

## A case study of the Volta River Estates Limited (VREL), Ghana

### *Etude de cas du Volta River Estates Limited (VREL) Ghana*

S. K. Agodzo and A. K. Blay

#### Abstract

Irrigation system performance of Volta River Estates Limited (VREL) was assessed, based on the objectives of production and productivity, profitability, sustainability and enhancement of the quality of life. Under the Dutch-based Fair Trade Labelling Organisation (FLO) International, VREL produces banana for the European market. The method of irrigation changed from high pressure, raingun sprinklers through to micro-sprinklers. A drip system was experimented but discontinued. Banana yields average about 9,000 tonnes/annum covering an area of 280 ha. Currently about 10–15 percent of production goes to the local market. Productivity of water is high: in crop terms, 3.56 kg/m<sup>3</sup>, and in gross product value terms, 167 US cents/m<sup>3</sup>. Profitability could not be determined due to privacy of certain information, but there are indications that the venture is profitable. The fair trade price for the banana is about US\$8.50 per carton of approximately 18 kg, attracting a premium of US\$1.75 per carton, which goes into a fund managed by workers and management representatives for mutual benefit. Economic sustainability of VREL will depend on a favourable national macro-economic environment and continued operation of the fair trade system in favour of relatively small operations as this. At the current borrowing rate of up to 50 percent for agricultural production ventures in Ghana, access to capital is difficult. Social sustainability under the fair trade concept guarantees that workers receive their due benefits from such a venture. The concept provides for enforcement of environmental conservation measures. VREL has contributed to satisfying certain non-agricultural objectives, such as improving the quality of life of participants and providing social amenities for local communities.

#### Résumé

*Les performances des périmètres irrigués de Volta River Estates Limited (VREL) sont évaluées selon les critères de production, productivité, rentabilité, durabilité, et amélioration de la qualité de vie. VREL produit des bananes destinées aux marchés européens en conformité avec les normes de Fair Trade Labelling Organisation (FLO) International du Pays-Bas. La méthode d'irrigation a évolué de l'aspersion à haute pression vers les micro-asperseurs. Un système d'irrigation goutte-à-goutte a été testé mais a dû être abandonné. Les rendements de banane varient entre 9000 tonnes par an sur une superficie de 280 ha. Actuellement environ 10 à 15 pourcent de la production arrive sur le marché local. La productivité de l'eau est élevée : 3,56 kg/m<sup>3</sup>, soit US\$1,67/m<sup>3</sup>. Il n'a pas été possible de déterminer la rentabilité en raison de la nature confidentielle de certaines informations mais toutes les indications font croire que l'entreprise est profitable. Le prix de banane est d'environ US\$8,50 par carton de 18 kg et il attire une prime de US\$1,75 par carton qui est versée dans un fonds de solidarité géré par des représentants des travailleurs et des gérants. La durabilité économique du VREL est tributaire d'un climat macro-économique favorable et du fonctionnement continu du système 'fair trade' en faveur d'entreprises relativement modestes comme celle-ci. Des entreprises de production agricole ont d'énormes difficultés d'accéder au capital d'investissement étant donné le taux d'emprunt actuel très élevé d'environ 50 pourcent. Cependant, le concept 'fair trade' offre aux travailleurs le garanti de pouvoir tirer leur part des bénéfices générés par de telles entreprises et encourage l'adoption de mesures de conservation de l'environnement. VREL a également contribué à la réalisation d'objectifs non-agricoles tels l'amélioration de la qualité de vie des participants et la mise en place des infrastructures sociales au bénéfice des communautés locales.*

#### 1. Introduction

Irrigation schemes in Ghana cover a wide range of sizes, technologies and organisational arrangements. In terms of size and as with most schemes in West Africa (Sally 1994), the schemes may be classified as small (< 50 ha), medium (between 50 and 500 ha) and large (> 500 ha). Furthermore, they could be gravity schemes (e.g., Bontanga, Sata) or pumped schemes (e.g., Tanoso, Weija) and to a large extent, reservoir-based (e.g., Dawhenya, Tono). These examples are the formal-sector, modern forms of irrigation, with more sophisticated forms of water control. The statistics

are that these cover only about 10,000 ha (Agodzo 1998) of the nation's farmland, even though the irrigation development potential could be even up to 500,000 ha (Agodzo and Bobobee 1994).

But there are also traditional, private-initiated forms of irrigation (e.g., Anloga, Bawku, Ada), developed with local resources and materials over a long period, and with partial or no degree of water control. Lately, some of these traditional schemes are receiving very limited external support but such support could well be described as insignificant. There are hardly any statistics on the extent of informal irrigation activities in Ghana.

There is also another group of irrigation practitioners that are engaged in more modern and highly sophisticated forms of private-sector, export-led irrigated farming of non-traditional export crops, an example of which is the irrigated banana estates of Volta River Estates Limited (VREL) in the Asuogyaman District of the Eastern Region of Ghana.

Defining performance as the degree of achievement of desirable objectives, the performance of an irrigation system cannot be meaningfully carried out unless its objectives have been clearly defined (Sally 1994). The objectives may be diverse and will vary depending on the perspective of all the stakeholders in question. General long-term national objectives such as attaining food self-sufficiency, contributing to food security and reducing poverty are well known but these objectives are often not explicitly translated to measurable system-level targets such as total annual production, productivity of land and water, cropping intensity, farmers' income and the like (Sally 1994).

Even though actual system-level objectives would depend on the specific physical, economic and social environments, Abernethy (1989) proposed that irrigation system performance could be assessed based on the objectives of *production and productivity, profitability, equity, sustainability and the enhancement of the quality of life*. Crop yields per unit area or per unit volume of water used are the most frequently used indicators of production and productivity. Profitability suggests whether the value of the outputs is commensurate with the costs of material and management inputs needed to produce them. Equity also suggests whether all stakeholders are deriving benefits from the irrigation on a fair basis. Economic, social and environmental sustainability are also required if the system will keep running for a long time. An irrigation system can also contribute to satisfying certain non-agricultural objectives, such as improving the quality of life of all participants.

In view of the discussion above, this paper, therefore, seeks to assess the performance of the VREL in terms of its production and productivity, profitability, sustainability and its enhancement of the quality of life.

## **2. The study**

### **2.1 Study methods**

The study methods included a desk study involving the review of relevant literature, the interview of key stakeholders of the project, and physical observations at the farm and the fruit handling and packaging unit. In addition to assessing the total irrigation water applied, the energy required to deliver the water and the labour costs of the operations were also assessed.

### **2.2 The study area: Background and natural resource base**

VREL was established as a private, Ghanaian-Dutch joint venture in 1988 with the assistance of the Dutch Financiering Company (FMO). It was developed under the Ghana Government Medium Term Agricultural Development Programme (MTADP), which was initiated as part of the Structural Adjustment Programme (SAP) to promote the export of non-traditional goods, especially in the agricultural sector.

After VREL was established in 1988, its operations collapsed in 1990 as a result of *black sigatoga* disease. It was restarted in 1993 under a new management and with loans from the Agricultural Development Bank and later the Dutch Development Bank/FMO. The company is now a Ghanaian/Netherlands partnership, with holdings in the proportions of 35: 65 approximately. The 35 percent Ghanaian holding is shared between the workers (25%) and the local private sector (10%). All profits are repatriated to Ghana to pay off loans, but up to 15 percent of total earnings are retained abroad for purchasing and importing items necessary for the company's operations.

The company began to export again in 1994 under its own *Ghanapack* label and only then discovered that it had to pay a licence fee to access the EU market. In 1996, VREL established contact with the Dutch NGO *Solidaridad*, which had played an important part in establishing the *Oke/Max Havelaar* foundation, under the umbrella organisation Fair Trade Labelling Organisation (FLO) International, for promoting fair trade of developing-country products.

Located in the Asuogyaman district of the Eastern Region of Ghana, VREL largely operates a total landholding of 280 ha (2000 figure) of banana plantations at four sites, namely:

- Atimpoku (30 ha).
- Akwamufie (60 ha).
- Senchi (90 ha).
- Akuse (100 ha).

These are located on the banks of the Volta river, which provides a reliable source of water for irrigation. The average climatic conditions based on Akuse conditions (1961-1990) are summarised in Table 1.

Table 1. Average climatic conditions at Akuse, 1961-1990.

Month	Average temp. (°C)	Relative humidity (%)	Wind velocity (km/day)	Sunshine (hours/day)	Solar radiation (MJ/m <sup>2</sup> /day)	ET <sub>o</sub> (mm)	Rainfall (mm)
January	27.7	69	78	6.5	17.7	111.6	13.7
February	29.3	70	112	6.8	19.2	123.2	51.3
March	29.4	73	121	6.7	19.8	142.6	89.9
April	29.0	76	104	6.7	19.8	135.0	125.3
May	28.1	80	86	6.8	19.3	130.2	147.3
June	26.0	81	86	5.1	15.6	102.0	195.9
July	26.0	82	121	4.5	16.1	105.4	90.1
August	26.0	80	112	4.5	17.0	108.5	52.9
September	26.6	81	104	5.0	19.3	108.0	135.4
October	27.1	82	78	6.8	19.4	124.0	127.2
November	27.6	80	69	7.5	17.8	120.0	79.4
December	27.1	75	60	6.8	17.3	114.7	24.5
Mean/Total	27.5	78	94	6.1	18.2	1,425.2	1,132.9

Source: Ghana Meteorological Services Department; Kwedza (1998).

Monthly estimates of dependable rainfall, by Kwedza (1998), are shown in Table 2.

Table 2. Dependable monthly rainfall at Akuse.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.0	17.9	56.9	68.7	89.5	131.4	40.6	13.5	81.1	89.1	46.7	8.7

Source : Kwedza 1998.

Apart from the Akuse site, the natural vegetation at the other three sites consists of riverine forest vegetation. The soils are the heavy dark clays usually referred to as the Akuse series, with high water-holding capacities of up to 220 mm per meter depth of soil and average dry bulk density of about 1.0 g/cm<sup>3</sup>. Even though average wind conditions cannot be described as strong, occasional storms can result in the destruction of farm produce.

### 3. Performance of VREL

#### 3.1 Production and productivity

VREL is a Ghanaian registered commercial plantation company that has been producing bananas for the European fair trade market under the *Oke/Max Harvelaar* label since 1996. It currently has 280 ha under production, employing 720 full-time workers and staff.

Principal data about the inputs of water, labour and expenditure in year 2000 are shown in Table 3.

For year 2000, total available water (irrigation plus effective rainfall) for the growth period ranged from nearly 1,300 mm at Akuse to as high as nearly 2,000 mm at Senchi. At Senchi nearly half came from rainfall and the other half from irrigation. Irrigation requirements for year 2000 were highest at Akwamufie (1,000 mm) and lowest at Atimpoku (700 mm). The method of irrigation varied from high pressure, rain-gun sprinklers through to micro-sprinklers. Nkansah (2000), in an energy audit study of VREL, computed total electrical energy cost for the pumping operations as nearly €60,000/ha/week (1999 figure).<sup>1</sup> Two types of centrifugal pumps are used for the supply of water and have the following characteristics: 140 m<sup>3</sup>/hr discharge and 65 m head; 190 m<sup>3</sup>/hr discharge and 70 m head. A drip system was also experimented but was discontinued.

Banana yields, as indicator of production and productivity, average at about 9,000 tonnes/year from the area of 280 ha. This is equivalent to 32,100 kg/ha. The average irrigation water supplied at the four sites (Table 2) is 902 mm, or 9,020 m<sup>3</sup>/ha. The productivity of water, in crop terms, is therefore 3.56 kg/m<sup>3</sup>.

The value of the bananas (price received by the company) is \$8.50 for a carton of 18.14 kg, which means 46.9 US cents/kg. The gross product value obtained per cubic metre of irrigation water delivered is thus 3.56 x 46.9, which is 167 cents/m<sup>3</sup>, a high figure for financial productivity of agricultural water according to current international comparisons.

An additional 60 ha is to be put under production before the end of 2001 as organic production using under-canopy sprinklers. If successful, this organic pilot will pave the way for conversion of the entire estate to organic farming. For the 2000 production year, total labour cost per ha per annum could be as high as €396,000 at Akuse. Minimum wage stands at about €8,300 per day, additional to payment of taxes, social security benefits and free medical care. Currently about 10–15 percent of the banana produced goes to the local market.

Table 3. Irrigation water, rainfall, labour input and labour cost for year 2000.

Farm Site	Irrigation water (mm)	Effective rainfall (mm)	Total available water (mm)	Labour input (hrs)	Labour cost (¢/ha)
Atimpoku	708	696	1,404	19,022	396,293
Akwamufie	1,009	738	1,747	21,656	225,584
Senchi	988	972	1,960	26,798	243,374
Akuse	904	355	1,259	31,868	284,559

Source: VREL Records; Blay (2001).

Management comprises a management team made up of the General Manager (Agriculture) and the Director of Operations, a Chief Accountant, Quality Control Manager, four Farm Managers, Personnel Manager and an Export Manager. Production and export sites are divided into plots under a plot headman. The plot headman is under the farm manager. Each site has its own packing station, with cableways to facilitate harvesting. Harvesting, packing and shipping are done once a week throughout the year, with cartons palletised onto refrigerated 40-foot containers that are shipped from Tema. The journey to Europe takes up to 25 days. This is because the only available shipping

<sup>1</sup>The average bank exchange rate of the Ghanaian *cedi* (¢) in recent years was approximately as follows: in 1999, US\$1 = ¢2,750; in 2000, US\$1 = ¢5,410; in 2001, US\$1 = ¢7,265.

vessel calls at various West African ports before reaching Rotterdam, the final destination of the cargo. This causes quality problems. The volume of bananas does not justify the use of reefer vessels which would reduce costs and voyage time. But VREL has installed pre-cooling systems to improve quality. Air-freight could further reduce voyage time but the costs are much higher and uneconomical for the current volume of banana exported.

VREL's focus on banana exports reflects the government's policy of agricultural diversification and promoting non-traditional exports, which has led to a rise in cassava, yam and pineapple as well as Asian vegetable exports. Exports do not attract duty, and agricultural companies are VAT exempted. Exporting companies have preferential depreciation rates and can also import capital items tax-free.

### 3.2 Profitability

Due to the privacy of certain key information, it may not be possible to assess the profitability of VREL in this paper, but indications are that it is a profitable venture. Once a producer is registered with the FLO-Banana Register, one of which is the *Max Havelaar* Foundation, it can sell to an importer that has a licence to use a fair trade label. In the case of VREL, it sells to *Agrofair* that markets fair trade bananas under the *Oké* label. Under the fair trade system, the International FLO-Banana Register sets a country FOB price based on what it costs producers to operate profitably while meeting pre-set social criteria for the workforce. For Ghana, the fair trade price *Agrofair* must pay to VREL is US\$8.50 per carton, of approximately 18.14 kg or 40 lbs.

The retail price of bananas on the fair trade market is typically higher than the mainstream market, sometimes by as much as 50 percent. This is partly due to the minimum price producers are guaranteed, and partly because consumers pay a premium of about 9.6 cents per kg (US\$1.75 per carton). The premium goes into a fund managed by a committee comprising workers and management representatives, with workers having higher voting.

At the time *Max Havelaar* foundation was starting the *Oke* label for fair trade bananas in the Netherlands, *Solidaridad* was unable to get import licences for bananas from Latin America because licence holders feared this would open the door to dollar bananas. At the same time, VREL was looking for efficient ways to lobby the EU, something that *Solidaridad* and *Max Havelaar* foundation were already doing for fair trade. As a result VREL was able to supply non-Latin American bananas and *Solidaridad* was able to help with lobbying and VREL was thus registered as a fair trade supplier in November 1996. In 1993, the company had 23 workers, 140 ha of partly uncultivated land and a host of labour and local problems. By the end of 1997, after a year of selling to the fair trade market, it had 280 ha under production, largely resolved its labour problems and was employing 900 workers. Workers of the company have a 25 percent stake in the company, being held in trust by *Solidaridad*.

However, the domestic economic situation does not favour private-sector agribusiness such as VREL. Access to credit is a common constraint to agriculture including the export sector. Only 20 percent of GADB (Ghana Agricultural Development Bank) loans are made to the agriculture sector, and for other banks the figure is even less. Loans are typically for one year or less, interest rates nearly 50 percent. Development bank loans are also difficult to access because of strict guarantee requirements, and the interest rates are often higher than could be obtained from European commercial banks using a collateral scheme such as that operated by the SGS (*Société Générale Surveillance*). The high interest rates by the Ghanaian banks are as a result of the depreciation of the *cedi* and high inflation rate.

### 3.3 Sustainability

Registering as a fair trade banana producer requires that VREL meet the social and environmental criteria of the International Fair Trade Banana Producers' Register. These criteria are intended to provide a core package of social and environmental standards that will promote sustainable banana production. The social standards include rights to freedom of association and collective bargaining; anti-discrimination and equal remuneration; non-use of forced labour and child labour; defined minimum social and labour conditions of workers; health and safety. The environmental standards include protection of natural areas (biodiversity); coherent policy and practice of prevention of erosion and water pollution; controlled and reduced use of pesticides and coagulants; controlled and reduced

use of chemical fertilisers; control of waste and optimisation of recycling; and environmental education.

These standards are elaborated for each producer through consultation between FLO, management and workers. The operation is then monitored by FLO, which conducts an annual in-country assessment as well as periodic monitoring operations by a local social monitor. FLO encourages continual improvement in labour and environmental performance, and also encourages plantations to implement social development programmes and worker shareholder schemes. The measures put in place by VREL to meet the social and environmental standards are explained as follows:

### **3.3.1 Social strategy**

VREL workers are represented by the Ghana Agricultural Workers Union (GAWU), under a closed shop arrangement, where 2 percent of workers' monthly wages are deducted for union fees. There are eight union representatives per site. They have fortnightly meetings. From them, an apex committee is elected to hold discussions with senior management. Each site also has a women's representative. Workers also receive interest free loans and subsidised rice grown on VREL land as part of a Solidarity Fund set up by the company on each site and managed by the workforce. VREL provided capital for the loan funds and pays the wages of workers on the farms.

### **3.3.2 Environmental strategy**

In addition to monitoring by the FLO, VREL is subject to environmental impact monitoring by the Environmental Protection Agency (EPA) of Ghana. It is VREL's policy to reduce chemical use. Weeding is done by hand, which accounts in part for the high number of field workers per hectare. Insecticide-impregnated plastic bags are not used to cover bunches. Chicken manure and potash is used for fertiliser. A 60 ha organic pilot is presently being established, which if successful will pave the way for the total conversion of overall production into organic. The fungicide *thiobendazol* is used on crowns prior to packing, but otherwise all cleaning is done with water using a circular (recycling) system.

## **3.4 Enhancement of the quality of life**

VREL has created 720 (2000 figure) permanent jobs in an area where income opportunities are seasonal and limited. The vast majority of employable hands within the project area do not have the required special skills, but priority has been given to people in the vicinity of the plantation sites. It is indicative of the attractiveness of the opportunities for certain people that even those with relatively large landholdings (>1 ha) have joined the workforce. Twenty percent of VREL's workforce is women.

In line with national law, the company gives 6 weeks paid maternity leave and women are allowed back on to the sites with young children. Workers also receive an initial 21 days' annual leave, increasing incrementally after the first three years. Regular wages mean that health and education costs of family members are more likely met. VREL provides a health clinic staffed by a trained nurse for each of its sites, and refers more serious cases to the Volta River Authority Hospital at Akosombo. Workers must pay for hospital treatment and are then reimbursed by the company. This is to prevent misuse. The health service at present is exclusive to workers, because there is concern that it would be over-burdened if extended to family members. VREL is, however, considering putting up a hospital and hence would be in the position to provide free health care for spouses and a limited number of children. Workers are provided with boots and protective clothing. Each site has treated drinking water and sanitation facilities. VREL provides both formal and informal training to its staff on a regular basis.

Union representation is an important element of fair trade plantation initiatives, and all plantation workers must join GAWU under Ghanaian law. GAWU is independent of VREL management although the two have worked together, for example, on the workers' protest against EU banana quotas in Accra. A collective bargaining agreement has been in place since the beginning of 1994, and there are formal procedures for worker organisation and negotiations with management. Some may question the emphasis the fair trade movement places on unionisation, but one needs to compare the conditions of VREL workers with those on non-unionised multinational-owned estates such as in Côte d'Ivoire.



The fair trade consumer interest in bananas largely stems from the working conditions on such estates. Even prior to fair trade accreditation, VREL had a fully unionised workforce, and participation in the union has increased the responsibility and experience of many workers. Through the union and through weekly management-site worker meetings, the workforce and management have reached a reasonable level of dialogue and there is a degree of transparency that is not typical of many private companies in Ghana.

As part of enhancing the quality of life for the people, VREL also provides some social benefits for some of the communities in the project area, for example, a school for Kpong township and a computer centre for Akwamuman Secondary School.

#### **4. Concluding remarks**

VREL is the only exporter of bananas from Ghana, and in terms of the multinational-dominated global market, it is a small operation. It is also one of the two initiatives serving the fair trade market in Ghana; the other being the *Kuapa Kokoo* smallholder cocoa initiative based in Kumasi. Economic sustainability of VREL will depend, first and foremost, on a favourable macroeconomic environment of the nation and the continued operation of the fair trade system in favour of relatively small operations as this. The VREL example suggests that plantations can increase livelihood opportunities for certain groups of people without negatively affecting the natural resource base. Production for export has complemented government policy, and has been supported by various tax and other concessions. Both the estate policy decisions and the global market have favoured VREL. Nonetheless, there have been numerous failed attempts to establish large agricultural schemes in the area but VREL has at least been able to operate for 10 years. As discussed earlier, VREL workers are well placed in livelihood and income terms compared to workers in comparable positions in the area.

VREL has adopted a system of cultivation that minimises negative impacts on the environment, while increasing the productivity of the land through irrigation and crop choice. The normal problems associated with disease such as nematode attack also apply here. Wider environmental impact is monitored externally and has not been deemed negative. It is possible that VREL serves as a model for increasing the productivity of the natural resource base on a sustainable basis. Indeed, a private sector agribusiness as VREL benefiting from the technology of irrigation for banana production has, for the past 10 years, made a significant contribution to the economy of Ghana and this is worth noting.

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