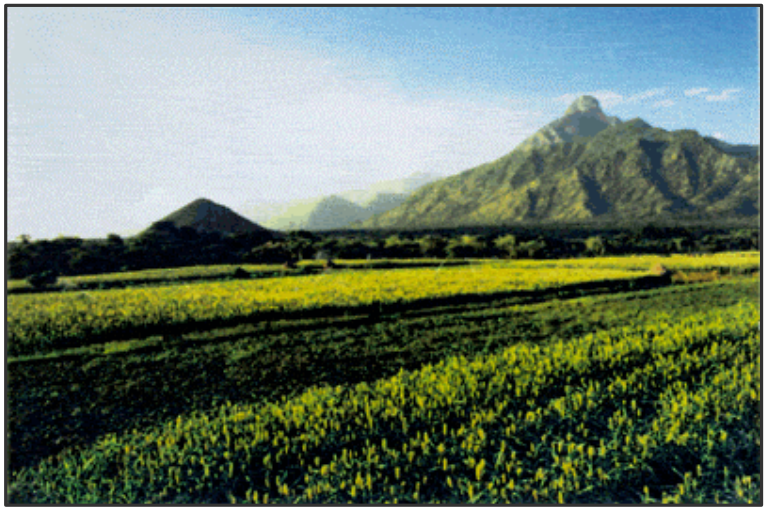
Small scale Irrigation in Remote Areas: An Approach to Marketing as Contribution to Successful Project Implementation



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• Introduction

It is of great importance to have a clear picture of the cultural, socio-economic and historic background of the Wei Wei location and of its inhabitants in order to understand the conditions, which supported the successful implementation of the first and second phases of the Wei Wei Integrated Development Project (1987-1994).

The present paper gives therefore a brief, but detailed description of all features, which formed the base for the project conception and for a participatory implementation of the project activities.

• Location

The Wei Wei Irrigation scheme is located in Sigor, West Pokot District, 510 km north of Nairobi. The foothills and plains of the Wei Wei location are situated in the South-Eastern part of the District, where the Wei Wei River runs through the area from South to North-East originating from the Cherangani Hills.

The tarmac road connecting Kitale to Lodwar offers good communication facilities. For a couple of years, regular public service vehicles connect Sigor to the major centres in the highlands.

• Climate

The climatic conditions in the location vary considerably due to the altitude differences. Rainfall data along the escarpment are not available, but one can assume that precipitation increases with the altitude. Average rainfall registered in Sigor at the foothill of the escarpment is about 750-800 mm/year, while on the upper part of the escarpment it might reach 1,500 mm a year. The long rains occur between March and August (with a period of relatively low rainfall in June) and the short rains in November. The high evaporation rate (ETo: 2,430 mm/year) indicates that crops hardly survive without additional water supply, thus the project area may well be defined as Arid and Semi-Arid Land (ASAL).

• Population

The inhabitants of the area are mainly ethnic Pokot, who may be subdivided in *Pi Pa Pax* and *Pi Pa Tix*. The two groups entertain different life habits. The first are sedentary farmers; the second are nomadic herds people. The project involved essentially *farming* Pokot people. Data on population density are controversial, mainly due to the fact that location boundaries had recently been changed and that there are no up to date census data. Due to recent immigration from areas bordering the Turkana district in the north, one can estimate that the current population density of Wei Wei Location reaches 250-300 inhabitants/km^2.

• History and Administrative Features

For time immemorial the valley of the Morun River (tributary of the Wei Wei River) has been representing a natural communication way between the highlands and the Kerio Valley. In the '90th the rough track connecting Makutano on the Highlands to Sigor was replaced by a tarmac road leading to Kalokol at the shores of Lake Turkana.

For years Sigor has been a reference point for the local subsistence economy, but trade opportunities increased after the realization of the tarmac road and the improved economic activities induced by the Wei Wei Integrated Development Project.

Already in the '50th the Government administration acknowledged the strategic importance of the village and in 1957, when introducing the divisional administrative unit system, Sigor became Divisional headquarter.

- **Farming Systems**

Contrary to most other people of Kenya, where irrigated agriculture was recently introduced, the Pokot have known this art for a long time. It is not sure when the first irrigation furrow appeared in the district, but oral history suggests that this was hundreds of years ago. Since time immemorial, traditional flood and furrow irrigation is practiced uphill the Wei Wei Irrigation scheme in Korellach- (Takoch furrow), Sangat (Mochowon furrow) and Ptokou- (Ptokou furrow) sub locations.

During the long rains irrigation complements natural rainfall. It represents a support to boost production. During the short rains it plays a vital role in assuring a second crop cycle, from November onwards.

Traditional crops grown with the support of irrigation are maize (Introduced in the early '20th), cassava, mango, banana and papaya. New crops were successfully introduced by the Wei Wei Integrated Development Project and include mainly pulses like cowpea (*Vigna unguiculata*) and green gram (*Vigna radiata* syn. *Phaseolus aureus*).

Provided this historic background it is evident that the existence of a community-based traditional water management culture substantially contributed to the success of the Wei Wei project

Rainfed crops are grown mainly along the escarpment during the long rains and include finger millet and sorghum. The cleared areas are cropped for two to three years and than abandoned (shifting cultivation system).

- **People and Environment**

Land degradation and erosion problems do exist for quite some time. During colonial times soil conservation measures were enforced on local farmers, who cropped finger millet on the steep slopes of the escarpment causing severe sail erosion. At independence restrictive rules ceased being imposed and farmers started an uncontrolled conversion of the escarpment, where higher rainfall pattern assured better crops than on the valley floor. In 1970 restrictions on burning in catchments areas and cultivation within a distance of 7 to 10 meters along the rivers were reinforced.

From the very beginning environment conservation has been considered as a mayor objective of the intervention to be achieved through the establishment of additional available, highly productive irrigated farmland on the valley floor. This should have dissuaded people from clearing the slopes of the escarpment and from practicing shifting cultivation.

Recently introduced Vetiver Grass (*Vetiveria zizanioides*) is currently multiplied with the objective of consolidating the embankments of drainage canals and the hill slopes.

- **Location Economy**

Low rainfall pattern and scarce irrigable lands are a definite restraint to agricultural development n the location. Erratic rainfall makes rainfed cropping a risky enterprise. According to a missionary stationed in Sigor since 1975, in a time-span of fifteen years, at the foothill of the escarpment, farmers succeeded only three times in growing crops in rainfed conditions.

The household economy of the Pokot farmer is a typical subsistence economy and is based on:

a) Agricultural activities performed on irrigated portions of land on the Sangat furrow irrigation scheme and in rainfed conditions along the slopes of the escarpment;

b) Livestock production as such, represents a reduced component of the household income. Cattle are rarely sold. Only small stock is subject to local market transactions. Livestock ownership in general is considered as a financial reserve to generate emergency cash. Established households of "Agricultural Pokots" own an average of 25-30 goats and 10 sheep. Cattle are rare. In times of food shortage goats are sold or battered for maize. Labour, fines, dowry and ceremony gifts are paid by goats.

c) Alternative sources of income are represented by employment opportunities offered by presently on-going activities, like the civil works on the Wei Wei Irrigation Scheme, the farm activities on the KVDA-JMS farm and some road maintenance performed by the Ministry of Transport.

• Project Background and Description

The subsistence economy of the *Pi Pa Pax* Pokot is based on small-scale agriculture. Rainfed crops are grown on the escarpment, while furrow irrigation is practiced on alluvial soils at the foothill of the escarpment. Due to the limited resources available to the farming community, expansion of irrigable land has ever since been a major constraint to improved livelihood.

Arising from this hardship, the Kerio Valley Development Authority stepped in to expand the irrigated arable land area. In 1982 it initiated the first large-scale intervention in the location leading water through a 6-km canal to the valley floor where some 200 ha of land were developed into a furrow irrigation scheme.

During the year 1994 a severe drought affected the whole country and the Kerio Valley in particular. Livestock and crops were nearly destroyed. Part of the local Pokot population migrated into the highlands, part settled on the hill slope increasing the clearing of the escarpment.

In 1996 the Kenyan and Italian Governments signed a Protocol of Bilateral Co-operation. The two parties agreed on a series of interventions including the Wei Wei Integrated Development Programme, the latter to face food shortage and assure food self-sufficiency of the population in Sigor.

The project design, envisaged the development of a gross area of 700 ha of which 580 hectares (540 plots) would have been equipped with gravity-fed overhead irrigation facilities.

The project, to be executed over three distinct phases, planned for the realization and provision of the following:

- Land reclamation and improvement over 700 ha;
- Construction of a permanent intake weir on the Wei Wei River at 1,010 m a.s.l. with maximum intake flow of 1,200 litres per second;
- Laying of a 4.88-km long, 1-m diameter steel pipeline leading water to the irrigation scheme;
- Laying of an underground steel and PVC pipeline network distributing water to the single plots;
- Equipment of 540 one-hectare plots with overhead irrigation facilities;
- Provision of technical assistance covering a broad spectrum of disciplines;
- Construction and equipment of a Service Center with workshop, stores and offices able to provide for logistic and technical support to the whole irrigation scheme;
- Supply of agricultural inputs for the first season.

The first phase of the intervention started in May 1987 and was completed in August 1990.

During this phase the main hydraulic adduction works, the pilot farm (70 ha), the Service Centre including workshop, offices and stores were completed. Farm equipment and crop inputs were supplied. Local farmers and counterparts were trained in the use of improved technologies through a technical assistance programme. Land reclamation and improvement (bush clearing, viability, drainage, etc.) were completed over an additional area of 203 hectares, while 36 plots were allocated to Pokot families.

In November 1990 the Italian Government financed the second implementation phase in order to expand the irrigated farmland to 273 ha net. The civil works have started on January 29, 1992 and will be completed by March 1993. By that time 223 farm units will have been allocated to the local families.

The third phase will start as soon as the Italian Government will allocate additional funds and will provide for the completion of the 540 plots, for additional resource personnel and for the facilities necessary to complete the back-up structure of the Service Centre.

Currently a core estate (pilot farm) of 50 ha is run commercially by the K.V.D.A. and operates as Service Centre, extension unit and focal point for input supply and crop marketing. Adaptive research focuses on crop husbandry, while in-field demonstrations are conducted on seasonal basis to assure a proper transfer of know-how.

The irrigation water feeding the scheme, originates from an intake structure 5 km uphill in the mountains. A 1000 mm diameter steel pipe leads water to the irrigated area on the valley floor. The system operates by gravity and supplies irrigation water 24 hours a day with a head of 3.5 bar at the plot hydrant. The irrigated area is divided into 2.5-acre plots, each with a hydrant fed from an underground pipe network, and equipped with galvanized steel irrigation laterals, raisers and sprinklers. As the land is prepared and the irrigation system installed, the plots are allocated by the local authorities to Pokot farmer families.

- **Approach to Crop Choice and Crop Marketing**

The project was conceived to relieve the local population from food shortages and to provide for food self sufficiency in the area.

Ascertained that the major constraint to agricultural development was shortage of irrigation water, and considering the soil characteristics, the topography and the concern of making best use of water, overhead irrigation was selected as the suitable solution.

During the first two years of operation, in-field trials allowed to identify crops and varieties suitable to be grown under improved conditions. Sorghum, pulses, sunflower and maize proved to achieve impressive yields with limited resources.

The dry climate contained disease development and pest control was limited to insects.

In March 1989 the first 42 hectares were completed and 20 farms were handed over to local farmers. The initial attendance of farmers to the project activities was scarce and their full involvement was achieved only after the completion of the first season, when they were able to cash the fruits of their efforts.

Prices of food crops were low and crop budgets showed that farmers could never afford to pay for inputs and services simply growing food crops. Thus, the establishment of an

alternative destination of the farm outputs was given priority within the planning activities. The resources made available through the project and the favourable climate allowed to obtain high quality produces. After a detailed market survey and after consulting farmers, the newly conveived Wei Wei Farmers' Association (WWFA) jointly to the project management decided to enter the seed production business.

The decision proved to be winning. Since the long rains in 1999 farmers grow seed crops in addition to their food crops.

The adopted cropping pattern includes a strict rotation and the following crop pattern:

Crop	Objective	Long rains	Short rains
Maize	Food	50%	-
Sorghum	Seed crop - cash	-	50%
Pulses	Seed crop - cash	50%	50%

Selected customers contract crops in advance and farm gate prices are fixed even before input procurement. Proper contracts are signed between the parties.

The yields achieved by the farmers on the scheme are impressive, reaching 26 bags/acre for sorghum. Maize is retained for self-consumption: 0.5 ha crop provide for at least 1.5 tons of grain, which satisfies the household need over a period of one year. Sorghum and pulses are sold to seed companies at the prices agreed in advance. The Farm Service Centre provides farm inputs and services like land preparation and post-harvest handling (trashing, weighing and storing). Farmers pay for the services in kind at current market prices, allowing the farm service centre to maintain its ability to operate through a revolving fund.

While monitoring the evolution of local micro-economics we were able to assess the spontaneous development of horticultural production. Every week on Thursday, dealers flock from the highlands to buy bananas, mangoes, papaya, guavas, onions, citrus and tomatoes. The market is still limited, but there has been a considerable increase in trade during the last five years.

Some of the farmers settled on the scheme, started growing fresh vegetables. In fact the semi-arid climate, the availability of irrigation and other facilities provided by the Italian Intervention, the proximity of Sigor to the main tarmac road connecting Lodwar to Nairobi and the increasing trade activity of the location, represent ideal conditions for the marketing of high value crops, like fruits and vegetables.

Any approach to further development should consider that post-harvest and marketing are by far the most difficult aspects of horticultural activities. As a general concept, small scale horticulture is most likely to be economically viable when it is located near a major market outlet to minimize the dependency on storage and transport facilities.

Considering the location of the project which is situated 110 km from Kitale, 160 km from Eldoret and 250 km from Lodwar, it appears that these towns are attainable markets, mostly due to the fact that - the local agro-climatic conditions are less favourable than the ones in Sigor and that vegetables reaching these towns travel longer distances from the south.

Considering the favourable climate, which allows cropping all-year round, Sigor has a considerable potential, especially for the production of vegetables, spices and essential oils. In fact, the remoteness of Sigor appears to be negligible should vegetables and spices be processed after harvesting. The local climatic conditions favour a quick dehydration of the crops, without loss of colour and quality. Agro-industrial processing would take advantage of existing resources like intense solar radiation, water and good communication facilities. Furthermore, there are plans for establishing a mini-hydro along the main pipeline, which could generate approx. 60 KW.

The first approach to low-tech agro-processing is already under implementation. This is the particular case of the red Bird Eye Chilly, which grows spontaneously along the Wei Wei River and in areas where some forest creates ideal micro-niches. Farmers know the crop. They do grow it in their home gardens or among other crops. In January 1992, the Project initiated some on-field trials planting *Capsicum fructescens*. The activity has been complemented by a market survey. In-field trials have showed that improved husbandry and provision of irrigation facilities increase yields and quality considerably. The prospects are favourable and orders have already been received. The introduction of this new labour intensive crop in the cropping pattern (on a micro-scale level), will allow farmers to have regular source of income throughout the year.

- **Final Considerations**

The experience gained in the implementation of the Wei Wei Integrated Development Project is quite unique. First of all because of its historic-cultural background, where irrigation and water management were part of the social and economic pattern for centuries; secondly because of the fact that the project happen to operate in remote, depressed, Arid and Semi-Arid Lands (ASAL), where the provision of reliable water resources and additional know-how, induced a tangible improvement in terms pf poverty reduction among the entire community; thirdly because a proper ad-hoc planning proved to be essential for the success of the activity, taking into maximum consideration of the traditional know-how in choosing crops and limiting the introduction of new technologies to the water application method (overhead irrigation) and to the use of selected seed and fertilizers.

The consultative process adopted in conducting market assessments and analysing costs and benefits of the various activities have been of paramount importance for the collaborative definition of farming system and crop pattern thus for the successful involvement of all beneficiaries.

The sustainability of the activities will depend mainly on the capability of the farmers to organize themselves in an efficient and responsible group. The bases are already in place: The *Wei Wei Farmers' Association* exists since 1991, but needs to be given additional operational and managerial capabilities. To this extend the project (through the KVDA and Lodagri SpA, the consulting firm) intends to continue providing adequate support in form of training and managerial support over a period of at least 4 years (2nd & 3rd project implementation phases).