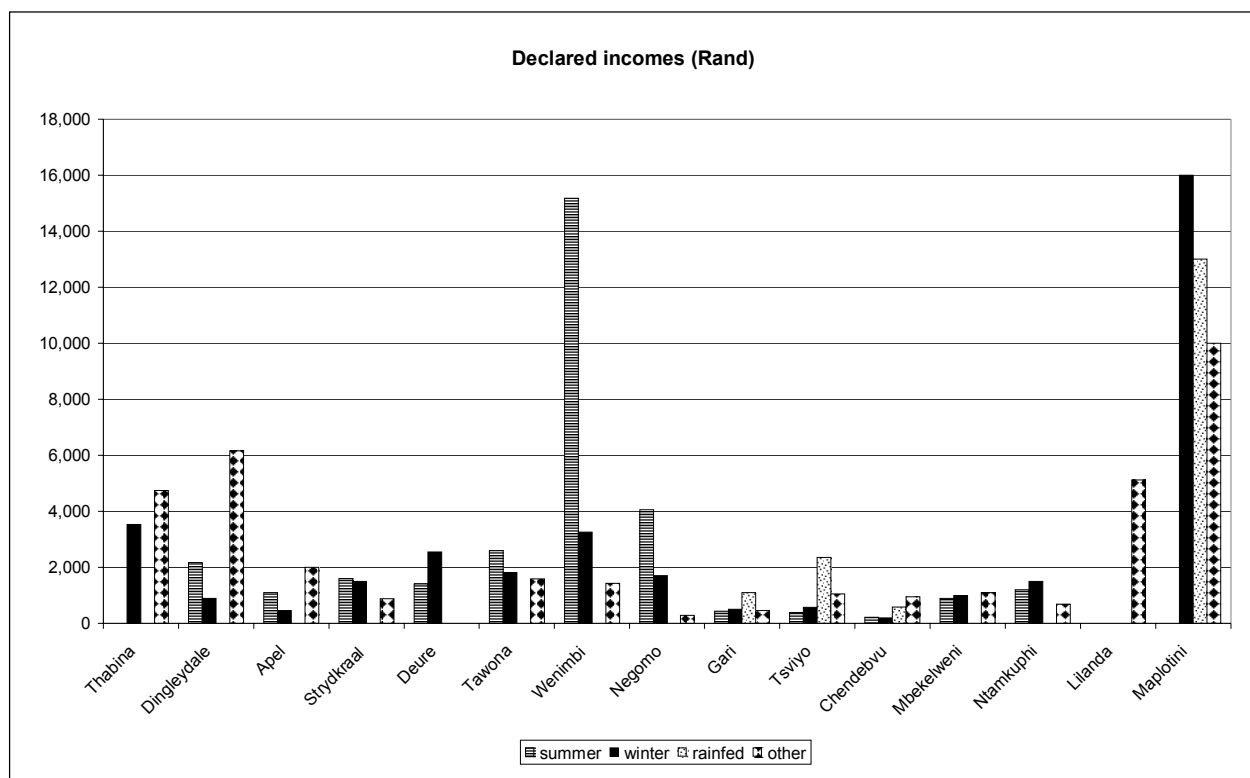


Figure 2 Average household incomes amongst respondents

i) Non-agricultural income

In South Africa, Thabina and Dingleydale, report higher average incomes from non-farming activities than from irrigated production. This is mainly a consequence of respondents receiving state pensions.

ii) High irrigated income

Wenimbi and Maplotini stand out as two schemes with much higher incomes from irrigated production than any of the other 13. Wenimbi sees greatest income in the summer, Maplotini in the winter. If income is seen as an indicator of commercialisation or commercial “success” then these schemes merit further review to identify the causes of such performance.

The “success” of Maplotini depends entirely on the capital backing of an external entrepreneur funding the provision of irrigation infrastructure, management expertise, transport to market and produce marketing. Discussion revealed that since the survey was carried out the entrepreneur had withdrawn his support and the scheme is now abandoned.

The “success” of Wenimbi appears to be more sustainable. It is a small scheme with only 22 households. It was built recently with the effective participation of the end users throughout the design and construction phases and the farmers appear to have taken the active decision to give greater attention to the growing of high value, commercial vegetable crops as Figure 3 illustrates.

c) Summer and winter irrigated cropping

Figures 3 and 4 show the average allocation of irrigated land to grain maize, vegetable crops and cash crops in winter and summer seasons reported for 4 schemes in Zimbabwe. Cash crops include wheat, cotton, groundnuts and beans. In the summer season (Figure 3) average cropping intensity ranges from 99% (Deure) to 78% (Negomo). Tawona and Deure represent “traditional” schemes where more than 70% of summer irrigation is devoted to grain maize. By contrast, Wenimbi farmers use only about 30% of their plot for grain maize and give 50% of their land over to vegetables. Negomo farmers, like those at Wenimbi, give only a small percentage of their land to grain maize but despite their focus on vegetables and cash crops their summer irrigated cash income is little more than a quarter that seen in Wenimbi.

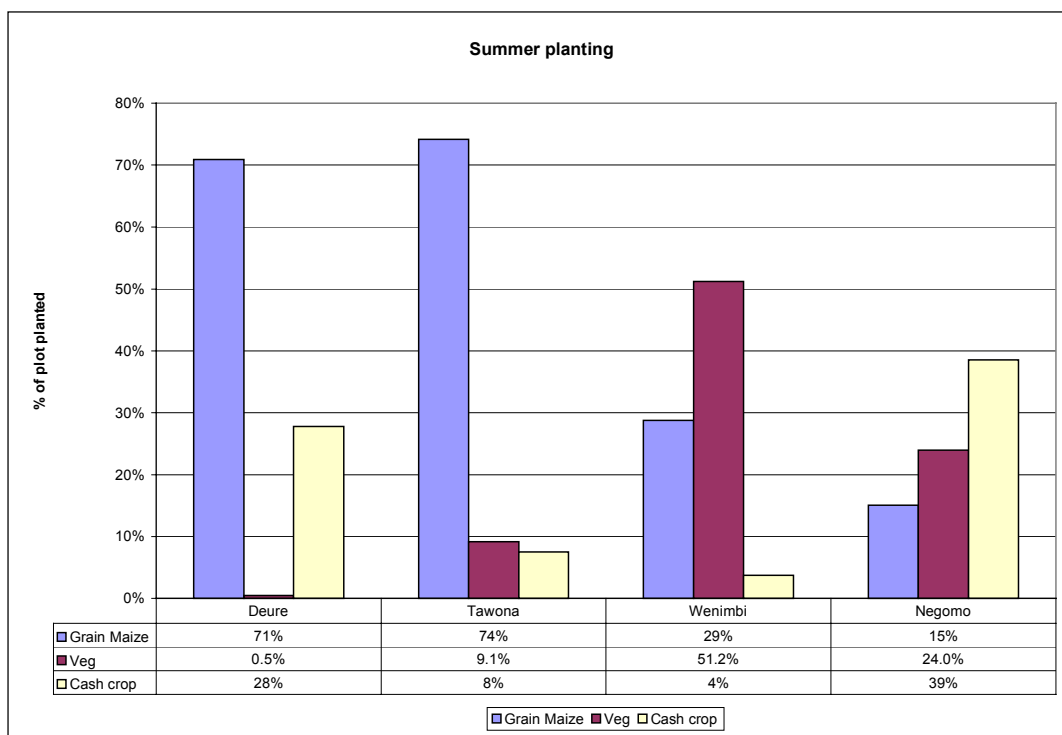


Figure 3 Average summer cropping patterns on 4 Zimbabwe schemes

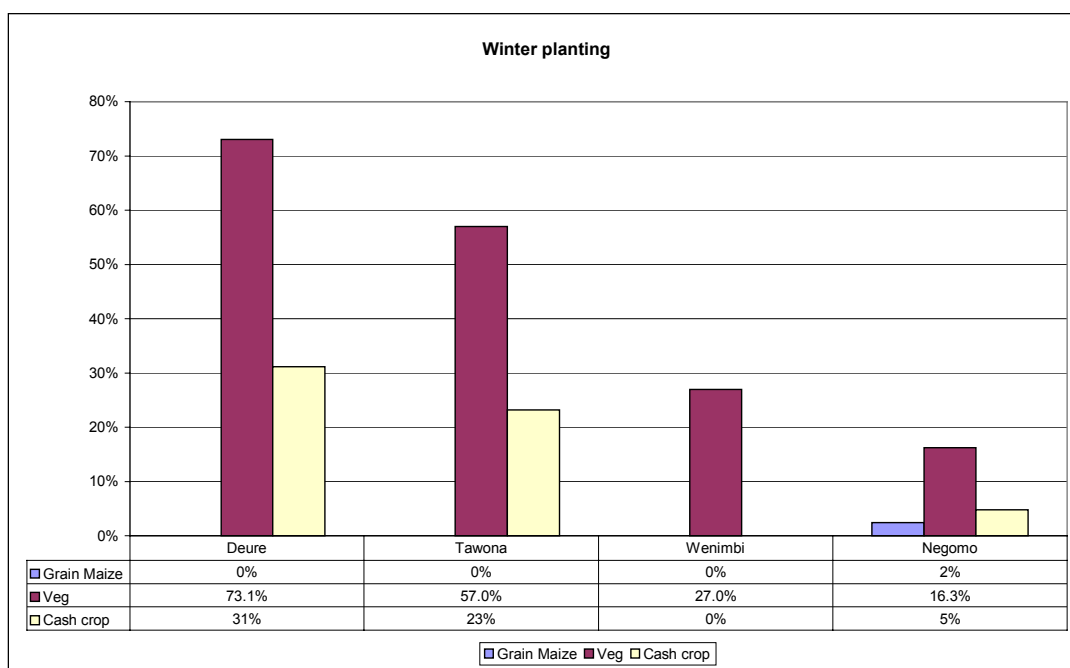


Figure 4 Average winter cropping patterns on 4 Zimbabwe schemes

In the winter season, farmers in all 4 schemes give the greatest part of their plots to vegetables. In Deure and Tawona cropping intensities lie at 100% and 80% respectively but in Wenimbi and Negomo, where winter temperatures are lower and there is a risk of frost, land use is much less intensive in the winter.

d) Discussion

It was questioned whether the high income recorded for Wenimbi was a consequence of their reliance on a pumped supply – are they compelled to make high incomes in order to pay the pump costs? This seemed unlikely as there are several other schemes also facing high costs for the operation of pumps but their incomes are not similar.

It was pointed out that both Wenimbi and Negomo have some of the largest average plot sizes of the schemes studied. Thus farmers could “afford” to allocate a smaller fraction of their plot to grain maize but still secure an adequate supply for their household. It was also pointed out that due to the high summertime temperatures at Deure and Tawona, farmers there might encounter problems not experienced at Wenimbi and Negomo if they sought to grow many types of vegetables. Such problems would be associated with peak daytime temperatures as well as a possible increased incidence of disease.

3.3 Overall Impressions

The overall picture as illustrated by the five tables and numeric data is very complex. The tables, graphs and accompanying notes simply illustrate the potential for monitoring how schemes perform through assembling information and identifying patterns. It is not possible to claim any clear correlation between one factor and commercial success. However, it is clear that all schemes are to some extent dependant on Government, Donor or NGO assistance.

In conclusion, a summary of the researchers’ ‘impressions’ was presented. They were identified as impressions, because, although they draw on the survey and interview data, it is recognised that these data are imperfect. It is important to note that no ‘impressions’ apply to all schemes all of the time.

1. Generally, results and benefits on smallholder irrigation schemes are less than anticipated. The availability and control of the primary resource, water, has not resulted in widespread increases in secure, sustainable production and reliable incomes capable of covering the capital and the operational

and maintenance costs of irrigation infrastructure. There are, however, examples of commercial success both at scheme level and at individual farm level for some schemes. These examples tend to be in newer, younger, schemes that have been designed to provide for commercial production and in which the farmer stakeholders have been involved from the beginning in assessment of viability, scheme design and management.

2. Most smallholder irrigators produce one or more subsistence crops from their irrigated land. This traditional approach to farming provides for food security but does not directly generate cash income to pay for the costs of irrigated production. Scheme design and management (and support agencies) needs to account for farmer objectives and resource relationships between subsistence and cash incomes, when seeking a framework to promote business orientated, commercial farming.
3. There are poor links to the commercial market at all levels - wholesale, retail, or directly with consumers. Links and interactions with the market place tend to be ad hoc and based on chance rather than organised interventions. Most farmers market as individuals in both transporting and selling products. There is little evidence of collective activity in negotiating with transport owners and buyers to achieve economies of scale or to achieve greater influence in the market place. A few farmers, as individuals, have contracts with buyers but many of these report negative experiences associated with reliability and worth of the contracts. These experiences may result from poor knowledge and skills on the part of the farmers and/or from weak systems and structures for enforcing contractual agreements.
4. In some schemes, members have been involved from the beginning in scheme design and identification and operation of irrigation technologies. In many others members cope with 'inherited' irrigation technology and scheme design. Farmer involvement tends to be greater in newer schemes and, there is some evidence above, that these are more successful. The previous experience of schemes in an 'inherited' situation was to be subject to, and separate from, some form of central management control. Only relatively recently have the scheme members become involved in making decisions on managing the schemes. These farmers are now confronting new experiences and new risks as they begin to create structures to take over responsibility for management and for securing the financial viability of schemes that provide the main resource of their livelihoods, but for which they may have little sense of 'ownership'.

On many schemes there appear to be poor frameworks for scheme level decision making, a poor sense of identity or ownership of the scheme, resulting in unclear objectives. This impression is largely based on observation of schemes in South Africa. Without overall objectives or goals that represent the present needs and future aspirations of members for the scheme there is no central reference point for strategic planning. This is not to suggest that irrigation schemes by definition should be run and managed as completely collective enterprises in terms of production and marketing. However, all schemes need objectives and strategies that provide a framework for managing the shared water and land resource, even if these aim to provide opportunities for maximising individual members' production and marketing choices.

4. SCHEME OBJECTIVES – WORKING GROUPS AND SUMMARY

4.1 Discussion paper: Scheme objectives and how they are agreed

Without an objective it is very difficult to prioritise actions. The aim of this paper is to look at the objectives of irrigation scheme members and their committees and promote discussion of who should be involved in adopting objectives and how they should be arrived at.

The majority of farmers on most of the schemes has limited resources and generate low incomes from irrigation. Relatively remote locations mainly on areas of low potential, along with weak consumer demand, further exacerbate low-income generation. Typically these areas lack infrastructure and are poorly served with transport, making transaction costs high and distant marketing arrangements unreliable.

Several of the problems faced in these circumstances are beyond farmer control; others might be alleviated by collective or communal action. In order to determine what form communal action might take, people have to ***reach a consensus about what they want to get out of the irrigation scheme***. In turn that leads to questions about how you find a collective objective or a range of objectives that meets the needs of the members.

It seldom is obvious that common objectives are consistently pursued. In reviewing the schemes in this study it is not clear how many farmer committees formally, or even informally, adopted targets, nor if such an approach was considered and rejected.

Neither is it clear if the business objectives of the membership are clearly reflected in management decisions relating to operation and maintenance. Management appears to be reactive dealing with crises as they arise and serving generalised objectives rather than specific targets set in a time frame.

Should we consider the impact of adoption of specific, widely agreed, objectives? It seems likely that a number of objectives might be required simultaneously at several different levels.

Features common to schemes in all three countries are:

- lack of individual titled land ownership
- sharing of a common water source
- common commitment to primary infrastructure
- low levels of asset accumulation
- labour intensive methods
- high involvement of women in production
- lack of commercial links and credit
- negative marketing experiences

For example:

Many interviews in the study touched on growing vegetables under contract. ***This is some evidence of wide agreement by farmers that contracts offer lucrative opportunity. However, this consensus may not be formally adopted as a scheme objective.*** Obtaining and fulfilling contracts is fraught with difficulties one of which is reliable water delivery to allow contract quantities to be fulfilled. If it is not possible to provide all members with the required water, an alternative second-level objective might be ***to ensure a minimum level of delivery to a specific area for a given period.*** If this objective is achieved only by disadvantaging some members, a third-level objective might be agreed, ***to devise a satisfactory compensation for those members, thereby spreading the benefit gained from the contract.***

Such arrangements have potential to motivate members to co-operate in an achievable management policy and provide everyone with an interest in the contract growers success.

On the other hand, irrigators may prefer strategies that allow them to continue to conduct business as separate individuals without reference to the activities of other members. In this case the objectives would be different and might include equity of water supply over the whole-irrigated area. Yet other circumstances might respond to objectives relating to credit, input acquisition, transport or marketing strategies. The core issues are:

- Inclusive participation;
- Setting clear achievable objectives;
- A high degree of trust and transparency;
- Close co-operation among farmers;
- Clear understanding between farmers and other stakeholders;
- Sympathetic institutional arrangements;
- Well-targeted and delivered support.

Participation is not an easy option. Training for participation is an essential part of a supportive policy. What sort of hierarchy and participation is needed to achieve agreements such as those discussed above?

Our observation is that participation in groups and membership of committees tends to be undertaken by farmers who are economically successful and achieve well above the average. There are many good reasons for these people being selected as representatives, yet at the same time, the proportion of so called 'successful' farmers tends to be small, maybe 20 % of scheme members. It seems that there is a correlation between success and group activity, however, what exactly does that mean:

- Do successful farmers become committee or group members? Or is the situation vice versa and membership of a group or committee leads to success?

At present we do not know which comes first or what the success of individuals who have been selected as representatives means for success of the scheme as a whole. Whatever comes out of discussing these relationships, the other side of the coin remains: ***the majority of members of irrigation schemes have low levels of participation.*** This may have implications for how a scheme is managed. For example, women are consistently under-represented on committees and schemes often operate in ways that disadvantage women farmers, such as requiring mechanisation for land preparation. Could the remaining 80 % of members be motivated and mobilised to contribute?

The majority of farmers act individually in running their farm businesses despite the necessity to share common resources such as water and infrastructure and despite the high individual costs of organising inputs or services or of transporting products. This may be fine in locations where demand is high and supply is a straightforward affair. However, in less favourable market conditions alternative strategies might be needed.

The general question is posed: *'Why is it the case that participation and therefore group action are not more popular?'* To tease out an understanding, answers to these questions might help:

- Is there a history of unsuccessful participation or past disappointment?
- Are there barriers to participation, like inconvenient times, places of meetings?
- Are people convinced by the concept of successful group action?
- What's the local evidence 'in favour' or 'against' organising in groups?
- Does the way the scheme works encourage or discourage co-operation?
- Is the mechanism for linking participation to institutional change effective?
- Are institutions convinced of the effectiveness of participation?

Although participation is promoted as an essential component of successful development, it is notoriously difficult to achieve in many sectors. Barriers to effective participation arise both among professional people and among the general population of grassroots individuals. This is nothing to do with the skills and educational level achieved by the individual, as after all, a professional in one sector may be a grassroots individual in another. For example, a professional irrigation engineer is likely to be a grassroots person in the health sector. Irrigation and agricultural professionals may feel threatened by participation, especially if it means change for them as individuals and farmers too may feel criticised or burdened by

participatory procedures. Another major factor is that institutions that were set up in the past, in a different political climate, may have procedures and arrangements that in themselves make participation difficult to handle, despite the best intentions of all stakeholders.

It is generally recognised that people need to see benefits in order to be persuaded that it is worth spending time and effort on participation. People need to feel comfortable about participating, not threatened or judged. When seeking to understand participation in irrigation schemes, or lack of it as the case may be, it is worth taking a look at what local people do engage in. Is there an example of successful participation in a non-irrigation activity in this area, and can the key features be identified and learnt from?

Posing the above questions can teach us much towards identifying and addressing barriers to participation. Below are some suggestions from earlier research concerning promotion of participation and evaluation of institutions which might also be helpful:

- Participation
 - Recognise that mass meetings have a role but cannot be relied upon to differentiate the valid needs of the different subgroups, particularly women.
 - Use existing groups and meeting points effectively to ensure that both men and women understand constraints and opportunities to successful irrigated farm businesses and can give their views in a comfortable unrestricted environment.
 - Investigate how information on participation techniques can be found.
 - Use participation to link the problems people experience in operating and maintaining their irrigation infrastructure and equipment to the different tasks that men and women are obliged to do and the different crops that they grow.
 - Recognise that explicit attention to women's needs and the needs of poorer and less able farmers can benefit all users.
 - Appreciate that the different objectives and resources available to men and women suggest that provision of a range of business options should be encouraged.
 - Encourage subgroups of stakeholders to reach consensus on at least some of their objectives.
 - Recognise that most communities focus on immediate problems and need help to identify long and medium term priorities.
- Institutions and management
 - Participation needs explicit attention and resources and must be budgeted for.
 - Structure participation by using checklists so that agency and farmers use the process effectively to systematically include the needs of women and poor farmers.
 - Be aware of the differences between types of management and the consequences for men and women smallholders.
 - The trade-offs between freedom and responsibility should be carefully considered.
 - Arrange institutional inputs to be in the interest of both men and women, rich or poor smallholders i.e. avoid dealing only with a subgroup of members.
 - Ensure that stakeholders, such as service providers, who influence the performance of schemes, also benefit from the success of the scheme and underwrite its failure.
 - Appreciate that external linkages are crucial. For example high technology choices attract high repair costs unless links are established to ensure prompt, affordable, locally available services.

4.2 Group responses to questions

Questions:

- **Have efforts been made to identify overall scheme objectives or to find out what members want from the scheme?**
 - What are they?
 - How do people feel about these? (i.e. different people)
 - What affect have they had?
- **Do scheme members work together in other aspects or activities on the scheme?**
- **Do scheme members belong to groups or associations outside the scheme? What are their experiences of these?**
- **Are there examples of problems, or issues faced because there are no scheme objectives, or because objectives are unclear/ambiguous?**

In responding to the first question ‘Have efforts been made to identify overall scheme objectives or to find out what members want from the scheme? What are they and how do people feel about these and what effect have they had?’ it was clear that newer schemes had greater opportunity to identify objectives than older schemes.

Objectives were particularly clear for Swazi cane-growers but less so for vegetable growers. Examples quoted suggest a limited view of objective setting, often confined to crop choice. Group objectives largely depend on extension advice. Individual objectives are generally not differentiated into those of the individual family members, but the term was used to represent ‘farmer’ objectives. None of the working-groups described a process of objective setting but nonetheless recognised the importance of the individual objective of food security and income generation.

Groups gave examples of objectives at different levels:

Mission statements	such as poverty alleviation and scheme development
Goals	such as facilitating marketing and leadership development
Group objectives	such as introducing new cash crops or processing produce.
Targets	Only one group mentioned a target (a target would normally detail a task, a date or a cost budget) of completing rehabilitation, but gave no set date or details.

There was little appreciation of hierarchy in relation to objectives and participants were not clear as to how objectives might be used other than as an integral part of a constitution. Consequently little was reported on the effect that objectives had on the schemes. There was a general recognition that group decisions could be difficult and had potential to be unsatisfactory for the majority of the group. Lack of scheme objectives, however, was held by some to be responsible for a lot of time spent on conflict resolution, falling levels of production, lack of farmer commitment and even abandonment of plots. Although, discussion was unclear due to the lack of consensus on the nature of mission statements, goals and objectives there was little evidence of real understanding about how objectives could be used to guide decision-making or monitor progress.

On the other hand, it was clear that group activity was very much part of life. Working-groups found many examples of groups that appeared to work rather better than irrigation schemes, such as burial

groups, savings groups and poultry projects. Nonetheless, group activity does take place on irrigation schemes in relation to tasks such as acquiring inputs and addressing maintenance, and even in one place hiring a truck to take produce to market. Lack of trust was identified as a serious constraint to further development of group activity of this sort in relation to marketing.

In summing up the views of the working groups it seems that clearly stated objectives are not universal and this may be deemed to be an unsatisfactory situation. On the other hand Swazi “schemes” often enshrine their objectives in a written constitution which all scheme members must accept. An example is that of all members working together on certain tasks – the constitution states that any member failing to attend will be fined 5Rand /day. The Swazi participants emphasised the setting out of objectives in group or scheme constitutions.

CARE schemes use a memorandum of understanding between themselves and the community, which sets out the objectives of both CARE and community members. However, it was pointed out that on large systems such as Dingleydale, where several whole communities are involved, then scheme objectives which must take account of the wider picture, become more difficult to achieve.

4.3 Plenary discussion of group findings

The plenary session focussed substantially on the need for farmers and agencies to emphasise commercial viability and to assess scheme potential and economic strategies before deciding objectives.

- Although there were clearly country differences in the way that schemes behaved as groups, there were also significant differences between older and younger schemes.
- Schemes developed in a different political climate for central or top-down management had more difficulty with objectives than newer schemes where farmer autonomy was the order of the day.
- Large size was also considered to limit capacity for group action and many schemes where group objectives were established were small.
- The development of small groups to follow objectives within the larger scheme objective was briefly explored as a strategy to overcome the difficulty of achieving agreement between large numbers of farmers.

5. SCHEME DECISION-MAKING – WORKING GROUPS AND SUMMARY

5.1 Discussion paper: Decision-making/policy options

- Farmers, like everyone else, have to make decisions all the time. These include “What to do?” “When to do it?” and “How to do it?”. The aim of this discussion paper is to promote discussion of how decisions are made and how this influences farmers’ ability to develop sustainable businesses.
- Good decision-making involves:
 - (1) Defining the aim or objective; (What do you want to achieve?)
 - (2) Identifying the alternatives; (What are the different ways of achieving the objective?)
 - (3) Recognising the constraints preventing achievement of aims; (What might go wrong?)
 - (4) Making a choice, bearing these in mind; (Which alternative comes nearest to meeting your objective given the constraints?).
- The main objective of most farmers is to make money or profit. However, avoiding risk may also be important. Growing sufficient staple food to meet family needs is also often quoted as a key objective.
- Some decisions are important and have a big impact on future life-for example whether to join an irrigation scheme. Other decisions are much less important-such as whether to weed a crop today or tomorrow.
- Some decisions can be made individually- example, what crops to grow on a private vegetable plot.
- Other decisions are made by bargaining between two persons- example, what price will be paid for a bag of mealies.
- Yet other decisions must be made communally (or by a representative of the community such as the chief) – example the allocation of land, and irrigation water, between members of the community.
- The way decisions are made depends on whether these are individual or communal decisions. Individuals may or may not consult with others before making a decision. However, communal decisions must be made by direct or indirect involvement of community members. Before this involvement, decisions must be made on the best way for the community to share in decision making.
- Although, in some ways, individual decision-making is easier, since no-one else is involved, there may be advantages in communal decision-making. For instance if agreement can be reached on all growing the same crop and marketing the crop as a group, there may be savings in transport costs and scope for negotiating a better price.

Areas of decision-making that affect what farmers produce and sell

The following is a list of areas of decision-making that affect what farmers produce and sell. It is useful to study the list and think about these questions.

- (a) Which are the key areas offering most scope for improvement in decision-making involving the majority of scheme farmers?
- (b) What are the main problems faced in these key areas?
- (c) How are decisions currently made in these areas?
- (d) How might the problems be overcome?
- (e) What decisions could or should be made communally? What are the advantages and disadvantages of doing this? In what ways could collective decision making be organised?

1. ACCESS TO NATURAL RESOURCES

- (a) Land tenure and control
- (b) Allocation of water or water rights

These decisions are usually made by a local authority or the scheme management and may be subject to laws on land tenure and water rights. However, it is worth considering whether greater farmer participation in these decisions would be beneficial.

2. INFRASTRUCTURE

- (a) Location
- (b) Communications

There may be little the individual farmer can do to change these resources, location being linked with access to land. Communications may be improved through group activity to improve rural roads or to press local governments for help.

3. CAPITAL ASSETS

- (a) Buildings
- (b) Tractors and other machinery
- (c) Irrigation and other equipment
- (d) Technical knowledge

Availability of these assets varies from one scheme to another. In some cases machinery and equipment are available but in poor condition. Decisions are needed on what to do with worn and broken down machinery. Technical knowledge may be provided by the extension officers attached to many schemes. However, machinery, equipment, and technical knowledge need regular up-dating as technologies change. Decisions are needed on funding and acquiring machinery and equipment, and further training for extension workers and other scheme personnel.

4. MARKETS AND MARKETING

- (a) Production for sale versus home consumption
- (b) Where to sell; market places
- (c) Choice of methods of transport
- (d) Timing when to sell
- (e) Processing
- (f) Packaging/presentation
- (g) Seeking contracts

Decisions on markets and marketing have an important knock-on effect on production decisions of what to grow and how to grow it. The scope for communal or group decision-making is worth consideration. Why is maize chosen as the main crop on many schemes?

5. CROP PRODUCTION

- (a) What to grow
- (b) Land preparation treatments
- (c) Planting methods
- (d) Fertiliser use
- (e) Pest control, links with risk and quality control
- (f) Timing

These are all central and important decisions, but they are all linked with markets and marketing, technical information and other productive resources. Timing may also be influenced by availability of inputs.

6. INPUT DELIVERY

- (a) Seeds/ planting materials
- (b) Fertiliser
- (c) Other agri-chemicals/pesticides
- (d) Machinery hire
- (e) Labour hire

Similar decisions to those for product marketing apply, such as where to obtain the input, when to purchase, how to transport, and whether to agree contracts for input supply? Might group buying be advantageous?

7. FINANCE

- (a) Whether to seek credit
- (b) Sources of credit
- (c) Terms and conditions

Finance may be needed for hiring in land or water, improving rural infrastructure, purchasing capital assets and buying inputs, particularly where new crops or methods are introduced. Decisions on how to raise or borrow the finance are clearly important.

8. INFORMATION

- (a) Markets
- (b) Market prices
- (c) Technical knowledge on crop production
- (d) Technical knowledge of servicing and maintenance of machinery and equipment
- (e) Input sources and prices
- (f) Sources of finance and repayment schedules.

Effective decision-making is dependent on having reliable and up-to-date information. Information is essential. Improved communications, possibly using computerised networks, with Senior Subject-Matter Specialists within the Extension Service and other Regional or National Agencies can help. Scheme members should also consider the need for promoting further training of selected scheme members.

5.2 Group responses to questions

Questions

- **What are the main concerns and problems faced in each decision making area?**
- **How are these problems dealt with and how are decisions made?**
- **What are the advantages and disadvantages of making these decisions collectively or individually?**
- **What are the key areas of decision-making areas that require most improvement in the decision-making process?**
- **Are there other important decision-making areas not identified in the discussion document? What and how is it dealt with?**

Broadly, the groups discussed the overall general conditions in the schemes but some consideration was given to problems associated with water use, land tenure and marketing.

Overall, the schemes, particularly those in South Africa and Zimbabwe, were seen as lacking coherent objectives and structures to provide a framework for managing scheme infrastructure or for developing

production and marketing opportunities. Also, they are isolated by the limited education experiences of members and in the use and availability of communications infrastructure, information, and sources of credit.

The participants were concerned about issues associated with traditional land tenure arrangements for individuals on schemes, particularly those in Zimbabwe and South Africa. Tenancy on land allocated to individual farmers by the local Chiefs or subordinate headmen/kraal heads normally provides secure 'rights of occupancy' for farmers and their families. However, some with 'rights of occupancy' do not use their land. In these cases there needs to be a means that will allow such people to retain this right while sub-letting the land for use by others. This will increase flexibility in land allocation, ensure that more land is used productively, and will provide an opportunity for some to extend the size of their farm units. The Swaziland participants indicated that in their case this issue is handled effectively by the local authority.

The main issues on water identified by the participants were installation and operation and maintenance costs of irrigation systems, mechanisms to achieve efficient and equitable water allocation (particularly at times of water shortage) and to control water losses. The participants were also concerned that extraction of water from different sources and dam construction often requires permission from different authorities and ministries.

With respect to marketing, participants identified market information, access roads, poor local market demand, and lack of agri-processing industries as important issues. It was evident that most decision making was undertaken on an individual basis and that there was a low level of trust between farmers so that they found it very difficult to relinquish control over marketing activities. Many groups talked of difficulties in reaching group decisions and further to farmers actually committing to the agreement. There was evidence of competition in the market from farmers on the same scheme. The lack of demand in local markets and the lack of information about conditions and prices in distant markets were both limiting factors.

Although marketing and business orientated farming are seen as significant problem areas for small-scale irrigators, participants identified marketing and production decision-making areas as relatively "easy". This was meant in the sense that they are decisions largely made by individuals and, therefore, 'easier' than making decisions in those areas, such as scheme-level water management and land allocation, that require collective collaboration and consensus.

The advantages and disadvantages of these forms of decision-making were not assessed for the different decision areas but identified in principle. The advantages of collective decision-making were seen as economies of scale in marketing and the potential to strengthen bargaining position. Also collective decision-making through consensus based on a wide range of information and views achieves acceptance and shared responsibility.

Groups referred to different processes of decision-making with respect to land allocation, ranging from collective discussion and consensus achieved through mass meetings and interaction with leadership groups, to decisions based on interactions between traditional leaders and technical specialists. Overall land allocation is mostly not under the control of the land users. In South Africa Ward Committees meet every month and, through the development committees, they can take problems to the Chief. This process has yet to identify a means for people to retain their 'right to occupy' while sub-letting their land to others.

There was some indication that committees or their leaders did not always reflect the best interest of farmers because of vested interests that deflected committee decisions. In the case of decisions relating to water there was a general perception that people, including those on committees, had insufficient information on which to base water-management decisions.

In general it seemed to be the case that participants recognised that group decisions were harder than individual decisions. People were able to address individual decisions confidently but were slow to reach, and often reluctant to commit to, group decisions which could be such a poor compromise as to please no one. Some decisions such as those relating to roads and other communications were seen as beyond the farmers remit and relatively little effort went into attempting to influence those decisions.

5.3 Plenary discussion of group discussion

In the plenary session attention was drawn to the economic viability of the schemes and the need for scheme members to see farming as a business activity and to develop appropriate skills to achieve this. A number of people supported the view that it was inappropriate to seek a welfare component in an irrigation business; schemes should survive or fail on the basis of economic success only. Participants from Swaziland emphasised the community driven nature of smallholder groups and the influence this had on the technology choices that are complementary to existing indigenous knowledge systems. Small-scale, purpose built systems for commercial activities were relatively successful. (This seemed to imply that an objective was present.) Also, such schemes are not saddled with past objectives and non-economic decisions. Reference was also made to the success of joint ventures in South Africa as a possible way forward for smallholder irrigators. These ventures effectively provide for the activities that the farmers find difficult to organise due to the need for collective decisions (transport, advertising, bulk delivery) while providing secure markets, input supply, and technical support. Examples of successful privately decided business ventures were given, highlighting the mix of technologies that could be used to develop successful businesses.

Some groups had identified the need for women and youth to be involved in decision making and it was agreed that these were cross-cutting issues and should apply to all the aspects we covered. The impact of women and youths on the decision-making process was not discussed. Several participants spoke of the need for discipline and this issue was also prominent among comments on the first draft of these proceedings. It was felt that the elected committee and office bearers needed to be vested with authority for their term of office but that re-election should be regular and above board.

6. EXTERNAL RELATIONS

6.1 Discussion paper on marketing and input supply, securing information and services.

The importance of developing external links may be illustrated by comparing the situations represented in Figures 5 and 6. Figure 5 represents a “closed system” of an irrigation scheme established within a community, but with no external linkages. It is assumed that all the products are consumed or sold within the community, while all the inputs are provided from within the community. This gives very little scope for growth and development.

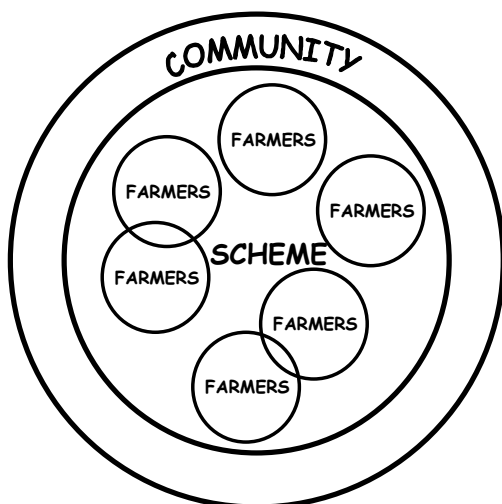


Figure 5 Closed system

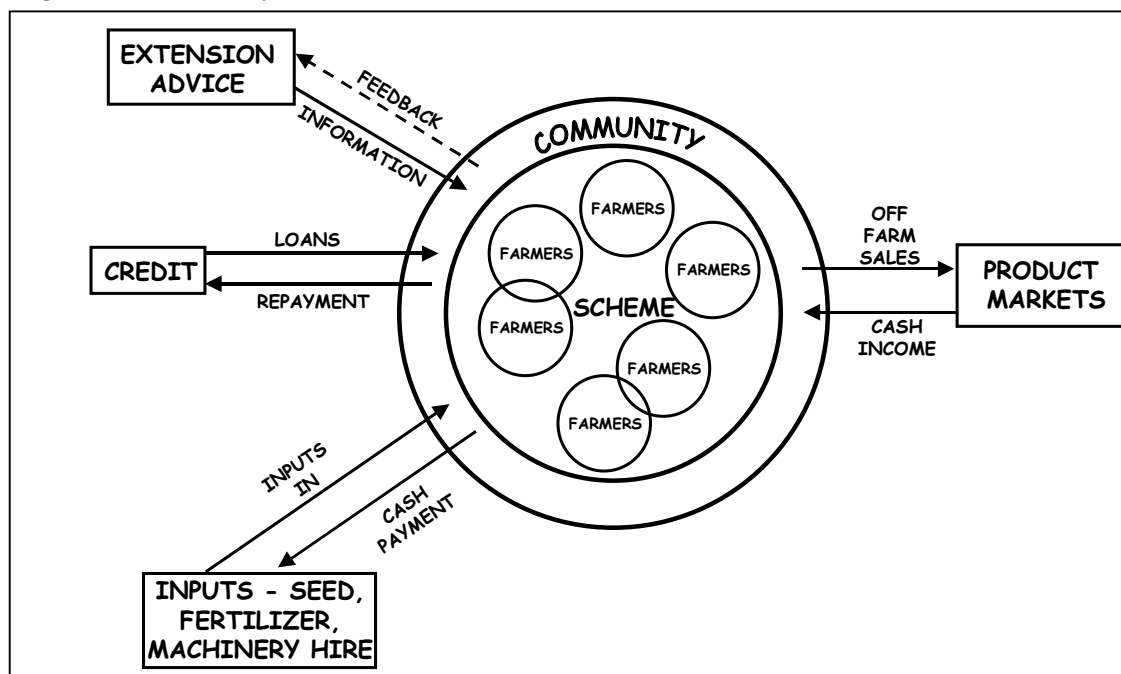


Figure 6 Open system

Figure 6 shows the situation after external linkages have been developed in four main areas:

- Off-farm sales of products;
- Purchase of inputs such as seed, fertiliser, machinery hire;
- Extension advice;
- Credit.

This creates a more “open system” which can expand and develop.

Generally speaking the links with product markets come first. There are many examples, from other parts of Africa, of smallholder farmers responding rapidly to new market opportunities (for example the spread of cocoa in West Africa, and the development of smallholder tea, coffee and milk production in Kenya). However, links with input markets must also be developed for the delivery of the necessary inputs. Extension advice is required for the introduction of new technology and the provision of market information. Finally credit is needed to accelerate the expansion of agricultural production.

All these external links involve outward and inward flows. Farm products flow outwards to the external markets and cash payments for the produce flow inwards. The income received meets the outward flows of payments for inputs and repayment of loans. The flows of information from extension workers to farmers should always be accompanied by the feedback of information from farmers to extension workers about their objectives, constraints and needs.

The links illustrated in Figure 6 really represent longer chains of linkages, as shown in Figure 7.

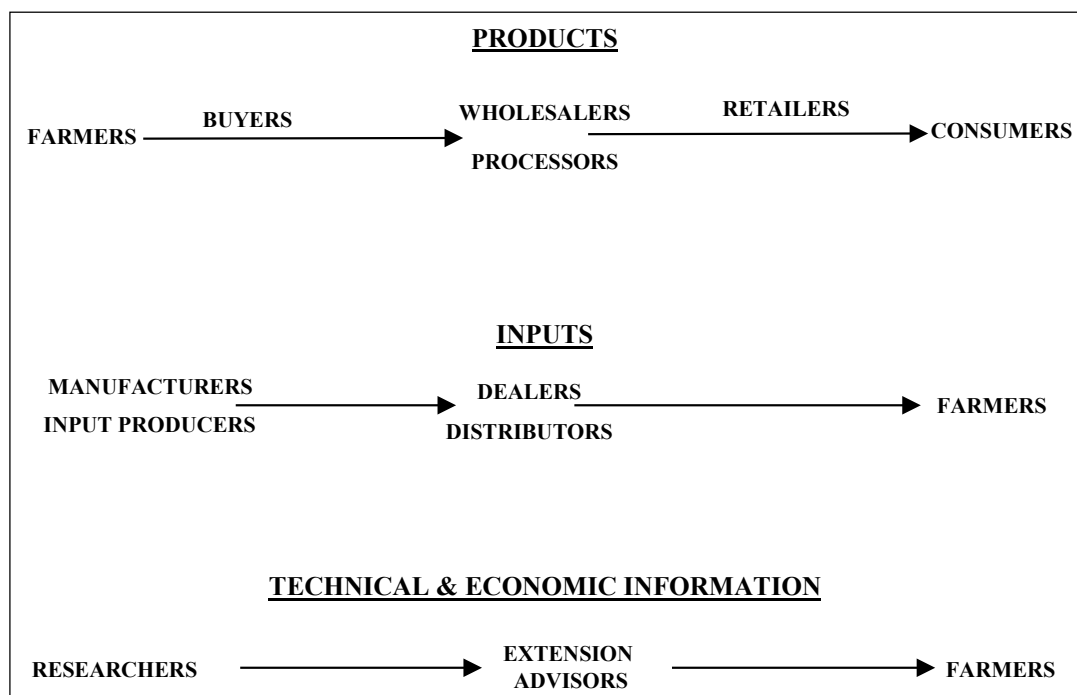


Figure 7 Chains of linkages

For instance the product market chain may extend through several traders, wholesalers and processors before eventually reaching the final consumers in the towns or even in other countries. Likewise there is often a long chain for input delivery from the original producer (the seed breeder or the fertiliser manufacturer), through various intermediaries before they reach the farmer. New knowledge passes through a long chain from the researcher through to the farmer. Credit too is rarely a simple transaction between saver and borrower.

In Figure 7, arrows are shown pointing from left to right, to keep the diagram simple. However, as already noted, all transactions or exchanges involve flows in both directions. Figure 8 serves to emphasise that all transactions involve both a seller and a buyer. They need to get information about each other, what the seller has to sell, in what quantities and what the buyer wants to buy. They need to agree on a price, and possibly arrange a formal contract.

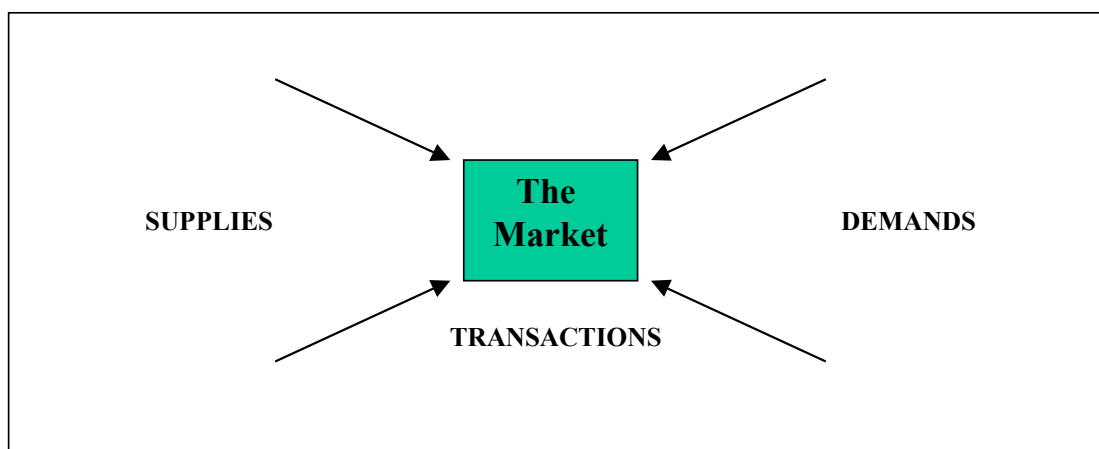


Figure 8 The exchange context

In all this, flows of information are important. The farmer with produce to sell needs not only to seek information about potential buyers but also to distribute information about what is available for sale. It is not enough to wait until a potential buyer comes to the scheme seeking to buy agricultural produce. Scheme members should be pro-active in seeking out information on potential buyers as well as publicising (even advertising) what they have for sale. Similar arguments apply to the search for suppliers of farm inputs and of agricultural credit. In the following discussion the aim is to learn more about the experiences of irrigator-farmers in developing market links.

The main source of technical information, on irrigation and crop production, is often the Extension Adviser. It is highly desirable that they should also be able to offer advice on marketing and farm management. However, most advisers lack training in these areas and are not well provided with information themselves. The following discussion is also concerned with the provision of extension advice.

6.2 Group discussion on external relations

Discussion Questions on External Relations:

1. Are there any benefits from developing links with distant (non-local) markets? What might they be?
2. If there are benefits, how can links be developed?
3. What can be done to get information on market opportunities and prices?
4. Do agricultural extension officers receive up-to-date information on (a) markets and prices (b) new technical recommendations?
5. Do the extension officers have the means and opportunities to pass information on to farmers?
6. What are the advantages and problems faced in selling under contract, or gentleman's agreement?
7. How are purchases of inputs of seed and fertiliser (and maybe machinery hire) organised? Are improvements possible?
8. What type of information and knowledge is most lacking; or in what area is there the greatest need for more information and knowledge?

Are there any benefits from developing links with distant (non-local) markets?

What might they be?

All groups identified positive benefits associated with developing links with distant (non-local) markets. Selling to distant markets increases the scale of the market and generally prices are higher than those found locally. Distant markets provide opportunities to exploit the potential comparative advantage of producing crops unsuited to other areas. The groups also identified the benefits of foreign exchange earnings for overseas distant markets and recognised the broader developmental benefits of access to information and new ideas for innovation from interaction with distant markets.

If there are benefits, how can links be developed?

The groups considered the development of links under four broad headings – communication infrastructure, nature and quality of information, agencies to facilitate links, and training needs. It was agreed that all forms of communication infrastructure are improving in all three countries but more needs to be done, particularly regarding road and tele-communication systems, adequately to link poorer smallholder communities with main markets. Accessibility and quality of information varied within and between the three countries and it was felt that good quality up to date information was generally lacking.

Overall the groups thought that the extension agencies had an important role to play in helping farmers to make connections into the wider market place. This should not be a managing or directing role; the approach adopted should be one that facilitated farmer and community control and direction to encourage ownership and understanding of business-based production and marketing.

Training was seen as a key issue to developing links into the market place.

What can be done to get information on market opportunities and prices?

Suggestions were made that information might be obtained through Extension Agencies and publications in electronic and print media (radio, TV, tele-centres). Timing of agricultural broadcasts is often inappropriate (e.g. 7.00pm). Market agencies may provide information to their clients, while some farmers conduct market surveys and consult each other. However, such approaches are more readily available to commercial farmers than to smallholder communities. Some success in information gathering by smallholders is reported from Swaziland.

Do agricultural extension officers receive up-to-date information on (a) markets and prices (b) new technical recommendations?

Extension Officers (EO) do receive market trends through (electronic) media for major markets in some commercial schemes (e.g. in Swaziland), but generally extension staff do not have up-to-date information on markets. It was suggested that dissemination of market information is easier in a small country like Swaziland; size being an important factor affecting information acquisition. In general however, extension staff does not receive enough initial or in-service training in marketing and their work environment does not afford the opportunity to record market information and trends.

Generally EOs are trained on crop production. In some cases technical information is disseminated from the Training Branch to EOs, or from Research Centres in text form. In addition technical and engineering staff and agricultural scientists render advisory support to EOs. In other cases inter-relationships between research, extension and farmers are rather weak. Extension staff does not always receive up to date information but it is none the less better than no market information.

Do the extension officers have the means and opportunities to pass information on to farmers?

A general problem appears to be lack of facilities such as copiers to duplicate publications and other materials for farming communities while transport is a major constraint. Some EOs are based on schemes where transport may be less of a problem. Most EOs have no telephones and cannot be easily accessed by farmers. Some do have the means to pass on information to the farmers, possibly through field days or the mass media. However, private sector suppliers of inputs and buyers can generally provide better information.

What are the advantages and problems faced in selling under contract, or gentleman's agreement?

Discussion first centred on the advantages of contracts. These are thought to include price and market guarantees which remove market uncertainty (although not in Zimbabwe) expressed in a legal document. The contract may also provide for the supply of inputs, which facilitates planning of farm operations, ensures good agronomic practice and may therefore benefit the whole scheme. Agreement on a fixed price and the exchange of a legal document is seen as potential disadvantages as well as advantages.

Problems with contracts include penalties charged for breach of contracts, being tied down to a fixed price agreed in advance (which may turn out to be below the market price) and the need to meet quality and quantity requirements, due to crop failure for instance. Individual farmers become dependent on the reliability of other group members when they enter a group contract. Doubts were also expressed as to whether farmers are able to benefit from contractual agreements, since they have difficulty in using the legal system, understanding the document and meeting the costs of arbitration.

The advantages of a Gentleman's Agreement are seen as the ease with which it can be arranged, the freedom to negotiate prices although some guarantee is assured because of personal knowledge and trust of the partner in the transaction.

Disadvantages include the fact that it does not represent a documented contract so it is more subject to disputes and conflict, and cheating may occur as the sale is not guaranteed. Uncertainty remains regarding price and quantity and over the actual sale so farmers may fail to gain any security while possibly being paid less than the going market price.

How are purchases of inputs of seed and fertiliser (and maybe machinery hire) organised? Are improvements possible?

In many schemes, farmers contribute to a fund for the purchase of inputs jointly, in bulk. Groups may be organised through a formal committee and assisted by the EO (e.g. some schemes in South Africa), or informal. In other schemes, such as Apel, individual farmers arrange their own purchases of inputs.

Machinery hire is arranged individually in Zimbabwe, but in Swaziland a group hires machinery and ploughing by oxen is done as a group.

Improvements might result from farmers being informed about the quality of service from contact buyers, putting pressure on suppliers to sell bulk at discount, and provision of loans to farmers by giving purchase vouchers. Ideally, irrigation scheme participants should participate jointly to fulfil their objectives at same time in operations such as ploughing, planting, fertiliser spreading hence justifying bulk (collective) purchases with an added advantage of bulk purchase discounts.

What type of information and knowledge is most lacking; or in what area is there the greatest need for more information and knowledge?

One group argued that technical information is most lacking, since research outputs are not disseminated to farmers on a regular basis. However, most were of the view that market information is the most serious deficiency. More information is needed on marketing of high value export products, market research, competitors in production and marketing techniques. Market information should be obtained from a neutral agency, e.g. Government or South African Sugar Association, and provided by a market task force and marketing workshops, until farmers are empowered, to take full responsibility themselves.

Economic and farm management knowledge is lacking, and there is a need for suitable basic business and financial skills training for farmers. A "planning (development) culture" should be encouraged and farmers must recognise the need to be reliable producers in time and quality. Government should encourage input suppliers to deal with small-scale farms where necessary.

6.3 External linkages – Plenary Discussion

Government agencies or NGOs can assist in the process of giving information to farmers. Extension services are better in some countries than others. It is unclear whether this is reflective of theory or practice. Availability of extension is influenced by the size of the country and organisation. e.g. Swaziland is smaller than South Africa or Zimbabwe and benefits from this. Some areas in Zimbabwe are very remote from extension with no phones, transport or copying facilities, so distance and organisations are important aspects of extension. If a high quality extension service exists farmers will be motivated, although good extension is not an end in itself, it can only facilitate access to information. Providing farmers with better market information at the start of the season enables them to plan their planting and crop production.

There should be some system whereby price information can be distributed to all users. In Zimbabwe, a system is being set up where if there is a surplus it can be taken to market areas where there is not enough produce. At the moment in Zimbabwe Agritex publishes producer prices every Friday for nine urban areas. They are now trying to provide information from more rural areas, which will be more useful to urban sellers. In Swaziland Supply Agreements are used instead of contracts and Gentleman's Agreements. These Supply Agreements have been successful as those who complete the contract are given some recognition in the form of a bonus.

Trends in Zimbabwe's market prices should now start being apparent as the marketing group has been established for 2 ½ years. Radios will be used to spread the information to smallholder farmers, but it is unsure whether farmers will use it, as transport to markets is expensive and there is no guarantee of produce being sold even if it is of good quality. Because of lack of consistency in supply, buyers more often than not choose to buy from commercial farmers. A mechanism needs to be devised to increase communication between producers and buyers. If a link can be created with definite transaction details sorted out, this will help both parties. A producer register, made available to interested people, might be a helpful solution.

Subsequent comment queried the validity of any long term involvement of government suggesting that the only long term role-players should be farmer/producers and private sector service providers. The role of government should be in providing an enabling environment. The private sector's willingness to provide services should be seen as a 'test' of sustainability.

Whilst some people thought that the presence of a reliable productive scheme was a stimulus to the market and attracted notice and buyers, others felt that the way forward was to respond to market demand. Participants clearly found this an area in which consensus was difficult.

7. IRRIGATION AND FARM MECHANISATION TECHNOLOGIES

7.1 Discussion paper on irrigation and farm mechanisation technologies

Choices regarding irrigation technologies, and the anticipated levels of farm mechanisation, are made when schemes are first designed or when they undergo major rehabilitation.. A considerable amount has been written about the way these choices affect the management and performance of irrigation schemes. The aim of this discussion paper is simply to note the different areas where choices about technology are made and to promote discussion of how these choices influence farmers' ability to succeed in growing crops for commercial sale.

General questions determining choice of technology:

In considering the choice and use of any irrigation or farm mechanisation technology general questions that arise are:

- (a) **User objectives** – Will the technology be adequate to meet the needs of the farmers? How much system flexibility will the objective require? Does the technology restrict choice amongst the users forcing them to adhere to a fixed pattern of work or does it permit flexibility and independence between users?
- (b) **O & M Costs** How much are people willing and able to pay for their technology? Should cheaper alternatives be sought?
- (c) **Operator skills** – What level of skills is available? Does the technology match the available skills? If not can new skills realistically be acquired?
- (d) **Maintenance** – Is the technology such that it can be serviced or maintained quickly, reliably and locally? Can spares and service components be obtained quickly and cheaply?
- (e) **Replacement costs** - How long will the equipment last and how will a replacement be paid for?
- (f) **Risk** - If part of the equipment or system breaks down, what are the consequences for crop production – does it affect a large part of the scheme for a long period, a small area for a short time or some mid point?
- (g) **Management and support services** – What management is needed to deal with the chosen technology? Is on-going support, from government or an NGO needed or are there alternative service providers?

The following notes examine how these questions relate to a number of specific areas of technology and how they might influence the commercial success of individual farmers and schemes.

Pumps for irrigation

Reliance on any form of motorised pumping to deliver water raises all of the questions above. Some schemes have been successful in taking on full responsibility for the operation and maintenance of a pump but others have encountered severe difficulties. Points to note are:

- a) The scheme may only be technically viable through use of a pump to raise water.
- b) Pumps were often installed during a period when a government agency took responsibility for all aspects of O&M. Changing policy now forces transfer of that responsibility onto the scheme users.
- c) Energy costs are high and rising. To raise sufficient revenue to pay for pump O&M schemes have to charge users high rates, which mean that farmers may have to seek more cash revenue than in the past.
- d) Reliance on pumping carries a high risk. If the pump breaks down a large part of the scheme is deprived of water. Failure of the water supply may affect those growing high value vegetable crops sooner than those growing grain crops or cotton, though all will ultimately suffer.
- e) Electric pumps have much fewer routine maintenance requirements than those using diesel or petrol prime movers.
- f) Private sector agencies offering service and repair facilities tend to provide faster and more reliable service to clients who are known to pay fully and quickly. Thus to retain this good service farmer groups must be able to raise funds quickly and deal on a “commercial” basis.

System layout & water management

Decisions influencing the layout of the scheme, the size and arrangement of individual plots and the procedures in place to plan water allocation can often be traced back over many years to a period when the economic, technical and institutional environment of the scheme were very different from today. Recently completed schemes have a much smaller legacy of “historic culture” and may find it easier to respond to present realities, although this is by no means certain. Apart from this general assertion, other issues that merit debate are:

- a) Does the layout of plots and water allocation plan demand that farmers accept a “scheme-wide” cropping pattern?
- b) Do farmers have opportunity to influence decisions on cropping pattern?
- c) Do technical factors concerning plot layout and water allocation play a large or small role or no role at all, in determining the mix of crops grown and the time of planting?
- d) How are decisions about water allocation made? What freedom do farmers have to decide when and how much to irrigate?
- e) What are the factors that influence the reliability of irrigation supply, does reliability seriously influence farmers’ business decisions and are there any general trends linking scheme type, form of management and consequent reliability of supply?
- f) Compared with other factors that a farmer must take account of when planning what to grow and when – farmer knowledge, supply of inputs, domestic needs, climate, risk of pest and disease, anticipated market demand, etc – does scheme layout and management play a large or small part in planning?

IN-FIELD WATER APPLICATION refers to the way that individuals or small groups of farmers manage and apply water to their crops. Thus, there are distinctions between drip irrigation (uncommon amongst smallholder farmers), overhead sprinkler irrigation, surface irrigation and bucket/watering can methods.

As with the other technology issues reviewed here, the broad choice of in-field irrigation method is made at the time of original scheme design, or rehabilitation / modernisation – individual farmers have little choice, except to the extent that they are consulted during the design process.

The selection of the in-field technology carries a lot of implications with it as the following examples show:

- Use of drip or sprinklers normally requires pumping to provide adequate working pressure;
- Surface irrigation requires more land preparation and grading to achieve efficient water distribution than sprinkler or drip methods;
- Bucket / watering can irrigation is only practical for very small plots;
- Some methods require a greater degree of co-operation between groups of users to ensure effective water distribution or avoid over pressurising pipe networks.

Land preparation

Land preparation is essential before planting any annual, irrigated crop (sugarcane and orchard crops may have different needs for inter-row or inter-tree weed control). This preparation may be done using manual means only, e.g. smaller, communal vegetable gardens, with draught animals or with tractor equipment. The method used is influenced by:

- The size of plot to be prepared
- The in-field water application method
- The local cost and availability of different options
- The extent of land forming required for weed control and water management

Manual plot preparation avoids dependence on any external service provider but because of the physical effort involved it is only practical for small plots where limited soil movement is required for water

management. Reliance on either draught animals or tractors for land preparation raises the following issues:

- a) How long must a farmer wait for land preparation to be complete – do demand peaks mean there are major delays before a farmer can plant?
- b) Is it necessary for several neighbouring farmers to be ready and able to pay for cultivation before the service provider is willing to come to the site? Does this apply equally to animal and tractor draught?
- c) Does the layout of field supply channels restrict access for tractors?
- d) Where government tractor hire services have diminished or ceased what has replaced them and how effective are they?
- e) Where land preparation services are now done on a “commercial basis”, replacing a previous state provided service, what effect, if any, has this had on the way farmers plan their land preparation and try to ensure timely cultivation?
- f) To what extent do concerns over the availability, cost and reliability of land preparation services influence decisions over what types of crop to plant? Are some crops more sensitive to the quality and timing of land preparation, and therefore planting, than others?

7.2 Group responses to questions on farm mechanisation & irrigation technologies

Discussion questions

1. The discussion paper identifies the following areas where technology choices bear upon farmers and scheme managers:
 - Use of pumps for water supply
 - System layout and therefore water management practice
 - In-field water management
 - Land preparation

In the schemes you know, which of these has greatest positive or negative impact on farmers commercial success, and why?
2. Do these technology issues play a major or minor role in the production decisions taken by scheme managers or individual farmers, and why?
3. On many schemes technology choices - use of pumps, scheme layout, irrigation method and methods of land preparation – have been taken in the past without reference to the farmers. What practical actions can farmers take to modify these technologies or otherwise make them more suitable to their requirements?

1. Which technologies have the greatest positive or negative impact on commercial success?

High negative impact: Pumps – the high running and maintenance costs and risk of breakdown leading to crop failure can result in serious negative impact. However, it is notable that in the 15 schemes studied all of those classed as “most commercially oriented” relied on pumped water supply.

Neutral impact: Land preparation methods – manual, draught animal power or tractor – were not considered as having a major positive or negative impact by any of the groups.

Positive impact: Good system layout - little was said to expand on this observation.

One group, with experience of low-cost drum kit drip irrigation, identified this as a positive impact due to water saving and improved crop quality.

2. Do these technologies play a major or minor role in shaping decisions?

- Pumps were seen as a critical issue due to the need to raise sufficient income to pay for their O&M. It was also said that if their use led to greater water availability this would also greatly influence the area cropped and what crops were grown.
- Other technology choices may have some influence over the choice of crops grown and their time of planting but generally their impact was seen to be minor in comparison with other factors.

3. What practical actions can farmers take to modify technologies or make them more suited to their needs?

- Farmers have no capital to make major changes to the irrigation and land preparation technologies that they inherit.
- They may seek training or other professional help in order to learn how to manage what they have to best effect.
- Where any re-design or rehabilitation is undertaken full participation of users was stressed as being essential – not merely a token consultation at the outset of the process!
- Establish maintenance funds to cover unforeseen breakdown.
- Develop management and other institutional structures that are consistent with the technology or layout of the physical infrastructure.

7.3 Plenary discussion of group findings

1. The factors most influencing the appropriateness of a technology were felt to be:
 - Purchase and operating/maintenance cost
 - Flexibility – allowing different users flexibility of choice
 - Reliability
 - Serviceability
2. It was observed that farmers may make a poor choice of technology due to lack of good information or the means to make effective economic judgement. For example, they may be attracted to using “high tech” sprinklers when furrow irrigation might be just as effective.
3. The dangers of “token” or passive participation were stressed. Communities need to be fully engaged in all stages of feasibility and design. Design should not be done away from the community with the final product presented to them as a finished job. There is need for regular consultation and input at all stages.

Later comments suggested that attention to efficiency can only be afforded once a minimum level of reliable profitability is achieved .

8. RESEARCH ISSUES

8.1 Objectives

There appears to be a need to demonstrate to farmers, and other players in irrigation, that group objectives and targets can provide tools with which to improve the productive and economic performance of schemes. Even where groups form to address tasks, the objectives tend not to be dealt with in detail but remain at a 'mission statement' level where they are too vague to assist in decision making. Only Lilanda scheme identified a target in its ambition to repay all loans by 2002. This provides the farmers with a very definite statement against which to measure alternative actions.

Would it be helpful to analyse the impact this objective has had on:

- a) The group success***
- b) The individual farmer success.***

It may be helpful to look at the level at which so-called successful schemes have chosen to use group objectives, given that there is a continuum along which objectives can be adopted at group and individual levels. In the case of the schemes surveyed, virtually all farmers market as individuals, whereas many undertake scheme maintenance and input acquisition as groups. Only at one site did farmers group together to provide transport to market. Where this occurred the outcomes are recognised to be broadly successful, but a causal relationship is not necessarily demonstrated.

Would it be helpful to analyse the relationship between group and individual objectives and the economic outcomes for farmers and their families?

Is this appropriate research and would the outcomes be useful?

8.2 Decision-making

The process of decision-making and who are the appropriate people to be involved is a key issue in the success of both production and marketing. It was clear from the workshop discussion that group decisions were so difficult that many farmers rejected them at all levels. However it is also true that to manage a communal system for the common good, agreement must be reached at some level.

Can research help us to learn lessons from different approaches to decision making and participation?
Can the lessons learned be disseminated to promote better practice?

The 'economic mindset' was broadly acceptable but there are difficulties in applying it both in concept and practice. The contradiction between economic viability of a business and the welfare impact of schemes was highlighted. It was suggested that government had to decide on support. However, it is also a question for the community and the group management - this may be a factor.

8.3 External links

Links to market information were seen as particularly limiting. Only Swazi sugar-growers were satisfied with their information base. Research on how to improve the distribution and dissemination of market information providing with it sufficient analysis of:

- trends
- consistent seasonal characteristics
- differences associated with location
- impact of product differentiation on price.

could provide some guidance for policy makers and providers of information.

How useful is this?

Facilitation of supplier-producer-buyer links was emphasised in the external links session but the question of how to put into practice such facilitation remains unanswered. There is likely to be a number of successful strategies from which schemes and agencies could select. Recognition of farmers and buyers as valid stakeholders in the market might be key requirements, as would the two-way flow of information from farmer to buyer and buyer to farmer, allowing planning to take place. Contributions from both sides need to be relevant, possible and affordable.

Would research in this area contribute significantly?

8.4 Technology choices

The lack of good information relating to the economic aspects of the technologies that are on offer, limits the ability of farmers to make appropriate choices. Farmer access to non-biased, reliable, economic evaluation of infrastructure and equipment is very limited indeed which constrains their ability to participate. To supply and update information is probably not a realistic or affordable option, however it may be possible to assist farmers in developing a systematic approach to deal with the situation.

Would it be helpful to work on a checklist to assist farmers or farmer committees to acquire and handle capital and recurrent cost data for irrigation options?

8.5 Cross cutting issues

1. In the course of the discussions differences in the institutional structure of schemes became apparent. Not only are there differences between countries in agricultural policy and the planned administrative structure of irrigation schemes but also between the various Government and Non-Government Organisations involved. Scheme size is one aspect which may depend upon, but may also influence, the choice of administrative structures.

Differences may well be linked with different development objectives, such as food security or commercial gain. In all cases, greater farmer participation is an important aim. However, given these differences in objectives it would be inappropriate to attempt a comparative assessment of scheme performance in terms of a single objective.

Nevertheless can useful lessons be learned from a more detailed study of the administrative structure and organisation of the different schemes included in this project?

2. Training was mentioned at various points in every session and emphasised in relation to marketing techniques, handling of contracts and planning. However the question still remains as to what are the key skills in which training should and could be given in order to improve the sustainability of smallholder irrigated farm businesses or small and medium enterprises.

What training materials need to be specifically developed for the smallholder irrigator's environment in Southern Africa?

In addition it may be useful to consider the best target audience and how training would best be delivered. The key role of the extension service was referred to frequently as was the strain upon extension services of significant reduction in available funds for training and logistic support.

3. Gender aspects were not discussed although there was an appreciation of the additional constraints faced by women farmers, particularly relating to transport. The issue of local and distant markets received more attention but the gender aspect was not specifically mentioned in relation to distance.

9. DRAFT RESEARCH PROPOSED

The research proposed in each country would be expected to shed light on all the research issues identified in section 8. However, the emphasis would differ as does the character of the scheme and environment.

South Africa

In South Africa there are significant problems associated with establishing appropriate objective and decision-making processes. Historically smallholder irrigators have been restricted in their activities and therefore in the links they have been able to make with suppliers and markets. As Government support is withdrawn from their farming system it is particularly important for them to develop business mindset and expertise over a short period of time. The activity of many different Ministries and Departments in rural areas can lead to confusion and adds to the difficulties of the stakeholders in being clear about their objectives. The research therefore must look at the fundamentals of how irrigators participate in and organise the 'scheme' activities. It is also important that training should address fundamental economic and business principles.

A scheme will be selected on which to investigate the mechanisms by which members and their families become involved in deciding scheme objectives and to identify the constraints and opportunities that influence participation in a range of decisions. Analysis of how individuals contribute to communal decisions that will support their own commercial goals and those of the scheme at large. The investigation would aim to analyse the impact of participation and agreed objectives on the development of farmer committees' ability to monitor their own progress and to use the feedback thus generated in managing the scheme satisfactorily and further improving their techniques.

Swaziland

It appears that information flows in Swaziland are such as to provide better support to smallholder farmers than in either South Africa or Zimbabwe. Physical compactness and institutional characteristics are thought to be a significant factors. Particular attention will be given to investigation of information collection and dissemination, the processes used in acquisition of market information ,and responses in terms of market practice. It is expected that this will involve qualitative information collection over a range of circumstances. It is expected that the investigation will analyse production decisions such as crop choice and timing and the level of support demanded from agency and private sector to enable commercial success. Comparison of these processes in the sugar and horticultural sectors may shed light on key issues.

Zimbabwe

In Zimbabwe attention is already being focussed by AGRITEX on market information systems at the larger smallholder schemes associated with government support services. Very small schemes often fall outside this sphere and do not benefit. There is potential to assist this group of irrigators by investigating local and distance marketing in small community based schemes where there is limited potential and high cost associated with commercial linkages with distant markets. Particular attention to marketing strategies and interactions with the local community and local businesses would be crucial to the research.

There is potential for this research to build on lessons learned in the already commercialised smallholder sector, particularly in relation to information delivery and training and also the work already done by CARE in developing their marketing modules. CARE are sensitive to the parallel development of social capital in the rural communities to support the success of training. Their proposed programme of monitoring and evaluation could potentially be supported by the project activities in this area.

Annex 1

Summary of field visit to Dingleydale

Annex 1 Summary of field visit to Dingleydale

A field visit to an irrigation scheme was organised on the morning of June 27th. Participants were briefed on the changes in irrigation management taking place countrywide, giving Dingleydale as an example.

Rex Mtileni, the Deputy Director of the Agricultural and Rural Engineering Program said that initiatives have been taken in areas of public works and public health in the country. Today, for 171 irrigation schemes, 500 million Rand were needed annually for operation and maintenance, out of which 19 million Rand would be used for diesel supply only. He said that the government was aware that changes could not be made over-night, especially since management needs to be transferred to an existing framework or institutions that are already in place. However, the decision to relinquish ownership to farmers had already been taken, as he said, “government is not a farmer, farmers should do farming and governments should do policy development”. He further explained that in order to implement these decisions 11 irrigation schemes had been selected as pilot projects from which they hope to learn and replicate the lessons to all other schemes in the Northern Province. In doing so, the government is collaborating with researchers, such as, ARC and IWMI, bringing together a field of experts to help them implement these policies. He stated that they have a lot of questions but the answers are still being researched for!

Development Process of Loxton Venn & Associates

Following this was a presentation of the Dingleydale irrigation scheme by Jon Rutherford, Director of Loxton, Venn & Associates. The scheme consists of 1650 ha, consisting of 1200 farmers and 1.3ha per farmer. He went on to talk about the three main principles that applied to their approach, which are:

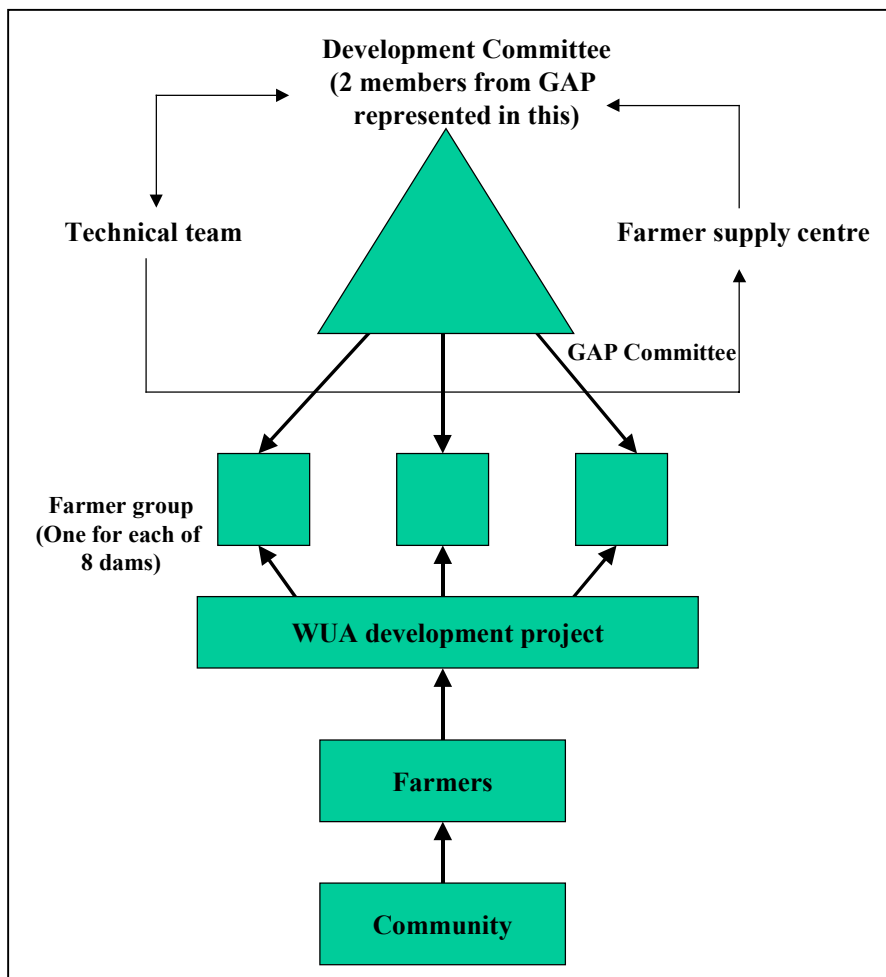
- Need for legal entity to transfer the structure to people themselves, the entity being the water users association. (It has the flexibility to be an entity, even if not a perfect one.)
- To establish a legal entity that can provide a framework in relation to water & agricultural management.
- Community must have maximum involvement in this process.

In relation to the last point, it appears much harder to set up a management structure while dealing with a complex project like that of Dingleydale. Government has provided most operation and maintenance (O&M) until now, but since this is not sustainable in the long term, one needs to ask how one is to hand over management on such a scale to people in extreme poverty with a predominantly elderly population with very little education. Jon stressed the aspects of a ‘people lived, people owned and people provided’ approach. Once these institutions are in place, capacity building and training are key factors that will enable the community to operate in the best way and maximise outputs, which includes establishing structures, defining responsibility and allowing people to take over. He explained that the process of transfer, passing over responsibility for management, is a gradual one. He stated that government would rehabilitate structures to allow the schemes to be managed by the farmers, so long as the farmers ‘decide’ to take on the responsibility of scheme management. This rehabilitation would be limited to fundamental irrigation structures. He also mentioned that as facilitators another responsibility of Loxton Venn is to take the community by the hand and assist them to become self-sufficient and sustainable. This was important, especially since these schemes vary enormously in nature from individual management to absolute government responsibility. Changing the mindset of the people was going to be very difficult. In addition, the question of whether the community can meet these demands both in terms of management and money was stated, especially since there is no guarantee of success and hence a huge challenge to the community. It is a people driven process resulting in rejuvenation of irrigation schemes resulting in better livelihoods.

Aims of Loxton Venn & Associates in relation to its activities:

- Looking at an established institutional structure
- Rehabilitation
- Agricultural upliftment. It is people developed and aims to empower people with a goal for people to manage scheme ownership.

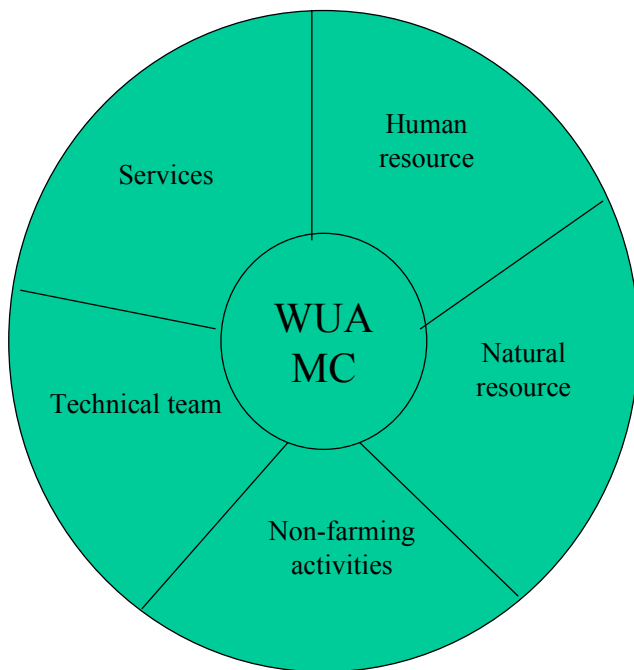
Management structure put in place by farmers (Dingleddale Chairman)



Discussion

The discussion that followed raised some interesting issues, for example addressing the needs of all groups for water (even those who are not farming), and other questions regarding land allocation procedures in the area. In relation to Loxton, Venn & Associates' rehabilitation work, questions regarding the financial viability of the scheme and the process of water charges were raised. Everyone with land is said to be paying 12 Rand annually but water pricing had not yet been implemented. As far as the question of sustainability was concerned, he felt that the minimum farmers will have to pay for is maintenance of infrastructure, but there is likely to be a government subsidy on water for a while.

Structure of Water Use Association Management Committee.



Annex 2

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Annex 2 Participants List

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Annex 3

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Annex 4

Supplementary analysis

Annex 4 Supplementary analysis

SIBU data set 2001

In this part of the analysis qualitative information related to aspects of production and marketing was processed, categorised and analysed. Questions dealing with the importance of different crops, factors that affect crop choices and amounts grown were examined. Additionally factors that determine prices, sale of produce to local and distant markets and key problems & constraints were also documented (Table 2).

All these aspects require different levels of decision-making, some at individual level, other decisions may result from intra-household bargaining, groups decisions or co-operative or scheme-level agreements etc. For instance, choice of crop to grow is an individual decision, however, this decision is influenced to a great deal by market, demand, timing, availability of resources etc. All this makes it a very complex picture with different levels of consultation and decision making.

While looking at the factors that farmers took into consideration in choosing crops to plant, not surprisingly market conditions were a paramount consideration, over 70% of farmers mentioned them in two of the schemes of Zimbabwe, (figure 1). In South Africa there was more emphasis on home consumption than in Swaziland and Zimbabwe. Consistent with this was the emphasis that Zimbabwe farmers gave the need for market information and support services. Swazi farmers gave varied replies concerning information needs and in the workshop related a relatively satisfactory situation regarding market information. In general, the primary constraints identified in relation to marketing were transport, infrastructure and various aspects of production. Whereas other limitations included external linkages, social aspects (theft) and management problems (the latter was only visible in South Africa, which appears logical due to the changes in the management of transfer). Most of the problems and constraints mentioned directly affected selection of crops.

Size of the plot might have been expected to have a bearing (Table 3). However, those who sited home consumption as an objective were evenly spread throughout the plot-size range. It seems that the home consumption may relate to marketing difficulty and general poverty levels. This could not be substantiated from the available data. The gender of the plot-holder had a relatively small impact on choice between subsistence and commercial crops. Over all both men and women produced for similar reasons, mainly home consumption or income generation. However minor differences are visible in Figures 5 and 6. Men are more inclined to produce for income generation purposes (especially in Dingledale A and most of the schemes in Zimbabwe). Women produce both for home consumption and income generation without much strong preference. While looking at these graphs it is important to keep in mind the gender count on Table 1, to avoid misleading results.

For example, in Figure 6, Strydkraal has only 2 female respondents hence giving a rather skewed picture. It shows that the 2 women in that scheme are much more cash oriented than the men. One man used irrigated produce as an input to a livestock enterprise otherwise the remainder grew mainly for home consumption. This data suggests that women are as strongly motivated by cash returns as are men and challenges the assumption that women produce mainly for subsistence or perhaps challenges the narrow definition of subsistence.

Most respondents sold to local rather than distant markets, this is visible in schemes in Zimbabwe more than in Swaziland and South Africa (Figure 3). The reasons for selling to locals include the convenience associated with selling directly from the plots to local customers, traders, and hawkers rather than transporting produce to distant places. In most cases distant marketing is complicated by lack of information, and transport and is often consciously avoided. In schemes where the market was distant, only 20% of respondents showed a high demand for information unless farmers were keen to break into distant markets. Farmers who lack immediate commercial goals, either as a result of distance from markets or lack of commercial links or lack of knowledge were concerned with production issues.

The analysis considered how the farmers viewed determinants of price. We gained insight into the extent to which price was seen to be determined by outside factors such as the number of competitors or factors within farmers control such as quality and quantity of the product (Figure 4). Farmers who work on small plots below 0.5 ha seemed significantly more aware of quality as a determinant of price than those dealing with larger areas and presumably larger volumes. This perception may be affected by the activities of NGO staff as all NGO assisted schemes mentioned quality and all happen also to have very small plot sizes (table 3). Farmers having immediate contact with all they produce maybe more readily aware of quality, assuming that on bigger irrigated areas labourers may harvest rather than farmers themselves. Linked also to quality is concern with production issues and weather. The small number of schemes (13%) that mentioned water, were also voicing a quality concern.

Water and credit, often regarded as key concerns, were not given prominence by the farmers, only 13% mentioned credit. However, finance generally, was particularly mentioned in South Africa.

Over all, the data reveals no striking surprises. In relation to their degree of commercialisation, farmers show a gradation of interest in market access, information and support. Among the least commercial production issues dominate but among the most commercial, information and market access are prized. These characteristics (Table 2) support Phase II research into the best and most affordable way to meet information and access needs.

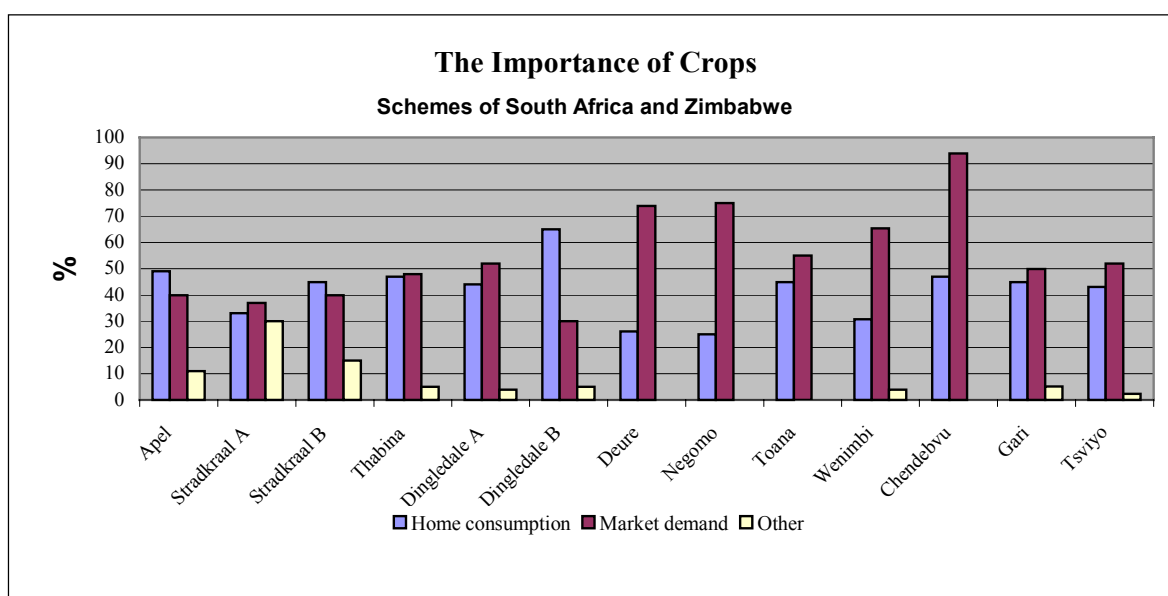


Figure 1

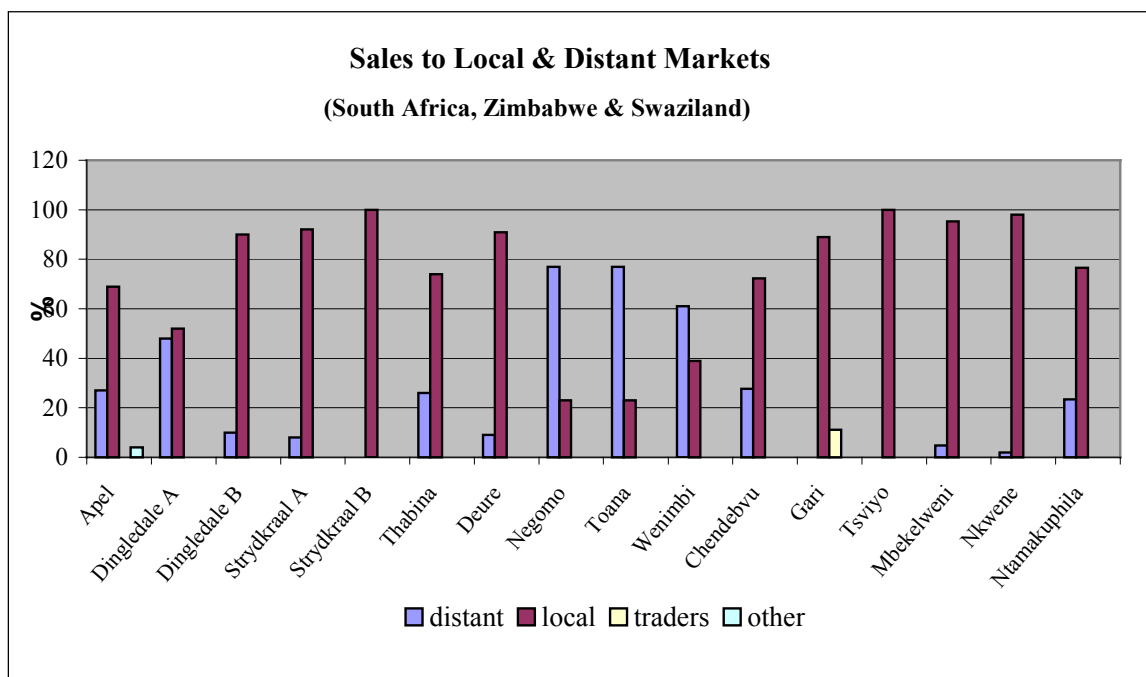


Figure 2

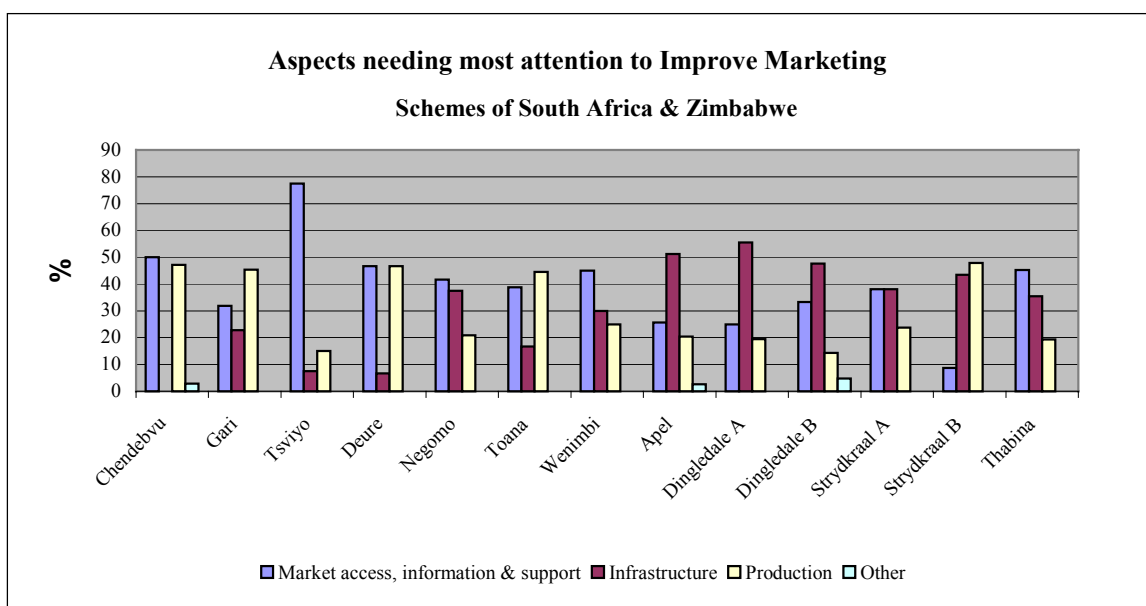


Figure 3

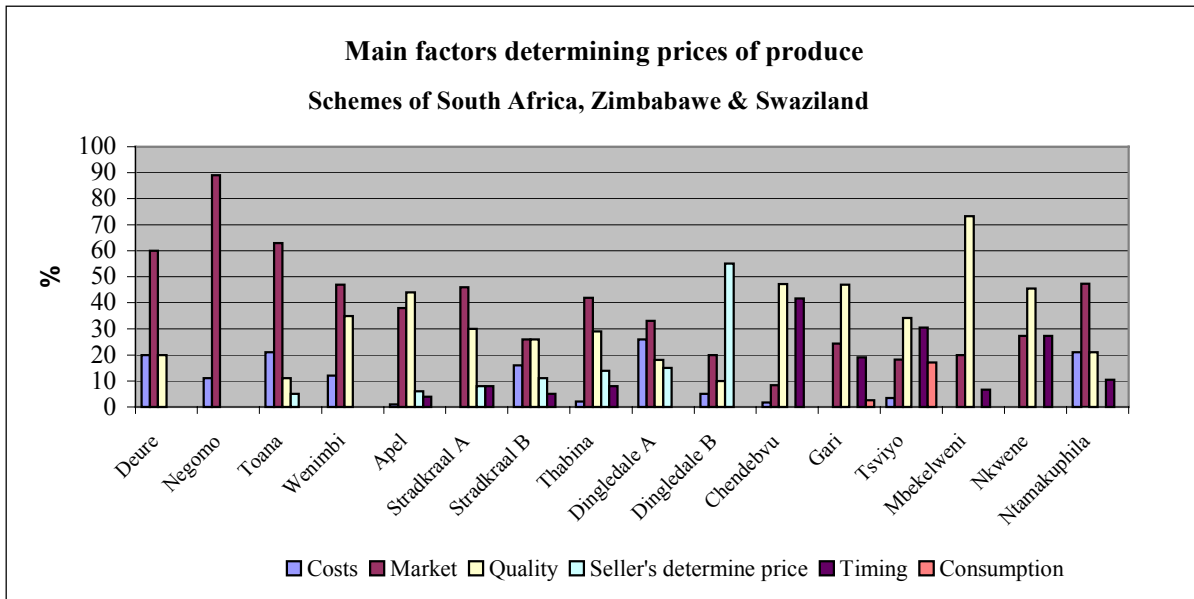


Figure 4

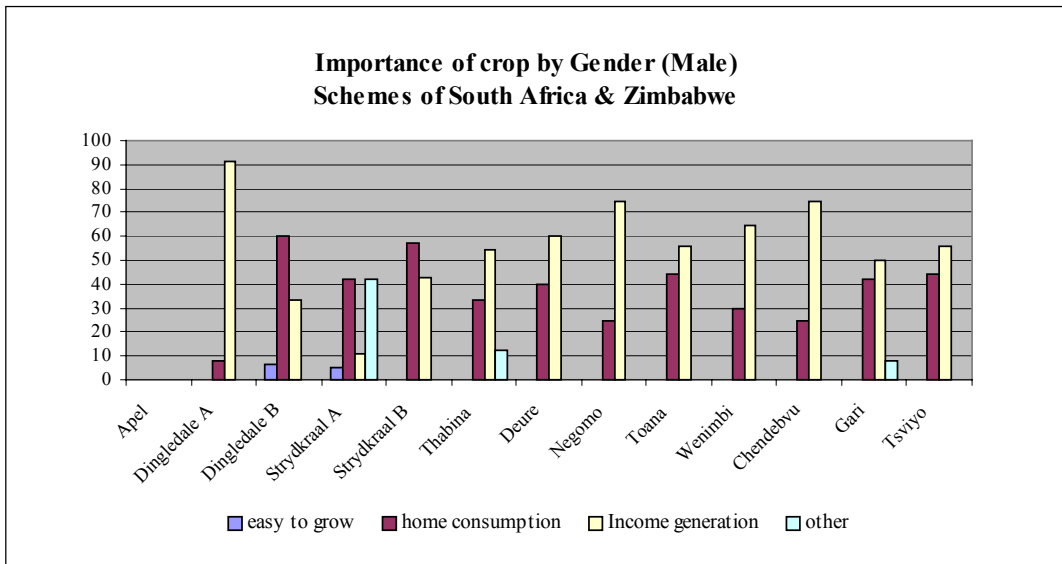


Figure 5

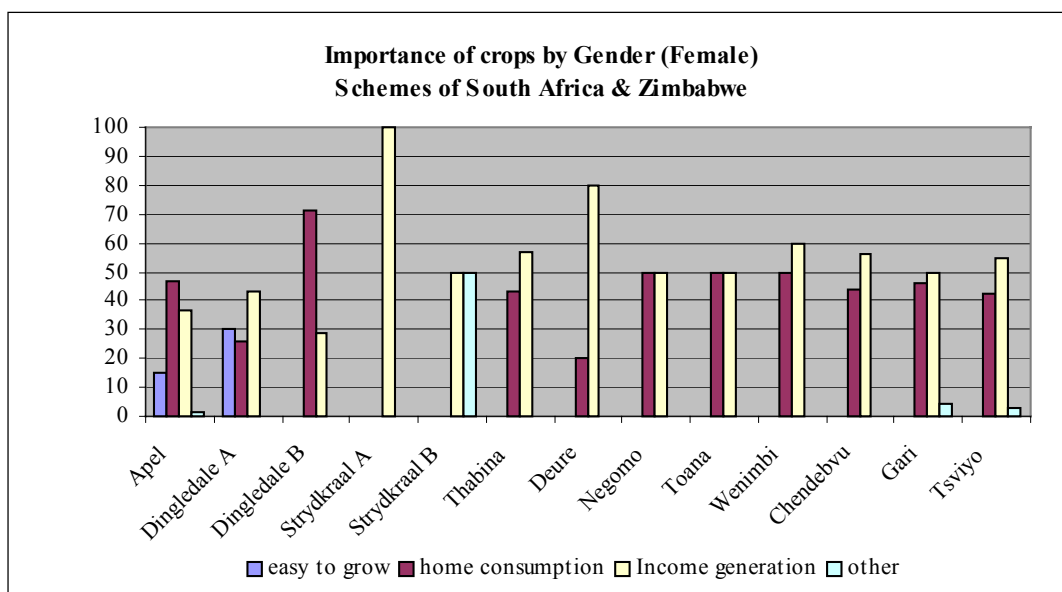


Figure 6

Table 1 Gender Count in all the schemes of South Africa, Zimbabwe and Swaziland

South Africa Schemes	M	F	Zimbabwe Schemes	M	F	Swaziland Schemes	M	F
Apel	0	16	Denure	5	5	Ntamakuphila	11	6
Dingledale A	8	10	Negomo	6	4	Nkwene	2	10
Dingledale B	12	3	Toana	5	5	Mbekelweni	6	9
Strydkraal A	8	2	Wenimbi	7	3			
Strydkraal B	1	9	Chendebevu	1	8			
Thabina	9	11	Gari	3	8			
			Tsviyo	2	8			

Table 3 Schemes Sorted By Plot Sizes

Plots < 0.5ha															Plots 0.5 - 1.5ha					Plots >1.5ha			
	Apel	Gari	Tsviyo	Chendebyu	Mbekelweni	Nkwene	Ntamakuphila	Denure	Taona	Negomo	Strydkraal	Thabina	Dingleydale	Wenimbi									
Importance of crops, Why?	Food	Money	Money	Food Money Demand	*	*	*	Demand	Demand	Demand	Market demand Food	Market demand	Market demand Food	Demand									
Factors affecting crop choice	Production	Production	Production	Production	Labour	Weather	Weather	Extension Profit	Profit	Food Demand	Demand Production	Production	Food	Production									
Factors affecting amount grown	*	*	*	*	Season Timing	Resources	Decide in group meeting	*	*	*	*	*	*	*									
Factors determining price	Quality	Quality	Quality	Quality	Quality	Quality	Demand	Market	Market	Market	Market Quality	Market	Market Sellers	Market									
Main Customers	Local	Local	Local	Local	Local	Local	Local Distant	Local	Distant	Distant	Local	Local	Local	Distant									
Special problems	Production	Transport Market	Capital Transport	Capital Transport Weather	Transport Competition	Production Social	External Linkages & Transport				Finance Production	Infrastructure	Finance	Management									
Aspects needing attention	Infrastructure	Production AIS	AIS	Production AIS				AIS Production	Production	AIS	Market Infrastructure Production	Market Access	Infrastructure	AIS									

* The scheme was not asked this question

- AIS: Access, information and support

Table 4 Schemes Sorted By Levels Of Commercialisation

	Highly commercialised		Moderately Commercialised			Minimally commercialised							Unknown			
	Wenimbi	Negomo	Thabina	Dingleydale	Denure	Taona	Gari	Tsviyo	Chendebru	Apel	Strydkraal	Mbekelweni	Nkwene	Ntamakuphila		
Importance of crops, Why?	Demand	Demand	Market Demand	Market demand Food	Demand	Demand	Money	Money	Food Money Demand	Food	Market demand Food	*	*	*		
Factors affecting choice of crop	Production	Food Demand	Production	Demad Food	Extension Profit	Profit	Production	Production	Production	Production	Demand production	Labour	Weather	Weather		
Factors affecting amount grown	*	*	*	*	*	*	*	*	*	*	*	Season Timing	Resource	Decide in group meeting		
Factors determining price	Market	Market	Market	Market/Sellers	Market	Market	Quality	Quality	Quality	Quality	Market Quality	Quality	Quality	Demand		
Main Customers	Distant	Distant	Local	Local	Local	Distant	Local	Local	Local	Local	Local	Local	Local	Local Distant		
Special problems			Infrastructure	Finance Management			Transport Market	Capital Transport	Capital Transport Weather	Production	Finance Production	Transport Competition	Production Social	External linkages Transport		
Aspects needing attention	AIS	AIS	Market Access	Infrastructure	AIS Production	Production	Production AIS	Production AIS	Production AIS	Infrastructure	Market Infrastructure Production					

* The scheme was not asked this question

• AIS: Access, information and support

Table 5 Schemes Sorted By Key Constraints

Water		Credit/Marketing			Marketing							Unidentified			
	Apel	Tsviyo	Chendebyn	Wenimbi	Strydkraal	Gari	N'amakophila	Mbekelweni	Nkwene	Thabina	Dingleydale	Denure	Taona	Negomo	
Importance of crops, Why?	Food	Capital	Food Money Demand	Demand	Market demand Food	Money	*	*	*	Market demand	Market demand Food	Demand	Demand	Demand	
Factors affecting choice of crop	Production	Production	Production	Production	Demand Production	Production	Weather	Labour	Weather	Production	Demad Food	Extension Profit	Profit	Food Demand	
Factors affecting amount grown	*	*	*	*	*	*	Decide in group meeting	Season Timing	Resources	*	*	*	*	*	
Factors determining price	Quality	Quality	Quality	Market	Market Quality	Quality	Demand	Quality	Quality	Market	Market Sellers	Market	Market	Market	
Main Customers	Local	Local	Local	Distant	Local	Local	Local	Local	Local	Local	Local	Local	Distant	Distant	
Special problems	Production	Capital Transport	Capital Transport Weather		Finance Production	Transport Market	External linkages Transport	Competition transport	Production Social	Infrastructure	Finance Management				
Aspects needing attention	Infrastructure	AIS	Production AIS	AIS	Market Infrastructure Production	Production AIS				Market Access	Infrastructure	AIS Production	Production	AIS	

* The scheme was not asked this question

• AIS: Access, information and support

Table 2 Schemes Sorted Out By Country

SOUTH AFRICA					ZIMBABWE							SWAZILAND			
	Apel	Thabina	Dingleydale	Strydkraal A	Denure	Taona	Wenimbi	Negomo	Gari	Tsviyo	Chendebyu	Mbekelweni	Nkwene	Ntamakuphila	
Importance of crops, Why?	Food	Market demand	Market demand Food	Market demand Food	Demand	Demand	Demand	Demand	Money	Money	Food Money Demand	*	*	*	
Factors affecting crop choice	Production	Production	Food Demand	Demand Production water	Extension Profit	Profit	Production	Food Demand	Production	Production	Production	Labour	Weather	Weather	
Factors affecting amount grown	*	*	*	*	*	*	*	*	*	*	*	Season Timing	Resource	Decide in group meeting	
Factors determining price	Quality	Market	Market Sellers	Market Quality	Market	Market	Market	Market	Quality	Quality	Quality	Quality	Quality	Demand	
Main Customers	Local	Local	Local	Local	Local	Distant	Distant	Distant	Local	Local	Local	Local	Local	Local Distant	
Special problems	Production	Infrastructure	Finance Management	Finance Production					Transport Market	Capital Transport	Capital Transport Weather	Competition Transport	Production Social	External linkages Transport	
Aspects needing attention	Infrastructure	Market Access	Infrastructure	Market Infrastructure Production	AIS Production	Production	AIS	AIS	Production AIS	AIS	Production AIS				

* The scheme was not asked this question

• AIS: Access, information and support

Table 6 Schemes Sorted By Management Type

	Farmer			Farmer/NGO			Farmer/Agency			Agency			Unknown		
	Apel	Wenimbi	Tsviyo	Chendebyu	Gari	Thabina	Dingleydale	Strydkraal	Denure	Taona	Negomo	Mbekelweni	Nkwene	Ntama-kuphila	
Importance of crops, Why?	Food	Demand	Money	Food Money Demand	Money	Market demand	Market demand Food	Market demand Food	Demand	Demand	Demand	*	*	*	
Factors affecting choice of crop	Production	Production	Production	Production	Production	Production	Demand Food	Demand production	Extension Profit	Profit	Food Demand	Labour	Weather	Weather	
Factors affecting amount grown	*	*	*	*	*	*	*	*	*	*	*	Season Timing	Resources	Decide in group meeting	
Factors determining price	Quality	Market	Quality	Quality	Quality	Market	Market Sellers	Market/Quality	Market	Market	Market	Quality	Quality	Demand	
Main Customers	Local	Distant	Local	Local	Local	Local	Local	Local	Local	Distant	Distant	Local	Local	Local	
Special problems	Production		Capital Transport	Capital Transport Weather	Transport Market	Infrastructure	Finance Management	Finance Production				Competition Transport	Production Social	External linkages Transport	
Aspects needing attention	Infrastructure	AIS	AIS	Production AIS	Production AIS	Market Access	Infrastructure	Market Infrastructure Production	AIS Production	Production	AIS				

- * The scheme was not asked this question
- AIS: Access, information and support

Towards Sustainable Smallholder Irrigated Businesses (SIBU)

DFID KAR Research Project R 7810

Annex 2: Phase 2 Research findings

**Report OD 149 - Annex 2
March 2003**

Towards Sustainable Smallholder Irrigated Businesses (SIBU)

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Appendices

Appendix 1

Appendix 2

1. INTRODUCTION

The first year of this research focused on identification of the main constraints to successful business on a broad front over a variety of smallholder irrigation schemes in southern Africa. The results were presented and validated at the Hoedspruit workshop in June 2001. A brief resume is provided later the details are contained in Annex 1.

The effectiveness of decision-making arrangements and the confidence with which farmers could produce for the market were clearly universal problems. It was clear that the second year of research should take a deeper look at the issues within this problem statement to increase understanding of why decision-making is a difficult area when clearly individual farmers are quite capable of, and do make, effective decisions. Similarly to investigate whether the problems of marketing, are knowledge-based or price-based relating to quality control or if they are exacerbated by poor decision-making or unequal access to commercial linkages?

The feeling of the research team and the collaborating agencies was that further research should attempt to understand the processes at work rather than simply collect more data, although some further data may be needed to develop better understanding. A large and complicated scheme was chosen as representative of challenging marketing and decision-making conditions. This annex details the research that took place in the second year and presents the work in the form of the reports on which the second workshop discussions was based. The workshop outcomes are recorded briefly in this annex and form the basis of the recommendations in the main document of Report OD 149.

2. PHASE 1 INVESTIGATION

2.1 Issues facing smallholder irrigators

1. Individuals and households are quite clear about their objectives, but irrigation organisations or committees find this more difficult. Many small irrigation schemes organisations have trouble in making decisions to improve commercial viability, because individuals who must co-operate in order to obtain water must also compete to sell or produce. The level at which co-operation should give way to competition is not given; it depends on the circumstances in which the scheme operates. The location of irrigation schemes in Southern Africa, often determined by past policy rather than commercial considerations, adds to their problems. Present day smallholder irrigators find themselves struggling for commercial success with inappropriate hardware in remote areas where produce demand is presently weak. The poverty of people in the rural areas influences the strength of local demand. In many cases, this leads to pressure on irrigators to seek distant markets and change crop-choices accordingly, in others the scheme historically operated this way. The difficulty and cost of accessing distant markets is often such that the commercial success achieved by this strategy is low or intermittent and does not promote financial or food security.
2. Direct support, previously provided by government, is being withdrawn and the challenges facing farmers are enormous. Irrigation reduces risk and provide for year-round production thus offering opportunities for business development. However, institutions and capacity to manage irrigation from within irrigating communities, need to develop. In the short term, and in some areas possibly in the long term, support of some sort will be needed. This KAR research aims to guide policy in supporting irrigating farmers to identify appropriate strategies for establishing and managing their irrigation farm businesses.
3. **Fifteen schemes were investigated in Phase 1, they included :**

South Africa

Four irrigation schemes, Thabina, Dingleydale, Strydkraal and Apel, all situated in Northern Province. Three are closely linked to the Department for Agriculture in Northern Province and the fourth has developed as a community initiative supported by Apel Mission.

Swaziland

Four irrigation schemes, Lilanda, Nkwene, Mbekelweni and Ntakamuphila all contributed information through the survey. Background data were collected where possible.

Zimbabwe

Four AGRITEX schemes, Duere, Tawona, Negomo and Wenimbi and three CARE irrigation gardens, Gari, Tsiyo and Chendebvu were investigated by survey and background data.

In addition, the South African schemes took part in follow up discussions with the research teams. The survey results and background reports suggested that marketing is the key constraint in many of the schemes across all countries, all scheme and plot sizes and all levels of commercialisation. Although other constraints such as water and access to credit are important, they are only occasionally regarded as key constraints.

4. The workshop identified major issues :

- 4.1 There is a need to demonstrate to farmers and other players in irrigation, that clear, well-defined, group objective and targets can provide tools with which to improve the productive and economic performance of schemes.
- 4.2 The processes of decision making and who are the appropriate people to be involved, are key issues in the success of both production and marketing. Many farmers rejected group decisions at all levels because they were so difficult. However, to manage a communal system for the common good, agreement must be reached at some level.
- 4.3 Links to market information were seen as particularly limiting. Improvements are needed in the distribution and dissemination of market information providing with it sufficient analysis of :
 - trends
 - consistent seasonal characteristics
 - differences associated with location
 - and the impact of product differentiation on price
- 4.4 Lack of good information on economic and financial aspects of available technologies limits the ability of farmers to make appropriate choices. Farmers need to adopt a systematic approach to deal with the situation.
- 4.5 Countries, Government and Non-Government Organisations differ in their agricultural policy and the planned administrative structure of irrigation schemes and their approach. In all cases, greater farmer participation in policy formulation is an important aim.
- 4.6 Training was mentioned in every workshop session particularly in relation to marketing techniques, handling of contracts and planning. The precise nature of skills in which training should and could be given to improve the sustainability of smallholder irrigated farm businesses or small and medium enterprises in a cost-effective manner needs investigation.

5. Workshop participants identified two key issues for monitoring and investigation in Phase 2

Firstly, **determination of appropriate institutions and training.** The complete relationship between policy and institutional change, and ongoing provision of relevant training, needs analysis, particularly in relation to improving the quality and inclusiveness of participation.

Secondly, **the role of relevant accessible market information in enabling consistent profitability** was considered another key factor in the establishment of sustainable businesses.

6. The investigations and further research in relation to institutions and training will take place in the context of smallholder schemes in South Africa, where the relationship between the individual or household objectives and decision-making, and objectives and decisions adopted by the scheme organisation, is undergoing significant change.

The large scheme comprising Dingleydale and New Forest was chosen to illustrate clearly the complexity of participation and decision-making issues. The scale tends to highlight problems that are easily overlooked in smaller schemes.

Swaziland has already gone some way in developing market services for smallholder growers. A key issue will be analysis of arrangements for delivery of market information and access to it by men and women smallholders, contrasting the sugar and vegetable sectors. The relatively small size of Swaziland lends itself to close investigation of the communications between Ministries in the generation of information and between institutions and farmers in disseminating and accessing information.

Farmers appreciate that without strong commercial links they will continue to struggle to achieve the level of profitability needed to ensure sustainability of their scheme. Information on scheme costs, and therefore what the minimum level of profitability is required, is generally not readily available to them or to the outgoing government agencies. This is a major impediment to setting realistic objectives.

Much discussion centered on the problems faced when attempting to convert schemes set up by outsiders with welfare objectives (although sometimes poorly designed even for that objective) to independent commercially viable community-based businesses. It was agreed that a key factor in achieving this transformation is the supporting role of the state, or of private businesses or of NGO's towards irrigators. The key issue is determining what roles are appropriate and affordable and how these can be achieved.

3. PHASE 2 INVESTIGATION

3.1 Communication, Information and Participation at Dingleydale and New Forest

1. Introduction and method

Interviewees with active and non-active farmers from both Dingleydale and New Forest were compared to investigate differences between men and women, and between the schemes. A total sample of 130 people was interviewed of whom 90 were men and 40 women.

Local researchers used informal structured interviews to gauge how people within the scheme got information, their views about change from government to farmer management and the chances of a successful future. People from different areas of the schemes were systematically interviewed in the plots and in the villages. An informal approach was used to allow participants to bring up issues that they considered important. It was also hoped that farmers would find it easy to talk to local people. There are, potentially, disadvantages associated with local researchers, such as social perceptions of the interviewers, and local opinion, but after discussion with the development committees it was agreed that in this case the effects would be minimal. Women interviewers were chosen to put women farmers at ease and in the knowledge that it was unlikely that men would find women threatening. This also provided an opportunity to enhance the women's skills, interest them in aspects of scheme organisation and management, and provide employment and also to provide new role models for local women. Part 1 looks at the employment and also to provide new role models for local women. Part 1 looks at the contrasts between men and women respondents and Part 2 at effects of location.

PART 1

2. Demography

The average age of men and women interviewed is very similar but women had spent longer farming, which suggests that some men had spent time away at other jobs. The women farms have smaller plots and slightly less land at their disposal per person in the households but the difference is not large and does not support the general perception that land allocation of tribal authorities is heavily loaded in favour of male farmers.

Table 1 People and households

Averages	Men	Women
Age	56.5 (std 14.6)	58.1 (std 12.9)
Family Size	7.8	5.7
Years farming	22	28
Ha/person in households	.30	.24

3. Land Holding

Men control more land than women but both are confident about ownership of the plots despite lack of title deeds. Men's lower ownership figure perhaps reflects borrowing by more than 15%+ of men. There is no borrowing reported among the women. The data does not reveal reasons for this gender difference, but possible explanations might be that women prefer not to borrow, or are unable to do so for social, cultural or economic reasons.

Table 2 Land size and tenure

	Men	Women
Plot size	2.37 hectares	1.37 hectares
Owned	71 %	83 %
Illegal	4 %	5 %
Borrowed	11 %	0
Owned & Borrowed	4 %	-

4. Problems

Men prioritise marketing problems. There may be a number of explanatory factors. Firstly the stimulus of the development initiatives on the scheme that has been largely directed to men and commercial production. Secondly, the perceived focus of men on cash crops (although not apparently significant here - see Table 6) and the larger quantities with which men deal. Tractors are problematic for women, which is to be expected due to high costs and informal linkages between men and tractor drivers. There seemed no gender implication in relation to water. However, markets vex women less.

Table 3 Perceived problems

Men's views on problems	Women's views on problems
Markets (69 %)	Fencing (58 %)
Fencing (61 %)	Tractors (58 %)
Water (58 %)	Water (55 %)
Tractors (50 %)	Markets (55 %)

5. Information

Knowledge about what is happening, what choices are to be made and why, is vital to participation. It is essential to know where and when meetings are to be held and to understand the objectives and background of issues for discussion. There are significant differences between men and women in the way information is received and it is more than likely that, because of the different communication routes used, the quality of information also differs.

Table 4 Information sources

	Men (%)	Women (%)
Relatives	3	28
Other farmers	9	50
Extension	31	2
Committee	17	10
LVA	1	0
Multiple Sources	18	0

Women get less information delivered directly. Four times as many men as women get information from extension services and the committee. Eighteen percent of men get information from several sources bringing potentially well-informed men to 66%. Among women, only 12% are potentially well-informed. This gender difference is related to the fact that there is no women extension officer. The longer route that information takes to reach women, via extension and men farmers, may well influence both the number of messages that are passed on and the quality of the

messages received. Although it reaches more men than women, the Committee reaches relatively few people directly and overall needs to improve communications.

Low literacy rates are a barrier and the more people a message has to go through before reaching the final recipient the less accurate the information becomes. It is therefore important to organise good information flows. Even for those who can read there is a lack of suitable places to post information. However, notice boards have been recently commissioned and it is hoped that in time looking for the latest notices will become a habit in the area.

6. Participation

The level of participation was assessed by assigning a score to different levels of participation then averaging the scores over subgroups such as schemes, men and women. The method did not differentiate between people, who went regularly to meetings and those who had only been to a few, hence the very similar figure for men and women. The only area where men and women seemed to be significantly different was in the number of recent returnees to farming. This finding is consistent with the information in Table 1.

Table 5 Participation and activity levels

	Men	Women
Participation	1.69	1.65
Didn't know about the management committee	6 %	10 %
Didn't understand what was happening	38 %	43 %
Not actively farming	10 %	12 %
Returned to farming recently	23 %	10 %

7. Crop Choices

The differences between men and women's crop choices are surprisingly small but the data does not reveal cropped areas and undoubtedly there will be differences of scale. Nonetheless this information leads one to question the much-quoted assumption that women concentrate on food crops whilst men focus on cash crops. There was a higher percentage of women simply farming for subsistence (see Table 7) but at 12% this was small compared to the 63% who gave evidence of marketing activities. Information about fertiliser use was not specifically gathered. Among those that offered details, men use an average of 13 bags, whereas women used 10 bags. However, rates of application may be about the same. However, no statements can be safely made without more information.

Table 6 Most mentioned crops

	% Men growing the crop	% Women growing the crop
Maize for cobs	12	5
Maize	71	70
Tomatoes	48	43
Paprika	12	10
Onions	21	28
Beans	41	43
Cabbage	19	17
Sweet Potato	9	10
Cassava	12	12

Pumpkins	9	10
Green Beans	7	5
Peanuts	13	25

8. Markets and related issues

Information about marketing was scarce, only three quarters of the sample provided information. Slightly lower number of men travelling to town markets may be influenced by necessity to attract buyers to collect the large quantities involved from the field. It may also reflect that women have less commercial links and need to seek market places to forge new links. The few who farmed only for subsistence were mainly women.

Table 7 Markets

	Men %	Women %
Marketing at a distance	0	0
Marketing in nearby towns	2	5
Marketing locally	68	58
Off field	11	12
By the road	12	15
Just local	36	24
Under contract	9	6
No information given	26	25
Growing for subsistence only	4	12

9. Other income

Overall 32% of the sample had no other income source and only one lady reported having remittance from absent family. Another 32% were in receipt of pensions and this group had proportionally more women but the pensions they reported may not all have been their own. The proportion of women who had income from a job was much lower than the figure for men but roughly the same proportion of men and women had developed some sort of non-farming business, and although the total numbers are small this is heartening.

Table 8 Additional income sources

	Men (%)	Women (%)
None	34	25
Remittances	0	2.5
Pensions	26	40
Job	20	7.5
Business	7	7.5

10. View of the Future

Women appear to be significantly more optimistic than men. There may be a case for assuming those women have a less developed sense of risk, or have a good impression of the managing committees' ability. Another possible explanation is in their different view of the objectives for scheme development.

Roughly the same proportion of men and women took a pessimistic view of the future, but by far the largest group in both cases, was cautiously optimistic but on condition that certain pre-conditions existed. The most frequently mentioned pre-conditions related to markets - "If the market is there, the farmers will be able to grow and sell".

Table 9 View of the future

	Men (%)	Women (%)
Optimistic	9	32
Potential with conditions	68	40
Negative	14	15

PART 2

The locations considered are the 'Top end' of Dingleydale served by Dams 1 to 5, the remainder was taken to be the 'Tail end'. New Forest being more compact system was taken as one unit. The sample is smaller because non-active farmers were not included in this part of the analysis.

11. Demography

Farmers at the lower end of Dingleydale are younger and have more land. At New Forest less land is borrowed, however it has the phenomenon of illegal plots. Few people did not use all their land, which is hard to interpret given the assertion that 'people cannot afford to farm'. That led us to expect that more people would farm only a portion. The small number of part users suggests that shortage of cash is not the only problem.

Table 10 People and household : land size and tenure

	Age	Family size	Plot Size	Owned %	Borrowed %	Part Borrowed %	Illegal %	Part Used %	No Info %
DD top	55.8	7.3	1.7	71	5	15	0	5	4
DD Tail	53.5	8.2	3.8	45	9	9	0		35
NF	59.2	6.4	1.8	61	14	0	9	3	13

Although food provision is the main reason for taking up farming, the influence of close relatives and extension staff is surprisingly strong. The high proportion that gave no information probably indicates that the question seemed difficult.

Table 11 Motivation to take up irrigated farming (%)

	Food	Retrenchment or unemployment	Influence of others	No information
DD1 - 5	29	20	20	31
DD 6 - 9	45	18	3	32
NF	35	5	24	31

12. Problems

Fencing and water are important throughout the area, and although water is the primary issue at Dingleydale it comes only 4th in importance at New Forest. Tractors and inputs were generally less important than fencing and water except at the top end of Dingleydale. Lack of co-operation was not identified as a major issue in either scheme but was persistently mentioned. Extension is clearly well down the list all over and shows an evenness of access. Although farmers do want and need increased services, one of the most mentioned aspects was the lack of extension visits to the farmer plots, clearly an expensive extension option that the older farmers remember from the past.

Table 12 Problems

	Fencing	Water	Input availability	Tractors	Lack of co-operation	Lack of extension
DD 1 - 5	1st =	1st =	1st =	4th	5th	6th
DD 6 - 9	2nd =	1st	4th =	2nd =	4th =	6th
NF	1st	4th	3rd	2nd	5th	6th

13. Information

Extension reliably covers about one third of the farmers. Information flows are very similar throughout the areas but there appears to be a noticeable failure of flow from the Committee to farmers and from farmer to farmer in the lower half of Dingleydale. Communicating information in an area where Committees should consider how improvements could be made.

Table 13 Information sources

	Relatives	Other Farmers	Extension Officers	Committee Members	LVA	Multiple Sources	% receiving info
DD Top	0	14	29	14	0	12	71
DD Tail	13	0	31	0	0	32	74
NF	2	11	30	12	2	16	77

14. Participation

The score was calculated by marking each interviewees according to whether they merely received information, went to meetings, took part in committees, training, etc. The lowest level scores 1. The next level, going to meetings, scored 2. An average score above 2 indicates full participation, however a score of 1.5 indicates a good level is being achieved. So scores of 1.68 are very satisfactory. Participation in Committees and training scored 3 and 4 but the audience was expected to be low in a scheme this size. However, in the top part of Dingleydale, almost a quarter of the sample was Committee members, so the result overstates the participation level. The overall result shows the success of the Water Care Project.

Table 14 Knowledge, understanding and participation

	Didn't know about the MC's existence	Didn't understand what was happening	Participation level
DD 1 - 5	10	30	2.04
DD 6 - 9	14	45	1.68
NF	9	61	1.68

15. Crop Choices

The main crop on the scheme is maize closely followed by tomatoes at Dingleydale and tomato, beetroot and spinach at New Forest. Beans are also popular throughout but Paprika was largely grown in Dingleydale as this was the focus of activity in the Paprika project (see Paprika note). The variety of crops was impressive, 23 were mentioned of which the 13 main crops are listed

Table 15 Crops and fertiliser use (%)

	DD 1-5	DD 6-9	NF
Maize for cobs	10	36	2
Maize	86	68	66
Tomato	45	64	38
Paprika	20	20	4
Onions	24	14	31

Beans	48	33	35
Cabbage	5	30	22
Sweet Potato	5	5	9
Cassava	15	5	9
Pumpkins	5	10	14
Green Beans	0	0	9
Peanuts	40	0	16
Beetroot & spinach	14	14	52
Confirmed use of fertiliser	61	72	60

Most farmers use fertiliser but we did not specifically gather information on amounts and areas. Individuals who quoted both used approximately the recommended amounts, but these were very few and possibly others used very small amounts. Other sources indicate people buy fertiliser in small quantities.

Farmers with bigger plots cultivated maize cobs, paprika was more widely grown than the information on contracts in Table 16 suggests. This latter fact indicates a lack of understanding of the contract situation (see Paprika note). The trend towards diversification seems strong at New Forest; dependence on grain maize is greatest in the upper part of Dingleydale.

16. Marketing

Local marketing dominates much being sold directly off the field and from the roadside. The figures on contracts indicate low levels throughout the scheme and medium distance marketing is undertaken by the very few who can access transport. Other than in projects, virtually all marketing is done individually.

Table 16 Markets

	No info	Local	Contracts	Medium distance	Subsistence only
DD 1 - 5	14	61	5	5	14
DD 6 - 9	17	73	10	0	0
NF	28	59	7	2	2

17. Other Income

All rural livelihoods depend on a mix of income sources. Although pensions are significant throughout the scheme they are more so in New Forest. Pensions may ultimately become less important if irrigation becomes more profitable. Increases in jobs and businesses will depend largely on the success of the irrigation scheme. Currently jobs are found in government, security work at local schools and hospitals and these are unlikely growth areas. The few businesses mentioned were mostly in New Forest.

Table 17 Other income sources

	No other incomes %	Pensions %	Jobs %	Businesses %	Getting some non farm income %	No information %
DD 1 - 5	43	24	14	0	38	19
DD 6-9	41	14	18	4	36	23
NF	26	33	17	9	59	15

18. View of the future

People's views were sorted into three categories. Firstly, those who were optimistic, secondly, recognised potential provided government or some other external force provided suitable preconditions, using phrases such as 'if the market is there', and lastly, those who felt success was remote.

Table 18 Future prospects

	Optimistic	Potential with conditions	Negative
DD 1 - 5	28	42	9
DD 6-9	4	72	18
NF	12	63	12

Optimism is not widespread but is higher in the upper part of Dingleydale where the sample contained more Committee Members. The majority thinks that success is possible but only if there are a number of features in place. The most commonly mentioned is **reliable demand for produce**, followed by reliable technical and physical services on scheme, such as tractors and sprayers for hire. Some people mentioned training and co-operative action in this context. It was clear that farmers expect favourable conditions to be somehow created by authority.

19. Conclusions

1. The men and women on the irrigation schemes are relatively old and therefore have some difficulty in changing their attitudes and farming behaviour. Past experiences has a strong influence on their perception of irrigation management, the trust they accord authority and other subgroups of farmers.
2. Gender and location analysis has revealed differences between men and women and people living in different parts of the scheme, however the basic nature of the problems is the same through the scheme. Water, fencing, marketing and production issues are all important and require simultaneous attention.
3. Participation levels on both schemes are relatively good, although there is some cause for concern on patches of Dingleydale. However, there is evidence to suggest that communication is generally poor and needs to be improved, particularly regarding the issues involved in the management change. (A number of factors combine to make communication difficult. The numbers of farmers, the layout of the system and the living areas so that people must walk long distances to do business and to attend meetings, poor literacy and perceived barriers.) Information sources are very different for men and women.
4. Women get less direct contact from extension and from the committees and it is probably that they receive less information in total and that it may be of poor quality. (The committees are aware of the need to improve communication and are developing new strategies.) The poor literacy among older women in South Africa is a barrier to communication and the unreliability of verbal messages also gives rise to problems.
5. Differences between men and women in relation to their irrigated farm activity do exist. They are more linked to scale than to crops. The data gathered does not support the view that women concentrate on different crops to men, although the emphasis they accord different crops may differ. Crop differences between schemes are also relatively small and are possibly linked to project activities such as growing

paprika or green beans under contract. There is a link between larger farms and the growing of maize cobs for sale.

6. Local markets are very important in all areas and to both men and women. Produce is sold off the field, some directly to consumers but much to middlemen. All the transactions seem to be made directly between individuals and this undoubtedly puts the farmers in a weak position, particularly when no alternative market is readily available. There was no indication of any grading activity by farmers although this is part of project activity (see Paprika note).
7. Although many irrigators are in receipt of pensions, few have jobs and small businesses and many have no alternative source of income and are therefore very vulnerable to failure. However, this situation develops high incentives to farm profitably and successfully take over the water delivery business of the scheme. Pensions are small and often support a large number of people so the insurance value is minimal and should not be overstated.
8. A small number of men and women, is pessimistic about the future, although it is slightly higher at the tail end of Dingleydale. These people are most vulnerable to poor water management so anxiety is understandable. Another similarly small group is very optimistic, mainly women. However, the majority sees possibilities of a good future only if markets and support services are assured. They still look to government to assist them.

3.2 Administration

1. Management Structure

Management committees are essentially elected bodies, however, at the start of the development or transfer process, it may be practically impossible to mobilise the electorate. There are a number of factors such as lack of clarity about ownership and cultivation rights, lack of a communication network, lack of trust on the part of the irrigators. Thus it is often the case that the first committee(s) are either appointed or elected using sub-optimal procedures reaching only a proportion of the total electorate. This is the best option but poses a number of problems relating to the validation of the committee and support for its activities. Nonetheless, developers and ministries perceive the establishment of a committee to represent irrigators' interests as an essential step in legitimately negotiating terms and conditions with the outside world. A committee also facilitates decisions that must be centrally agreed in order to sustain the scheme. The decision-making process is central to sustainability and is dealt with in detail separately. This part of the investigation considers practical issues for scheme administration and management.

2. Managing committees activities

In the past committees existed but the role was always secondary to agency management of the schemes. The main function was to channel instruction to farmers, and farmer needs to the agency. These committees became run down as government became less and less able to manage the schemes effectively due to lack of resource and in a climate of negative political will. Their extinction was gradual and informal with no proper disbanding process. This left an unsatisfactory situation for past committee members and new committees alike. However, it is clear to all stakeholders that forward progress is essential to development and strategies must be found to ameliorate this situation as best as possible.

3. **Dingleydale and New Forest**

These schemes share a complex water delivery system and in that way could be regarded as one scheme. However the former administration imposed different homeland governments on the two portions of the scheme. This division more or less coincided with a physical rationale - those obtaining water from the Thulandziteka River above Orinoco dam on the New Forest side. Each part of the scheme has a management committee and because this is a relatively large scheme, each dam area has a dam committee which is represented on the management committee. The many functions of the management committee were organised in a portfolio system each developing a specialist committees dealing with technical matters, services and so on. Each is answerable to the management committee and reports to it regularly at monthly meetings. Fine-tuning of this structure is being undertaken to bring the activities of these specialist committees closer to the electorate and provides more positive and immediate linkages with the dam committees.

4. **Revitalisation**

The management system is designed to encourage participation, foster transparency and facilitate decision-making and is being developed by Limpopo Department of Agriculture as part of its *Water Care Project* smallholder revitalisation and hand over programme. The regular meetings of the managing committees not only include formal monthly meetings at which the portfolio / subcommittees report, but weekly day management committees to deal with ongoing decisions. Portfolio committees have their own needs-based regime of meetings. In this large scheme each dam consists of approximately 100 to 150 households and they too have an elected committee with a regular schedule of meetings. Links between scheme management and the wider community and its institutions are provided through development forum meetings that ratify the management committee in the broader development scene in the district. There are many opportunities for involvement but the structure puts high demands on the active participants.

5. **Committee challenges**

Committees face significant challenges in shouldering responsibility for a scheme. The territory is relatively uncharted. The role model of successful farmer-managed smallholder irrigation schemes is elusive. The market for produce is highly competitive and the resources of irrigators are usually sparse and unreliable. This is not only a problem for those who have volunteered for committee duties but also poses problems for the outgoing agency, in this case the Department of Agriculture, the consultants they employ, in determining the nature and delivery of support required for irrigators to establish new community-based irrigation businesses.

6. **Institutional context**

In addition, the institutional context of the development is in process of adjusting to changes in policy and law governing water resource management and the implementation of the 1998 Water Act. The establishment of Catchment Management Agencies (CMA) under the direction of the Department of Water Affairs (DWA) and the registration of Water User Associations (WUA) have direct implications for management of smallholder irrigation. Schemes are encouraged to take on WUA status and activities. There are potential advantages for them in acquiring legal status, accessing grants, establishing themselves on a business footing and developing a relationship with the CMA. There are also responsibilities such as production of business plans and development of welfare roles.

7. **Learning Curve**

Irrigators have the opportunity for self-determination within the WUA framework. They can choose to organise run themselves as collective or co-operative businesses

or they can opt for sharing a common water resource and continuing farm businesses as individuals. In order to make this choice that will best meet their objectives they need information about many aspects of the farming system. These can be summarised :

- Water capture, storage and distribution
- Financial viable water distribution businesses
- Production resources and services
- Market information and linkages
- Business planning and budgeting

Many of the *Water Care Project* committees have come a remarkably long way in a short time on all these fronts. As a result they have strengthened their links with other community actors such as the tribal and municipal authorities, service providers and the farmers themselves. However, the challenge remains of establishing a sustainable new system.

8. Responsibilities and activities

Phase 2 monitoring of the management committees investigated the content and attendance of the many meetings that are involved in the system over a six month period. The committees did the monitoring themselves to provide a sample experience. Each committee was asked to categorise the attendance at meetings into household typologies to reflect their representation in decision making. The University of Pretoria in work that formed the basis of the SMILE software identified household typologies in each earlier study.

The analysis of the monitoring revealed :

- Meetings are held regularly and are well attended
- The total number of meetings per month is higher at Dingleydale than at New Forest
- Attendance at meetings declined over the period at New Forest and increased over the period at Dingleydale
- In Dingleydale there is a better spread of representation across the different types of household. At New Forest female participation is low and subsistence farmers are not represented

Issues:

- The issues under discussion in New Forest were predominantly administrative in nature whereas practical issues were the priority at Dingleydale
- In New Forest the Management Committee are responsible for solving most issues, in Dingleydale the Technical Committee take this role
- It is possible to see the development of business and marketing developments at New Forest with the purchase of a computer and an electricity connection, both have yet to happen at Dingleydale.

Training:

- The flow of training is more regular at Dingleydale with events every month except July. Less training events and less regularity in New Forest

Service Provision:

- Information clearly indicates some progression at New Forest, the information is less clear for Dingleydale and therefore inconclusive

9. Voluntary contributions

Committee membership is unpaid and time consuming. It is essential therefore that members are able to achieve and benefit from overall improvement of conditions on the scheme. Improvement must at the end of the day contribute to a better livelihood for irrigators. The reality of the matter, however, is that there are so many parameters outside the control of the irrigators and their supporters that inevitably some committees and communities will fail to establish sustainable schemes and businesses.

10. Marketing Committee role

A major problem with schemes built to resettle people is their intrinsic unsuitability to competitive markets. Many are far from established commercial markets and local populations that provide effective demand for the products that the scheme was originally designed to grow. However, at Dingleydale and New Forest the surrounding population is extensive and certainly provides demand. At present almost all scheme produce is marketed locally although the prices are low. The greatest success in marketing seems to be in maize cobs for which demand is strong and traders are willing to visit the scheme relieving the farmers of virtually all the marketing costs. The support needed for marketing seems to be unclear. Simple board advertising, or on-scheme grading are possibilities but require farmers to agree and maintain pricing strategies. This is unlikely to take place without an active marketing committee to process information, assess opportunities and develop strategies to enforce the agreed price structure.

11. Implications for elections, membership and communities

Committees are expected to make business decisions in regard to the scheme water distribution network, make decisions regarding the agricultural business environment and seek election ie remain popular. On the one hand this is very demanding of committee members, particularly office bearers and on the other faces members with difficult electoral choices. Another important issue is clear definition of membership and eligibility to vote for a committee and how the member (he/she) relates to that committee in terms of rights and responsibilities. What can he/she reasonably expect the elected committee to do and what can the committee expect of an average irrigator or irrigation household? Can household be given the right to opt out?

12. Implications for links with commerce and supporting ministries

It is unclear how electoral change will impact on links between the scheme and other institutions. Will the scheme have to develop some level of civil service to provide continuity? One view might be that the extension service fulfils this function at present. Is this a sustainable arrangement? Plans are underway for assessment and improvement of the provincial extension service; what are the key training modules required for the service to fulfil a useful role in relation to changing elected committees ?

3.3 The Paprika Note

1. Background

Some years back a Paprika growing project was active on the scheme but results were poor and farmers viewed the event as a bad experience. During this research project another Paprika growing project approached farmers at Dingleydale. The project has been seen as highly controversial for a number of reasons. Briefly these include'

- lack of effective liaison with the Scheme Management Committee
- poor clarity in contractual arrangements with the farmers
- failure to check suitability of agronomic conditions with extension staff
- poor timing of planting and input delivery for production of good grade paprika

The research team made contact with Mr T Bosma, Junior, one of the Project Managers in early 2002, when the main crop was being harvested around the scheme, who kindly agreed to tell us how the Paprika project worked.

2. The Project

The project is funded by IDC the Industrial Development Corporation. The objective is to encourage business development and forget contractual links between farmers and the market. In this case processors of Paprika, which is used extensively in the manufacture of Coca-Cola. Demand is at present high due to the withdrawal of Zimbabwean producers from the scene so an opportunity exists for South African producers to develop skills and market links in producing this crop; a target of establishing 4000ha in the next few years (rumours of poor paprika contracts were rife in Zimbabwe in 1999).

3. The start up

The project sought approval to work on the schemes from the local tribal chiefs and the local authority, securing letters of authority/introductions, and also claimed to have spoken to the development committee. As the committee had complained of being by-passed, there was clearly confusion/manipulation in relation to the identity of the committee. Lack of clear identification and ratification of the new committee in the minds of farmers and tribal authorities contributed. The project had experienced difficulties at the start due to farmers negative experiences with another paprika contractor two years ago. This delayed the start of the programme while trust and confidence was established (and explained to some extent the poor timing).

4. Suitability

The suitability of Dingleydale/New Forest had been investigated by the project, although not in collaboration with the provincial service, and although there are some problems with the soils, a suitable cultivar has been selected. There does however remain a problem with disease and because tomatoes have been so widely grown on the scheme in the past this is a serious problem. Gaseous treatment of the soils is possible but takes time and is very expensive. There is no question of any such treatment this year. It was very difficult for the project to get a clear picture from the farmers about early tomato crops and so much of the paprika has been adversely affected.

5. The crop

Although Paprika is related to tomato and therefore susceptible to similar blights and viruses, the crop is of relatively long duration, staying in the ground for ten months

during which five harvests should be possible. The crop has the ability to more or less pause during the cold weather but revives again and responds to mid season fertiliser and goes on to crop further. Harvesting takes place at approximately four week intervals. A hectare might yield 2.5 tons overall in the season. Although the plants can produce on into a second year the fruits become smaller and therefore the project encourages replanting from seed each year. Late harvesting tends to draw the plants down but they revive after the ripe fruit is taken. Seeds are planted in well-prepared seedbeds and transplanted to the field at approximately five to six weeks old. Water requirements vary as the plant grows but applications average around 20 - 30mm twice per week. The interruption to supply due to the rehabilitation activity caused problems, resulting in late transplanting of the seedlings further contributing to poor timing.

6. The contract arrangements with farmers

When farmers join the project and are approved and given seed those who do not already have a bank account have one opened for them by the project. Careful records are kept of payments into the account and we were briefly shown these. Each farmer is paid from the end of the month in which the seeds are given. They get a wage of R400 for a five month period and then the money to pay labour costs for 3 labourers/ha. The project has 113 farmers cultivating 300 ha and, including all the labour pays over 1000 people. They also employ women directly to grade the paprika. There appeared also to be a number of men employed driving vehicles, but it was not clear if these were local people. In addition, the project is working with the women's development group to prepare a seed bed for a further 30ha of paprika to be grown by the group.

It was not totally clear to us how labourers' wages related to the crop stage but they seem to coincide with weeding and harvesting periods. Presumably the farmers will receive income from harvests soon after the end of the five month period.

7. Grading

The farmers are paid according to grade. Grade 1 is paid R7.5/kg. Grade 2 at R4.50/kg and Grade 3 at 2.75/kg. Colour and freedom from blemish, determine grade. Local women were contacted through an existing Women's Club and were trained to grade the Paprika. Grading is done on the project premises at Dingleydale. There is very little waste and it is treated and returned to the farmers in a suitable form for cattle feed, although cost was not clear. At the time of the investigation the first harvest was in progress and some farmers had yields of over 700kgs. It was not clear how the yields of the successive harvests are likely to vary.

8. Training

Training in Paprika care and cultivation has been given on a group basis and is ongoing. We did not ask numbers but had the impression that all the farmers involved were offered training. The Women's Development Group had specific training on seedbed preparation and grading.

9. Inputs

Fertiliser and sprays are available from the project. The cost per hectare was around R1700-2000. No information was given on how this was financed, explained to farmers, or how effective delivery of inputs was organised and worked in practice.

10. Marketing

Drying, grading and marketing is all done by the project employing local women but a representative from the market visits the scheme regularly and is in contact directly

with the farmers. The project has had difficulty with the produce grown in the project being sold to another paprika project under individual land bank loans.

11. The future

The project intends to withdraw from the scheme after three years and move to another scheme. The project will assist in developing contracts directly between farmers and the market before leaving. Farmers will maintain contact with the market themselves. It seems they have already identified several farmers as good growers with potential to fulfil such contracts and plan to help these individuals to intensify production next year. Clearly not all farmers will wish to remain in the paprika market, but the project was optimistic that the results would be reasonably this year with the potential for improving greatly next year (there are apparently mixed views about this). They were clearly worried by the disease situation, as were many paprika producers we spoke to.

12. Comment

Project farmers with whom we talked had very poor understanding of the arrangements particularly the financial aspects, harvesting procedure; crop cultivation, risks and who would bare them. Many people who were attracted to join the project were those who were unable to farm without financial assistance for inputs and labour. Their rusty farming skills and understanding made them particularly vulnerable to risk. The risks were increased by the difficulties the project experienced, both from the unforeseen impact of disease and the polarisation caused by failure to engage with the committee.

11. Conclusions

The case is doubtless more complicated and involves many more issues than are described. However, it provides an example of difficulties encountered when a group based scheme organisation comes against an essentially private commercial venture that prefers to deal with individual farmers.

- It highlights the issues around the rights of the individual to chose their own business enterprises and the expectations of irrigation scheme management in terms of behaviour of members and potential commercial links
- Essentially any business scheme that jeopardises individuals in the scheme poses a threat to the scheme as a whole, a fact that will come more sharply into focus when payments are established for water or irrigation services
- This project appears in concept to fulfil many of the requirements of the smallholder farmers and its attractiveness deflects farmers from detailed questioning
- It represents a commercial venture of the type that might be attracted to the scheme as rehabilitation improves water delivery, management and the general standard of production
- It seems that many of the problems that arose might have been reduced if the paprika project, the management committee and extension services had been able to work as a team
- It flags the potential for undermining development if a system to act on farmer's behalf in checking attractive propositions cannot be implemented
- It illustrates the importance of good communication and wide support within the scheme

3.4 Decision Making & Governance

1. Introduction - The Institutional Context

- 1.1 Irrigated farms range from large scale high tech privately or publicly owned business to small scale semi-substance farms based on land rights usage. Many if not most of these farms are found within some kind of scheme of shared or interdependent irrigation water access and management. Most of these smallholder schemes were not indigenous or local farmer driven developments, but creations of the state associated with resettlement and/or production modernisation policy. The policy now however is that these schemes are handed over to their occupiers or members, ie from a state or command institutional framework to a private or market institutional framework. The smallholder irrigation schemes of Limpopo Province such as DD/NF, are examples of schemes in a transitional phase between these institutional frameworks.
- 1.2 The justification for transferring the resource and responsibility of the scheme to the members may be summarised as follows :
- Changing understandings of the role of the State as the principal vehicle for socio-economic development through a shift from emphasis on delivery processes and outputs to concern with results or outcomes
 - Development should be seen as the freedom and capacity to identify and make choices; to be independent and self-reliant
- 1.3 There are then benefits for both sides. The state benefits from reduced costs for taxpayers and the members benefit from direct control over resources of production to engage in and benefit from the market economy. It is recognised however that the transfer from subsidy and state to market based decision making is not a straight forward matter and in the RSA case there are programmes in place to, amongst other things, assist the occupier/members to develop the management, production and marketing capacity needed to efficiently and effectively utilise their new resource. This research has identified issues that reflect on the viability of the schemes in the new market context.

These may be summarised as :

- Competition position vis a vis private commercial farms
- What are or will be the scheme entities during and after transfer and what are the ownership/institutional implications of being a WAU?

2. Competitive position - a level playing field ?

- 2.1 Schemes such as DD/NF are now engaged in a process of institutional transition and at the same time seeking to enhance capacity, both in terms of individual knowledge and skills and collective action, for commercial production and marketing. Indeed it may be argued that early commercial successes, even on a modest scale, are an essential ingredient to stimulating the drive to achieving appropriate institutional arrangements for managing the schemes. However, in the case of schemes such as DD/NF it might be

questioned how an entity devised to collectively own and manage a common pool resource can or should be understood as a commercial enterprise in the same way as we understand a commercial irrigated farm to be.

2.2 The single owner or company/shareholder owned commercial irrigation farm works to a single market driven plan integrating water supply, enterprise choices and production operations in one single management framework. On the other hand smallholder irrigation schemes such as those like DD/NF are made up of individuals linked together in some form of 'community' or shared ownership and/or usage rights that requires them to create mechanisms to manage the irrigation resource (if not the land resource) as a common pool resource (CPR). Such schemes may be seen to be at a considerable competitive disadvantage because of the operational and management costs of negotiations and institutional arrangements between individuals as joint owners, and as users (either as collective production and/or marketing associations or as individuals products/sellers).

2.3 These disadvantages are further compounded by :

- the market and marketing disadvantages for smallholders referred to later
- relatively isolated locations and poor communications infrastructure
- relatively poor irrigation infrastructure designed with separate 'external' centralised management in mind

3. Issues of Identify and Purpose - the legal and institutional context

3.1 There are a range of institutional and organisation arrangements that define the role and place of irrigation schemes within the State and the economy and which distinguishes them from the single owner or company /shareholder owned commercial irrigation farm.

These include :

- Original resettlement schemes (the old status of schemes like DD/NF) subsidised and managed through State command and co-ordination.
- Publicly or privately owned schemes of tenant farmers controlled and co-ordination for production and marketing through a centralised management unit (eg Vuvulani scheme in Swaziland).
- Individual neighbour smallholder/garden irrigators (use rights or property 'owners') collaborating to improve competitiveness in the market (eg CARE groups in Zimbabwe).
- Out grower schemes supported and financed by single commodity processor/producers (eg the Royal Swaziland Sugar Corporation).

3.2 In the latter two cases above the individual producers make decisions to belong to, or to create, a commercial or economic organisation to generate economic returns. They do not have to work together, but choose to do so for commercial advantage. In the Vuvulane example the tenant farmers chose to take up tenancies on integrated schemes for economic returns. In the case of schemes such as DD/NF, however, the basis or starting point for collaborative action is different because it is not a voluntary response to

market forces but an enforced outcome. In these situations the place in which people live and find some or their entire livelihood is now linked to their neighbours in some form of interdependent ownership that is wholly different from the past.

- 3.3 The government's gift of ownership is seen as providing the basis for local, internally driven development, but first **the irrigations who receive the gift must understand what it is they now own and how it is going to be able to work. They need a thorough knowledge of how to draw up rules and a constitution that will allow them to make the best arrangements for good consultation and decision making whilst allowing the scheme to be managed in a manner and at sufficient speed to be commercially viable.**

In the case of DD/NF, the occupants are being asked or obliged to create something which is meant to sit in the 'Economy/Private' arena, that was of the 'State/Public' arena, and may well have been and may still be of the 'Civil Society' arena. What is the new entity to be, and how does it relate to the WUA?

- 3.4 Are these schemes to be :

- collectively owned businesses on which the members happen to live? If so, at what level does the business operate - i) only at the scheme level and limited to managing and selling water **to subgroups as customers of the collectively owned water business, or, ii) further down to group and household levels including the land resource, or**
- communities that collectively own and use an irrigation scheme to achieve wholly commercial goals or commercial and social/welfare goals or
- co-operatives of individual land owners (or PTO rights users) to manage the water common pool resource or
- **co-operatives that extend from water resource management to some level of collective enterprise and collective bargaining for resources and services**

- 3.5 Or again, is the formation of a WUA seen as the institutional framework for ownership and management of these schemes? To paraphrase Agrawal and Gibson (2001), will the notion of the schemes as a "commons" be given meaning by the institution of a 'WUA' that establishes rights of access and use (exclusivity that creates "property") and some degree of co-operation or communal constraint on individual behaviour. This is rather different from the role and function of the WUA as a statutory body in other sectors. Elsewhere *legal entities* of one form or another (eg Municipal Authorities (state), or collaborating commercial farmers (private business or firms) will take on the role and responsibility of a WUA. In other words the Municipal Authority can also be a WUA, as can a group of commercial businesses. But the reverse is not true - the WUA cannot define the Municipal Authority or the commercial businesses. How then can the statutory body of a WUA define what is, for example, Dingleydale and New Forest? It seems, however, that in the case of smallholder schemes, there is an assumption that

WUA can and will provide the institutional framework for their revitalised existence.

- 3.6 It has been argued elsewhere (IWMI Research Report 60, 2002), that irrigation management transfer (IMT) alone will not be enough to achieve viable sustainable smallholder irrigation schemes. It is argued that there are a complex of constraints that can only be overcome by other interventions that address wider contextual and infrastructural issues such as input supply, credit and markets. Our observations and experience endorse this position and we later draw particular attention to market and marketing constraints. However, while we would agree that IMT alone is not enough, we are concerned that the wider complex of constraints cannot be addressed until there is greater clarity regarding the nature of the system the management is being transferred to.
- 3.7 The IWMI paper argues that the only successful smallholder schemes are those that have mirrored the integration of larger commercial farms by developing organisations and management systems to handle input, credit and marketing constraints, as well as the co-ordination and delivery of irrigation water. It is not at all clear to us how a statutory WUA can provide an appropriate institutional framework for these needs. WUA's are WUA infrastructure or in its area of operation, or whose livelihood depends on the successful operation of the WUA can be members of the WUA.

In what way does or can this membership arrangement define a formal relationship between the PTO groups in terms of their land use, and production and marketing decisions? If the PTO group cannot agree on arrangements to, for example, secure production (eg tractor) services and markets considered essential for irrigated crop production or co-ordinate production through the use of Crop Production Programmes, this may threaten the viability of the WUA itself, if the legal or institutional boundaries between the individual/household PTO's and the 'scheme' are only defined in terms of a WUA.

The recent Paprika 'contract' arrangement illustrates this point. The 'outsiders' entered the scheme via 'traditional leadership' sanction but the deals were done with individuals and a women's group employed to grade the crop with no account taken, by the growers or the contractors, or the scheme as such. This caused some consequences, not least regarding the legitimacy and credibility of the Management Committee. The farmers were free to act in this way but what would be their position if they have been members of the scheme as a WUA and what would be the consequences for the WUA? If their position would be no different and if there were no consequences for the WUA, then the WUA would not be functioning as an integrating device for securing the production and marketing services required for irrigated agriculture. If, however, the farmers were not free to act independently as farmers without threatening the integrity of the WUA, then it would have become something rather more than a WUA.

The large commercial farms are private business entities, ie privately owned and disposal property, and it is as such that they have in the past collaborated to form Irrigation Boards and in the future will collaborate to form WUA's. What are the entities that should form to provide an institutional framework for smallholder households to collaborate to first and foremost create

irrigation businesses, and which can also, assuming they have the same constituency, become WUA's?

4. Issues of Identity and Purpose - the internal and organisational context

- 4.1 In the context we are examining, "irrigation schemes" means common/shared property that requires central management/decision-making (ie a[a] formal organisation) to control and operate the supply and distribution of water, to maintain the infrastructure and to secure and develop the capital base. The nature of the organisation at the scheme level is defined by the legal framework and what must be done centrally, ie
- 4.2 The agreed institutional and legal framework - is the scheme to be a single legal business entity in which the occupants, for example, become co-owning (share-holding) tenants, or will the single legal entity be co-owned by the occupants but only exist at the scheme level in terms of the irrigation infrastructure and the distribution (sale) of water.
- 4.3 The irrigation infrastructure, and the design and technologies of this infrastructure will determine the minimum kind and level of central control necessary.
- 4.4 Individual (household) scheme members may own the land, or the farmers may be land tenants of the scheme itself or have some other traditional rights to occupancy and land use. Land ownership, or user rights, will influence the level and character of independence of the membership with respect to the management of the scheme. The 'scheme' as a collective business must have some minimal level of control over land utilisation and/or powers to secure payments to maintain the irrigation infrastructure from individual land users/occupiers whether or not they use irrigation water if it is to maintain it's integrity.
- 4.5 The legal framework and what must be done centrally define then the nature of the overall scheme. This may be expressed as a Level One process because :
 - It is determined in the context of state policy and the historical political and resource legacy, ie largely external
 - It requires the members to achieve the capacity and skills required to own and decided in an institutional context
 - It defines the terms for an organisational and managerial framework for centralised control to achieve (at a minimum) objectives to :
 - provide (sell) water to meet various user needs
 - maintain infrastructure
 - develop and secure infrastructure capital
- 4.6 This should be distinguished from Level Two processes that influence how the organisation might be determined by choices associated with:

- what *might* be more effectively done centrally
- the nature of the sub-unit associations (if any) such as Dam Groups, and how these are constituted
- the nature and constitution of the links between sub-groups and the centre

4.7 These choices will depend on the will and aspirations of the membership in the context of their culture, knowledge and experience, the enterprise, economies of scale and market opportunities, and the nature and distribution of power in the scheme community. These processes are then largely internally determined but can (as is the case in DD/NF) be facilitated by participatory learning intervention to define and consolidate Level Two sub-unit associations (eg Dam Groups) with objectives to :

- manage and distribute water at dam level (subject to scheme/area requirements)
- collect water payment dues - transfer to scheme
- seek and promote collective inputs and marketing opportunities
- organise production and marketing training

4.8 The concerns regarding competitiveness, the identify and purpose of the schemes and the complex of requirements required to achieve viable and sustainable irrigation businesses suggests that there will need to be a long term committed support from the previous owners, the State/Municipal authorities to the schemes new owners. The future of these schemes will not perfectly reflect the 'modern' neo-liberal view of separation of government and enabling authorities from ownership and market decision-making as, perhaps envisaged in the transfer of ownership programme. If schemes such as those at DD/NF are to have any hope of success in the future then the state needs to urgently address :

- the nature of the scheme entity as legal independent units and how this will relate to the statutory institution of a WUA
- What the basis will be for institutional support and training to address the market, inputs and other resource issues beyond institutional identity and management transfer - including how much influence is brought to bare on how much more the schemes should be beyond simple IMT.
- what the basis and timing of cost sharing might be to provide a platform for equitable intervention into commercial agricultural markets.
- what institutional arrangements are appropriate to represent itself in these partnerships with the scheme institution management and membership, including the framework for agreeing, paying and monitoring cost sharing.

4.9 The future success of these schemes will not be simply a matter of hand over following investments to create the ownership institution and equip the members to cope with the demands of ownership and independent decision-making in the market place. It will rather also, for some time to come, be a matter of the institutional arrangements established between the state authorities and the new owners to facilitate their development and negotiate

and maintain the shared cost system. In other words the relationship cannot immediately change from command/authoritarian to market demand but must arrive there through a process based on negotiation and joint planning/decision-making.

3.5 Markets & Marketing

1. Introduction

- 1.1 Sustainability of irrigation development is dependent on the generation of income to meet the additional costs of irrigated agriculture.
- 1.2 The additional costs (over and above costs of rainfed production) are :
 - a) construction and establishment (sunk costs)
 - b) rehabilitation
 - c) operation and maintenance
 - d) management
- 1.3 It is essential that costs, at least of items c) and d), are met for an irrigation scheme to remain viable and sustainable.
- 1.4 On the smallholder irrigation schemes of Limpopo Province, RSA the Management Committee structure is currently operated on a voluntary basis. However, given the demands on the precious time of irrigator farmers and the need for professional management expertise, it is highly desirable that managers should be paid, along with extension workers.
- 1.5 The overall policy objective is, presumably, that the costs will be recovered from the farmers as charges for the use of water (to be collected and administered by the Water Users' Association).
- 1.6 In principle, the greater return from irrigated production, compared with returns from rain-fed production, should be sufficient to cover all the extra costs (including authorisation of the original capital invested in the scheme?). This is the key economic criterion justifying irrigation development.
- 1.7 This, in turn depends upon equitable and efficient allocation of irrigated land and water, full participation by all those allocated irrigated land and water, and the production and marketing of profitable crops (see Perret & Touchain 2002).

2. Choice of Crops

- 2.1 Problems arise in choosing suitable crops for profitable production and marketing. The main summer crop, for practically all farmers, is maize grown partly for sale, particularly as green cobs, and partly for home consumption. The most common winter crops are various types of vegetables, sold individually in small consignments in local towns. This system is unlikely to earn sufficient cash income to meet the full costs of O & M and of scheme management.

- 2.2 Maize production may prove sufficiently profitable to be retained as a key summer crop, particularly if cobs can be marketed earlier than those from rain-fed production and in drought years, such as 2001-02, when prices are high. However, markets are not assured, and in times of plenty, prices and profitability must fall (estimated costs of production of irrigated maize exceed the estimated revenue from sales of grain, COMBUD 1989).
- 2.3 Winter cropping is important to ensure that sufficient income is earned to meet the costs of production, including irrigation costs and to meet household needs. Crops grown include tomatoes, onions, spinach, cabbages, carrots, squash, peppadew, paprika and others. Choices of what to grow are made individually and produce is sold in small lots in competition with other scheme members. There is little or no co-operation in marketing. Sales are made on the scheme to consumers or traders, or produce is transported to nearby towns for sale.
- 2.4 Attempts have been made to establish marketing links with commercial buying agencies, for group production by farmers and bulk delivery of produce, at Dingleydale. The first, for the production of peppadew, was co-ordinated by the Bushbuckridge Small Business Development Unit. The second, for paprika production, was negotiated by DKW a processing company. Both schemes involved contracts with advanced paid to the farmers, in return for contractual delivery of produce. Both schemes collapsed, the first at an early stage, largely because of misunderstandings between farmers and the buying agency.
- 2.5 The conclusion drawn is that smallholder farmers are not well organised and lack the necessary information, skills and experience for dealing with commercial produce buyers. Thus farmers are at a serious disadvantage, first in finding potential buyers, then in negotiating just, fair and feasible contracts and then in ensuring that the buyer fulfils his or her side of the bargain.
- 2.6 Similar arguments apply regarding the delivery of essential inputs such as tractor services, seed, agri-chemicals and credit, together with technical advice.
- 2.7 Although smallholders, and their chosen representatives, may eventually develop the necessary skills and experience for dealing with outside commercial agencies, this will take time and really depends upon achieving some initial successes on which to build. Thus, for SIBUs to become established on a financially viable and sustainable basis, outside professional assistance is needed.
- 2.8 Serious consideration should be given, by the Department of Agriculture of Limpopo Province, to the establishment of a marketing agency to assist smallholder irrigators in establishing markets for their produce. Failure to adopt such a policy will lead either to a need for continued indefinite subsidies for smallholder irrigation schemes or to their collapse with the total loss of the investment already made in the irrigation system.

3. Evidence from Swaziland

3.1 Sugar Production

- 3.1.1 The problems discussed above do not arise where there is already a well-established market for a particular cash crop, through which smallholder irrigators' produce may be sold. In many such cases essential inputs including extension advice may be provided by the marketing agency. Contracts for delivery of produce to the agency and of inputs to the farmers are then built into the design of the smallholder irrigation project.
- 3.1.2 This is the case in the Low Veldt of North Eastern Swaziland, where the Simunya and Mhlume sugar mills are in operation. Although the mills are fed with cane from the associated company estates there is sufficient surplus milling and export market capacity to justify expansion of production, by establishing smallholder sugar out-grower schemes. The Royal Swaziland Sugar Corporation that owns and runs the Simunye sugar estate and mill, has already organised an associated smallholder out-grower scheme by providing inputs, managerial support and an assured market for cane (*more details may be available from Leonard Ndlovu*).
- 3.1.3. Furthermore a total area of 7400 hectares of irrigated smallholdings is being developed under the Swaziland Komati Project Enterprise (SKPE). The majority of the smallholders will grow sugar cane (5500 hectares) to supply the Mhlume Mill, which will be expanded for the purpose.
- 3.1.4 In cases such as the sugar industry, in Swaziland and elsewhere, the processing and marketing facilities are already available funded by private enterprise or the State or a combination of the two, as is the Royal Swaziland Sugar Corporation. Smallholders are not then faced with the daunting problems of finding, organisation and managing the markets for their produce and supplies of their inputs.

3.2 Horticultural Production

- 3.2.1 The Middle and High Veldt regions of Swaziland are unsuited to cane growing. Smallholder irrigation is largely devoted to vegetable production. The National Agricultural Marketing Board (NAMBOARD) provides market support to fruit and vegetable growers and cereal and poultry producers. It provides three main types of service (*further details are given by Ms D Sithole*).
- 3.2.2 First NAMBOARD serves a regulatory function. By issuing import permits and charging import levies for the commodities listed, it imposes a measure of control on the quantity and quality of imports and thereby gives some support to domestic producer prices.
- 3.2.3 Second, the Board has provided market facilities for local produce at the Swaziland Fresh Produce Market since 1987. Private agents were used to sell produce on commission. Agents found the income from commissions was inadequate and all have left. Producers find

the urban municipal markets more convenient, so the NAMBOARD market is only used as a last resort.

3.2.4 Third, NAMBOARD acts as a market agent, by entering supply agreements with farmers. The Farmer Support and Development Scheme has been run on a trial basis for a few years but is restricted to carefully selected farmers within a 50 km radius of Manzini. The farmers enter into contracts to deliver specified quantities of selected crops for NAMBOARD to buy at a pre-determined agreed price. For various reasons problems have been faced on both sides in fulfilling contracts. Government funding is being reduced and NAMBOARD is being privatised. Progress has been limited and scaling up of the activity to national level appears unlikely.

3.2.5 The main lesson to be learned is that, in the absence of a well-established bulk market such as that for sugar cane, public sector support is highly desirable. However, the experience of NAMBOARD in Swaziland to emphasise the substantial difficulties faced in providing market support for smallholder producers, especially with very limited public funding.

3.3 An NGO scheme for promoting irrigated horticulture

3.3.1 The Anglican Church and the NGO, World Vision, established Usuthu Farm in 1998, as a joint venture. An area of 25 ha is devoted to growing horticultural crops, of which 0.75 ha are under plastic greenhouse production. Vegetables are produced for local hotels and supermarkets and for export to Europe (UK, France and Germany). Crops are also purchased from Swazi Community Garden Schemes and packed at Usuthu Farm Packinghouse before delivery to a South African Exporter in Johannesburg.

3.3.2 In addition to the main farm, World Vision have supported the establishment of 35 irrigated Community Garden Schemes in Swaziland. Of these only one is working, the others not functioning because of lack of the support and training needed to ensure the quality and continuity of production required for export markets. The one successful scheme involves 34 farmers cultivating plots on a total of 2 ha of land. Irrigation is by bucket from standpipes. This group has been successfully producing fennel and leeks for export to France since February 2002.

3.3.3 The Chief Extension Officer for the project outlined the concept of a series of "bicycle wheel" systems of production and support for small-scale export production. The central hub would be a small packinghouse (and possibly a cold room) an input service unit with a technical and co-ordinating manager overseeing production, packaging and onward delivery to central exporters. This "hub" would then provide certain input and marketing services to Community Garden (out-grower) schemes around the "rim". He referred to Hortico in Zimbabwe as an example of this approach.

3.3.4 The Usuthu Farm project appears successful in establishing profitable horticultural production for urban and export markets, mainly from the crops in tunnels. Effective support is provided for

one of the community garden schemes. Without having studied the Hortico Scheme in Zimbabwe it is difficult to judge whether a system with more out-grower community gardens, associated with the service centre at the "hub", and with different external support would function as effectively. Such an idea appears worth testing further.

4. WORKSHOP RECOMMENDATIONS FOR COMMITTEES

1. Participation and Representation

- 1.1 Participation is essential to a committee's sustainability and capacity to implement collective decisions. If sections of the irrigating community are not included they are unlikely to contribute physically or financially and thereby threaten the sustainability of the scheme. At worst they may undermine the development effort. It is hard to achieve the desired level of participation without a good communication system.
- 1.2 Categorising attendance at meeting helps identify those who are not represented so that action can be taken. Regular taking stock of progress towards the desired level of participation, in collaboration with extension, also helps.
- 1.3 People have different capacity to receive messages so it is important to identify the capacity of the various subgroups in the scheme and the barriers to communication that might apply to each one. Barriers might consist of one or more of a variety of factors, such as :
 - distant location
 - different language
 - disability
 - gender
 - poor literacy skills
 - political or religious affiliations
 - social divisions
- 1.4 Different information routes access different groups of people. If individuals receive information by more than one route the chance of their responding is higher. Once a system is in place it may require some checking, updating or adjustment from time to time.
- 1.5 It is important to differentiate between presence and participation. Silent acquiescence may in fact be mutiny. Techniques for sensitive conduct of meetings to promote inclusive decision-making should be adopted. Committees might lobby for training in participatory techniques to increase their capacity in this respect.
- 1.6 Participation in decision-making requires organisation and resources and tends to be slow if a high level of agreement is required. A key strategy is to achieving sufficient initial participation to decide which decisions should be taken with full participation, which can be taken at committee level, and which can be taken by sub-committees or selected individuals on behalf of the farmers within in an agreed set of rules and objectives.

2. Aims and Objectives

- 2.1 Most schemes in the study had difficulty with aims and objectives. Transforming smallholder into businesses and WUAs will necessitate that they look critically at their objectives and how and when specifically they need or want to achieve them. The transformation process should be used to

lobby for assistance in developing new and amending existing constitutions that meet the different needs of as many of the users as possible.

- 2.2 Particular attention needs to be given to equity and poverty alleviation if schemes are to remain sustainable in the long run. Experience from other irrigation or development situations can be helpful to groups and committees in reviewing how to deal with these issues. Organisation of exchange visits with other schemes stimulates the committee to think about equity issues on their own scheme as well as the scheme being visited.
- 2.3 Recognition and legitimacy must be accorded to the objectives of different groups and the management committee must have a clear role in approving negotiations between groups whose objectives conflict.

3. Monitoring and Resource Development

- 3.1 The quality of decisions will be affected by the quality of information available to those responsible for the decision. Gathering information requires resources and has to be budgeted and carefully thought out.
- 3.2 The human resource to handle interpretation of data may have to be developed over some considerable time. Interpretation, experience and confidence are key factors in determining the quality of decisions. In the development process there must be some mechanism for assisting individuals and committees to deal with the outcomes of poor decisions.
- 3.3 Monitoring is only useful when it answers a management need. It therefore takes time to develop a relevant monitoring system, and because it is a dynamic tool, institute a regular review regime. On the other hand, monitoring must be in place for a reasonable length of time for management to judge costs compared to usefulness. Whereas the monitoring needs of a WUA may be fixed in the business plan, scheme management may wish to fine tune specific aspects.

5. WORKSHOP RECOMMENDATIONS FOR SUPPORT AGENCIES

Department of Agriculture, Land & Environment (LPDALE)

Department of Water Affairs & Forestry

Public Works Department, NGO's & Commerce

1. Management Transfer of smallholder irrigation schemes to the farmers themselves is a difficult and complicated process. Successful management of any business unit involves both effective decision-making and an adequate level of control of resource allocation and finance. Participatory management of a smallholder scheme further complicates decision-making and control. Furthermore the scheme represents a community with social needs that must be considered within the management structure. The first recommendation is therefore that management transfer must be a long slow process. Adequate time must be allowed for change to occur.
2. The legal framework of a Water Users' Association is designed to serve many different types of users; including domestic water supplies, industrial users and groups of large-scale commercial farmers previously organised as Irrigation Boards. Doubts arise as to whether the Water Users' Association concept provides an adequate legal framework for the operation of a self-managed smallholder irrigation scheme. More debate and discussion is needed on how the framework might be improved.
3. Land tenure is an issue that has not been clearly resolved. In irrigation schemes, water allocation is closely linked with the allocation of land. It is very difficult for a Management Committee to ensure effective water allocation and use and to collect water user fees, without also controlling the allocation of land. This will be necessary to ensure that all irrigated plots are cultivated and the fees are collection from all plot holders. Efficiency might be improved if plot holders were able to rent out their plots to others. Currently plots are allocated and occupiers are issued with Permission to Occupy (PTO) certificates. Apparently such certificates were abolished in 1991 (Abolition of Racially-based Land Measures Act 1991), but in fact are still in use. Traditionally the tribal chiefs made the allocations, although now the Department of Agriculture is officially responsible. The situation needs to be clarified, most importantly in giving Management Committees greater control and the scope for disciplining those who fail to contribute to the upkeep of the system and who fail to pay water user-fees, which will be essential when the WUAs are registered and required to pay fees to the Catchment Management Agencies as well as meeting operating and management costs of the scheme.
4. A key recommendation is that further Government support should be given to smallholder managed irrigation schemes, for an extended period and possibly indefinitely. For reasons given above, smallholder schemes are likely to be at a disadvantage in competition with large-scale commercial producers. Subsidy may be needed to keep the small schemes viable. From an economic point of view, the major investments involved in establishing water storage, pumping and distribution systems are now sunken and unavoidable costs. Some continuing financial support to maintain the systems in operation may be preferable to allowing them to decline and fail, with associated write-off of the past investment. While initially support is most likely to be provided by Government Department, every effort should be made to promote links and co-operation by NGOs and Commercial Businesses. The assistance should extend beyond the provision of training courses and extension advice.

5. A particular area where further support is necessary is that of marketing. It is widely recognised that smallholders generally have a great deal of indigenous and acquired knowledge about techniques of production, but are far less able to deal with commercial buyers, processors and traders. Marketing Boards and Marketing Co-operatives have proved unsuccessful in many developing country situations. Ideally an agency is required which would seek out market opportunities, locally, in major urban centres and overseas, establish the legal contractual framework, possibly provide some transport and storage facilities and help to enforce delivery or compliance on both sides of the agreement. Experiences in Swaziland offer some insights.
6. Training of smallholder scheme managers is needed in financial management and accounting techniques. Regular external audit will be necessary and possibly some assistance in account keeping.
7. Additional issues:
 - a) High cash costs due to mechanisation
 - b) Absence of credit, and input markets
 - c) High costs of pump schemes

6. SMALLHOLDER SUGAR CAR PRODUCTION: ISSUE PAPER FOR SWAZILAND

Dr L S Ndlovu

1. Introduction

The aim of the paper is to set out some key issues in Swaziland with a perspective upon smallholder irrigated sugarcane production. The discussion will also include other issues related to irrigation and water resources in the country, particularly after the introduction of the new water bill as well as some production issues. In discussing the smallholder schemes it is important to appreciate the proportions involved. It is estimated that 191,500 ha of sugarcane are cultivated rain-fed or irrigated. This is slight over 11% of the total land area of Swaziland. Of the total cultivated, approximately 70,000 ha is irrigated, of which 2320.1 ha at the end of 2001 was classified as smallholder. Recently developed and proposed developments will result in a total of approximately 16,000 ha, which will mostly be smallholder schemes. These irrigation schemes are emerging throughout the country partly as a government initiative to alleviate poverty as well as the desire among the entire population to get involved in the sugar business. Most of the schemes are concentrated in the drier and warmer eastern part of Swaziland.

Swaziland can be divided into six agro-ecological zones, namely; the Highveld (HV), the Upper Middleveld (M), the Lower Middleveld (LM), the Western Lowveld (WL), the Eastern Lowveld (EL), and the Lubombo Escarpment (LE). The agro-ecological zones in Swaziland run approximately parallel to each other from north to south. To the west is the HV, a range of mountains that extend from the Drakensberg in South Africa, occupying about 33% of the country. To the east of the HV also running from the north to the south is the UM and LM, typically rolling hills, and forms 28% of the total area. To the east of the LM is the WL and EL, which is 33% of the area and receives the lowest annual precipitation. The eastern border of the country is the Lubombo escarpment, which is a relatively narrow zone occupying 8% of the country.

Table 1: Brief attributes of Swaziland's Agro-ecological Zones

Zone (% Total Area)	Altitude (min-max)	Annual rainfall 80% reliability (mm)	Soils	Farming Activities
Highveld (33)	900-1400	1000 - 1200	Acidic, low in N, P & Mn	Cattle grazing, small scale dry land and some irrigated farming
Upper Middleveld (14)	600-800	850 - 1000	Deep clay loam	Main agricultural zone; sugarcane, pineapple, maize
Lower Middleveld (14)	400-600	700 - 850	Sand and sandy loam	Groundnuts, beans, vegetables
Western Lowveld (20)	250-400	450 - 550	Good to fair soils	Sugarcane, cotton
Eastern Lowveld (11)	200-300	400 - 450	Vertisols	Groundnuts, sorghum
Lubombo Escarpment (8)	250-700	550 - 700	Deep clay loam in limited areas	Ranching, maize, cotton, minor crops

The lowveld with its semiarid climate and warmer temperatures has become very important for irrigated agriculture since all the rivers in Swaziland drain towards it, and its relatively warmer temperature and well structured soils in areas have made it an attractive area for irrigated agriculture. The climate is conducive to, among other things, growing sugarcane because of the relatively higher temperatures and annual sunshine hours. According to studies conducted by the Swaziland Sugar Association Technical Services, the amount of precipitation received at the lowveld accounts for only 20-25% of sugarcane crop water requirements. Therefore irrigation of the sugarcane crop is essential.

2. Water Issues to think about

Rainfall contribution

Due to the topography as can be seen in Table 1, and the country's position in relation to the Indian Ocean, the most common type of rainfall that occurs is orographic. The rainfall, which is not orographic, is for the most part convectional. At times even though with less frequency of occurrence, Swaziland does experience cyclones and hurricanes, which originate from the Indian Ocean. Most of the storms in the country are of relatively short duration with very high intensity. *High intensity storms do not normally provide sufficient time for water to infiltrate into the soil and become available for crop water use.* It has been observed over the years that of the total annual rainfall received on irrigated sugarcane, only 50% on average contributes to crop water requirements.

- 1) As the irrigation demand continues to increase and the water supply has remained constant, water-harvesting methods need to be investigated
- 2) Water conservation techniques should be sought

Irrigation & Irrigation Management

Individuals and small communities in Swaziland used to obtain their water directly from the river, stream or springs. Industrial, urban and agricultural developments have led to the construction of large storage dams along rivers and controlled releases of water from such structures. The controlled releases are aimed at ensuring that water is available during periods of low flows in the river systems. One such project, which was established in Swaziland with small irrigation business, is the Komati Downstream Development Project which gets its water from the Maguga Dam.

Swaziland is traversed by five main river systems that drain the country from the west to east emptying into the Indian Ocean. All of which are shared between countries. As a result of recent droughts and rising demands for water, awareness has been raised on the need to manage the resource more carefully. The main indicator of this is the New Water Act introduced in 1998, which arose out of concerns during the eighties and nineties. Furthermore, a strategic planning workshop held in 1996 by the Swaziland Sugar Association determined the need for an expansion in water management skills to meet :

- the challenges arising out of the introduction of the New Water Act
- increased competition for water resources within Swaziland
- increased sugarcane production
- increased demands for water in Mozambique and South Africa

The New Water Act

The New Water Act has brought about certain challenges in the irrigation industry including the system of water allocation, ie how and how much, administration and management within river basins and stakeholder involvement.

The allocation of water in Swaziland will no longer be based on flow, but will now be based on volume. This volumetric allocation will now cause a problem for all irrigators particularly the new small grower community in Swaziland in that :

- 1) all the literature that is available for use based on past experiences gives water allocation on a flow basis
- 2) all schemes will require reliable and robust measuring equipment
- 3) the culture of irrigation will be relatively new for some, the steep learning curve coupled with fact that experienced irrigators will be learning to adjust to the new approach to water allocation will post a problem in sharing experiences
- 4) for a given volume of water for each year, the grower will have to make a decision in terms of choice of irrigation system. This would mean that if a grower chooses an inefficient irrigation system, then the amount of land that can be developed will be increased. Efficient irrigation systems tend to come at a high price and can be complicated to operator
- 5) should the allocation run out in the middle of the irrigation season, what does that mean for the grower since no water transfer can take place between users
- 6) close co-operation among users

Stakeholder involvement in the administration would mean heterogeneity in perceptions, interests and values. This would pose a challenge in the administration of river basins because perceptions lead to conclusions and at times wrong ones for that matter. Different interests and values do lead to diversity in decisions and conclusions unless the group matures. Large and small-scale farms tend to have different values depending on the reason for their establishment and this at times can cause problems.

A clear understanding of how the bodies responsible for water allocation work and inter-relate should be addressed and any perceptions between large and small-scale water users removed. Lessons would have to be learnt from others in different countries in the African and Pacific areas where the situations are somewhat similar to the local situation.

During periods of drought or when water becomes scarcer, there is always a problem around conflicting priorities. Objectives and priorities set for drought situations need to be clear, and agreed to by all. A high degree of trust and transparency is another issue that has to be dealt with long before droughts occur. Discussions would need to be carried out ahead of such disasters and priorities set and tested long before. Drought strategies would include deficit irrigation while maintaining the same area, full irrigation on reduced area with best soils and giving water to areas that are carrying out the best management practices.

Irrigation Management Technology Transfer

1. shortage of capacity at Government of Swaziland level and parastatals for water management and smallholder support

2. introducing the concept of irrigation technology and all the requirements that would give optimum yields and conserve water ie low emission precision application systems
3. keeping up with appropriate technological advances in irrigation
4. making farmers out of non-farmers who are interested in the business
5. create an environment that is conducive so that dry-land farmers are comfortable with the paradigm shift that would have to be made
6. ensuring common commitment to the primary infrastructure particularly as maintenance requirements begin to increase

3. Cane Production-Related Issues

Common commitment to shared responsibilities

At crop establishment, ie planting and associated activities, proved to be a problem in one of the projects where there was no hired labour in an effort to cut costs. Showing up timeously for work and also performing tasks to the same standard requires a well-developed group. This has been a problem particularly for group schemes in certain areas in Swaziland.

Sugarcane Harvesting and Delivery to the Mills

The smallholders experience problems in harvesting sugarcane because of the lack of infrastructure and machinery and in cases where contractors are harvesting, the lack of skills to manage contractors. It may not be economical to purchase harvesting equipment or hire cane cutters at individual scheme level, because the cane has to be delivered for thirty two weeks ie spread through the harvesting season. Contractors have taken over the harvesting in some cases but management of contractors is an issue that needs to be addressed because the following has been observed:

- poor quality of cutting (base and top resulting in loss of sucrose)
- burn-to-crush delays due to unreliable transport (loss of quality, and sucrose)
- soil compaction or damage to cane from poor contractual practice/negligence

The distance between schemes reduces the potential for joint efforts in activities such as ripening the cane, or haulage, thus increasing the cost to each individual scheme.

The size of each consignment makes it difficult to get a proper sample for sucrose at the mill and this in some instances works to a disadvantage for the farmer (if his good product is in a batch of poorer products).

The sugarcane payment system also does not have incentives that promote quality harvesting. A consignment could have a lot of trash or mud, which thing would reduce the amount of recovery of sucrose, therefore the miller ends up carrying the cost but it will not be for long. The main reason for this is that there is no regulation because historically, millers were crushing their own sugarcane and that of growers attached to them where they were providing assistance and extension.

4. Relationships between the Swaziland Sugar Industry & the Smallholder Schemes

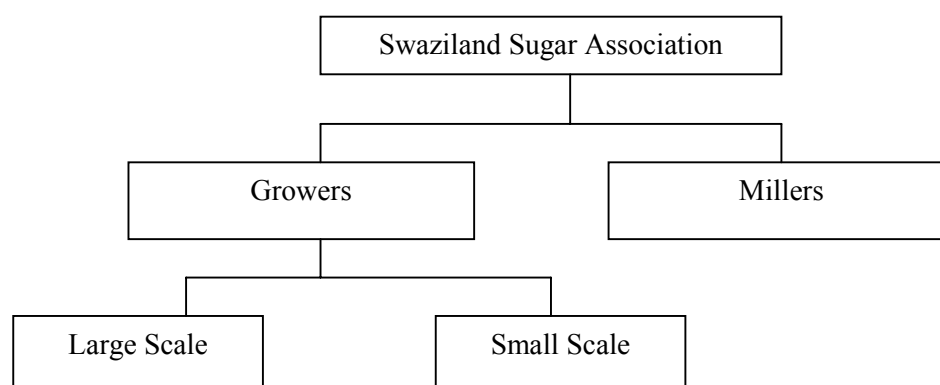


Figure 1 Structure of the Swaziland Sugar Industry

The Swaziland Sugar Industry is structured as shown in Figure 1, and the smallholder schemes are represented in the growers group. The millers buy sugarcane from the growers and make raw or refined sugar and then transfer the sugar to the Swaziland Sugar Association (SSA) for marketing. The millers pay the growers for the sucrose delivered at a price set by the SSA.

Swaziland's sugar production is expanding at about 3% each year mainly from increased area (SSA 2002). The advantageous position of sugarcane is due to a number of favourable factors including :

- a strong selling environment including protected prices and markets
- relatively low labour costs
- good growing conditions

Threats to the Industry

Swaziland has benefited from the sale of sugar to the EU market under the Protocol on sugar of the ACP - EU Co-operation Agreements during the past 26 years. Such protection has benefited the growers. However, recent drops in the sugar prices have been felt in Swaziland the crop diversification as opposed to reliance on one sector is a challenge that would have to be faced. The planned expansion of smallholder irrigation will expose smallholders to the risk of change in world prices, but this exposure is not borne by smallholders alone, rather it will be shared by all growers. The impact of prices will likely be more dramatic on smallholders livelihoods. *This at times is not clearly understood by the farmers at a time when profits are lost.*

Efforts are being made to educate the farmers and enable them to understand the risks. The millers are providing assistance to the growers in developing business plans. Royal Swaziland Sugar Corporation for example has set up assistance programmes for the smallholder to make sure that they are educated on both husbandry and management of sugarcane. This is all done to ensure viability of the mills as well.

There is a definite need to develop a clear understanding and a high degree of transparency and trust will be issues that would have to be dealt with.

5. Conclusion

This paper has highlighted some of the issues and questions that would need to be addressed since Swaziland has embarked on extensive small-grower expansion.

- Expansion has required that mills be expanded to cope with the extra sugarcane that would come from such projects. Both the Mill Businesses and the Government of Swaziland need to ensure that these projects are sustainable to guarantee returns on investments in the infrastructure. If the prices of sugar fall below levels where the enterprise is no longer profitable, sustainability cannot be ensured.
- All farmers need to be educated on the requirements of the New Water Act and its implications on irrigation management in sugarcane.
- Education programme 'farming as a business' need to be undertaken and include contract management and quality standards and their importance in businesses.
- Close co-operation among farmers and other stakeholders is essential to ensure higher profits and sustainability.

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7. MARKET INFORMATION & MARKET SERVICES IN SWAZILAND

Evaluation of Present Information & Marketing
Systems for Vegetable Growers
Dumile Sithole

1. Outline of Government Policies for Horticultural Marketing & Development

After Swaziland gained her independent in 1968, national policies were driven by 5 year national development plans and, in subsequent years, 3 year rolling plans. 25 years later the strategy changed with a longer term planning system known as the National Development Strategy (NDS). The NDS articulates a long term vision (25 years) and formulated macro and sectoral strategies for the attainment of the vision. It highlights the comparative advantage Swaziland has in horticultural products because of the good soils, good climatic conditions and the potential for more quality agricultural research and establishment of competitive wage rates. In addition the agricultural sector is seen to have strong backward linkages with other sectors in the domestic economy, hence by stimulating it, it is hoped to stimulate other sectors of the domestic economy. Therefore horticultural agriculture is seen as one of the major areas of strategic thrust.

Specifically the NDS states the following:

- 1.1 The promotion of the production and marketing of horticultural crops
- 1.2 The promotion of rural markets and produce finished goods for sale in the domestic, regional and international markets
- 1.3 Improve infrastructure to provide market information and facilitate its dissemination
- 1.4 Define the roles of the different structures involved in marketing, handling and storage of good crops and strength institutions to be more responsive and effective
- 1.5 Review duties on exports and imports to promote agricultural production and agro-based processing industries
- 1.6 Regulate the importation and exportation of agro-based and agricultural products in order to assure a safe balance of domestic supply and demand
- 1.7 Review and update all agriculturally related legislation to be compatible with international conventions and policy requirements.
- 1.8 Promote production of crops and livestock for domestic and international markets by both small and large-scale farmers.

2. Functions of National Agricultural Marketing Board (NAMBOARD) as an Intermediary in Fruit & Vegetable Marketing

The National Agricultural Marketing Board was established to address most of the policy statements covered in the National Development Strategy as specified above.

It was established by Act of Parliament number 13 of 1985 for the purpose of promoting the production and marketing of agricultural products in Swaziland. Initially NAMBOARD focused on maize (which is a staple food in Swaziland) and fruits and vegetables. With time other products were added to the schedule, such as rice, poultry and wheat and wheaten products. NAMBOARD approach was two fold, firstly by regulation of imports of the scheduled products and secondly, by the provision of market facilities for fresh fruits and vegetables.

2.1 Regulatory Function

The regulatory division of NAMBOARD was established to regulate the importation of scheduled products into Swaziland. The aim of this policy was to protect local production from the unfair competition by imports, originating mainly from the large-scale commercial sector in the Republic of South Africa, which benefits from economies of scale. The close proximity of Swaziland to South Africa and the ease of trade between the two countries facilitated by the Southern African Customs Union (SACU) also made it very easy for traders from Swaziland to simply cross the border to import. The result of this was that local farmers were deprived of a market for their products, thereby discouraging production. Therefore the main beneficiaries of this policy were the farmers of Swaziland. Initially the regulation also included exports, where exporters also got export permits from NAMBOARD. However this was discontinued in the interest of making it easier for exporters to export Swazi produce to other countries.

2.2 Method of Operation

All importers must register with NAMBOARD to acquire an import permit. The condition for registration is the possession of a valid trading license. NAMBOARD then issues an import permit valid for one calendar month. Whenever importers bring in produce through border gates, they must produce the invoice and import permit to the Custom's officials who then endorse the permit with the value of the produce. At the end of the month, the permit is returned to NAMBOARD where the applicable levy is calculated and after the importer has paid the levy the permit is renewed.

NAMBOARD has 5 inspectors who monitor the border gates to ascertain if the value declared is correct, and to carry out inspections at shop floors and stores to ensure that products have been imported legitimately. In addition the Inspectors also carry out surveys of produce suppliers in South Africa and they compile a price list which is posted at the border gates. This price list assists the Customs officials in determining whether an importer is under-declaring the value of the imported goods or not.

Table 1 Import Levy Rates for the various Scheduled Products

	Products	Levy %
1	Maize excluding seed maize, yellow maize and popcorn	3-4.5
2	Maize products excluding processed poultry and animal feed	5-10.5
3	Rice	3.5
4	Fresh fruits excluding apples, pears, peaches & bananas	6.5-7.5
5	Apples, pears, peaches and grapes	3 -4.5
6	Banana	6.5-25

7	Fresh vegetables excluding cabbages, tomatoes, potatoes and seed potatoes	6.5-10
8	Cabbages, tomatoes and potatoes excluding seed potatoes	6.5-20
9	Poultry and poultry products including live broiler birds, day old chicks and hatching eggs	5-15
10	Wheat	3-5
11	Wheaten products	7-18

Members of the public and importers are informed of applicable levy rates by means of government gazettes and public notices. The rates provide for a range, which allows for the levy to be adjusted either upwards or downwards, depending on the local supply situation. When the local supply is high the levy is increased, in order to discourage imports and vice versa.

The local supply situation is monitored by the Extension Officers and by regular meetings with producer associations, like the Swaziland Poultry Producers Association.

2.3 Impact on farmers

Although farmers were the intended beneficiaries of the NAMBOARD regulatory activities, the extent to which farmers benefited and the impact of the regulatory activities on farmers have not been measured. However, certain observations can be made with regard to the effects of the regulation on farmers and how they have benefited.

The levies collected from importers are ploughed back to develop agriculture in Swaziland. A unit known as the Farm Support and Development Unit was created within NAMBOARD to channel assistance to farmers. The unit provide the following services to smallholder farmers :

- horticultural marketing extension services (3 mobile extension personnel)
- subsidised produce transport services for farmers (3 4-ton trucks)
- development of the export programme for high value vegetables
- poultry abattoir equipment for smallholder farmer groups
- production information collection project (PICOP) for vegetables
- National Maize Competition (NAMCOM)

With regard to vegetables, farmers have had increased access to marketing extension services, cheaper transport for their produce and access to regional and overseas markets. Maize farmers have participated in the national maize competition (which is sponsored mainly by NAMBOARD), and some significant yield increases have been realised by some producers. Smallholder producers have increased production, due to the regulation of imports and the installation of abattoirs for the processing of the chickens at community level.

It is however still disappointing that production of scheduled products is not growing sufficiently, and cannot meet national demand in the case of maize, and is characterised by seasonal gluts and scarcity of produce in the summer period in the case of vegetables. Unfavourable weather conditions also contributed to the stagnant production of maize in the country. The country has suffered from seasonal droughts that have affected maize production

negatively. Almost all maize is grown under rain-fed conditions in Swaziland.

2.4 Scope for scaling up and replication

The regulatory function of NAMBOARD is unlikely to scale up in its present form because it must respond to globalisation of trade and WTO, SACU, SADC trade protocol agreements to which Swaziland is signatory. NAMBOARD is presently studying how to position itself in light of these changes. Levies may not be eliminated completely but NAMBOARD will change some of the ways of operation. For example, in the past NAMBOARD would restrict imports by reducing quantities that could be imported by each importer. In view of the WTO agreement they may not do this anymore. At the time of compiling this report NAMBOARD could not divulge their future strategy as it was still under development.

With regard to the development programmes currently in place, NAMBOARD is collaborating strongly with the Ministry of Agriculture and Co-operatives and other agencies for continuity in the event that levy income is affected in the future. Already the information project is funded in part by the Ministry of Agriculture and the International Fund for Agricultural Development (IFAD) project.

3. Fresh Product Market

The Swaziland fresh produce market (SFPM) started operating in 1987. The aim of this policy was to promote and commercialise agriculture in Swaziland, particularly in the rural smallholder sector, which was mainly characterised by subsistence production of maize, the staple crop. The establishment of the fresh produce market was part of a larger project that was funded by IFAD. Among the other components of the project was the rehabilitation of 12 irrigation schemes. It was therefore necessary to create an outlet for the anticipated increased production from the irrigation schemes. Historically, the marketing of horticultural produce from smallholder farmers had been fraught with problems because most local traders obtained most of their requirements from neighbouring South Africa. The intended beneficiaries of the new policy were fruit and vegetable producers, particularly from the smallholder sector.

NAMBOARD operated the market on a commission system similar to the way the fresh produce markets were operated in neighbouring South Africa. Produce was sold on the market on a commission basis, meaning that farmers delivered produce to the market floor, where any one of the 3 or 4 market agents sold it and received a commission of between 5 and 7.5 %. NAMBOARD would also extract a fee of 5% for providing the physical facilities, cashiers and an information system for tracking all sales and allocating them by the market agent and the farmers that delivered the produce.

The commission system in Swaziland had the following serious disadvantages, which led to its total failure :

- Farmers who delivered produce also bore marketing risks in that ownership of the produce did not change title, even though the produce had changed hands. Therefore if produce was spoiled, the farmers only received a condemnation certificate and no money.

- Farmers were not paid immediately for their produce. They had to wait 2 weeks or sometimes longer for payment. This was caused by the need to process the transaction.
- The market agents often had produce purchased from elsewhere together with produce on commission from local producers. Their loyalty was therefore divided, and they tended to give better attention to the produce they owned than to the produce belonging to farmers.
- The volumes of produce traded on the market diminished significantly after peace returned to Mozambique (most business had been through cross border trade with Mozambique). With the reduced business, the commission system was not viable anymore, and agents withdrew from the market.

3.1 Financial Turnover

From 1987 when the market started operating, sales were continually growing and reached a peak of more than E16 M in 1994 as shown in Table 1. From 1995 sales began to decline steadily for the reasons already mentioned relating to the stoppage in cross border trade with Mozambique and in addition the market lost its general competitiveness in the local market.

Table 2 Total market throughput compared with local produce throughput

Year	Total throughput (tons)	Total turnover per annum (E)	Local Produce throughput (tons)	% Local of total throughput
1990	12711	8.648.824	1107	9
1991	12431	9.532.763	1098	9
1992	13710	14.527.779	1198	9
1993	15931	10.875.319	2291	14.4
1994	15967	16,734.351	1684	12.9
1998	5814	n/a	728	12
1999	3990	n/a	743	19
2000	n/a	n/a	n/a	n/a
2001	2942	n.a	935	31.8

A market study carried out in 1998 indicated that the loss in competitiveness was due to:

- there was increased competition with the bakkie traders
- reluctance of buyers to travel to SFPM which is located 15km from Manzini and 30km from Mbabane, whilst the municipal markets in Mbabane and Manzini were within easy reach
- the limited trading hours of the market (0600 - 1100)
- high prices

3.2 Importance and coverage of the fruit and vegetable market

In spite of its limitations, the market provided for the first time a place where buyers could access a wide range of produce, properly graded and priced. Buyers could also get other services, like credit facilities.

3.3 NAMBOARD acting as a market agent/contract system/supply agreements

In response to the challenges facing the market and the continue failure to provide meaningful assistance to smallholder farmers, the SFPM instituted various initiatives among which was the supply agreements or contract system. Others were the export development, diversification into other products such as poultry, establishment of sales depots in Pigg's Peak and in Lomahasha, on the border between Swaziland and Mozambique.

The aim of the supply agreements was to link the production of vegetables to the exact requirements of the SFPM, thereby assisting producers to supply an assured market and also assuring the market of timely supplies of high quality produce. This service was intended to benefit both producers and the market.

3.3.1 Method of Operation

This service commenced in June 2000 and the following sequence of events was followed in instituting it:

- Identification of vegetable crops that smallholder farmers in Swaziland had comparative advantage in producing. Eight vegetables were identified, namely cabbage, tomato, green pepper, lettuce, butternut, green beans and carrot
- Quality specifications were developed for each crop to meet the requirements of the market.
- A selection criterion was developed for those farmers who would qualify to be contracted. The criteria were that producers should have a minimum of 0.4ha of fenced land, an irrigation system, be within 50km radius from the market, have finance for inputs and have a minimum of 3 years experience in producing vegetables.
- An announcement was made over the national radio and newspapers inviting farmers to a meeting to discuss this new approach. At the meeting farmers were invited to make their own suggestion on the approach.
- Interested farmers made applications to be contract farmers and the specific crop they wanted to grow, and the supply period
- Site inspections were carried out on all the applicants' farms to verify whether all criteria were met
- The qualifying farmers then signed the contracts and production commenced
- NAMBOARD extension staff paid monthly visits to the farmers and produced progress reports

- The contracts extend over a period of 1 year and the process starts all over again for subsequent years.

3.3.2 Importance and coverage of vegetable growers

When the programme commenced in 2000, 95 farmers were contracted, and in 2001/02 the number increase to 180 farmers,

Farmers on the programme are visited once every month. Since most products are ready for harvest 3 months after planting, the degree of contact with each farmer depends on how many crops he/she is contracted for and the planting schedule. On average, 35 farmers are contracted to plant each month, which means that on an average of 3 months growing period for the vegetables, at most, 100 farmers are visited per month.

When NAMBOARD (August 2000) entered into supply contracts with the farmers, total sales continue to decline as illustrated in Figure 1 below.

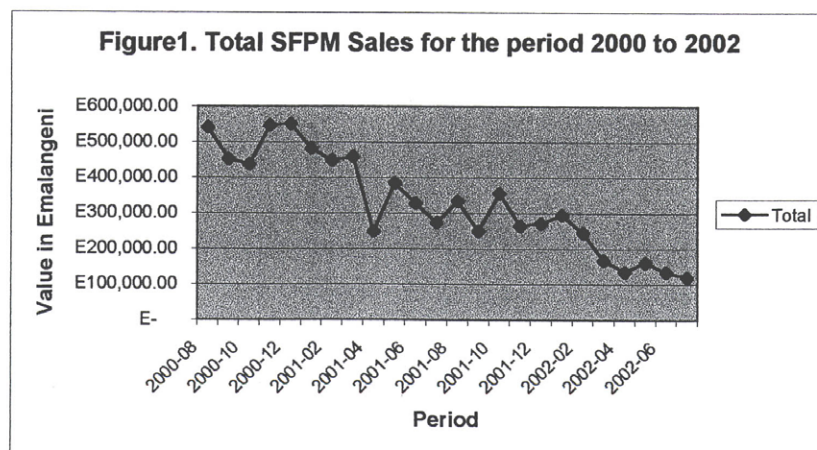


Figure 1 indicates a steady decline in sales from E640, 000 in August 2000 to E106, 000 in July 2002. Evidently the reduced competitiveness of the market has continued unabated.

The data stretching from August 2000 to July 2002 does not show any seasonal variation at all. Historically however, there were seasonal fluctuations to market sales. The SFPM tended to realise most sales during the summer months when local production was at its lowest. This was due to the fact that both buyers and producers as the market of last resort viewed the SFPM. The main reason why the clients of the market took this view was that for the first decade of the market's operation, farmers' goods were sold on commission basis and they bore the full risk of the marketing process. In contrast, other buyers paid cash for produce and so the farmers' risk ended immediately the goods exchanged hands. The small-scale buyers on the other hand preferred purchasing from wholesalers located at the municipal markets because of proximity and they did not have to

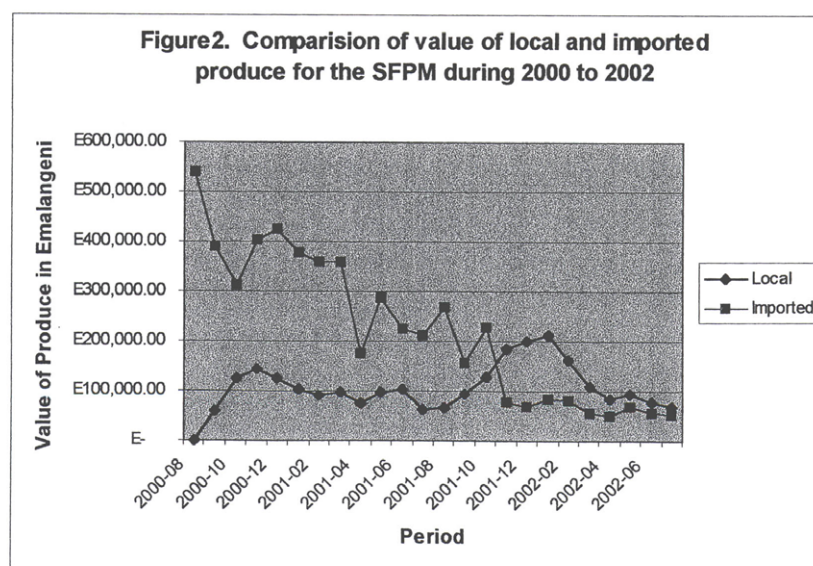
spend money travelling to the SFPM. Larger buyers had the option to import their own goods from South Africa, and sometimes they preferred to do so. During periods when local production was plentiful, the trade by-passed the SFPM, and when produce was scarce, the SFPM with its capacity to import large amounts of produce and store it in cold rooms, was the preferred supplier.

During the period August 2000 and July 2002, the trading margins averaged 18%. The margins however exhibited a big variation with some months showing a negative margin and in other months, showing margins as high as 84%.

3.3.3 Supply of produce from local farmers

Since inception one of the objectives of the SFPM was to increase the volumes of locally supplied produce sold on the market floor. The supply agreements between producers of horticultural crops and the market were one such strategy to achieve this objective.

Figure 2 below shows a comparison of the sales of local produce compared to imported produce over the period August 2000 to July 2002.



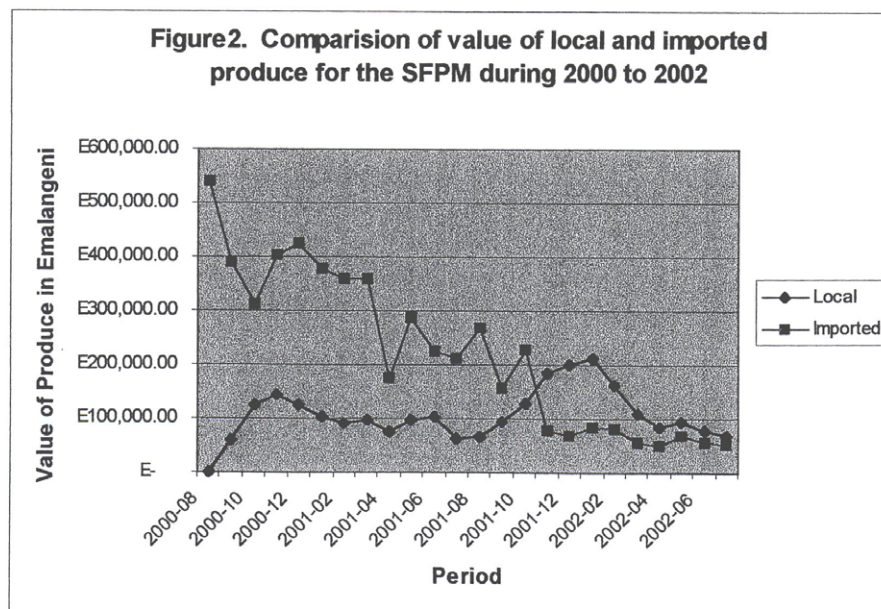
The sales of local produce since the inception of the supply agreements showed a marked increase during the period of November 2001 to February 2002. It is during this period that local produce exceeded imports, probably a first in the history of the market.

Figure 3 below shows that despite a decrease in the sales of imported produce, sales of local produce remained somewhat steady, and that the market probably in the light of a reduced market share opted to reduce imports in favour of local produce.

It is interesting to note that prior to November 2001, the sales graph for imported produce was an almost exact reflection of the total sales

graph, which is an indication of the important that imports played in the business of the market.

For the specified period local sales as a percentage of total sales averaged 33%, with a range between 13 and 74%.



3.3.4 Cost of the service

The SFPM was unable to provide details of the cost of the supply agreements. The reason for this may be that they do not really know how much it costs due to the fact that the market itself does not cover most of the related costs. The import levy revenue that is administered by the statutory division of NAMBOARD carried the main costs of the supply agreements.

The main components of this support are :

- the salaries of the 3 Marketing Extension Officers
- vehicles for the Extension Officers
- 60% subsidy on transport for collecting farmers' produce

From time to time the market pays for produce that was not sold, due to errors in judgement on the volumes required, or an unanticipated reduction in demand. This would also constitute a cost to operating this service.

3.3.5 Impact on farmers

A survey was carried out on a sample of 9 producers contracted by the SFPM. A brief questionnaire was prepared and the 9 farmers were interviewed individually to ascertain their level of satisfaction with the supply agreements. A sample of the questionnaire and the farmers included in the survey are given in appendix 1 and 2 respectively.

The results of the survey indicated the following salient points:

- The idea of the supply agreements was welcomed by producers who saw it as a step in the right direction in improving their relationship with the SFPM. In spite of the problems encountered farmers still believe that the strategy is very sound ,but lacks proper administration
- The supply agreements were very helpful in assisting farmers to secure loans from banking institutions
- 70% of the farmers sampled were able to produce according to the requirements of SFPM. At other times, producers failed to produce due to lack of finance to secure inputs, shortage of water for irrigation, delay in land preparation due to non-availability of tractors at the right time.
- Most of the time SFPM has been unable to absorb all of the contracted produce. One farmer indicated that out of 1200 heads of broccoli only 850 were purchased by SFPM, another indicated that out of 4000 heads of lettuce, only 600 heads were purchased. The main reason given to producers for a failure to honour these agreements were that the market at those given times was saturated and could not absorb the produce. At other times producers were told that transport to collect the produce had been unavailable.

At times farmers were informed in advance that the market would be unable to absorb produce, therefore farmers should find alternative markets. At other times though, there was no advance notice and farmers would be stuck with harvested produce and SFPM not showing up. In some instances farmers were compensated for the losses they incurred, in others there was no compensation.

The SFPM indicated that the reason they compensated some farmers and did not compensate others had to do with the quality of the produce. Where the quality did not meet the specified standard, they would not collect the produce and thus not compensate the producers. However, where the produce did meet the standard, and the market could not collect it due to slow demand, farmers were compensated.

The SFPM indicated that farmers were informed why produce had not been collected; however some of the farmers interviewed indicated that they had not been informed at all.

- In some instances the schedule of supply indicated in the supply agreement did not tally with the delivery schedule. For example the agreement would indicate supply of 200 bags of cabbage over a period of 1 week, yet at delivery, the SFPM would stretch the schedule over a 3-week period, resulting in some of the produce becoming over mature or even spoiling.

- Some of the time the prices agreed upon was not adhered to. One farmer indicated that his agreement indicated a price of E42 per 20 kg crate of tomatoes, only to receive prices ranging between E15 and E30 per 20 kg crate.
- In some instances producers indicated that they recouped their losses by quickly finding other markets such as bakkie traders, supermarkets, market women or other wholesaler. In other instances, farmers suffered total losses.

3.3.6 Scope of scaling up and replication

The present situation of SFPM presents no scope for scaling up or replication of the supply agreements. The biggest challenge facing SFPM is the considerable loss in market share. This has made the market unable to honour contracts made with producers. As this situation persists, more farmers are bypassing the SFPM to trade directly with the SFPM's competitors and their customers, thereby completely cutting off the SFPM from the supply chain. The SFPM's customers include supermarkets, market women, caterers (company rations, hospitals, schools), city street vendors and roadside stalls. Competitors the larger wholesalers who perform the same function as the SFPM including pre-packing, the market women also club together and hire 30 ton trucks and import produce from South Africa and compete effectively with the SFPM.

Unless this untenable position is urgently addresses, the SFPM will not be in existing for very long. Its survival even to this point is quite surprising. Most probably the levy revenue from the statutory division of NAMBOARD is providing quite a lot of financial support.

Management at the SFPM indicated that the market is undergoing restructuring to address some of the concerns of the organisation. Another strategy being adopted is the development of export markets, particularly for high value vegetables. The SFPM already operates a packhouse of international standard for produce destined for overseas markets and supplies produce into the South African market as well.

The strategy adopted for the export development is that the SFPM first establishes export markets for particular high value vegetables through South African exporters or direct into the European markets. A planting programme is then developed and farmers are identified to plant according to the programme. Farmers access credit from the Swazi Bank to produce these crops based on an assurance that the SFPM has an assured market. The SFPM provides technical support for the production of the crop until the farmers deliver in bulk to the SFPM's packhouse. Produce is graded and packed by SFPM staff and transported to the various destinations. All produce goes by road to Johannesburg in refrigerated trucks for onward distribution to overseas markets or South African supermarkets or wholesale markets.

The SFPM pays farmers on the basis of the pack-out percentage and pays whatever price has been paid by the buyer less a handling fee to cover the SFPM's costs. This in effect means that the SFPM should track each producer's consignment throughout the packing and marketing process. Inevitably mistakes are made here and it leads to endless squabbling between farmers and the pack-house about whether the farmers' produce is all accounted for.

4. Marketing Systems and Practices of Vegetable Growers who do not sell through NAMBOARD

NAMBOARD only regulates imports and does not restrict trade within the country. Producers of vegetables can sell their produce through various networks of distribution, depending on their particular circumstances. For example, those farmers who are close to the cities may enjoy higher patronage from the municipal market traders than those further away. Farmers producing close to major road may enjoy trade from passing traffic more than their less accessible counterparts.

Vegetable growers organise in various ways to meet their needs. In the majority of cases forming an association whether within irrigation schemes or in individual production units. Within the irrigation schemes the method of operation varies. Most commonly producers, have individual plots, but co-operate in the management of common resources, like water or in accessing farming inputs. In some cases they work together to produce on one piece of land and share proceeds at the end of the season.

In some cases farmers are organised along commodity lines, where they do not share a common resource like water or land, but still co-operate to market their common commodity as happens among farmers producing high value vegetables for export. Some growers operate strictly for both producing and marketing.

4.1 Farmer-Wholesaler-Retailers-Consumer

This system is most similar to that used by SFPM. The farmers supply the wholesalers with bulk produce, which is subsequently repacked and supplied to the supermarket trade and also the catering and hospitality services. The farmers often deal directly with wholesalers; alternatively, private agents link them and extract a commission from the wholesalers for facilitating the sale.

Other wholesalers have stands at the municipal markets in Manzini and Mbabane. They scout around the country and buy produce from farmers in pick-ups or small trucks, store in a small warehouses, and very early in the morning they park their vehicles at the municipal markets and sell. These municipal markets have retail sections and retailers from the same markets or street vendors purchase produce, pack into small units and sell to consumers. These wholesalers usually import produce as well.

Wholesalers rarely enter into binding agreements; most business is done through verbal agreements, which are not binding at all.

4.2 Farmer-Retailer-Consumer

In this instance, farmers approach the major supermarkets or caterers at hotels and enquire what sort of products they would like produced for them, and then supply as stipulated.

Most of the farmers who supply directly into the retail business, have pre-packing units where they convert the bulk produce to the form required by either the supermarket or caterer. Some of these farmers may also purchase produce from other producers or wholesalers to meet the requirements of their customers.

Another variation of this system, is where the market women who have retail stalls in the municipal markets purchase produce directly from farmers to re-sell. The market women often hire a pick up as a group and travel very early in the morning to buy produce. Often they do their own harvesting because they select the best products. This is common where the gardens are close to the city.

4.3 Farmer-Processor-Retailer-Consumer

Some farmers seek contracts with processors of vegetable products, but because there is no sizeable vegetable processing in Swaziland, this is not common. There is however a company that produces jams and other products for export. This company contracts some farmers to produce vegetables like the Roma tomato for processing.

5. Recommendations

5.1 The local market for the small population and the people limit vegetables and fruits in Swaziland's eating habits. As a result most initiatives that target the local market tend to glut the market and leave the farmers worse off than before. It is important therefore for Swaziland and the SFPM to consider :

- the regional markets and overseas markets in horticultural development
- investigation of it's competitiveness with regard to horticultural production
- alternatives to the "commission system". Such as buying produce from farmers rather than selling on their (farmers) behalf

The supply agreement strategy is one way that NAMBOARD, through the SFPM, sought to assist smallholder irrigators access markets. In theory, the strategy is a very attractive way to achieve this goal. In practice however, it presents a lot of challenges. NAMBOARD experiences have been useful and many lessons have emerged. In order for the system to be improved the following is recommended :

- a) use supply agreement between producers and markets to establish a steady and health demand for products. Processing companies may be ideal candidates to engage farmers in such a programme
- b) invest in adequate training for farmers and the extension advisors in order to meet the quality specifications of the buyer
- c) identify and engage with organisations similar to NAMBOARD to provide a range of developmental ventures, otherwise let private sector individuals deal with the buying and selling business
- d) already in Swaziland there are individuals who are brokering supply arrangements between producers and supermarkets, providing the

potential to pilot an innovative arrangement with buyers, brokers and farmers

- e) augment the experiences of NAMBOARD with experience from other parts of the world to fine-tune the strategy

PLEASE NOTE:

The Swaziland currency, Emalangeni (E) is at par with the South African Rand. At the time of compiling this report, the exchange rate with the US Dollar was E9.79 = USD.

Appendices

Appendix 1

**SURVEY OF FARMERS PRODUCING FOR THE NAMBOARD
SUPPLY AGREEMENTS**

1. NAME _____ SEX _____

2. AREA/DISTRICT

3. LAND AVAILABLE FOR VEGETABLES :

Products Grown	Period of supply to market	Quantities & price specified by agreement	Quantity supply & price received	Level of satisfaction and reasons

4. SUGGESTIONS FOR IMPROVEMENT

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Appendix 2

LIST OF INTERVIEWED PRODUCERS WHO SUPPLY NAMBOARD ON CONTRACT

	NAME	SEX	AREA	PRODUCTS GROWN
1	Simanga Dlamini	M	Sihhohhweni	Broccoli, Cauliflower
2	Samuel Johnson	M	Boyane	Tomatoes, cabbage, carrots
3	Gladys Khumalo	F	Ludzeludze	Swiss Chard, cauliflower
4	Hezekiel Manana	M	Mbekelweni	Cabbage, Green beans, Lettuce
5	Samson Johnson	M	Ekudzeni	Lettuce, cabbage, tomato, potatoes
6	Sibonelo Mkhabela	F	Malkerns	Lettuce, green beans
7	Solomon Maseko	M	Sigombeni	Lettuce
8	Phineas Nkambule	M	Ncabeni	Lettuce, green beans, Swiss chard
9	Maria Dlamini	F	Lozitha	Broccoli, hot pepper, potatoes

PHASE 2

WORKSHOP DISCUSSION & CONCLUSIONS

The Department of Agriculture has up to now been responsible for smallholder irrigation schemes. However, it has no longer the financial resources to subsidise the schemes as they were in the past, providing water management in the form of scheme managers and water bailiffs, teams of maintenance workers, tractor services. It does intend to maintain and improve the extension services and is embarking on extensive retraining and reorientation of the service, mindful of its protective role and fully recognises the need for on-going support. Support must be affordable to government and at the same time relevant to the needs of smallholder irrigators. It is therefore crucial to analyse the relationship between irrigators and the government departments they interact with a clear understanding of the social, financial physical and natural and human opportunities and constraints they face. Rural livelihoods are complex and the research has revealed that irrigators are no exception. Poverty is endemic in rural areas and affects the opportunities for irrigators to produce and sell agricultural products.

A major concern for the Department is to encourage all stakeholders to commit to the development programme in a spirit of co-operation. The institutional framework is vital to achieving co-operation while supporting people and giving them sufficient freedom and support to develop their farm businesses and entrepreneurial initiatives. This preoccupation is closely related to the concerns of the irrigators about decision-making and marketing identified in Phase 1 of the research. Thus much of the workshop discussion centred on :

- functions of the various institutions,
- the role of stakeholders (irrigating men and women, committees, support service staff, community-based organisations and local community leaders including politicians) in fulfilling these functions
- relevant, accessible and affordable support.

Functions of the institutions

Because the Department of agriculture, the development consultants and the farmers representative are aware of the close relationship between the success of irrigated farming and water management there has been a conscious decision taken to link the functions of commercial and water management in the remit of irrigation scheme committees. This has been part of the philosophy of the programme of smallholder irrigation revitalisation.

The programme has in many ways been highly successful. Notably it has succeeded in reawakening interest in irrigated farming. At the outset of the programme conditions on the schemes were so poor, both in terms of water management and production, that many plot owners no longer farmed. Significant improvement has occurred and sets the scene for greater development based on irrigation although for some schemes the critical mass is yet to be reached. This success has been achieved by strategic improvements to the schemes agreed by the users through the development committees on the schemes and supported by the department through the activity of the consultants who have effectively taken the role of facilitation. The formation of development committees has been problematic, given the lack of clear leadership in a situation of extensive institutional decay. Information on existing communications and local networks was scarce at the outset of the programme. Nonetheless the committees have formed and established themselves among scheme members but some have encountered difficulties in establishing themselves as the relevant authority. This has been particularly the case in larger scheme and where more than one tribal authority is involved. The workshop agreed that it is impossible to totally separate irrigation development from land tenure issues.

Workshop Participants accorded priority to scheme management establishing authority over members in respect of water allocation and use and financial contribution to operation and maintenance.

The function of group or community-based agricultural businesses was seen differently. The need for flexibility and voluntary association was emphasised but the workshop was unable to identify specific action to protect irrigators in the commercial world while allowing them to develop entrepreneurial skills. It was suggested that local government could take a more proactive role, perhaps facilitated through an area based development forum arrangement. What was clear was that the functions of water management and profitable farming were different but closely linked.

The role of stakeholders

The role of committees was discussed in relation to sustainability. The case study identified over commitment of the voluntary committee members as a significant problem that threatens sustainability of both the committee structure and the household businesses of individual committee members. The growing need for greater communication and participation that was highlighted by the internal monitoring indicates that, in the short run, the burden is likely to increase.

The workshop was agreed on the need for farmers to be committed to the development programme and the need to get everyone on the 'development vehicle' in order to assure sustainability. It was clear from the case study that on large schemes getting everyone on board was a difficult and time-consuming task. Lack of information and misinterpretation of information was a critical hazard and required rethinking of the institutional frameworks.

The issue of financial support from government for management functions was discussed, and linked to the registration of an irrigation scheme as a WUA under the National Water Act 1998. Establishment as a WUA would enable a scheme to access grants for development and to be paid by the catchment agency for some water management tasks. It was clear that farmers were apprehensive about the implications of becoming a Water User Association and unclear about the responsibility that accompanies the legal status that would confer.

The role of government was seen as regulatory, particularly in relation to markets and marketing with importance given to the role of government in providing infrastructure to facilitate marketing such as roads, railways and market places.

However, establishment as a WUA brings responsibilities that may not be appropriate or compatible with business approaches that were also seen as an essential factor in creating sustainable schemes, such as equity issues and development plans. The functions that would then be required would be burdensome. This left many questions unanswered and deliberation further to the workshop led on to the institutional options suggested in Appendix 1 of the main report. All were agreed on the need for continued support to irrigators through government agencies, on the need to create stronger links with NGO and private sector developer and on the need for continued research.

It is clear that government support to the smallholder irrigation sector needs upgrading. The Department of Agriculture is already embarked on improvement of extension service training. The Year 1 workshop emphasised the need for business approaches and business training however it became clear during the second year investigation that training alone will not be sufficient and that an enabling institutional environment must exist. Otherwise stakeholders will be unable to reap the benefits of training.

The Swaziland experience detailed in the papers on NAMBOARD and Sugarcane growers indicates that support to business can take different forms and might possibly be best provided on a crop-basis. Difficulties are greater where markets are seasonal and volatile and the product is perishable. The experience of the Wintervelt irrigators supports this viewpoint.

Local individual marketing is in place but the limited profit is insufficient for farmers to be able to raise enough income to be able to support their families and the costs of operating and maintaining the scheme.

The growing of maize cobs is the exception and local demand ensures good prices. The scheme studied is particularly suited to growing maize for cob sale and two or possibly three crops per year could be achieved. However, for most schemes in former homeland areas of South Africa this will not be the case. Also in most schemes the surrounding areas suffer unemployment and low incomes. These areas tend to be net importers from the wider South African economy. Supermarket outlets source fresh produce from the established commercial sector where economies of scale keep costs low and cheap food can be offered undercutting local producers and often outstripping the quality of crop they are able to offer. Local networks do to some extent ameliorate this situation and on-field sales are widely reported. However by the nature of that sales method and the local economy, expansion is likely to be slow and limited and is unlikely to produce a significant contribution to the running costs of the schemes. Increased commercial linkages are essential in the medium and long run and require the support of government in activating and regulating their development.



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