

EXTRACT FROM "BEPOSO BRIDGE DESIGN REPORT AND SCHEME DRAWINGS" BY CEMENTATION INTERNATIONAL ENGINEERING LTD.

1. INTRODUCTION

Cementation International Limited have been invited by the Ghana Highway Authority to undertake a Soils Investigation for the above Bridge, and to use the results to develop suitable alternative structures for the crossing, consider the relative merits of each, and make a recommendation as to the preferred Bridge type.

2. BACKGROUND TO PROPOSED BRIDGE REPLACEMENT

The existing single lane suspension bridge at Beposo was constructed in 1934.

The upgrading of the African Highway has increased traffic volumes and axle weights and has resulted in slippage of the hangar saddles and consequential distress to the main support trusses. Frequent maintenance has been necessary to keep the bridge open.

There are no realistic diversions, and any closure of the bridge for repair would have serious consequences on this important route. The bottleneck caused by the single way working is also disruptive to traffic.

These considerations have led the Ghana Highways Authority to seek urgent replacement with a new 2-lane structure of a standard equivalent to the other recently constructed bridges on the route.

3. BRIDGE LOCATION

The location of the existing bridge was dictated by the occurrence of local rock outcrops which have restricted the river width and provide sound founding strata.

The same considerations influence the siting of the replacement structure. North of the existing bridge the rock outcrop disappears and there is a low lying marshy area on the East Bank. The river is

also wider. The preferred location is therefore immediately south of the existing and as close to it as possible.

This not only takes advantage of the rock outcrop and minimum river width, but also keeps the road as far from existing buildings as possible and reduces the length of existing carriageway to be realized.

It is therefore proposed to site the centreline 8 m south of the south face of the existing bridge. The soils investigation has concentrated on this location. Some limited investigation has also been carried out on an alignment 10 m further south, as shown on G.H.A. Highway drawing.

4. RESUME OF GROUND CONDITIONS

The course of the Pra River and the structure of the ground at the site are controlled by the presence of outcropping or near surface bedrock. The bridge is located just on the exit from a sweeping right hand bend at a point where the river is forced to the west of high ground, formed by outcropping bedrock. The west bank lies towards the backwater of the bend with the bank formed of a raised levee beyond which a low lying flood plane indicates that periodic inundation takes place to the west at times of peak flow.

The bed profile at the bridge line includes a 30 metre wide deep central channel, located 25 metres from the west bank in which water depths approach 12 metres at low tide. Beyond this channel the bed rises rapidly to 6 metre width of the crossing shallowing gradually towards both banks.

The ground investigations (detailed in Appendix No. 1) show that the bedrock is formed of a Granitic GNEISS which dips towards the west at some 29 degrees. The rock is strong, generally fresh and intact in outcrop. Soundings taken on the bridge line show the bedrock to extend from the east bank to beyond the central channel without superficial cover or any significant thickness of weathering.

West of the central channel, the bed consists of up to 1.5 metres of loose to medium dense sand and gravel overlying fresh GNEISS.

Further to the west, at, and beyond the west bank, alluvial soils consisting of soft to firm silty clays and medium dense sands and gravels form a 6 metre thick covering to the bedrock.

5. DESCRIPTION OF PROPOSED ALTERNATIVE SCHEMES

5.1 General

5.1.1 All alternatives are designed to accommodate an 8.0 m carriageway, 2 No 1.5 m wide footways, and 2 No 300 wide parapets, giving an overall bridge width of 11.6 m, as requested by the G.H.A. during discussions in April 1984.

5.1.2 The existing bridge has a clear, opening width between abutment faces of 100.8 m. A minimum acceptable opening width comparable with this is considered to be 99 m, with the east abutment face in line with that of the existing and the west abutment face some 2.8 m forward. This reflects the direction of the current which is skew to the west bank but parallel to the east bank.

5.1.3 The river is tidal, with a water depth of 12 m at low tide and 16.4 m during flood.

5.1.4 Consideration has also been given to the viability of utilizing the existing bridge for one way operations and providing a new bridge for traffic travelling in the opposite direction. - Ref. Scheme 5.

5.2 SCHEME 1. Standard Precast Prestressed 'I' Beam In-situ Deck

A standard 26.5 m span deck has been developed and used successfully for 5 bridge crossings in Ghana and there are advantages in continuing with the system at this site.

At this site 4-No simply supported spans are proposed of which 3 are of the standard 26.5 m span and the 4th is 20 m, giving an overall bridge length of 98.48 m, the minimum considered acceptable.

Bedrock within the channel is generally exposed at bed level, but towards the west bank there is a one metre layer of sediment.

It is therefore proposed to use pad foundations constructed within cofferdams, and suitably shaped to minimize the disruption to the river flow.

The disadvantage is that 3 of the foundations lie within the river, resulting in difficult construction access and high cofferdam costs. The two centre piers come in deep water on steeply sloping rock close to the deep central channel which increases the construction problems with these piers.

The stability of pier 2 is also of concern as the dip of the rock bedding planes makes it vulnerable to a wedge failure.

The reduction in flow area which results from the large number of piers and wide cutwaters is significant and greater than desirable, although the increased velocities will not create scour problems due to the hardness of the bedrock exposed right across the river bed. Pointed rectangular cofferdams have been proposed to minimize the obstruction to flow.

5.3 Scheme 2. Incrementally Launched Prestressed Concrete Deck

Description of Proposed Scheme

An incrementally launched bridge scheme was developed for the Oti Bridge crossing and proved very cost effective at that location. It also had the construction advantage of keeping the number of piers in the river to a minimum.

At Beposo the conditions are in some ways similar, with a permanently high water level and we have therefore considered the merits of a similar bridge at this site.

We have retained a maximum 34 m span as used at Oti, and this results in a 4 span arrangement with 24m/34m/24m and 16.5m spans, giving an overall length of 99m - (c.f. 100.8m clear opening width for the existing bridge).

Bedrock is exposed at bed level throughout, except for a thin sediment layer towards the west bank where flow velocities on the inside of the bend are slower.

It is therefore proposed to use pad foundations constructed within sheet piled cofferdams sealed with tremie concrete, and suitably shaped to minimize disturbance to the river flow. Single leaf piers are proposed.

The span layout results in basically two river piers straddling the deep main channel. The west pier (3) is reasonably located but the east pier is located on steeply sloping ground which has bedding planes parallel to the slope. It will be necessary to provide adequate dwelling into bedrock to stabilize the rock and avoid horizontal slippage of the foundation.

The principal reason is an attempt to reduce the number of river piers and by using longer spans than Scheme 1, to improve the location of the piers relative to the main channel. It is only partially successful in achieving this.

The overall bridge length is somewhat short to justify the capital investment in plant and equipment and as the foundation advantages are limited, it is unlikely to be cost effective.

5.4 Scheme 3-3 Span Steel Girder Bridge

Description of Proposed Scheme

This is a 3 span structure with a 50 m main span and 2 No 30 m sidespans, giving an overall bridge length of 110 m.

The two river piers are 7.5 m diameter reinforced concrete pads constructed within cofferdams sealed by tremie plugs. The foundations bear direct on the prepared bedrock and are dwelled in for enhanced resistance to lateral forces.

The sheet piles which form the cofferdam will be left in place and tied into the new foundation. Leaf piers support the steel deck girders.

A high quality corrosion protection system is proposed, comprising zinc sprayed steel plus two finishing coats of paint in order to give a long life to first maintenance, and minimum maintenance thereafter. Detailing will be kept simple to avoid corrosion traps.

Both the piers are located in reasonable water depths, giving easier construction than Schemes 1 and 2.

The steel deck permits rapid construction, thereby keeping costs and time to a minimum. It is also less susceptible to delays during the wet season.

The in-situ deck construction is virtually identical with that of the post tensioned 'I' beam solution, thereby taking full advantage of the experience gained on previous bridges and the availability of suitable construction equipment.

The resulting structure provides an attractive appearance with simple, clean lines.

The number of expansion joints is minimized, leading to reduced maintenance problems.

5.5 Scheme 4 - 3 Span Concrete Alternative

Description of Proposed Scheme

This utilizes the standard 23.48 m span precast post tensioned 'I' beam decks as drop in spans between insitu 'table top' piers with short cantilevers. This arrangement gives 31.74 m sidespans and a 40.0 m mainspan. = 103. 48 m overall length.

The insitu piers have twin leaf columns and beam and slab deck construction in reinforced concrete.

The two river piers are 8.0 m diameter reinforced concrete pads constructed within cofferdams sealed by tremie concrete plugs. The foundations bear direct on the prepared bedrock and are dowelled in for enhanced resistance to lateral forces.

The cofferdam sheet piling will be left in place and tied into the new foundation.

The standard 26.5 m span precast alternative resulted in two piers in deep water close to the centre of the vee. By stretching the span to 40.0 m the piers can be located in reasonable water depths.

In utilizing the standard prestressed post tensioned I-beam system used for a number of recent bridges in Ghana full advantage may be taken of the formwork and launching equipment etc. available and of the experience gained with this form of construction.

Disadvantages of the scheme are the complexity of the pierhead and half joint construction, difficult access for bearing replacement and an extended construction period.

5.6 Scheme 5 - Retention of Existing Bridge for Westbound Traffic (New 3-Span Bridge for Eastbound Traffic)

Description of Proposed Scheme

The existing bridge at Beposo is a 100.8 m clear span suspension bridge with a 6.0 m wide carriageway and two number cantilevered footways. It is currently operating with one way traffic controlled by police at each end.

The Ghana Highway Authority have asked CIL to give consideration to a scheme which retains this bridge for one way working and provides a new structure for traffic in the other direction.

The existing structure will require general refurbishment to ensure a reasonable future service life. A full inspection of the bridge will need to be undertaken before the extent of this work can be defined. For cost comparison purposes we have compiled an outline schedule of refurbishment based on our preliminary inspection, and this is attached.

The new bridge will have an overall deck width of 7.6 m

- ie 2 No. 300 mm parapets
- 2 No. 1.5 m footways
- 1 No. 4.0 m carriageway

The form of construction of this bridge may be similar to schemes 1, 3 or 4 but with a reduced number of support beams.

The design of a 7.6 m deck has not been developed and for cost comparison purposes pro-rata deck costs have been prepared assuming 3 No. beams will be required (steel or concrete). The size and costs of the foundations will not be significantly less than for an 11.6 m wide deck.

Reasons for Selecting Alternative

This alternative has been reviewed at the request of the Ghana Highways Authority, and has the obvious attraction of a lower

initial construction cost, if it is found that the existing structure is sound.

Costings based on an initial appraisal of the refurbishment requirements show however that there is no such saving.

The existing bridge is 50 years old and even if refurbished it will have a significantly shorter service life than the new structure. Maintenance costs will also be high.

The alternative is not therefore recommended, and further scheme development has not been undertaken.

Schedule of Refurbishment to Existing Bridge

1. Remove Footways from Both Sides of Bridge
The existing footway stringers are badly corroded - provide replacement footways on new structure.
2. Break out and re concrete badly cracked Deck Bays
Allow for breaking out 2 No 6m x 6m bays, cleaning and painting steel trough decking and re concreting with mesh reinforced concrete.
3. Break out and Reset Expansion Joints - 2 No.
4. Prepare and repaint complete structure - check cable wrapping and repair where necessary.
5. Carry out detailed inspection to identify any other defects and prepare recommendations for any additional refurbishment works considered necessary.
6. Carry out Design Assessment of Bridge to check that Bridge is able to carry HA and HB Loading.

6. RECOMMENDATIONS

The final choice of scheme is related to a number of considerations including:-

- Initial cost
- Construction Complexity and Risk
- Frequency and costs of long term maintenance
- Construction period
- Bridge aesthetics

In the table below each scheme has been placed in order of descending merit for each of these aspects.

| | Initial Cost | Maintenance Cost/ Frequency | Constr. Compl/ Risk | Constr. Period | Aesthetics | Overall Rating |
|----------|-----------------|-----------------------------------|---------------------------|-------------------|------------|-------------------|
| Scheme 1 | 3 | 2 | 4 | 2= | 4 | 3 |
| 2 | 4 | 1 | 5 | 4 | 3 | 4 |
| 3 | 1 | 4 | 1 | 1 | 1 | 1 |
| 4 | 2 | 2= | 2= | 2= | 2 | 2 |
| 5 | 5 | 5 | 2= | * | * | 5 |

* depends upon which deck types is selected and upon whether existing bridge is removed.

Scheme 3 - the 3 span steel plate girder alternative, is rated 1 st in all but maintenance.

The maintenance aspect is of obvious concern to the G.H.A. and close attention has been given to researching suitable protection systems, their durability and the performance of steel bridges in Ghana. The results of the research are summarized in Appendix No. 2. These show that with the proposed protection system maintenance intervals are long and that even if maintenance periods are significantly greater than recommended the consequences should not be serious.

The steel alternative is therefore strongly recommended. Of the concrete alternative Scheme 4 - the 3 span structure with drop in spans is clearly the preferred choice and is rated 2nd in all respects. The extended choice and is rated 2nd in all respects. The extended construction time the large quantity of insitu concrete to be placed at the river piers and the complexity of the having joints are all aspects of concern and bearing replacement at the having joints and the number of expansion joints all create maintenance difficulties, potentially as onerous as maintaining the steel girders.

Each of the other schemes has one or more severe disadvantages and should not be seriously considered.

We therefore recommend the adoption of a 3 span steel plate girder bridge with insitu composite concrete deck.

EXTRACT FROM "ECONOMIC RECOVERY PROGRAMME 1984-1986"
GOVERNMENT OF THE REPUBLIC OF GHANA

58. When the present Government took over on December 31, 1981 the economy was in shambles. Real national income per capita had declined in the preceding three years, the account on external payments was in massive deficit, and the net uncommitted reserves were only C43.5 million (not even sufficient to finance a week's imports). The tripling of cocoa producer prices in November 1981 without the supporting measures to sustain that price had resulted in a deficit of over C3 million for the Cocoa Marketing Board. Thousands of tons of cocoa from the previous cropping seasons were rotting in the bush due to the inability of the previous Government to make proper evacuation arrangements. The over-valuation of the cedi has reached such heights that the difference between the official and black market prices was about 20 times. The rate of inflation had reached a peak of 116 per cent in 1981. Money supply had more than doubled between 1979 and 1981. Payment arrears had accumulated to C1,105 million. The banking sector's claims on Government had jumped 63 per cent from the previous year. Every economic performance indicator pointed in the same downward direction.

Government Policies for Economic Recovery

59. As the crisis in Ghana's national economy had persisted so long and had left such ugly scars on the social system as a whole, it was clear that the surgical operation needed to put the system back on track would be painful, the temporary side effects bitter, and the process of recuperation and recovery slow and gradual. The economic recovery program launched by the Government on April 21, 1983 was formulated in full knowledge and understanding of these consequences. Despite tremendous pressures and repeated opportunities for making quick political gains and to achieve popularity, the present Government has stuck to the program faithfully. It is convinced that unless the root cause of the economic malaise facing Ghana is removed, it would be lacking in responsibility to the nation and will fail to achieve the goals of the December 31 revolution.

60. The economic recovery program is set within a four-year time frame. The first year, calendar year 1983, is devoted to stabilization and consolidation and the preparation of the economic, social and political conditions for the launching of a three-year Medium-Term Plan in 1984.

61. The main objectives of the economic recovery program are:

1. to restore incentives for production of food, industrial raw materials and export commodities and thereby increase their output to modest but realistic levels;
2. to increase the availability of essential consumer goods and improve the distribution system;

3. to increase the overall availability of foreign exchange in the country, improve its allocation mechanism and channel it into selected high priority activities;
4. to lower the rate of inflation by pursuing prudent fiscal, monetary and trade policies;
5. to rehabilitate the physical infrastructure of the country in support of directly productive activities; and
6. to undertake systematic analyses and studies leading towards a major restructuring of economic institutions in the country.

62. In 1983, the agenda entailed basic reforms in economic policy and restructuring of supporting institutions. The objective of the 1983 program was to lay the foundations for a sound macroeconomic structure which will improve and rationalize the incentive system of the social and political mobilization effort. From the record of radical economic and social transformation in other countries, it is clear that material incentives will continue to be crucial. The economic policies outlined in the following paragraphs form the cornerstone of the Government's economic recovery program and will be pursued with full vigor during the succeeding three years.

Exchange Rate Policy

63. Ghana's exchange rate system was officially classified by the IMF as a flexible system. In spite of this there had been no adjustment in the cedi/dollar official rate of C2.75 since its establishment in August 1978. Against the background of high inflation rates in the post 1978 period, the maintenance of the rigid official dollar/cedi rate created a situation of increasing over-valuation of the cedi. The problems of declining production, foreign exchange crisis, income distribution and budgetary deficits analyzed above can all be traced back more or less to this over-valuation of the national currency.

64. A system of bonuses and surcharges has been introduced since April 1983 to promote activity in the productive sectors of the economy by conferring on foreign exchange earners bonuses which are to be financed by surcharges on all users of foreign exchange. The system has been simplified as much as possible to ensure administrative efficiency. In practice, there are two effective rates of exchange—both for exports as well as imports of goods and services. The lower rate i.e. 23 cedis to the US dollar based on a surcharge of 7.5 times the face value of the transaction, is charged on crude oil imports and some other import items. All other imports of goods and services attract a surcharge of 9.9 times the value of the transactions resulting in a higher rate of 30 cedis to the US dollar. Similarly, cocoa, coffee, gold, diamonds, manganese and bauxite earn a bonus of 7.5 times the face value, i.e. 23 cedis to the US dollar. All other manufactured goods, processed timber, tourism, home remittances from Ghanaians residing abroad are entitled to a bonus equivalent to 9.9 times the face value of the foreign exchange surrendered, i.e. exporters receive 30 cedis to the US dollar.

65. It is also being envisaged that the effective exchange rates will be adjusted periodically so that the real purchasing power of the exchange rate in terms of currencies of Ghana's major trading partners is maintained.

Fiscal Policy

66. Fiscal policy and the 1983 budget have been formulated with the view to ensuring financial discipline and eliminating the traditionally high deficit. On the revenue side, the objective is to maximize collections through more effective collection, changes in the basis of taxation and widening of the tax net. With the elimination of waste from the system, expenditure will be fully financed in the first instance from current revenues and by borrowing from non-inflationary domestic and foreign sources.

67. Government receipts have been low especially the *advalorem* indirect taxes and the corporate income taxes as the official control prices, though largely ineffective in practice, formed the basis for tax assessment. On the other hand, Government purchases were made on the ruling transaction prices—eight to ten times the official prices—thus rapidly inflating Government expenditure. The potential gap thus created between payments and receipts was either closed by new taxes, higher tax rates or by deficit financing.

68. With the introduction of the surcharge and bonus system the basis for import duties, sales tax and purchase tax has been revised. The value of dutiable goods is computed as the face value *c.i.f.* plus the banking surcharge of 7.5 or 9.9 times the face value depending on the category of imports. It became necessary, under the new system, to reduce the import duty rates to conform to international practice. The duty structure was simplified and reduced to only three rates—0 per cent, 25 per cent and 30 per cent.

69. To make corporate income tax more responsive to the changes in the economy, all tax assessments will henceforth be made on the actual income earned during that year i.e. on a current year basis rather than being based on profits of the previous year.

70. Fees and levies for various purposes performed by Government institutions such as hospitals, passport office, Mines Department and the Police have been revised upwards. A net wealth tax is being introduced.

71. As a result of the above measures, the total recurrent revenues are expected to increase from C4.6 billion in 1982 to a projected C14.6 billion in this financial year. The largest expected increase is in the category of taxes on international trade, expected to increase from C789 million in 1982 to C8.4 billion in 1983.

72. Expenditure control measures instituted last year are being strictly enforced this year. The recurrent expenditure will however, increase by about 48 per cent as a result of the increases in remuneration to employees in the public service following the rationalization of the structure of remuneration incorporated in the reform package. Thus the recurrent expenditure in 1983 is estimated at C14.9 billion.

73. The proposed development expenditure of 3.1 billion cedis represents only a marginal increase in real terms from the previous year. Although the requirements for rehabilitation are overwhelming, it was deliberately decided to restrain the level of development expenditure in order to maintain fiscal discipline.

74. The overall budgetary deficit therefore would be reduced from C4 billion in 1982 (4.6 per cent of GDP) to C3.6 billion in 1983 or 3.1 per cent of GDP. Total net foreign financing of the 1983 deficit is projected at around C1.4 billion and domestic bank financing is to be limited to C2.3 billion or equivalent to 15 per cent of the broad money stock at the beginning of the period.

Investment Policy

75. Foreign investment will be welcome and actively encouraged in petroleum exploration and production, mining and mineral processing, timber logging, wood processing, quarrying, deep sea fishing, food processing, and domestic-resource based manufacturing industries. To achieve this objective, the new mineral code will streamline, centralize and remove bottlenecks in the processing of applications for prospecting and exploitation. External account status will be granted to new projects as well as existing projects which are able to self-finance their foreign exchange requirements. These accounts are intended to guarantee free transferability of dividends and debt service payments and to ensure the regular and uninterrupted availability of imported inputs and raw materials.

76. At the same time the existing foreign investors have been assured that they would be allowed to operate freely within the confines of their obligations and responsibilities and the general laws of the country. The socially conscious investors who are interested in re-investment in productive ventures using domestic raw materials and labor intensive techniques will be given all possible assistance. As the foreign exchange problem eases, the Bank of Ghana will make endeavors to assist such investors in clearing their payment arrears.

Prices and Incomes Policy

77. Incomes policy seeks to keep a socially acceptable relationship between the various sources of income in the system in relation to their contribution to national welfare. It also seeks to redress the anomalies that exist in the structure of incentives and remuneration.

78. One of the unfortunate features of the economic policies pursued during the last decade has been an erosion in the real purchasing power of the salaried employees and wage earners. By the end of 1982, an average salaried employee was receiving 16 per cent of his 1970 income in real terms. The consequential effects on the motivation, morale and productivity of these employees, especially in the public sector, are quite obvious. The Government doubled the minimum wage from cedis 12 per day to cedis 25 per day with effect from April 1983. The salaries of other private and public sector employees were also revised upwards.

It is the intention of the Government to review the budgetary situation and make further adjustments in the salaries if possible. While there is concern that the real purchasing power of the Government employees should be restored as quickly as possible, the dangers inherent in uncontrolled expansion in Government expenditure that may defeat the objectives of this program are also clearly recognized.

79. The guidelines on prices and incomes policy being followed by the Prices and Incomes Board seek to maintain a healthy balance between expected changes in prices and incomes with a view to protecting the real living levels of the mass of the workers.

80. Pricing policy in Ghana has for a long time been a mixture of administered or control prices for manufactured goods and market determined prices for agricultural produce, officially supported by minimum guaranteed prices for cereals and cocoa. To the extent that price controls have been effective, this has largely been the case at the factory or wholesale level and hardly so at the retail level.

81. The underlying principle of the new pricing policy is based on the recognition that where there are serious supply bottle-necks, neither laissez-faire market determined prices nor the rigid enforcement of prices unrelated to costs of production is a satisfactory basis for action. A viable pricing policy must be formulated in the context of a systematic elimination of the critical supply bottle-necks to increase productivity and production together with responsible management of Government finances aimed at eliminating the severe imbalances that lead to heavy deficit financing and the debasement of the currency.

82. In an attempt to tackle production bottle-necks, raise productivity and production, and encourage responsible financial management, pricing policy will be based on production costs together with appropriate incentive margins. The aim is to evolve a set of competitive price guidelines which together with supplementary imports, especially of food, will moderate the scarcity premia responsible for the high retail price. Under the program, therefore, prices have been determined on the basis of production costs of domestic produce with a margin for incentive.

83. In keeping with the above principles, the Government has revised the prices of a large number of commodities and services. Road haulage rates have been raised from 85 pesewas to 2 cedis per mile in the case of bulk cargo. Domestic telecommunications tariffs and external tariffs have been allowed to move up by 325 and 127 per cent respectively. Railway freight and passenger tariffs have been increased by 380 and 100 per cent respectively and electricity tariffs by 40 per cent. Water supply tariffs have been increased on average by 150 per cent. Petroleum product prices were also doubled in April 1983. As an immediate pass through of the exchange rate changes may be unbearable, the Government considered it necessary to maintain some subsidy on petroleum products for the time being.

Promotion of Manufacturing Industries

84. In the area of manufacturing the program envisages (i) increased

production and capacity utilization in selected industries to produce essential consumer goods, generate Government revenues and promote exports; (ii) a major rationalization exercise to achieve greater concentration and better economies of scale; and (iii) maximum reliance on local raw material base whenever economically and financially feasible.

85. Inadequate backward linkages in the case of agro-based industries with indigenous supply of industrial raw materials and lack of co-ordination between the agricultural and processing units have stunted meaningful industrialization in this country. After several careful studies it has been found that the development of the local raw material base should concentrate on the following agro-based raw materials, i.e. cotton, kenaf, maize, sugar-cane, shea-butter, oil palm, groundnuts, copra, coir fibre and rubber and industrial raw materials such as clays, iron ore and bauxite of which the country has large deposits. The program will pursue a policy of linking research and production and establishing co-ordination between growing and processing units with the greatest vigour in order to develop new possibilities.

86. The rationalization exercise will prepare the ground for shedding those industries that are not economically viable, are a net drain on foreign exchange earnings, provide few employment opportunities, are based on highly capital intensive techniques of production, generate almost no revenues for the Government or can only operate behind excessive tariff protection.

87. Priority allocations of import licences, foreign exchange and credit are proposed for those industries which are producing essential consumer and incentive goods such as bread, milk, milo, kerosene, cutlasses, matchets and tools or are generating Government revenues—breweries, tobacco companies—or are export-oriented, e.g. timber based and wood processing industries. To improve the efficiency of these industries, make them more competitive and stabilize the prices for domestic consumers, it is the policy of the Government to allow liberal imports of these goods and commodities.

State Enterprises

88. The problems confronting state enterprises are well-known. They include inadequate capital, lack of the required inputs, machinery and spare parts, heavy overhead expenses on redundant labor, too frequent changes in management personnel, poor accountability and failure to adhere to laid-down regulations. What is required now is a bold decision to address these problems decisively. The Government has requested the World Bank to carry out an in-depth study of the state enterprises and recommend redefinition of the objectives of state enterprises and specific measures for each individual enterprise that may include abolition, elimination, merger and restructuring whenever appropriate. In the meanwhile, the Government has asked all the state enterprises to end the irrational pricing policies implied in selling below the break-even point.

89. It has already been decided to transfer the farms and lands belonging to the Food Production Corporation and the Ghana National Reconstruction Corps to those workers interested in operating on a co-operative basis.

90. The tariff and price increases allowed recently for various commodities and services provided by state enterprises reflect the Government's policy to make these enterprises financially viable and operationally efficient. Subsidies and subventions to these enterprises will be discouraged as far as possible.

Agriculture Policy

91. Agricultural policy and programming are aimed at increasing the production of food, selected raw materials and export crops. For the cocoa industry, rehabilitation and replanting will be encouraged through remunerative producer prices which are revised and adjusted periodically so that the real income of the farmer is preserved. In furtherance of this policy, the producer price per bag of 30 kilos has been raised 67 per cent to C600 with effect from May 31, 1983. Additionally a more rational policy for spraying materials will be pursued together with adequate provision and distribution to farmers. In addition to the existing stock, orders have been placed to import a further one million liters of Gammalin and Uden to bring total available supplies of insecticides to about 2 million liters. Furthermore, 20,000 spraying machines are on order which together with the spare parts should enable the equivalent of one-fourth of the estimated 4.0 million acres under cocoa to be effectively sprayed. It is estimated that with effective control of capsid, cocoa output should increase by about 25 per cent in the first year rising to 40 per cent in the second year on the acreage sprayed. A special replanting program has been launched in the areas most severely affected by the recent bush fires.

92. Like the other export sectors, output in the timber sector has declined severely in recent years. Since the timber industry presents an opportunity to earn considerable foreign exchange quickly the rehabilitation of this sector is given priority. The World Bank assisted Export Rehabilitation Program will provide assistance in the rehabilitation of two major state-owned and 17 private-sector timber firms over the next 12 to 18 months. An allocation of \$50 million has been made in the import program for this sector.

93. Food production in 1982 was particularly low. Rainfall was both inadequate and haphazard. By December 1981 no fertilizer had been imported into the country with the result that the main season had to start without any fertilizer applications. This year the Government made all possible efforts to ensure that reasonable quantities of fertilizers were available for the planting season. To date about 70,000 tons of fertilizers have been imported, distributed and used by the farmers. The Government has decided to phase out the subsidy on fertilizers. The distribution and marketing of fertilizers have also been opened up to

the private sector and co-operatives. These measures, it is hoped, will rationalize the pricing structure and also promote efficient use of and application of fertilizers with beneficial impact on the output of major food grains. The Government has also imported insecticides, weedicides and pesticides in sufficient quantities to be distributed through private sector firms.

94. The sale of all food grains and starchy staples takes place through the normal marketing channels and the Government does not intervene in setting, controlling or monitoring the prices in any way except to announce guaranteed minimum support prices. The prices of these commodities have varied widely from region to region and season to season but the net prices received by the farmers were so lucrative that if the natural conditions, specially rainfall are favorable, there could be a big boost in the production of food. The deteriorating transportation system of the country is responsible for the high and erratic price movements of food items in major urban areas. The Government is therefore tackling this problem with great urgency and in addition to the emergency imports of tyres, spare parts and batteries, more systematic efforts are being made to rehabilitate the roads and highways, railways, ports, cargo handling in the context of the medium-term investment program. These investments should help in reducing transportation costs and thus the cost of food.

95. The Government is aware of the problems faced by the farmers in procurement of good quality seeds. Although the Ghana Seed Company is endeavoring to improve its performance, the Government would encourage the co-operatives and private sector to establish seed multiplication and distribution companies and thus meet the growing demand for quality seeds.

96. Similarly, adequate incentives including tax holidays will be provided to the co-operatives and private sector in establishing livestock, poultry and dairy farms as the present nutritional needs cannot be met by the existing domestic production.

Transport Policy

97. The Government intends to pursue a policy of healthy competition between the private and public sectors in the road transport sector. To this effect, the proceeds of the World Bank-assisted Rehabilitation Import Credit for the supply of tyres, batteries and spares have been allocated in proportion to the vehicles owned by the public and private sectors (20:80 per cent respectively). This policy is proposed to be continued in the subsequent allocations from foreign-aided commodity and project loans and also under the import program. To provide proper returns to the road transport operators, tariffs have been revised upwards and the Government is committed to adjust them periodically to reflect changes in operating costs.

98. The Government is concerned with the efficiency and standards of service provided by the State Transport Corporation, Omnibus Services Authority and City Express. Efforts are underway to reorganize and

streamline their operations by specialization of effort, formation of autonomous companies on commercial basis, greater managerial autonomy and competition with the private sector wherever possible. These companies will be permitted to enter into joint ventures with domestic and foreign investors while the employees will also be given the opportunity to subscribe to the share capital. The prices charged by these companies will be determined in a way to enable them to break-even, to amortize their external and domestic debts and to make annual depreciation provisions for replacement of their fleet without resorting to any subsidies or grants from the Government.

99. The railways, which used to carry the bulk of Ghana's export commodities, are being modernized and rehabilitated under a World Bank/African Development Bank assisted project. On its completion the railways would have developed the capacity to carry all Ghana's projected cocoa, manganese and bauxite to the ports. To restore the financial viability of the system, railway tariffs have been increased. A team of external management consultants is being appointed to assist in the operation of the system.

100. As the performance of the Black Star Line has been dismal in the recent years, it is proposed to convert each of the 16 vessels owned by the Line into a self-accounting subsidiary company operated purely as a commercial enterprise. Bonuses will be paid according to the profitability of each individual company.

Relations with International Financial Institutions

101. The economic recovery program announced by the Government has attracted support from the International Monetary Fund, the World Bank, and African Development Bank. The IMF has approved a compensatory financing facility in the amount of \$125 million. A stabilization program was also approved by the Fund Executive Directors on August 4, 1983 supported by a one-year stand-by arrangement leading to the purchase of \$240 million. The World Bank approved on June 29, 1983 an emergency IDA Credit of \$40 million for imports of tyres, batteries, spares, fertilizers, insecticides and sprayers. The African Development Bank has agreed to provide \$30 million for similar imports. The World Bank has also appraised an Export Rehabilitation Credit for revitalizing the cocoa, timber and mining sectors. Although no firm commitment has been made about the amount likely to be available, it is expected that at least \$70 million will be committed for this Credit before the end of the year. The project which forms the main plank of the recovery program has been formulated in such a manner that other co-financiers can participate and provide supplementary financing to meet the objectives of the program. The endorsement of these international financial institutions shows that the Government's economic policies are clearly in the right direction and worthy of wider bilateral and multilateral support.

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