

land-use smallholder agriculture in the Volta basin

J.A. DADSON

University Legon, Ghana

ABSTRACT

The creation of the Volta Lake for power production opened up new possibilities of land use and improved practices for smallholder farming, namely mechanization, irrigation and « drawdown » (shore-line) agriculture. Some 80,000 people, mostly subsistence farmers were displaced; most of them were resettled under a public programme. This paper reviews the record of the resettlement programme, and discusses the problems, progress and issues of exploiting the new opportunities of improved agricultural practices in the river basin.

RÉSUMÉ

L'aménagement du lac Volta pour produire de l'énergie a offert des possibilités nouvelles pour l'utilisation des terres et amélioré les systèmes de production des petits fermiers en apportant la mécanisation, l'irrigation et l'agriculture « draw-down » (de bord de lac). Environ 80.000 habitants ont été déplacés, principalement des agriculteurs d'auto-subsistance; la plupart d'entre eux ont été réinstallés à l'occasion d'une opération nationale d'aménagement. La communication a pour objet de faire le point de cette opération, de discuter des problèmes rencontrés ainsi que des progrès et des résultats obtenus pendant l'exploitation de ces nouvelles possibilités pour l'amélioration de la production agricole dans le bassin.

INTRODUCTION

The creation of the Volta Lake for power production opened up some new possibilities of land use and improved practices for smallholder farming, namely, mechanization, irrigation, and « drawdown » (or shore-line) agriculture. The exploitation of these opportunities have so far lagged behind expectation. This paper discusses some of the problems and issues that have confronted the full realization of these new opportunities.

To provide a background for the discussion, a brief description of the Basin itself and the settlement pattern before

impounment will be given; this is followed by an account of the resettlement, and the major agricultural opportunities open to the affected community.

THE VOLTA BASIN BEFORE THE LAKE

The Volta Lake drains most of the riverine system of Ghana from the north-west of the country to the south-east. It covers an estimated area of 8,482 sq. km. (3275 sq. miles), or 3.6 % of the surface area of the country. It is 400 km. (3000 miles). It is said to be the largest man-made lake in the world.

O.R.S.T.O.M. Fonds Documentaire

N° : 03085 ex 3

Cpte : A

Archaeological and other studies conducted before the formation of the lake recorded the following findings about settlements and economic activity in the area (1) : (a) the basin had been settled for at least half a million years; (b) simple pre-capitalist economic activities, including agriculture, craft and commerce had been practised there for over 3000 years; (c) disturbances in the area (eg. riverine disease, inter-tribal wars and slave-raiding) and development outside it (eg. the emergence of cocoa and mining industries in the forest belt) had caused relative depopulation of the area.

Prior to the lake, there were 80,000 people (or 1 % of the population in 1964) living in some 740 villages in the area. Their basic occupation was subsistence agriculture. A few farmers in the south and east were cocoa farmers. Livestock production was inhibited by the tsetse-fly; and only a small proportion (2 %) of the people were riverine fishermen.

THE LAKE AND RESETTLEMENT

The people affected by the lake formation were given the option of either accepting compensation for lost property and making their own arrangements for resettlement, or accepting official resettlement. About 85 % opted for official resettlement. They were resettled in 52 new settlement townships of between 2000 and 5000, in contrast with the original 740 small villages. This, of course, was expected to facilitate the organization of viable communities and communication. But it also raised conflicts and social tensions : the scheme involved people from eight ethnic groups, and their regrouping was bound to affect traditional political jurisdiction (especially where people were being moved from their traditional homelands to new areas) and precedence of chiefs (even in cases where people were being moved within their own areas).

A second source of discontent and frustration was the provision of housing, which was found unsuitable in design, and inadequate in other respects. The demoralizing effect it had on settlers is documented by DODOO (2) and OYEDIPE (3).

A third, and very important problem associated with the resettlement programme was the issue of land for farming purposes. Initially, the question considered was whether the Volta River Authority, the agency representing the government on the project, should acquire the land outright and grant it to settlers, or assist the settlers to rent the land from the landowners (the host community) (4). It was not until 1968, six years after the scheme was initiated, that the question was finally resolved in favour of outright acquisition for long-term lease to farmers under regulated use (5). Meanwhile, the uncertainty of land tenure, as might be expected, was having a harmful effect on settlers' farming, as OFORI has reported (6).

Furthermore, it had also been planned to clear the farming land for the settlers before they moved to the site. In fact, only 3200 ha. (8000 acres) had been cleared before resettlement. Thus, coupled with the uncertainty of land tenure, and with little working capital and farming equipment, the people being moved faced the reality of having to clear the land themselves on arrival. As might be expected, farming was off to a poor start under these conditions.

PRODUCTION ORGANIZATION : MECHANIZATION AND COOPERATION

The types of farming envisaged for the settlers were as follows arable, tree crops, intensive livestock, and pastoral. Land was to be distributed in accordance with this scheme. For arable farming, a minimum of 4.9 ha. (12 acres) was to be allocated; for tree crops, an area of between 2 ha. and 6 ha. (5 and 15 acres) was to be provided; for intensive livestock, particularly for poultry and pigs, 1.2 ha. (3 acres); and for pastoral farming 12.1 ha. (30 acres). The assumption was that this scheme would enable the farmer to generate a minimum income of C700 per year (C1.00 = S0.98; 1971), provided that he followed recommended practices.

One such practice — and a very important one — was mechanization. It was proposed to introduce mechanization as a modern technology that would enable settlers to enlarge their farms rapidly and to apply other modern practices as well, such as fertilizer and improved planting material.

The national agricultural policy at the time emphasized large-scale mechanized farming using state-supported cooperatives, state farms, youth settlement farms, and so forth. Accordingly, some effort was devoted to the formation of farming cooperatives. In fact, the regrouping of the displaced population previously spread over 740 villages into only 52 townships of larger size was seen as a facilitating factor, if not an original rationale.

It quickly became evident that this programme was over-ambitious in relation to the planning experience, organizational resources and administrative capacity available for its implementation. KALITSI aptly assesses it in these words : Naturally, this was an ambitious programme that was to encounter practical difficulties in implementation. For the entire programme to succeed, systematic planning, marketing organization, and other things were required. But the manpower resources, the skills, and the experience needed were not available in adequate quantities. The result was that initial progress was very poor » (7).

Thus, the acreage targets were reduced considerably — by almost a half for arable farmers. In part, this was due to the problem of land acquisition which remained unresolved for a period; in part, it was due to the failure of the mechanization programme. The mechanization component of the settlement scheme failed because, as AFRIYE has observed : « ...mechanization required a complete change in the values of the settling peasant farmers and in their attitudes toward new farming techniques and practices. As a completely new concept of farming, mechanization could have had a chance of success only if, first, its introduction to the settlers had been preceded by a vigorous extension programme with experiments and demonstrations directly involving the farmers. Second, there should have been a sufficient professional and technical staff trained in the operation and maintenance of mechanical equipment and in the management of mechanical farms as a business. Third, the timing and financial problems that could impede the supply of equipment and materials for the mechanization programme should have been solved. None of these preconditions had been satisfied before the people arrived » (8).

Nor was the effort at cooperative farming component any more successful, for similar reasons. Cooperatives for farming

have had an unhappy record in Ghana. This approach appears have poor prospects (9).

The effect of these failures and other problems cited in the last section was a substantial emigration of settlers. TAYLOR (10) has recorded that by 1968, 60 % of the original settlers had moved out. This process was reversed by a change in the tenure system, whereby land acquisition became easier and tenure more secure, and by the introduction of the World Food Programme 356, by which food was provided the farmers as an incentive to stay and clear their land.

A very important aspect of the agricultural policy pursued was that it involved only the settler communities. This naturally evoked considerable hostility and envy among the host communities, who saw the settlers (strangers) not only as intruders on their land, but also as a privileged group on whom new, income-increasing opportunities were being concentrated. Accordingly, the scope of the programme was modified to include the host communities, to reduce this hostility, and to avert disparities of income and employment opportunities between the two different communities (11). However, it is necessary to note that hostility has not been completely eliminated (12).

We now turn to the other opportunities for farm development created by the lake, namely irrigation and drawdown agriculture.

IRRIGATION AGRICULTURE

The Volta Lake contains 148,000 million cubic metres (120 million acre-ft.) of water. It is natural to presume, and expect, that such a large body of water should provide opportunities for irrigated farming. This, in fact, is readily recognized for the area below the dam, *viz.* the Accra Plains, whose irrigation prospects have been the subject of major feasibility studies (13). Some use of the Volta River resources for irrigated production of commercial crops (sugar cane and rice) has already started around Asutuare. The irrigation potential of the basin itself, however, is still an issue about which public policy is rather cautious.

The Volta River Development Act, 1961 (Act 46) which established the Volta River Authority (V.R.A.) defined its functions as electricity production, flood control, lake transport, fishery development, wild life development, and other purposes including lake side development. There was in fact no specific mention of irrigation although officials do admit that « the development of the lakeside area » could be interpreted to include this. The concern of the Authority, however, is that irrigation up the basin would imply diversion of water resources from power production, the primary purpose of the Volta Lake.

In this regard, the V.R.A. Chief Executive's view on the matter stated at the Volta Lake Conference in 1976 is worthy of note : (14).

« It would seem obvious that the presence of such a large body of water should bring to mind the immediate development of irrigation, but it should be borne in mind that the prime aim of constructing the dam and the subsequent formation of the lake is to produce electric power. Also, that, water which is taken out of the lake for irrigation purposes is necessarily lost to power generation. However, as in the case of the plans for the irrigation of the Accra Plains, if the water for irrigation is pumped from

downstream of the Dam then it is not lost to electric power generation, and both objectives are happily realised at the same time.

It is thus very important to try to determine beforehand the use of water in the headpond of the lake for irrigation and electric power generation purposes, respectively, in the overall National interests and it is with this aim that studies have gone on, not only to ascertain the amount of water which may be drawn from the lake for irrigation without jeopardising electric power production but also to find out those areas which are best suited to benefit from irrigation. Results so far indicate that eventually, at least, 50,000 acres of land, mostly in the Afram Plains, could be irrigated with water mostly taken from the Afram wing of the headpond of the lake without detracting from the generation of power even in dryest years ».

Studies are being conducted into the consumptive use and diversion requirement for irrigation against power production over the cropping seasons. Fragmentary rainfall data seem to suggest that the shores around the lakes are drier than before the formation of the lake. This would seem to urge irrigation practice. At the same time, the water level has remained rather low in recent years, so that the prospects for irrigation for the settler zone are not too bright.

Meanwhile, agronomic studies are being conducted on experimental stations to determine the cropping patterns, fertilizer use, the appropriate types of pumps, plant protection and crop disease control, the costs and returns of smallholder irrigation in the basin, and so forth (15) (16). These studies already indicate that crop responses to trials are encouraging. There is fact general expectation that the demand for water and resources for smallholder irrigated farming will increase significantly in the near future, and research and development officers, are urging planning for development, appropriate credit delivery system to purchase recommended inputs, standardization of machinery, and last but not least, appropriate legislation to regulate water extraction and use consistent with power production requirements.

DRAWDOWN AGRICULTURE

An important farm land resource associated with the lake is the area exposed, by the annual fluctuation in lake level. This is called the drawdown area. Associated with it is a narrow belt of land immediately above high water level where the presence of the lake results in a temporary high water table in the soil.

The drawdown occurs between November (highest level) and July (lowest level). The fall in lake level is between 1.8 m. and 4.3 m. (6 ft and 14 ft). It is estimated that in a normal dry season, there is a drop of 3 m. (10 ft). This exposes 80,000 to 121,400 hectares of land (200,000 to 300,000 acres) with an average width along the shoreline of 183 m. (200 yds). Of this 70 % is arable.

The exploitation of the drawdown started on the initiative of the lake side dwellers themselves. A wide range of subsistence crops were grown on a trial-and-error basis. Some failed due to their late maturing characteristics in relation to the residual moisture. Supportive research work has followed, focussed primarily on soils and cropping sequence (17). These studies have established recommended plating dates and strategies for selected crops. The residual moisture can support

crops maturing in 40 to 60 days. For crops needing a longer period eg. rice, supplementary irrigation is needed.

Preliminary estimates (in process, unpublished) indicate relatively high returns from crops grown in the drawdown. But the full realization of the benefits is impeded by a number of problems, among them the following land tenure, poor extension support, difficulties of transport and marketing, and pests (18).

The demand for drawdown land exceeds the supply, leading to exploitative tenurial practices. For example, host community « landlords », including chiefs, rent areas at high rates to settlers (19). And it is not uncommon to find the same piece of land leased or sold to different tenants.

Extremely weak extension support accounts for lack of knowledge of recommended practices, dates of planting, etc., for selected crops. Extension is undertaken by agronomists of the V.R.A., of whom there are now only two; and they have absolutely no support from the Ministry of Agriculture.

The road and transport system connecting the townships is poor, and affects the marketing of perishable crops. Market days are once or twice in the week, and storage facilities are non-existent.

Finally, production is affected by pests — birds, monkeys (especially on maize farms in the forest zones of the basin), and domestic animals (sheep and goats). Tomato rot and nematodes are known, but not on a large scale.

CONCLUSION

In this rather short sketch, an attempt has been made to high light some of the problems that have confronted a major exercise in social engineering associated with a relative simple multi-purpose river basin programme, with particular emphasis on the new agricultural land use improved techniques opened up by the programme. First, the initial resettlement programme was not a complete success for a variety of reasons, among them inadequate housing provision, failure to work out a system of tenure conducive to undisturbed economic activity by the displaced peoples, and land shortages. Second, the prospect of irrigation in the basin appears distant on account of the competing requirements for power production, although the technical and economic feasibility for smallholder farming has been established. And third, the relatively new and promising drawdown agriculture is hampered by a number of factors, some of them avoidable through administrative sensitivity and action.

The smallholder, in the circumstances, is adjusting to the new opportunities without really significant public support. This is not intended to be an ending note of pessimism. It is perhaps almost a definition of our underdevelopment — that we are unable to organize effectively to exploit the opportunities we create for our social development. And it constitutes the challenge and essence of our development effort.

REFERENCES

- (1) DAVIES (O.). — *The Archaeology of the Volta River Basin*, University of Ghana, Legon, 1971.
- (2) MARTHA DODOO. — «A Case Study of a Resettlement Town : New Mpamu, in CHAMBERS, R., éd., *The Volta Resettlement Experience*, Pall Mall Press, 1970.
- (3) OYEDIPE (F.P.A.). — *The relative success of the Kainji resettlement Scheme as compared with that of the Volta*, paper present at the Conference on the Volta Lake and National Development, Legon, Sept. 5-11, 1976.
- (4) KALITSI (E.A.K.). — « Volta Lake in relation to the human population and some issues in economics and management », in ACKERMANN, W.C. and others, eds., *Geophysical Monograph Series Vol. 17. Man-Made Lakes : Their Problems and Environmental Effects*, American Geographical Union, 1973, pp. 77-85.
- (5) Land is now leased to settlers for 33 years. Rights are heritable and renewable; but fragmentation is prohibited.
- (6) OFORI (I.M.). — *Some problems of land tenure in new agricultural settlements; a case study of selected V.R.A. settlements*, paper presented at Cocoa Economics Research Conference, Legon, April 9-12, 1973 (mimeo).
- (7) KALITSI. — *op. cit.*, p. 79.
- (8) *Ibid.* — For a further discussion and appraisal of Ghana's experience with farm mechanization, see : RIPLEY (P.O.) ed., *Symposium on Farm Mechanization*. Legon Feb. 1979; and DADSON (J.A.). — *Socialized Agriculture in Ghana 1962-1965*, Unpublished doctoral thesis, Harvard University, 1970.
- (9) See DADSON (J.A.). — ref. 8,
- (10) TAYLOR (B.W.). — *People in a rapidly changing environment, the first six years at Volta Lake*, in ACKERMANN, et al., ed., *op. cit.*
- (11) OFORI (I.M.). — *op. cit.* (ref. 6).
- (12) *Ibid.*
- (13) See : (a) KAISER Engineers and Co. Inc. — *Accra Plains Irrigation Feasibility Study for the Volta River Authority*, Accra, 1965; 3 vol.; and (b) NIPPON KOEL Co. Ltd., and Ghana. — *Feasibility Report on sugar and Rice Production Project in the Accra Plains*. Accra, 1967, 3 vols.
- (14) See : KEYNOTE Address by the Chief Executive of the V.R.A. at the opening of the Conference on the « Volta Lake and National Development », 5th-11th Sept., 1976; mimeo, p. 5.
- (15) JAMA (M.). — *Irrigation Potential of the Volta Lake, Volta Lake Conference*, 5th-11th Sept., 1976, mimeo.
- (16) Unpublished records by YEBOAH (F.K.), LARYEA (K.B.) and ATUBRA (F.). — All officers of the Volta Lake Research and Development Project.
- (17) See : (a) VOLTA LAKE Research and Development Project,

Quarterly Reports 3, mimeo (b) AMATEKPOR (J.K.) and DROSDOFF (M.). — *Soils in Ghana Volta Lake drawdown area and the effect of seasonal flooding on their mineralogical and chemical properties after 5 years*. Volta Lake Conference, 1976 (mimeo), and (c) MUAMAH (A.E.A.), JAMA (M.) and SEKOU (E.T.). — *Moisture and crop sequence in the drawdown areas of the Volta Lake*. Volta Lake Conference, 1976, mimeo.

(18) NUAMAH (G.E.A.). — *Some Factors that inhibit agricultural production in the drawdown*. Volta Lake Conference, 1976.

(19) Settlers are preferred to non-strangers because they pay rents. Between C20 and C30 (1976) may be charged for 30 stretches of the 2 arms.