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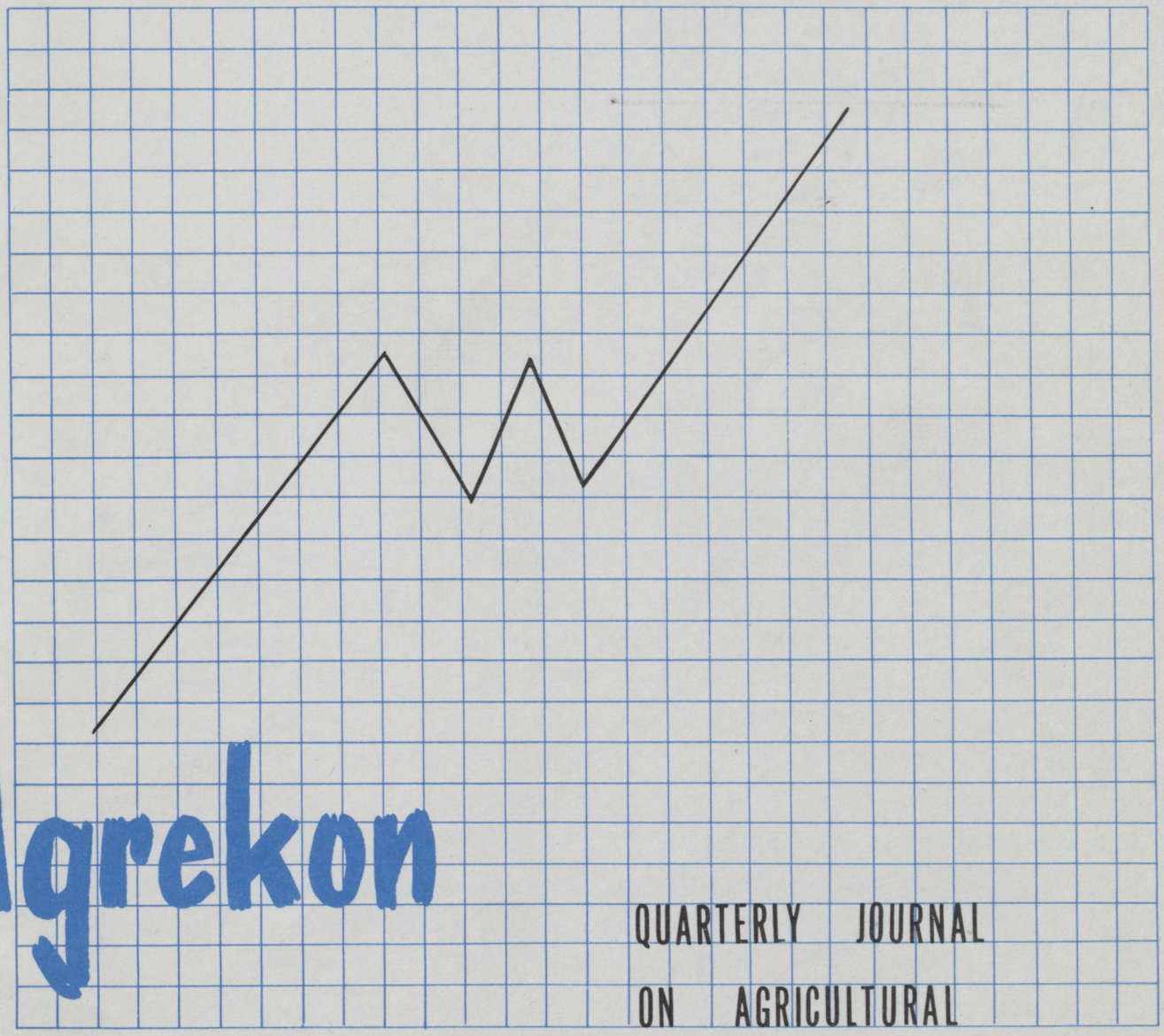

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A NEW APPROACH FOR THE PLANNING AND DEVELOPMENT OF SMALLHOLDER IRRIGATION SCHEMES IN THE BLACK STATES OF SOUTH AFRICA

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ABSTRACT

Black smallholder irrigation schemes should be used as target areas for agricultural development. A number of economic, social and political factors are responsible that the smallholder irrigation schemes in South Africa's Black States are unable to achieve their development potential. The experience of Vuvulane Irrigated Farms in Swaziland proves that Black smallholder schemes can be successfully developed by the application of an integrated development framework. Such a framework incorporates three planning stages, namely the determination of the agricultural potential and the economic profitability of the scheme, and the establishment of the required agricultural infrastructure. The framework aims at providing smallholders with the means and motives to achieve commercial production. As the developer provides the full range of required irrigation services the risk attached to commercial production is largely minimized for the smallholder. By adopting a commercial approach in the provision of the services the developer ensures that the equity objectives of both parties are met and the active participation of smallholders encouraged.

1. INTRODUCTION

The agricultural sector in developing countries has an important role to play in stimulating and supporting economic development, by:

(i) The provision of food supplies for a growing population;
(ii) the provision of surplus labour to meet the demands of the industrial sector;
(iii) the creation of an internal market through rising farm incomes for agricultural inputs and consumer goods;
(iv) the provision of agricultural exports;
(v) the development of marketing and processing industries.

Irrigation schemes are usually developed on the higher potential soils and require large capital inputs. With the correct application of capital, technological and managerial inputs, favourable production results can be achieved within the short term.

Smallholder irrigation development has a direct effect on economic development. Large numbers of farmers can be settled on smallholdings to achieve commercial production. By means of the multiplier effect rising farm incomes stimulate economic development in the local industrial and retail sectors.

2. PRESENT SITUATION

Project development of irrigation schemes in the Black States of South Africa by the development corporations, that is, capital and managerial intensive projects with the inclusion of Blacks as employees and not as farmers, have indicated that these schemes are capable of high production yields. The results on the 102 irrigation schemes settled by Black farmers and developed by the Departments of Agriculture of these States, are however, unsatisfactory. On the majority of these schemes production is at the subsistence or near subsistence level with no or only a small amount of produce marketed.

During any specific period 50 per cent plus of the *bona fide* male settlers are absent from the schemes. The present pattern of irrigation farming does not provide the settlers with an adequate economic means and they are therefore compelled to leave the schemes periodically to supplement earnings elsewhere. The result is that the effectiveness of the control methods of the Departments of Agriculture are severely curtailed as officials have to work with a shifting population.

A number of economic, political and social factors are responsible for the present unsatisfactory situation. It is clear that comprehensive replanning is required in order that these schemes are to achieve their real development potential.

3. A SOLUTION FOR UNDERDEVELOPMENT: THE DEVELOPMENT FRAMEWORK

The development framework offers a solution to the vicious circle of underdevelopment which exist on the majority of the smallholder irrigation schemes. The framework provides smallholders with the means and motivation to achieve commercial production, as well as indicating the means by which the interests of the developer and smallholder are to be reconciled.

Development economists generally agree that traditional farmers react positively to incentives if exposed to the demonstration effects of a stimulating environment. For this to happen certain conditions have to be met:

(i) From the viewpoint of the traditional farmer a specific threshold of a critical minimum benefit must be achieved, that is, the marginal yields resulting from the application of modern technology must be large enough to compensate for the use of the required marginal inputs. Empirical research indicates that the height of the threshold of critical minimum benefit is inversely parallel to the stage of development.

(ii) The farmer must be in the position to handle the additional risk attached to commercial production. It is completely rational for farmers to prefer traditional to commercial crops if adequate protection against price fluctuations and crop diseases is not available.

(iii) The farmer must have access to the means required to engage in commercial production.

It is necessary for the developer to identify the required elements of the development framework as well as the delivery system required to apply the framework to the development level of the people involved.

4. PRACTICAL RESULTS FROM TWO SMALLHOLDER IRRIGATION SCHEMES

The results from two of the more successful smallholder irrigation schemes in Southern Africa, namely Taung Irrigation Scheme (TIS) in Bophuthatswana and Vuvulane Irrigated Farms (VIF) in Swaziland, indicate the guidelines of the development framework.

On the individual holdings at TIS the individual farmers, or their representatives, do not apply any particular crop programme. The partnership farmers follow a three year crop rotation programme which consist of maize, wheat, cotton, groundnuts and oats.

At VIF farmers are obliged to plant three-quarters of their holdings to sugarcane. On the remaining portion farmers plant different combinations of maize, cotton, potatoes, beans and other vegetables according to their own choice.

The average farm incomes recorded at TIS and VIF are not directly comparable as crop programmes and smallholding sizes differ. The table does, however, indicate the farm income levels per smallholder which results from different levels of planning and organization.

TABLE 1 - Average nett farm income (NFI) per smallholder of two Black smallholder irrigation schemes, 1976

Irrigation scheme	Average size of holdings ha	Average NFI per smallholder R	Average NFI per hectare R/ha
1. Taung			
(a) Individual holdings	1,7	Subsistence level	-
(b) Partnerships	3,5-6,5	650-1 200	210
2. Vuvulane	4,0	7 200	1 800
	6,5	9 800	1 500

Sources:
1. Department of Agriculture and Forestry, Bophuthatswana
2. Vuvulane Irrigated Farms, Commonwealth Development Corporation, Swaziland

Table 2 indicates the different planning and organizational levels at TIS and VIF. (Page 12 and 13.)

It is significant that 50 per cent plus of the individual *bona fide* smallholders at TIS are absent from the scheme at any time, while this situation does not apply to the partnership farmers. The lease agreements at VIF require a 10 month occupancy per year. It is further significant that the payment of commercial fees to the VIF irrigation authority has not deterred Swazis to apply in large numbers for placement on the scheme (on average 1 000 applications are received for the 30 available holdings annually). Furthermore the total package deal available for sugar cane has not introduced passiveness at VIF as smallholders earn on average 30 per cent of their total farm incomes from the remaining portion of their holdings for which the farmers themselves assume full responsibility.

5. THE DEVELOPMENT FRAMEWORK

The examples described above indicate the required elements of a development framework for the planning and development of Black smallholder irrigation schemes.

Irrigation schemes must be planned sistematically. This will ensure that the planning process is continued only if preceding results justify this. During planning every facet must be thoroughly analysed as the success from the total planning exercise will be determined by the strength of the weakest link in the planning package.

The first step is to determine the main objective or combination of objectives for the scheme as this will direct the emphasis of the planning process. Possible objectives for a smallholder irrigation scheme could be production for local consumption or for exports, promotion of local employment opportunities and income generation, rural and community development, local entrepreneurial abilities, linkage with local industry and retail sectors, etc.

The guidelines of the development framework can be identified in three phases.

5.1 Determining the agricultural potential

A number of physical, economic, technical and other factors have to be analysed in order that the agricultural potential of a scheme can be determined.

Physical factors such as water supplies and quality, soil types, climatological conditions and topography determine the physical suitability of an area for irrigation.

Economic, technical and other factors such as crop programmes (dictated by ecological, rotational, mechanical and labour requirements), and profitability, market potential and marketing facilities, irrigation systems, and sizes of the holdings are taken into account to calculate projected farm incomes. The planned farm incomes are aimed to attract the required type of people to full-time farming and therefore the income levels in the other sectors of the economy must be considered. Due consideration should also be given to the level of projected farm incomes in relation to local incomes. Farm incomes which are too high in relation to the local development stage will have the undesirable effect of making the scheme politically unacceptable, as well as giving rise to a buying pattern aimed at economic development outside the sphere of the local economy.

The sizes of irrigation holdings are thus based on projected farm incomes but also on practical considerations of the capital and labour requirements of the proposed farming system.

5.2 Determining the economic profitability

The second planning phase determines the economic profitability of the scheme as an investment in relation with other investment opportunities in terms of the development objectives. The economic profitability is determined from the viewpoint of the developer, and can be done by means of dynamic benefit/cost analysis.

All benefits and costs over the productive life time are discounted to present values in order that the present value of the sum of benefits and costs can be directly compared.

Benefit/cost analysis of irrigation schemes should be carried out at two levels.

At the first level only the direct benefits and costs of the scheme resulting from the scheme's operation in isolation of its environment are taken into consideration. For this reason benefits and costs are valued at their nominal values (market prices). The first level of analysis gives an answer as to the direct economic profitability of the scheme.

At the second level the economic profitability of the scheme is analysed from the viewpoint of the local economy. In addition to the direct benefits and costs of the scheme the indirect benefits and costs resulting from the scheme's linkage effects with the local economy must also be considered. The indirect benefits and costs should be valued at their opportunity values (shadow prices). From this second level of analysis the total economic profitability of the scheme will be proven one way or the other.

5.3 Required agricultural infrastructure

If the two preceding planning phases provided positive results the agricultural infrastructure required to achieve the agricultural potential and economic profitability of the scheme can be established.

The required physical infrastructure include the storage dams, canal and irrigation systems, irrigation plots and transport and communication systems.

The required institutional infrastructure comprises the provision of production inputs, cultivation, harvesting, marketing, credit, extension and training services and facilities.

The success of a smallholder irrigation scheme will depend to a large extent on the type of farmer to be settled. Special attention should thus be afforded to the selection process in order that persons with the required background and characteristics are to be settled. By including both the irrigation and traditional authority in the selection process it ensures that due consideration is given to agricultural as well as political and social aspects.

To support the development of local entrepreneurs both at the farm and at the scheme management level, extension programmes and control regulations should be linked to training programmes.

In the final instance a successful smallholder scheme requires the active participation of the farmers and management and therefore the interests of both parties have to be reconciled. This objective can be achieved by the application of control measures supported by economic realities.

Economic prices for irrigation services increase the value of production resources, and draw the attention of the farmer to the fact that irrigation farming is a full-time job that requires his full-time attention. By making full use of the opportunities provided by the development framework he can earn an attractive income, but if he should neglect the opportunities he can sustain financial losses.

Prices for irrigation services must therefore be determined at the level which could meet the interests of both parties; it would ensure an attractive income to the efficient farmer, and provide sufficient income to the developer to at least cover the running costs of the irrigation services over the short term and the capital costs over the long term.

6. CONCLUSION

Experience in Swaziland has proved that Black smallholder irrigation schemes can be successfully developed by the application of an integrated development framework.

The framework provides the smallholder with the motives and means to achieve commercial

production. The risk attached to commercial production is largely minimized for the smallholder.

By adopting a commercial approach in the provision of irrigation services the developer ensures that equity of interests are met.

The framework underlines the importance of adequate economic and technical planning and the application of sound management principles. Special attention must be given to possible linkage effects in order that the maximum benefit from increased farm incomes accrues to the local economy.

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Table 2 - Planning and organizational aspects of two Black smallholder irrigation schemes

Planning and organization	Taung Irrigation Scheme		Vuvulane Irrigated Farms
	Individual holdings	Partnerships	
1. *Determining of agricultural potential*			
(a) Physical potential	Soil survey	Ditto	i) Climatological surveys ii) Hidrological surveys iii) Soil surveys iv) Outlay of irrigation holdings
(b) Economic potential	None	Crop programme study	i) Market potential studies ii) Crop programme studies iii) Sizes of holdings studies iv) Irrigation system studies
(c) Social potential	None	Farming system study	i) Selection standards studies ii) Farming system studies
2. *Settlement*	i) Holdings alloted by tribal authority ii) Individual freehold rights	i) Ditto ii) Farmers form own partnerships	i) Developed holdings advertised ii) Applications made to district authority iii) Selection made at this level and shortlist submitted to selection committee iv) Final selection by selection committee consisting of representatives of irrigation authority and national assembly v) Successful applicants sign 20 years lease contract
3. *Holdings*			
(a) Size	Individual 1,7 ha	Partnership blocks of 20 ha, 3 to 6 farmers	Individual 4,0 to 6,5 ha
(b) Land fees	R12/holding/year (R7/ha) Government levy	R140/block/year (R7/ha) Government levy	R300 to R480/holding/year (R75/ha) irrigation authority rent
4. *Irrigation water*			
(a) Use	On request	Irrigation programme controlled by Department of Agriculture	i) Irrigation programme for sugarcane controlled by irrigation authority ii) Irrigation water for other crops on request
(b) Irrigation fees	None	Ditto	Average R100/ha/year (basic + additional consumption fee)

Planning and organization	Taung Irrigation Scheme		Vuvulane Irrigated Farms
	Individual holdings	Partnerships	
5. *Cultivation and harvesting services*	i) Per hand with own or hired labour ii) Mechanical work by private contractors on request	i) Ditto ii) Mechanical work by private contractors controlled by Department of Agriculture	i) Mechanical work for sugarcane provided by irrigation authority (controlled) ii) Mechanical work or hired labour for other crops on request
6. *Marketing services*	No control over marketing of products. If surplus production exists it is marketed either by the co-operative or through private channels	Marketing of products controlled by co-operative	i) Marketing of sugarcane controlled by irrigation authority ii) Marketing of other products through private channels
7. *Credit services*	i) Production inputs available from from co-operative on request on credit terms, repayable during marketing stage	i) Production inputs provided by co-operative on credit in consort with Department of Agriculture's crop programme. Credit repayable during marketing stage.	i) Production credit available from irrigation authority to a limit of R3000/smallholder at 8,5 % interest. Repayable from sugarcane sales.
	ii) Co-operative levy of 5 % on value of products marketed + R5 membershipfee per year	ii) Ditto	ii) Subsistence allowance of R15/month for one year available to settlers from OXFAM at 6 % interest.
8. *Extension services*	Provided by Department of Agriculture to shifting population	Provided by Department of Agriculture linked to crop programme, harvesting and marketing controls	Provided by irrigation authorities. In the case of sugarcane extension is linked to production, harvesting and marketing controls
9. *Control regulations*	Irrigation regulations cannot be effectively enforced on shifting population	Irrigation regulations enforced as it is linked to production, harvesting and marketing controls	Irrigation regulations specified in lease contract and supported by eviction clauses
10. *Local participation in management*	Black extension officers and certain administrative positions of Department of Agriculture	i) Ditto ii) Farmers elected as directors of co-operative	i) Black extension officers and certain administrative and management positions in irrigation authority ii) Farmers' society represents farmers at irrigation authority, also controls sugercane nursery
11. *Social infrastructure*	Responsible for own housing in adjacent township	Ditto	i) Credit available from irrigation authority to built houses on holdings ii) Smallholders have access to all medical, schools, sporting and retail facilities which are available within the total CDC project area

Sources: 1. Department of Agriculture and Forestry, **Bophuthatswana.**
2. Vuvulane Irrigated Farms, Commonwealth Development Corporation, Swaziland.