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THE CONSTRUCTION INDUSTRY OF UGANDA.

INTRODUCTION.

The research project on the construction industry outlined in this paper, is being undertaken in association with the composite research project on industrialisation, for which research outlines have already been presented. From the research paper "Industrialisation in East Africa" (EDRP 82), it is clear that this particular project differs from the others in its approach - and in particular in the research resources that are to be devoted to one industry. Some justification of this must be given.

FIRST: from Table 1 it can be seen that expenditure on construction accounts for an important share of total expenditure on fixed capital both in economically advanced countries and those in the process of development. Thus the construction industry has a crucial part to play in the development plans of a nation, a substantial proportion of the investment which goes to build up future productive capacity being expended in this industry. The association of the industry with the provision of social overhead capital is obviously of similar importance.

SECOND: with reference to work done earlier in the EDRP by P.Clark and B.Van Arkadie, and presented in EDRP papers 39 and 42. In these papers the authors set out to develop a model of the economy of Uganda, and to trace from this model the detailed implications of the government's aim to double per capita income over the period 1961-81. It is understood that this model has served to form the basis of many of the calculations connected with the second five year plan. The relevant point may be clearly seen from Table 2 which has been taken from EDRP 42(Table4) - that in line with the overall growth targets for the economy in the period 1961-81, the construction sector must expand substantially faster than any other sector of the economy. On the basis of these calculations the construction industry will have grown by 1981 to thirteen times its 1961 size, followed by a growth of manufacturing of some seven times. Together by 1981 construction and manufacturing will have doubled their relative importance in the economy.

THIRD: that information available to the government and academic researchers on the construction industry is virtually non-existant. It should be appreciated, however, that this is not something peculiar to Uganda, or East Africa. Preliminary investigations have indicated a lack of information covering Africa generally, and at the same time that little academic interest is shown in the industry in the developed world.

On these three points rests the need for a study of the construction industry of Uganda. It is clearly essential that our knowledge of this industry -upon which so much is going to depend for the fulfillment of the development plans of Uganda should be increased.

In the rest of this paper an outline is given of what are thought to be the more important and directly relevant aspects of the industry requiring study. It is hoped that in the discussion of this paper attention will be turned not only to the details of each of the sub-headings, but to the headings

themselves, so that their relative importance may be assessed and omissions considered.

The sub-headings are divided into those dealing with the present operation of the industry (nos. 1-5) and the problems of the expansion of the industry (no. 6). It will become apparent that the area of concern is with supply. The aim is to study the industry as it is now, and the problems that may be encountered in meeting a greatly increased demand arising from the government's development programme. Demand is thus taken as given, though some indication of the nature of demand by class of building can probably be obtained from a breakdown of figures already published by the Statistics Branch under the heading gross capital formation by type of asset. Beyond this there seems little cause to comment on demand.

One further point - the study is concerned primarily with the industry in Uganda, and aspects of the industry in Kenya and Tanzania will generally be considered only for purposes of comparison.

DEFINITION.

A preliminary difficulty arises in defining what is meant by the construction industry - after allowing ourselves the liberty of identifying an industry with a census trade. The British Standard Industrial Classification defines the building industry so as to make it a giant among industries.

> "There is much more here than the elementary activity of enclosing bits of space for the purpose of shelter. The industry is extended for convenience to include the installation (and consequently the subsequent repair) of fixtures, for example plumbing, electric wiring, or central heating, which are usually put in position at the time of building. It is also extended to include other structures fixed to the earths surface such as bridges, which (though not intended for shelter) involve the use of techniques of building. Having thus included the civil engineering industry, the definition is bound for convenience to follow that industry into activities which are only distantly like building - such as open cast coal mining". (1)

In this study it is proposed to adopt a much more restricted definition, more in line with the United Nations Standard Industrial Classification. There would, however, seem little point for purposes of examining the structure of the industry, to follow that definition into the realm of individual electrical, plumbing, and plastering contractors, and to the construction of power lines.

In this study the construction industry is taken to be composed of businesses concerned with enclosing space for the purpose of shelter, and providing other structures fixed to the earths surface, where the activity can be said to employ the techniques of building. This will include all contractors whose business it is to provide the structure of houses, shops, offices, flats, public utility buildings (e.g. dams, harbours, power stations and roads).

Certain aspects of the study will, however, call for a consideration of the organisation of subcontracting work, and the cost of this work as a proportion of the total cost of a building.

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(1) C.F. Carter "The Building Industry", in The Structure of British Industry edited by Duncan Burn, p.47.

OUTLINE.

(1) A Study of Structure, Organisation and Competition.

It would seem that the most appropriate starting point is to discuss the basic aspects of the construction industry included under the headings - structure, organisation and competition, for such is the degree of our lack of information on this industry in Uganda.

Virtually no information exists of the structure of the industry, even the basic data, an accurate list of construction firms, being difficult to obtain. Yet it has been suggested that there are grounds for thinking that the degree of competition is less than might be desirable. Furthermore, it is clear that the organisation of the industry has important effects on structure and competition, as well as economic implications of its own.

The first task is to describe and analyse the structure of the industry in terms of the number of firms and various measures of the degree of concentration. This can be done for 1964, and it is hoped for past years in order that structure may be analysed over time. A useful complement to this work will be to obtain similar data for Kenya and Tanzania as is available from their respective Censuses of Industry. Other aspects of structure warrant attention, particularly the functioning of public agencies in the field of construction, the number of foreign firms, and a breakdown of firms into racial ownership and legal status. In passing the individual firm will be studied to assess the importance of subsidiary activities.

Organisational aspects of the industry in Uganda must also be studied. There is the split between public and private investment in construction and the extent to which the public sector carries out its own construction. The policy of the government in allocating work between government agencies such as the National Housing Corporation and the private sector is likely to be of interest, as is the degree of control it exercises over the work it puts out. The government uses the system of tendering in its relations with the private sector - but which type of tender is used, and does the system used encourage efficiency, competition and competitive pricing? How is the industry itself organised - what are the links between customer and builder? How is sub-contracting work arranged, and what are the links between construction firms and the buildings materials industry?

Finally an assessment of the state of competition must be attempted. The initial indicator will be the structural data, though other aspects of this are of course deliberate restraint of competitive conditions in the industry, and that arising through the nature of the industry(e.g. few firms being equipped to carry out certain types or scale of work). From the organisational aspects studied, the role of public authority construction in exercising control over the private sector is of relevance, both in the competition it provides and in the fact that skilled teams of quantity surveyors exist in the Ministry of Works, the National Housing Corporation, and the UDC., to advise the government in the light of tenders received. There also exists the competition exerted by foreign firms and the related question of just to what extent construction can be said to be an African industry and not an industry of a particular nation. The competitive system can be assessed by its results- the evidence provided by tender prices and the return on capital invested in the industry.

(2) A Study of Building Costs.

Certain problems associated with building costs in Uganda have been indicated in discussions. First and foremost there were complaints against the level of building costs, and the increase that has been registered in the last few years. In addition there is claimed to exist a substantial disparity between costs in Uganda and costs in other East African countries.

All these assertions call for investigation and perhaps subsequent analysis. Should the point relating to a cost disparity over the three territories be substantiated, then the stage is set for an explanation based on differences in factor and material input prices, efficiency and the relative degree of competition.

Thus it is proposed to undertake an analysis of buildings costs over time, a detailed breakdown of present costs, and a comparative analysis with the level of costs in Kenya and Tanzania.

In this aspect of the work the problem of the hetergeneity of the product must be faced. In order to make the analysis more meaningful it will be necessary to break down the broad aggregate of construction. Initially it will be enough to simply divide the output of the industry into fairly broad but distinct classes - housing, simple and complex industrial buildings, offices, tall buildings, public utility buildings and oads. This is done since each category is likely to involve a different combination of costs and to have been subject to different factor and material price movements. Where, however, a comparison of building costs is involved it will be necessary to be far more technically precise in describing the product under consideration.

(a) movement of building costs over time: here the major source of information will probably be data on New Buildings Completed collected by the Statistics Branch. The aim is to construct an index of building costs over the period 1953-64. An overall index will be given and one based on a division of construction output into its main products.

(b) movement of components of cost over time: in order to facilitate interpretation of (a) and subsequent analysis, indices of the prices of factor and non-factor inputs will be estimated.

(c) index of building activity: the information collected in (a) and (b) can be interpreted alongside an index of building activity - calculated from the data on New Buildings Completed.

(d) cost breakdown: for the various types of construction defined, technical advice will be sought in specifying a typical building within each category, which in technical specification is likely to find many examples or near examples, throughout East Africa. A cost breakdown will then be attempted on the basis of data available from individual sites and the total cost ascertained. The detailed cost analysis will provide valuable data to facilitate judgements as to past and future cost trends, and at the same time, combined with the detailed specification and total cost, provide the basis for a comparative analysis of building costs in East Africa.

(e) building costs: an assessment of reasons put forward for high building costs (or difficulties in the way of reducing the present level), from restrictive building regulations, shortages of skills and materials, to a lack of standardisation, and uniform quality of building materials.

(3) A Study of Efficiency.

A study of the relative efficiency of the Ugandan industry follows on from the analysis of building costs. To the extent that significant differences are found of cost per sq. foot for virtually identical buildings between the three countries, an explanation must be sought on the basis of differing costs of materials or factor inputs, differing degrees of competition, differences in scale of outputif economies of scale are important, or differing levels of efficiency.

It is thus proposed to measure the relative efficiency of the Ugandan industry as against the industry in Kenya, if initial findings indicate a need for this.

The method of going about this is rather difficult to decide. The usual method is to obtain some global measure of output per man for an industry and compare it with figures of another country. This, however, is a poor indicator of efficiency to which would have to be added the serious deficiences in the material available on which the ratio would be calculated. Furthermore, additional information to make this method of measurement more comprehensive is not available.

Another possibility arises from a suggestion put forward by B.Walstedt.(1) It cannot be claimed that this method is without its difficulties, but what is of particular relevance here is that the measure proposed would be based on material already collected for the study of building costs, and at the same time provide an insight into the reasons for any observed price disparity.

Walstedt points out that a competitive selling price is a generally accepted measure of economic health, but that in an international comparison of selling prices certain corrections would clearly have to be made for differences in the prices of inputs. Thus he proposes a measure of relative industrial efficiency based on a comparison of selling prices systematically corrected for differences in factor prices.

The first problem that usually arises is in the definition of the product - which will already have been dealt with in the building costs enquiry, as will the second problem- the need for the price of inputs in the base country. What has to be ignored, systematically excluded or allowed for, are differences in the quality of the product.

Assume that Kenya is able to build a house much cheaper than is the case in Uganda. A line of argument that the Uganda builders could put forward is that this due to lower input prices in Kenya, and not to greater efficiency on the part of the Kenyan industry. This can be assessed in the following way. From the available cost breakdown of the Uganda plant, apply the factor prices applicable to Kenya. It then follows to compare prices of the final product, and in this way get a measure of relative economic performance (at Kenyan prices). There are at least three limitations to this approach:-

(a) to the extent that there are substantial differences in resource allocation and thus relative factor prices, the comparison would be unreasonably biased in favour of Kenya. This does not, however, seem likely.

(b) in order that this measure will give an indication of the overall efficiency of the two industries, cost data and prices would have to be obtained from a cross section of the industries.

(c) though having established the existance or not of a significant difference in efficiency, it still remains to find, in the case of the former, the reasons why.

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(1) B.Walstedt,"Indices of Industrial Efficiency" in Productivity Measurement vol.1 EPA/OEEC 1955

The data required to undertake this is as follows: the selling price and its breakdown by cost elements in Uganda; the selling price in Kenya; and price indices of the major cost elements for Kenya. Only the latter will have to be collected in addition to the material already collected for the building costs enquiry.

Bearing in mind the criticisms made, it would seem that the position arrived at having completed this analysis is to have established whether or not a divergence in the efficiency of the two industries exists. Having reached this point it must be decided if a more detailed study of the causes of the divergence is warranted.

(4) A Study of Labour.

A number of aspects of labour employed in the construction industry call for attention. In addition to information collected from all firms, a more detailed study is proposed of one or two of the larger employers of labour. This work will be done in association with A. Baryaruha who is engaged on a study of industrial employment in East Africa. It was proposed by Mr. Baryaruha to include a construction firm in the case studies he is undertaking, and thus on the grounds of expediency this has become a field of joint endeavour though the information collected and its subsequent publication as it relates to the firm chosen remains firmly within the confines of his project. This, however, does not rule out the possibility of the joint consideration of interesting problems highlighted by the more general survey to be undertaken in association with the present research project being considered.

The aspects likely to be of interest are; total numbers employed and labour turnover; labour requirements -- man hours worked; wages, earnings, conditions of employment; division by skills and professional status; provision of training at all levels and company attitudes to and actual expenditure on training; labour problems and organisation of trades unions; productivity of labour in firms by size, incentive schemes, methods of payment.

(5) Techniques and Capital.

An important issue in development planning concerns techniques of production and in particular the choice between labour and capital intensive techniques. The aim here is to provide some information on the techniques used in construction, the degree of capital intensity, and managerial attitudes to capital and labour intensive techniques.

An account of the techniques used at various stages of production will be given and assessed on the basis of the techniques employed in the Western world.

A knowledge of capital employed will be of interest in this repect, but equally so from the calculation of average and marginal capital output ratios and capital labour ratios. As much information as possible will be sought on the capital equipment employed - the nature of the equipment, its original and written down cost and age. In addition information on capital equipment purchased during the past year, and in particular whether this represents an addition to or replacement of equipment.

Beyond the techniques employed it will be interesting to take note of the degree of standardisation in materials and components and the extent of prefabrication(if any).

(6)A Study of the Problems of Expansion.

The focus of concern with the construction industry is clearly the requirements of expansion placed on the industry and its present operation. The latter having been dealt with, it arises

now to deal more specifically with the problems of expansion.

A certain amount of background material will inevitably be collected concerning the plans and experience of other nations regarding the construction sector in their overall plans for growth. This will help to judge Ugand's plan against in a sense a normalised pattern of development and growth of the construction industry.

There are a number of problems requiring detailed analysis; is it possible for this industry to expand at the required rate; what are the plans of the industry and its awareness of the future demand for construction; is the building materials industry able to cope with the demands placed upon it? But at the same time the industry in East Africa must be looked at to gain some idea of comparative rates of growth (present and required), the existance of surplus or deficient capacity , and the development of the building materials industry and the trade in building materials.

(a) Capacity For any industry an aspect of its performance is its capacity - is there either excess capacity which raises costs above the minimum attainable, or insufficient capacity so that demand is met only by utilising available capacity with uneconomically high intensity.

A problem that must be immediately faced is that of the concept of capacity, for it has been said that along with depreciation this one of the controversial items of industrial enquiries. A distinction must be drawn between physical and economic capacity, the latter being defined in relation to the minimum point on the average cost curve. It would seem to be impracticable to carry out a sufficiently detailed study to determine economic capacity, and of the few nations that do incorporate such questions in industrial censuses few adopt any objective criteria. The concept is usually left to the individual judgement of the repondents. But to avoid wild guesses the engineers measure of the capacity of the plant should perhaps be used - that output for which the plant was built to operate under normal conditions. This of course need not conform to economic capacity and furthermore the majority of construction firms are not going to have engineers on the staff to make this sort of calculation. Consequently the judgement of the owner is often all that there is to go on, but the accuracy of his statement can be assessed from the information collected on employment and capital equipment.

Though the result will be a measure of physical capacity it has been pointed out that the result of many cost studies in showing the existance of an almost horizontal marginal cost curve indicates that there is likely to be little difference between economic and physical capacity of the plant. It remains to be judged to what extent the horizontal marginal cost curve is a reasonable assumption for the construction industry.

The problem is to assess the present capacity of the construction industry in Uganda. Assuming capacity to be in short rather than in over supply, further information is required as to the plans of contractors for expanding capacity the elasticity of capacity, and barriers that are said to exist to an expansion of capacity and output.

The lack of homogeneity of the product poses certain problems·the resources of a construction firm can be turned to the output of many different forms of building - some for which a sq. foot measure is appropriate, some not. Even where it is appropriate, to build 'x' sq. feet of warehouse is likely to be less demanding on the resources of the firm than to build the same number of sq. feet of housing. An answer to this might be to specify in technical terms two

hypothetical buildings at opposite poles of complexity in order that an upper and lower limit to the measure of the capacity of the firm is obtained. Thus each firm will be asked - assuming your present capital resources, and assuming materials and labour to be readily available, how many sq. feet of project A and of project B could you complete per time period at normal levels of operation.

(b) Input Coefficients. An associated problem to that of the capacity of the construction sector concerns bottlenecks that might arise from outside the industry, in the course of the planning period, in the utilisation of such capacity as might be created. Bottlenecks may arise from other spheres of activity calling for a detailed consideration of the availability of building materials and skills. Should either prove to be in short supply, capacity may become unemployed in the construction sector.

From the detailed cost data that it is hoped to obtain, it is intended to calculate for each major product, the input coefficients for all major materials, labour analysed by skills, and what is a more difficult task, import content. On the basis of these coefficients a calculation can be made of the likely demand for supplies of materials and labour(by skill).

CONCLUSION.

Whilst six studies have been listed, a considerable degree of overlap exists particularly among the studies on building costs, efficiency and input coefficients. Success here depends on the feasibility of specifying in technical terms a 'typical building', and on obtaining site data. The latter must surely exist for it is inherent in the system of tendering to undertake a preliminary allocation of costs to each job.

The study of Structure, Organisation and Competition is going to invove a certain amount of questionnaire work within each firm, to build up the framework of analysis. But for the rest of the study, the major sources would seem to be government departments and authoritative opinion on the working of the industry.

As for the Building Costs enquiry, the Statistics Branch should be able to furnish a large proportion of the information. The major outstanding task will be to construct an index of input prices.

The questionnaire will also have to be employed for all aspects of the studies on Labour, Techniques and Capital and Capacity.

Generally speaking, there would seem to be here a fairly even break between fieldwork and study in government departments and the offices of highly cooperative firms. All the usual problems of questionnaire work arise - and more besides as the result of a difficult and long qustiònnaire. It would be out of the question to consider anything other than personal contact with the firms - and furthermore, to be prepared for more than one visit. This, however, must be judged against the fact that two thirds of the construction firms are located in the Kampala-Jinja area.

At the same time it is hoped to secure the support and cooperation of the Ugandan and Kenyan Associations of Builders and Civil Engineering Contractors.

It is hoped that this research project will first provide an adequate description of the Ugandan construction industry and its operations; second provide the basis of further work covering the industry itself and the more general aspects of industrialisation involving the industry; third answer some of the qustions being asked by the planners about the industry.

Table 1

THE IMPORTANCE OF CONSTRUCTION EXPENDITURE IN NATIONAL EXPENDITURE, (Selected Countries. 1953 (%)

COUNTRY.	SHARE GFCF IN GNP	SHARE CONSTR. IN GFCF.	NON RESIDENTIAL CONSTRUCTION as% total constr..	CONSTRUCTION as % of GFCF.
Germany	20.6	47.4	...	...
Netherlands	20.7	46.5	62.4	29.0
Norway	29.2	50.0	54.8	27.4
U.K.	13.4	51.7	48.2	24.9
U.S.A.	16.1	58.6	61.4	36.0
Argentina	15.5	68.8	...	...
Brazil	14.2	57.5	...	...
Burma	14.1	76.5	...	...
Chile	9.3	60.4	46.4	28.0
Ecuador	11.1	46.3	74.6	34.5
Ghana	13.3	54.2	80.8	43.8
Israel	23.7	70.8	53.7	38.0
Philippines	6.8.	62.1	63.2	39.2
Uganda 1953	19.8	56.1.		
1963	11.1	41.5		

Sources:

U.N. Statistics of National Income and Experditure Jan.1957. and 'Industrialisation and Productivity' bulletin April 1958.

Uganda - Abstract of Statistics

Table 2.

ESTIMATED EFFECTS OF DOUBLING PER CAPITA INCOME 1961-81

Sector Gross Product.	£m 1962	1981	Ratio '81 to '61	p.a.% rate growth '62-81	Share of GDP 1962	1981
Agriculture	49.9	170.5	3.4	6.7	47	35
Non-Agric..	56.5	314.2	5.6	9.5	53	65
Construction	3.9	51.0	13.2	15.7	4	11
Manufacturing	8.6	57.7	6.7	10.6	8	12
Services	22.8	114.7	5.0	8.9	21	24
Government	13.4	58.9	4.4	8.1	12	12
Transport	7.8	31.9	4.1	7.7	7	6
Gross Invest.	15.4	157.9	10.2			
Construction	8.3	93.4	11.2			
Import Constr. Materials.	1.6	4.7	2.8		Share total Imp. 5	4