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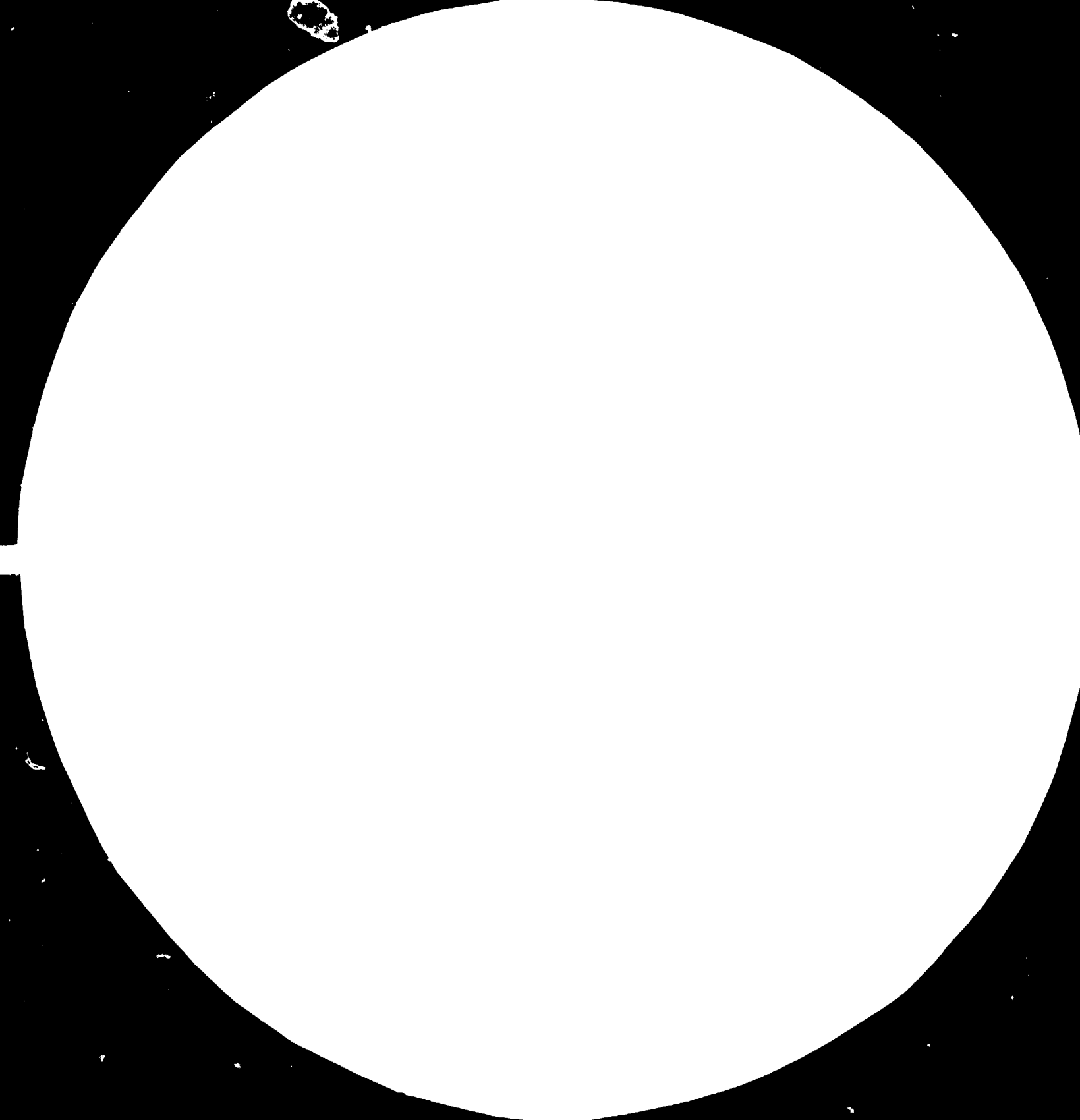
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GLOBAL PROSPECTS FOR THE DEVELOPMENT OF THE CONSTRUCTION  
AND BUILDING MATERIALS INDUSTRY

- Draft -

Jürgen Riedel

München, June 1983

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A. Review of the Sector's Past Performance

In the sixties as well as in the seventies, construction net output increased less than GDP world-wide whereby the growth gap even widened. Moreover the disparities are larger in comparison with industrial production (see also tables in Annex A-1 and A-2).

Table 1: Global Average annual growth rates

	1960-65	1965-70	1970-75	1975-78
G D P	5,8	5,6	4,3	4,6
Construction	5,7	4,6	2,7	2,9
Industry	6,8	6,5	4,5	5,8

Source: UN-Yearbook of National Accounts Statistics 1979

Different trends, however, have occurred between developed and developing countries.<sup>1)</sup> While in the former group the gap accentuated, construction growth in the latter increasingly advanced GDP.

Table 2: Difference between global construction and GDP average annual growth rates

	1960-65	1965-70	1970-75	1975-78
Developed Countries	+ 0,9	- 1,2	- 2,6	- 2,7
Developing Countries	- 0,6	+ 0,9	+ 2,3	+ 3,7

Source: UN-Yearbook of National Accounts Statistics 1979

1) Market Economies only i.e. Centrally planned economies excluded.



Due to this relatively high growth the construction sector's share in developing countries GDP went up from 5,3 % in the early sixties to 6 % in the mid-seventies.<sup>1)</sup>

In the individual developing regions, very different trends have taken place:

Table 3: Construction average annual growth rates by developing regions

	1960-65	1965-70	1970-75	1975-78
Developing Countries	4,9	7,2	8,7	9,2
- Africa	2,2	5,8	12,6	8,1
- Caribbean, Latin America	2,8	9,0	8,0	7,0
- Asia - Middle East	9,2	6,0	11,4	11,0
- Asia - East and South East	7,9	6,2	5,2	10,4

Source: UN-Yearbook of National Accounts Statistics 1979

In Africa, construction growth went steeply up from an average of 2,2 % p.a. in the early sixties to 12,6 % in early seventies by slowing down below average to 8,1 % in the following years. The Caribbean and Latin American region experienced its peak in the late sixties and then steadily declined. Construction growth in Asia clearly reflects the oil boom and its impact on infrastructure and building investment in the Middle East throughout the seventies and the rapid

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1) The UNITAD System, 1981 Report, UNIDO/IS 337, 7 Sept.1982, p. 77.

industrialization in the Far East accelerating from the mid-seventies onwards. Both Asian regions constituted the growth poles of construction development in the recent period and according to various economic indicators it can be argued that this trend still is unbroken in our days and very likely will continue to be effective.

Considering that more than half of an economy's capital formation is in the form of construction works and this ratio being fairly constant in developing countries<sup>1)2)</sup>, the construction development can be attributed to the advanced growth of gross fixed capital formation (GFCF) against GDP in the Third World (see tables A-1 and A-2). While since 1960 this ratio was rather constant world wide (except the temporary variation in the early seventies) in developing countries GFCF took a continuously increasing share of GDP. This applies in particular to the Middle East and the rest of Asia whereas in the Caribbean and Latin America since the mid-seventies a slight relative decline is observed. These regional features of GFCF growth correspond quite well to the developments of the construction sector.

There is little empirical evidence on the performance of building materials industries for two reasons. First, international statistics on industrial production are very incomplete and second, there are - apart from few exceptions - no classified groups within the International Standard Industrial Classification (ISIC) clearly identifying building materials. On the

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1) Jürgen Riedel, Siegfried Schultz, Bauwirtschaft und Baustoffindustrie in Entwicklungsländern, Ifo-Studien zur Entwicklungsforschung Nr. 3, München 1978, p. 17, 233.

2) In developed countries this ratio tends to decline.

other hand, various classified products or product groups include building materials, the share of which varies from code to code number. A further constraint is the multiplicity of products based on different raw materials such as wood, metallic and non-metallic minerals and requiring various production and processing stages before being used as intermediate inputs and assemblies in construction. Finally, this multiplicity increases together with the level of standards and refers in particular to building.

Major building materials are: sand and stones (ISIC 2901), sawnwood, plywood (included in 3311), paints (3521), bitumen (353034), tar (3540), ceramics (36100), glass (36200), bricks and tiles (3691), cement (3692), concrete blocks and pipes (3699), different types of steel products such as mats, wire rods, plates and sheets (3710). These products are mainly included in the ISIC groups 29, 33, 36 and 37 for which international statistics on production indexes are available (see table A-3).<sup>1)</sup>

Supposing the share of intermediate inputs (building materials) in construction gross value approximately constant it could be expected that in line with the world-wide declining ratio construction/GDP the relative importance of building materials production went down as well during the seventies. In fact, the data confirm this trend: the production of sand and stones (other mining ISIC 29), wood products (33), non-metallic minerals (36) and basic metal products (37) increased less than total manufacturing as well as GDP at world level in this

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1) Because of the lack of more specific data in the following it is assumed that these groups represent building materials.

period. The gap is smaller for quarrying and non-metallic minerals and the widest for basic metals (see table 4). Admittedly within the latter the portion of building materials is rather low.

As for the construction sector in building materials too, different trends have occurred between developed and developing countries and world regions. The following table displays the regional variations by pointing out the deviations of building materials from total manufacturing growth rates.

Table 4: Differences between individual building materials and total manufacturing growth by country group / world region (average annual rate 1968-1980)

	Other Mining (29)	Wood Products (33)	Non-metallic Mineral Products (36)	Basic Metal Products (37)
World	-0,6	-1,4	-0,1	-1,7
Centrally Planned Economics	-3,0	-2,1	-1,4	-2,6
Developed Market Economics	0,0	-0,9	-0,2	-1,7
Developing Market Economics	-1,6	-2,0	+0,3	+0,4
Caribbean, Central and South America	-1,4	-2,2	+0,7	+0,7
Asia	+0,2	-2,3	+0,3	0,0

Source: UN-Yearbook of Industrial Statistics 1979 and 1980 (see also table A-3).

Figures show that in developed countries the world-wide trend of declining share of building materials in total manufacturing has accentuated except for mining products.<sup>1)</sup> In developing countries, on the other hand, in line with the increasing share of construction in GDP the growth of building materials was above average (manufacturing) except for wood products. This applies in particular to the Caribbean, Central and South American region.<sup>2)</sup> Furthermore, the growth disparities between developed and developing countries are relatively large for basic metal products.

Whereas the total of developing countries prevented the world production of non-metallic minerals and basic metal products from a further relative draw-back, for quarries production the Asian region only signed responsible. On the contrary, the relative large reduction of wood products growth in the Third World was compensated somehow by the developed countries.

As far as building materials' international trade is concerned the statistical examination faces similar definition constraints as mentioned with respect to industrial production statistics i.e. the majority of these products are grouped together with other goods consumed by sectors other than construction. Although trade statistics are more complete and elaborated it would by far exceed the scope of this report to venture a thorough analysis of exports and imports of building materials by country groups. The pursued approach,

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- 1) Methodically this linking is not quite correct because mining is not part of manufacturing but for statistical reasons this relationship has been applied here.
  - 2) No data are available for Africa.

therefore, contents itself first to major building materials which can be determined rather easily such as cement, bricks and tiles, wire rods, wood, stone and sand, paints and second to the developing countries shares in international trades and their growth,

On an average (unweighted) the developing countries share in 14 major building materials imports was 24,1 % and in exports 16,2 % in 1979. These average shares were by 1979 35,1 % (imports) and 26,6 % (exports) higher than 1970. Obviously these figures do not allow per se to conclude that imports have developed faster than exports due to the lack of weighting but they may serve as a reference to appraise the relative structure of individual materials' import and export performance. As table 5 and table A-4 show, for cement, iron and steel-shapes, primary forms, universals plates and sheets and pigments and paints developing countries have their highest world import shares in building materials ranging from 79 % (cement) to 27 % (pigments and paints). During the seventies, growth was relatively high again for iron and steel shapes and cement, but also for plywood veneers, builders woodwork, prefabricated, glass, stone, sand, and gravel and rough wood. On the other hand, wood simply worked, steel and copper nails nuts, screws, bolts etc. wood shaped, clay refractory building products lost importance on the building materials import account.

Table 5: Ranking of 14 Major Building Materials according to Developing Market Economies' shares (1979) in World Imports and Exports and their Growth 1970 - 1979

Product	SITC	Ranking			
		Import shares 1979	Import growth 1970/79	Export shares 1979	Export growth 1970/79
Wood rough	242	12	7	1	10
Wood shaped	243	13	12	4	9
Plywood veneers inlaid.	63121	8	1	2	8
Wood simply worked	6318	14	14	5	12
Builders wood work prefab.	6324	9	3	6	2
Stone, sand and gravel	273	11	6	7	4
Ciment	6612	1	5	3	14
Clay, refractory building prod.	662	6	10	12	6
Glass	664	7	4	10	5
Iron steel primary forms	672	3	8	9	7
Iron and steel shapes	673	2	2	11	11
Iron steel universals plates and sheets	674	5	9	13	3
Steel, copper nails, nuts screws, bolts etc.	694	10	13	8	1
Pigments, paints	533	4	11	14	13
Total Unweighted average 14 product groups		24,1 %	35,1 %	16,2 %	26,6 %

Source: UN-Yearbook of International Trade Statistics, 1979

On the export side, developing countries are important exporters of wood products in particular rough wood, cement, stone, sand and gravel. Their world market share ranges from 60 % (wood rough) to 12 % (stone, sand and gravel). It should, however, not be overseen that Third World countries imported for instance four and a half times more cement than they exported in 1979. This disparity may be the reason for cement ranking last in export growth (1970-1979) among 14 major building materials. In this category, apart from some wood products, the developed countries dominate world exports. In the respective ranking (table 5) from position 10 on the developing countries' share in world exports is less than 5 %, although considerable success has been achieved in promoting exports of a number of building materials such as steel and copper nails, nuts, screws and bolts, builders wood-work prefabricated, iron steel universals plates and sheets, stone, sand and gravel, glass, clay, refractory building products where the share in world exports more than doubled between 1970 and 1979.

But even this success story cannot overshadow the fact that developing countries still seem to remain dependent to a very large extent on building materials imports of the developed World. The disparities between import and export world market shares (1979) are particularly pronounced for iron and steel shapes (import share: 36 %, export share: 4,4 %), pigments and paints (28 % / 3 %), iron and steel universals plates and sheets (27 % / 4 %), primary forms (29 % / 6 %), glass (22 % / 5 %) and clay, refractory building products (23 % / 4 %).

These results have to be interpreted as very preliminary and with extreme precaution. In addition to the above mentioned



definition constraints, the analysis of trade data does not represent exports and imports between developed and developing areas only but include as well commodity flows between these country groups the first of which obviously takes the lions share.

Due to various constraints and deficiencies it appears rather risky to draw conclusions from the growth and regional differences of building materials production and international trade on trends in the development of construction types and technologies. Nevertheless, even with great precaution, it could be preliminarily argued that the relative lagging of wood products behind the growth of other building materials might show its loss of importance in construction which may be due, among other reasons, to exhaustion of forest resources particularly in the Third World. Considerable import growth of builders woodwork prefabricated and plywood can only partly compensate. On the other hand, the relatively small world-wide decline and the gains in developing countries in the group of non-metallic minerals can be interpreted first as an indicator for the increasing use of bricks and particularly cement and second as a growing share of building in construction. (This argument is reinforced by the relatively high share of cement and its continuing growth of imports.) The latter could be further confirmed, first by the relative production and import loss of quarrying products (other mining) which are predominantly used in civil engineering such as road construction and second by the regional production and import trends of basic metal products growth. This would imply also a growing tendency towards multi-storey building. However, it has to be considered that first basic metal products are used in both building and public works such as bridges and

harbours and second only a relatively small portion of this group's production goes into construction.

International statistics on central government expenditure provide further evidence as to a growing share of building and a declining one of road construction since the mid-seventies. As table A-5 shows, the housing share has moderately increased world-wide from 2,4 % in 1974 to 2,5 % in 1980 whereas the roads share diminished from 3,1 % to 2,4 %. This trend applies to both developed and developing countries; the only exception are the oil exporting countries which still in 1979 devoted by far the highest percentage of all country groups to housing (3 %). Housing shares increased more in developing than in developed countries. Their growth was particularly significant in Africa, South and Southeast Asia. The same applies to the relative decline of road construction for which central governments in developed countries spent 2,4 % in 1974 and 2 % in 1980 of their budget. Developing countries, on the other hand, starting from a high level of 7,2 % dropped their share down to 4,3 % in 1979. This strong decline was mainly induced by developments in Central and Latin America.

International cooperation in the field of construction usually takes the form of contracts between governments in developing countries and foreign construction firms to execute larger projects of public interest. In countries where international contractors expect continuous flows of contracts, joint-ventures have been increasingly established often supported by respective government policies. Financing is provided by Third World governments either directly from domestic budgets or indirectly through international banking or development aid funds.

This type of business has enormously grown in the seventies, mainly due to the accumulation of capital funds in OPEC-countries. On the other hand, contractors in industrialized countries have made particular efforts to engage in foreign business during periods of economic recession which somehow coincided with OPEC booming. In medium and long terms, this foreign engagement was supported by structural weaknesses and saturation trends in the industrialized countries construction markets. The share of foreign contracting in total construction gross product increased considerably, for instance in France from 15 % (1969) to 27 % (1975), and in USA from 13 % (1970) to 24 % (1979). In the FRG and Italy, the shares are estimated at about 10 %. The following table underlines the rapid growth of foreign contracting.

Table 6: Foreign Contracting by Major Countries

Country	Unit	1965	1970	1973	1975	1977	1979
Federal Rep. of Germany	bill.DM	0,5	0,8	1,2	3,6	8,2	10,1
France	bill.FF		5,3	6,6	12,0	22,3	20,0
Italy	'000 bill. Lira		0,1	0,3	1,2	3,1	3,1
Japan	bill.US-\$			0,6	1,2	1,3	2,6
Netherlands	bill.hfl			1,9	6,6	9,2	5,3
South Korea	bill.US-\$			0,2	0,8	3,5	6,4 <sup>1)</sup>
U K	bill.£		0,3	0,5	1,3	1,6	1,3
U S A	bill.US-\$		4,1	6,0	21,8	15,9	22,2

1) 1980 : 8,3

Source: K.Behring, E.Gluch, V.Rußig, Entwicklungstendenzen im Deutschen Auslandsbau, Ifo-Institut für Wirtschaftsforschung, München 1981.

The figures show that following a considerable expansion in the mid-seventies the growth rates tended to decline towards the end of the seventies. This trend does not apply to Japan and South Korea which strengthened their market position further, very likely due to comparative cost advantages in the OPEC and East-South East-Asian region. South Korea became the second largest foreign contractor after the USA.

Middle East oil exporters play the dominant role in the use of foreign contractors. German firms make nearly 90 % of their total foreign turnover with these countries (Italy 60 %; UK 55 %). Furthermore, in the seventies there was a declining share of Africa and a growing one for Asia. French and Italian contractors seem to be better established in Africa with regional shares (1978/79) of 55 % (1975: 76 %), and 45 %, whereas German, Dutch and British firms get only 24 % (1970: 58 %), 21 % and 21 % (1975: 37 %) of their contract value from this region.

According to West-German figures only, building construction has received increasing priority in international contracting. Its share went up from 29 % in 1970 to more than 60 % in 1979. Within this category non-commercial/industrial i.e. public building and housing improved its share from 32 % (1969/70) to 83 % (1978/79). This corresponds to the generally increasing weight of building against civil engineering and public works in developing countries. On the other hand, the latter subsector lost its significance in international contracting accordingly; this decline was particularly pronounced in the second half of the seventies in general

and in road construction in particular; other civil engineering and public works were less affected. This West-German sub-sectorial structure, however, cannot be deemed representative because foreign contractors country-wise seem to concentrate on specific types of works: Italians for instance are highly specialized in civil engineering and were involved in most of the major damm projects in Africa.

The available data base does not allow any conclusion so far as to what extent the expansion of the construction sector in the Third World can be attributed to foreign contractors business and to what extent the domestic construction industry in developing countries has benefitted from these developments.

B. Basic Conditions and Constraints for Future Development

Whereas the spatial distribution, settlement structure and growth of population and various development policy targets serve as indicators for construction needs, effective demand generally depends on economic resources i.e. the growth of gross domestic product and of gross fixed capital formation. Furthermore, public construction is determined - in addition to political priorities - by Governments' capacities to reserve part of their total budget for investment expenditure.

Between needs and demand for construction considerable gaps can prevail in addition to distortions within the construction market itself.

As far as needs for construction are concerned there is no doubt that from a world-wide point of view Third World countries have been and will continue to be in the center of concern. This is confirmed by two reasons:

- i. Past trends of the sector's performance outline accelerating growth rates in developing and declining in developed countries; this applies to both absolute and relative growth rates (with respect to GDP); *no. 1 in ch*
- ii. The gap between needs and effective demand comparatively accentuated in developing countries due to their lack of resources and low level of development.

Hence there is good evidence that developed countries after construction booming in the post-war period of the fifties and early sixties have achieved a certain saturation of needs

and demand whereas developing countries still face unsatisfied needs for construction works which exceed largely existing effective demand.

These needs basically refer to

- the exploration and exploitation of vast unused and thinly populated spaces which require large public works and huge investments in technical infrastructure,
- the population growth and rural outmigration which have led and will continue to lead to a constantly rising ratio of urban to total population thereby amplifying the already existing enormous needs for housing and infrastructure in urban areas. It is estimated that Third World countries will account for nearly 70 % of the world urban population by the year 2000 (1975: 50 %).<sup>1)</sup>

Furthermore, shortcomings apparently prevail which prevent demand to be more oriented towards needs. As a result, various discrepancies can be observed which tend to increase:

(i) Rising modern urban skylines contrast sharply with vast slum areas on the periphery of the cities. There large portions - sometimes up to 90 % - of the urban population for whom no decent residential environment can be provided at prices they can afford, are struggling to exist: "Cramped, crowded, and unsanitary settlements are the lot of low income families, conditions that debilitate their energy and reduce national productivity. Families in illegal favelas, tugurios, or bidonvilles constantly face the threat of eviction as well as scarcities of water, sewerage and transport. Often under the banner of slum clearance, low income groups are removed to higher quality dwellings located far from income-earning opportunities and asked to pay rents they cannot afford".<sup>2)</sup>

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1) UN, World Population Trends and Policies, 1981, Monitoring Report, Vol. I, p. 148.

2) Grimes, O.F., Jr., Housing for Low-Income Urban Families, Economics and Policy in the Developing World, A World Bank Research Publication (Washington D.C., 1976), p. 4.

On the other hand, modern and luxury commercial, industrial, and administrative buildings are being erected in the centres of the capitals and other big cities, while a few high-standard, luxury residences are being constructed in selected suburbs.

(ii) Few broad, well-illuminated multilane roads contrast with the deplorable conditions of the road network in general. Lack of or badly maintained rural access roads hinder the

commercialization of agricultural products. Outside the islands of mechanized agricultural estates producing for export, rural, technical, and social infrastructures, such as wells, which could be constructed relatively cheaply, remain undeveloped. This contributes to the rural exodus and increases the need for public works in the urban areas where construction is more expensive.

(iii) With the exception of some advanced developing countries, little development is taking place in the domestic construction and construction materials industry, i.e. the supply side. Rather, during construction booms in the modern sector of the Third World cities, large foreign, usually well organized, companies gain the lion's share of public and private contracts. This leads, inter alia, to the application of capital-intensive and often ill-adapted technologies, to considerable imports of expensive construction materials and equipment, and finally to an indifference towards utilization of domestic resources.

(iv) Supporting facilities such as specific government services (e.g. legislation, regulations, standards) financial institutions, design engineering, construction and building materials research are either not existing or ill-adapted to local resources and requirements.



All these factors and trends reveal a growing disparity between basic human needs of the mass of population and the effective demand of government, the wealthy minority, and foreign investors for construction projects. A similar disparity can be observed between the development potential of the domestic construction industry and policies which encourage foreign involvement in this sector. This raises the questions: Who plans? Who decides on what is being constructed? What is the planning machinery like?

These disparities are largely the result of government policy-making, planning machinery, and administration which can be classified as follows:

(i) Demand-oriented, short-run resource allocation. The planning process is relatively well organized and functions to the satisfaction of the politicians, but the criteria for decision-making are effective demand and the profitable allocation of resources in the short run.

(ii) Basic needs targets not implemented. Targets for the satisfaction of basic needs have been clearly set but the planning and organization machinery is technically inadequate and has not the necessary political and economic power to implement these targets.

(iii) Vague planning targets easily circumvented. Planning targets (basic needs) are not conceived and/or formulated in a clear and consistent manner in order to prevent misleading interpretations. This makes it even easier for planning targets to be impaired by the vigorous efforts undertaken by individuals and pressure groups to protect their interests.

Although in Third World countries there may be empirical evidence for each of these three types, the third one seems to offer the best explanation for the planning performance in the construction sector.

Irrespective of these internal bottlenecks of structural underdevelopment and home-made constraints which basically refer to discrepancies between growing (basic) needs and restricted effective demand and available resources, external factors have been affecting construction development in both developed but moreover in developing countries. Oil price shocks levied high burdens on foreign trade balances of oil-importing countries thereby generating massive resource transfers to oil exporting countries. In particular the vulnerable economies of poorer countries and others which had been relying on high foreign loan financing had to face adjustment policy requirements which they were hardly capable to cope with. Moreover, the lasting world-wide recession reduces the absorptive capacity of industrialized countries for both raw materials' and industrial goods' exports from the Third World. In addition, many developing countries have to face declining world market prices resulting in unfavorable terms of trade. This altogether was leading to a fast exhaustion of foreign currency reserves, to increased international borrowing and finally to the actual exorbitant indebtedness. This evolution was and still is further aggravated by two factors. First, many government did not pay duly attention to the crisis by underestimating its strength and duration. They continued by keeping relatively high public investment levels and further borrowed abroad up to hardly manageable ceilings to pursue deficit spending. Second, US high interest rate policies together with unfavorable exchange rate tendencies are levying further burden on debt service payments.

Particularly affected by this evolution are advanced oil importing economies such as Brazil, Mexico and Turkey, but also a number of poorer countries. The impact on developed countries consists mainly of increasing government debts, a

slowing down of production, and a draw back of investment and housing construction due to high interest rates. Centrally planned economies apparently are less touched by these specific external events.

Although some of these international problems such as the high oil price and indebtedness have been alleviating due to the oil glut, debt rescheduling and new IMF financial facilities and also many observers are already voicing a recovery of the world economy, others are less optimistic by stressing those constraints which will have a structural bearing and are requiring longer term adjustment policies.

In response to their high indebtedness, many developing countries are forced to pursue austerity policies - strongly advised and imposed by the IMF - the principal elements of which are:

- strengthening of exports which in a situation of restrained world markets will be difficult and hence may exercise high pressures on domestic market prices and resources;
- abandonment of deficit spending policies and further shrinkage of public expenditure which in many countries may force governments at least in short terms to give up employment supporting subsidies to public enterprises and other services and to reduce investment programmes;
- introduction of higher prices for agricultural products and of further measures to promote this sector which, on the one hand, may stimulate productivity and capital accumulation there but, on the other, will charge the food balance of the poor and unemployed in the urban areas;
- liberalization of imports of goods and foreign private capital with the purpose to reinforce competitiveness and productivity of domestic production, the achievement of which will depend on the entrepreneurs' possibilities to cope with these pressures; otherwise they will be ousted.

These policies, in fact, assume sound and vigorous economic structures in developing countries and their success will depend on the capabilities of enterprises and governments to meet the requirements and to establish an appropriate and effective implementation machinery even if the national socio-economic environment and attitudes are not very receptive.

Some countries will have less problems to introduce such policies because either they have so far already pursued same or similar strategies such as the newly industrializing countries in South-East-Asia or they seem to be ready for such changes. Others, however, may face enormous difficulties to orient themselves towards the international division of labor and to adjust accordingly their domestic economic structures. Mainly because of their high indebtedness for which they are largely but not exclusively responsible, many countries, however, have in fact little or no choice at all. Due to the often enormous volume of foreign debts, such policies cannot be short sighted but have to be conceived as long term.

These world-wide economic and political trends of the past ten years pointed out above have a considerable impact on construction and building materials development keeping in mind the important construction component in gross fixed capital formation.

Two factors should be considered in this context: First, on the demand side, construction is a dynamic element in development because of its growth stimuli to other sectors. But, on the other hand, construction investment has per se a high capital output ratio and consequently draws heavily on scarce financial resources. If built structures being over-dimensioned or not effectively used this ratio is climbing up even further. Their effects, on the supply side therefore, depend on appropriate design and degree of productive utilization. Many cases, however, suggest that this aspect has not been paid due atten-

tion with the consequence of large amounts of investment mis-directed.

Second, usually construction investment in particular as far the private sector is concerned is a very sensitive indicator for both short term up-swings and down-swings in the business cycle and for medium to long term development prospects. Looking at the construction growth of the sixties and seventies, one would argue that only developed countries anticipated the world economic situation and outlook. Admittedly accelerated construction growth in the Third World was mainly supported by the benefitting oil exporting countries. But also other countries continued to invest large capitals in this sector although economic trends would have suggested lower profiles. The combination of streamlined interests between development oriented governments and loan-expansion policies of international financial institutions overruled the mechanism of construction being a sensitive indicator for changing economic prospects. Adjustments were not alerted in time and postponed because foreign borrowing somehow served as a buffer-stock. In the course of negative factors further accumulating (second oil price shock, high interest rates), the system is approaching collapse. In fact, the bill is drawn on the future. Remedy policies will require for some time depending on their success the more productive use of existing capital instead of new investments e.g. in construction.

These circumstances have to be taken into account when scenarios are ventured for prospecting construction development. Notwithstanding the huge needs for construction in the Third World there will virtually be a hard-shell hedge to keep effective demand in custody of available resources.

C. General Long-Term Prospects for the Development of  
Construction and Building Materials Industry

Irrespective of the prospects for the recovery of the world economy, the evolution of world market prices particularly oil prices and interest rates and of international debt arrangements some visualization can be purported as to the future construction needs and demand by country groups and types of works.

As far as developed market economies are concerned the declining trend of the ratio construction investment to gross fixed capital formation and gross domestic product observed since the sixties<sup>1)</sup>, very likely will continue in the future for two reasons: First, on the one hand, basic infrastructures have been set up during earlier stages of economic growth and transport infrastructures and urban systems are relatively developed nowadays. On the other hand, the average annual rate of population growth has dropped from 1,2 % (1960-65) to 0,7 % in the early eighties and is expected to reach 0,5 % at the end of this century; in Western Europe stagnation has practically occurred already. Therefore, a certain saturation of infrastructure and housing requirements can be anticipated.

Second, in maturing industrialized economies, the investment in machinery and equipments being necessary to create an additional industrial employment unit is increasing. Moreover, mechanization continues to spread over many fields. Even if reduction and other forms of labor employment as well as alternative life styles will gain momentum this will hardly affect the above trend.

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1) See Table A-2 and Ifo-Schnelldienst, 36. Jgg., No. 12, München, 25. April 1983, p. 1.

Within construction itself, industrial and commercial building and housing may increase their share at least in the near future whereas civil engineering may lose importance.<sup>1)</sup> In addition to the general perspective, this structural outlook will negatively influence the construction machinery sub-sector supplying predominantly capital intensive public works. On the other hand, building materials industry and labor intensive building crafts will relatively benefit from this situation in particular if energy conservation efforts are taken into account. This applies as well to rehabilitation and up-grading of old building structures and self-help activities within the shadow economy becoming more attractive.

In developing countries the satisfaction of the enormous construction needs will increasingly face resource constraints. The declining trend-following the peak of construction and gross fixed capital formation growth in the middle of the seventies when their rates doubled those of GDP will likely continue thus bringing growth rates closer to each other. The ratio of GFCF to GDP may stabilize at the 26 % level or even slightly decrease.

Despite the slow-down of development booming in oil-exporting countries construction growth will be higher there than in other areas and further attract foreign contractors originating more and more from developing countries such as South Korea, Turkey, Pakistan, India, Malaysia, and the Phi-

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1) For the Federal Republic of Germany this is suggested by: Volker Rußig, Europas Bauwirtschaft erholt sich nur langsam - Mittelfristige Aussichten bis 1985 - in: Ifo-Schnelldienst, op.cit., pp. 12-14. Despite slow population growth housing construction may increase due to high elasticities for housing demand related to income and because of the growing number of households. Average size of household in ten industrialized countries is estimated to decline from 2,75 to 2,6 persons by the year 1990.

lippines.<sup>1)</sup> The oil-rich Middle-East and the fast industrializing East and South East Asian countries will be the growth poles for future construction. Oil-exporting and semi-industrialized countries in Latin America and in the Mediterranean will further support construction in the Third World. Tropical Africa, however, except a few countries, very likely will lag behind although it is the poorest and in great need of housing and infrastructure.

According to research work, in the Third World, the building and construction component in gross fixed capital formation was estimated at 54 % whereas machinery and equipment counted for the rest (46 %) in the early seventies.<sup>2)</sup> There may have been a slight increase of the former by the late seventies and early eighties, but little can be said whether and to what extent this structure might change in the future. In pursuance of austerity policies towards strengthening the utilization of existing production capacities, recommended and postulated by international organizations such as World Bank and IMF, investment in machinery and equipment may gain momentum following the trend observed in developed market economies. But the question remains open in particular with respect to housing how far this will be feasible in the light of the prevailing economic, social, and political environments.

In the early seventies, 40 % of construction investment was spent in residential building (housing), 22 % in other building and 38 % in civil engineering.<sup>3)</sup> In fact, this distribution has led to an increasing gap between housing supply and need due to the fact that the large number of unemployed and low income earners could not be satisfied at market terms.

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1) Construction contracts received for instance by German contractors from abroad declined 1982 by 30 %, *Bauwirtschaft*, Heft 18, 5th May 1983, p. 698.

2) Jürgen Riedel, Siegfried Schultz, *Bauwirtschaft und Baustoffindustrie in Entwicklungsländern*, Ifo-Studien zur Entwicklungsforschung Nr. 3, München 1978, pp. 19, 236.

3) *Idem*.



According to World Bank data of 1975, between 30 % and 80 % of the population living in large Third World cities could not afford the cheapest dwelling offered on the market.<sup>1)</sup> This situation very likely has aggravated in the meantime and future outlook is even worse if population and urbanization forecasts - as outlined in table 7 - are taken into account. Notwithstanding long term moderating growth trends, population pressures particular in the urban areas will force governments to set forth rigorous policy measures. Even if decentralization and rural development will be encouraged low cost housing policies and public investment in urban water supply and sewage as well as transport, communication and social infrastructure will rank on top of the agenda. On the other hand, the promotion of agricultural production will have as precondition capital expenditure in irrigation and feeder roads. Trade offs between rural and urban construction priorities depend on resource conditions prevailing in individual countries and on the facilities of governments to successfully implement decentralization policies. Taking into consideration actual financial (public) resource constraints, stronger emphasis is likely to be placed on rural construction for various reasons: First, works i.e. per capita construction investments are less expensive in rural than in urban areas. Second, better conditions exist for the use of local building materials, less sophisticated and import-saving building techniques and cheap labor. Third, more adequate use can be made of cooperative, self-help, and co-financing programmes discharging government funds.

In many countries, particularly in those where food supply shortages already exist, crop and animal production can be

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1) World Bank, Housing: Sector Policy Paper, Washington 1975.

Table 7: Population 1980 and 2000 and Average Annual Growth Rates (medium variant) by Region

Region	in billions		Total Population				Urban Population			
	1980	2000	Average Annual rate of growth		Average Annual rate of growth		Shares		Average Annual rate of growth	
			1980-85	1985-90	1990-95	1995-2000	1980	2000	1980-85	1985-2000
World Total	4,4	6,1	1,70	1,65	1,60	1,50	41,0	51,0	2,8	2,8
More developed region	1,1	1,3	0,68	0,61	0,58	0,48	70,9	79,4	1,3	1,1
Less developed region	3,3	4,8	2,04	1,98	1,89	1,77	30,7	43,7	4,0	3,7
Africa	0,5	0,9	3,00	3,02	2,99	2,90	28,8	42,2	5,8	4,6
Latin America	0,4	0,6	2,38	2,28	2,15	2,02	64,7	75,1	3,6	3,1
East Asia	1,2	1,5	1,24	1,20	1,09	1,02	32,7	45,1	2,7	2,7
South Asia	1,4	2,1	2,17	2,02	1,90	1,72	24,8	37,1	4,3	4,2
Oceania	0	0	1,44	1,36	1,29	1,19	75,7	82,6	2,0	1,7
Europe	0,5	0,5	0,34	0,30	0,27	0,24	70,5	78,4	1,4	1,1
North America	0,2	0,3	1,04	0,95	1,05	0,70	73,7	80,7	1,4	1,1
USSR	0,3	0,3	0,93	0,84	0,70	0,64	64,8	76,0	2,0	1,5

Source: United Nations, World Population Trends and Policies, 1981 Monitoring Report, New York 1982, Vol. I, pp. 30, 148, 150.

brought up relatively easy if appropriate price policies are set up. Indirectly, these employment and income creating measures affect positively the numbers of jobs in urban areas through their impact on the demand for industrial products. Industrial wage incomes then would benefit and partly be spent for private housing. There is some evidence that such policy considerations increasingly gain momentum and will if vigorously implemented affect construction priorities in the Third World. On the other hand, increasing scepticism and hesitating attitudes are expressed at least by financial institutions, and bilateral and multilateral aid agencies with respect to big projects in the field of dams, roads, harbors, airports, government buildings. To sum up, it can be argued that construction in the Third World will increasingly focus on small and medium sized projects being linked to local resources and mass demand and consuming less capital and foreign resources. This applies in particular to oil importing countries which have not yet achieved an advanced level of industrial production and exports and the more to all low income countries. This may imply an expanding share for housing estimated previously at 40 % of total construction investment at the expense of other building (22 %). The share of civil engineering (38 %) might remain constant or slightly decline but small and medium works very likely will substitute for larger projects at least in the near future and in the poorer countries.

D. Scenarios up to 1990 and their Implications on Policy  
Adjustments

There is empirical evidence that construction develops in line with growth of GDP because this sector - apart from its contribution to national product - is both stimulating development in other sectors and affected by the growth in other sectors mainly through construction investments.<sup>1)</sup> The most significant exogenous variable for a construction forecasting model is the gross domestic product. In addition, population trends together with the number of households are used to predict housing construction.<sup>2)</sup> The accuracy of prediction can be improved if the forecast is separately made for individual subsectors such as road construction, other civil engineering, public building, agricultural construction, residential building and building in the industrial and service sector.<sup>3)</sup>

So far, however, global model systems allow forecasting for the aggregated construction sector only. Since more precise prediction methods do not exist for the construction sector at present - this may constitute a task for future research work - for the time - being scenarios on future construction are suggested to be linked with global forecasting models. Various attempts have been made to model possible and probable development paths.

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1) Though this correlation being in general rather close and stable leaving aside short term oscillations the share of construction in GDP depends on the level of development, measured in per capita income. It is rather low in the very poor countries before it accelerates in the middle income country group. In threshold and developed countries, it stabilizes slightly higher up the scale. - Jürgen Riedel, Siegfried Schultz, op.cit., pp. 6-18.

2) Tamás Görhely, Methoden der IFO-Bauvorausschätzung, Ifo-Institut für Wirtschaftsforschung, München 1980, p. 54.

3) Idem, p. 51.

The usual approach is to answer questions such as: What will happen if past trends continue or if alternative targets are to be achieved under alternative hypotheses? In this sense, scenarios are meant to test the consistency of quantitative scenarios and to point out consequences either of continuing past trends under ceteris paribus conditions or of set up targets.

Model makers emphasize that "most certainly, the results should not be identified as forecasts, not even of a very broad nature. They are conditional projections providing a set of consistent results for the target year given the projected values of the exogenous variables. Whether they are optimistic or pessimistic, plausible or implausible, desirable or not, will largely depend on the accuracy of the exogenous predictions as well as on the specification of the model itself".<sup>1)</sup>

This cautious attitude, however, cannot turn away the fact that attempts are made to incorporate reasonable values of exogenous variables in those models. Fair enough, the understanding of what is reasonable remains open to dispute on the when, how and where of change in particular when the world economy undergoes difficult periods with important structural changes where little can be said about its future recovery. Thus, there can be no doubt that in particular nowadays any scenarios formulation has to be interpreted with extreme precaution.

The following scenario formulation refers to the UNITAD-Projet, a world modelling system established by UNIDO in cooperation with UNCTAD and assisted by international experts.<sup>2)</sup>

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- 1) UNIDO, The UNITAD System - 1981 Report, World Modelling Working Paper (UNIDO/IS.337), Vienna, 7 September 1982.
  - 2) For the characteristics of this system see: UNIDO, The UNITAD System - 1981 Report, World Modelling Working Paper (UNIDO/IS.337), Vienna, 7 September 1982.

In its 1981 Report, the UNITAD Project has provided a sample of overall results containing three scenarios for the development of the world economy up to 1990. One of them is based on past trends - "trend scenarios" (T) as perceived in the 1980 report whereas the other two (IDS 1 and IDS 2) are related to the International Development Strategy for the Third United Nations Development Decade adopted by the General Assembly in December 1980. The two IDS-scenarios differ essentially by alternative sets of assumptions on trade and agricultural policies, but are identical with respect to GDP growth. Table 8 outlines average annual GDP growth rates for the individual scenarios.

The trend scenario shows declining growth rates compared with the GDP performance between 1963 and 1975 for all regions which reflect decelerated developments in the early seventies. Under IDS 1/2 assumptions, however, economic growth will recover - particularly in the eighties, i.e. they take into account the world-wide economic recession in the second half of the seventies and assume a turning point rather early in the eighties. This applies to all regions with varying degrees. It is, however, further expected that the Developed Regions including East and South East Asia will not achieve again the same economic dynamism as experienced between 1963 and 1975.

As far as the contribution of individual sectors to GDP is concerned assumptions have been determined for sector growth elasticities by regions. In addition to construction and investments elasticities, table 9 outlines indicators for basic products including among others building materials and capital goods which contain as well construction machinery and equipment. The results show that opposite to trends in developed regions in the Third World, construction relevant sectors will generally grow less than GDP. Exceptions are basic products and investment as the Indian Sub-Continent, capital goods in Latin America and construc-

Table 8: Average Annual Growth Rates of World - GDP for the Period 1975-1990 Under Alternative Scenario Assumptions by Region

	1963-75 (actual)	1975-90 T IDS1/2 <sup>a)</sup>		1980-90 IDS 1/2
<u>Developing regions</u>	...	...	...	7,0
- Latin America	6,1	5,5	6,3	7,0
- Tropical Africa	4,5	3,7	4,8	5,5
- North Africa/West Africa	7,0	5,9	7,8	9,3
- Indian Sub-Continent	3,6	3,5	5,0	5,6
- East and South-East Asia	7,2	6,0	7,0	6,8
- Total Developing Market Regions	5,7	5,2	6,3	...
- Centrally Planned Economies (Asia)	6,0	6,0	6,0	6,0
<u>Developed Regions</u>	...	...	...	3,5
- North America	3,7	2,6	2,9	...
- Market Economies (Europe)	4,5	3,0	2,9	...
- Japan	8,9	4,9	5,9	...
- Other Developed	5,0	3,5	4,5	...
- Total Developed Market Regions	4,5	3,0	3,3	3,3
- Centrally Planned Economies (Europe)	6,7	4,0	4,0	4,0

Source: UNIDO / IS.337, op.cit., pp. 72, 76.

Table 9: Sector Growth Elasticities under Scenario IDS 1 Conditions<sup>a)</sup>

	Basic products	Capital goods	Construction	Investment
<u>Developing Regions</u>				
- Latin America	0,9	1,0	0,9	0,9
- Tropical Africa	0,6	1,35	0,6	0,6
- North Africa/West Africa	0,95	1,4	0,9	0,95
- Indian Sub-Continents	1,0	0,9	0,9	1,0
- East and South-East Asia	0,7	0,85	1,0	0,95
<u>Developed Regions</u>				
- North America	0,9	1,15	1,0	1,1
- Market Economies Europe	0,9	1,1	1,2	1,2
- Japan	0,9	0,8	1,1	1,1
- Other Developed	1,0	1,2	1,1	1,1
- Centrally Planned Economies Europe	1,0	1,1	1,4	1,5

a) Impact of a 1 % GDP growth of region R, on economic variables of the same (fixed growth rates for all other regions).

Source: UNIDO / IS.337, op.cit., p. 142.



tion in East and South-East Asia which will equalize GDP and capital goods relatively accelerating in Tropical Africa and North Africa/West Asia. By multiplying sector elasticities with GDP data average annual growth rates can be computed for the construction relevant sectors (see table 10).

The results of IDS Scenarios show that despite relatively low sector growth elasticities the development of construction and related sectors will be generally faster in the developing than in the developed regions due to higher growth rates of GDP. Exceptions in the former group are Tropical Africa and to a certain extent the Indian Sub-Continent. On the other hand, Japan and also somehow the Other Developed Countries and the Centrally Planned Economies of Europe will be less affected by slower growth than North America and the Market Economies of Europe. Among Third World countries, the North African, West Asian and the East and South-East Asian region will continue to be the growth areas of construction and related activities.

These conclusions seem quite reasonable as to the regional growth differentials. Some reservations, however, should be made with respect to the size of the rates in absolute terms. Apparently, IDS anticipated a further world-wide economic recovery following the first oil shock. In fact, however, the recovery period 1975-79 was interrupted by the second oil shock 1979-82 which obviously provoked a deeper crisis. Thus, the actual short and medium forecasts up to the late eighties do not look as bright as assumed by the IDS-scenarios. Developing countries average annual GDP growth rates following a drop from 5,8 % (1960-73) to 4,6 % (1973-80), and a further decline to 3,3 % (1980-82) are now forecasted for instance by Wharton Econometric Associates<sup>1)</sup> at 4,2 % (1982-87) and at 4,5 % and 5,7 % (1980-90) depending

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1) Quoted from: Samuel Brittan, A Very Painful World Adjustment, in: Foreign Affairs, Vol. 61, Nr. 3, 1983, p. 563.

Table 10: Average Annual Growth Rates of World Construction and Related Sectors for the Periods 1975-1990 and 1980-1990 under IDS Scenario Conditions

	Basic Products		Capital Goods		Construction		Investment		
	1975-90	1980-90	1975-90	1980-90	1975-90	1980-90	1975-90	1980-90	
<u>Developing Regions</u>									
- Latin America	5,7	6,3	6,3	7,0	5,7	6,3	5,7	6,3	
- Tropical Africa	2,9	3,3	6,5	7,4	2,9	3,3	2,9	3,3	
- North Africa/West Afr.	7,4	8,8	10,9	13,4	7,0	8,4	7,4	8,8	
- Indian Sub-Continent	5,0	5,6	4,5	5,0	4,5	5,0	5,0	5,6	
- East and South East Asia	4,9	4,8	6,0	5,8	7,0	6,8	6,7	6,5	
<u>Developed Regions</u>									
- North America	2,6	...	3,3	...	2,9	...	3,2	...	
- Market Economies Europe	2,6	...	3,2	...	3,5	...	3,5	...	
- Japan	5,3	...	4,7	...	6,5	...	6,5	...	
- Other Developed	4,5	...	5,4	...	5,0	...	5,0	...	
- Centrally Planned Economies Europe	4,0	...	4,4	...	5,6	...	6,0	...	

Source: Tables 8 and 9 and own calculations.

on different scenarios by the World Bank.<sup>1)</sup>

This only allows two thirds to four fifth of the Third World's GDP growth anticipated by the IDS. For the Developed Market Economies, the corresponding forecasts are 3,0 % (Wharton) and 2,8 % to 3,6 % (World Bank) i.e. 80 % to little more than 100 % of the IDS Scenario. Hence, the IDS outlook nowadays appears to have been too optimistic and it can be argued that the growth of construction and of related activities in the building materials and construction machinery industry will be lower than assumed in the IDS Scenarios. This applies in particular to developing countries thus also affecting the regional growth differentials.

In the light of the enormous indebtedness and the deterioration of terms of trade prevailing in developing countries and the continuing world-wide economic recession with a high dollar exchange rate and interest rates even the actual forecasts may rule out to be still too optimistic and will have to be adapted downwards in the near future.

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1) World Bank, World Development Report 1982, Washington 1983, pp. 9,39.

E. Requirements for Adjustment and New Policies

The structural weaknesses of the construction and building materials sector prevailing in many Third World countries as outlined in chapter B and the still on-going world-wide economic crisis require structural adjustments and new policies to strengthen the productivity of the construction itself and the related industrial sectors as well as to improve the efficiency of policy formulation and implementation. While in developed countries the principal issue will be the adaptation of existing capacities to declining demand the spectrum of targets in developing countries is much wider and requires, therefore, a multifaceted and coordinated approach. In view of developing countries high indebtedness particular emphasis is assigned to foreign currency saving measures.

In many low-income countries as a first development step a domestic construction and building materials industry still has to be created or - where a nucleus already exists - to be further promoted. In others, more advanced countries, construction equipment and machinery industries as well as architectural and engineering design capabilities need to be strengthened. Depending on the level of development of individual countries, the following targets may attract different priorities: In nearly all developing countries, the marriage of needs for urban housing and rural infrastructure with financial resources and construction supply capacities constitutes a primary development objective. In this context, the development or strengthening of a domestic construction and building materials industry could constitute a prominent issue and target within a reorientation of government policy. Apart from general national policy considerations, a more intensive reliance on domestic resources will be required in the future to cope with the changing pattern of construction and building materials demand.

In the past ten years, few efforts have been made in many developing countries to explore and to develop domestic resources such as local building materials, home-made construction technologies, domestic skills and entrepreneurial capabilities. Their development and productive use, however, could alleviate problems of lagging economic growth. Smaller and scattered works in rural areas, executed by local resources would create the necessary infrastructure to diminish the deepening food dependency. This together with the application of less sophisticated and expensive but more appropriate technical standards would considerably reduce the import component of construction cost and the drain on public investment funds, thus diminishing the pressure on external payments and domestic fiscal imbalances. Finally, positive effects might be expected in terms of employment creation and income distribution. In many poorer countries, particularly in Africa, such expectations can only be fulfilled if the actually employed foreign resources can be substituted by domestic ones. Studies undertaken in Africa, however, reveal that actually the scope of substitution is still rather limited albeit by far not exhausted.<sup>1)</sup> Hence, efforts to strengthen the domestic construction and building materials industry should concentrate first on the better employment of the existing domestic capacities and capabilities and second on the long term development of the industry's potential.

According to research findings major constraints to any promotion of this industry lie in governments' lack of awareness of the multifaceted characteristics of the sector's development. There seems to be a wide-spread belief that the industry will already develop if some training courses and technical assistance are provided. Past experiences, however, have supplied

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1) Using various assumptions, import savings of 810 Mill.US-\$ were estimated under the hypothesis that construction in Africa were executed exclusively by domestic contractors in 1980. See Annex A-6.

enough evidence that strengthening a domestic construction and building materials industry requires a comprehensive and well coordinated approach covering aspects which range from public construction programming to imports of equipment and materials, from construction legislation to the training of various skills. In view of these lessons, it is time to consider a new and orchestrated approach to facing the problems experienced which impede upon the development of a domestic construction industry.

Such an approach will in the first instance depend on national governments, who if keen to encourage the creation of an efficient industry, must understand that construction is a key economic sector. Its gradual and productive emergence will make indispensable a public commitment to implement the necessary measures (legal, organisational, administrative, financing etc.) and to coordinate their application. This suggests that one government department must be officially designated to provide coordination for the different activities intended to assist the development of the domestic construction and building materials industry. These activities will be undertaken by the government, by private firms, by aid agencies and, possibly also by foreign contractors and consultants and should be integrated and mutually supportive.

One principal focus of attention is a coherent and careful planning of demand and supply of construction and building materials. This applies first at an aggregated level to the balancing of construction work load demanded and the productive capacities of the industry to fulfil this demand. Second, with respect to aspects of time and scheduling, coherent planning means the ascertainment of a smooth and continuous demand for construction output. Third, at individual project levels coherent planning comprises considerations on how and to what extent the nature and technical requirements of individual projects

could be adapted to the capabilities of the domestic construction industry without being detrimental to the technical and socio-economic functioning and to security requirements of the constructed facility. This imposes a government decision making on values of alternative technical solutions, thus a first step towards a technology policy in the field of construction.

A well-functioning coherent planning system not only guarantees a satisfaction of construction demand, but is, moreover, basic to entrepreneurial decision making on investments and other dispositions not only of the construction industry but also of related economic sectors such as building materials industry, import trade, banking etc. To establish an efficient planning machinery, on the other hand, special efforts are required as inputs, among which are particularly important (i) to improve the programming, organizational and managerial capacities and capabilities of both the public sector (departmental forces and parastatal institutions) and the private sector (contractors); (ii) to establish or strengthen existing professional associations in order to create a platform for small and medium contractors to express and defend their interests. In the light of the dominating position of public authority, particular emphasis should be placed on training and technical assistance programs for domestic contractors.

Since financial shortcomings appeared to be in the past a major constraint for the development of domestic contractors, governments should take appropriate measures to improve the access to financial facilities of this industry for the provision of bid, performance and maintenance bonds as well as for working and equipment capital. Due to the facts that commercial banks are reluctant to finance "new-comers" with insufficient securities and that the construction process contains particular risks, the financial aspects deserve very careful analysis and evaluation. In this connection, governments should also consider con-

tractual payments' procedures and the implications of disbursement delays.

In many country-specific construction surveys the need for manpower training, in particular of middle-level personnel, has been stressed. The lessons of the past have provided evidence that institutionalized training resulted in unexpected low benefits and preference might be given to on-the-job training.

There is, in general, a wide range of issues which are relevant and may constitute constraints to the development of a domestic construction industry and the importance of which may vary from country to country. Issues such as construction legislation, standards and specifications, project design, consultancy business, contractual procedures and procurement practices, settlement of disputes, slice and packaging rules for public contracts, prequalification systems, joint venture policies, project supervision by public authorities, import procedures for equipment and building materials, fiscal measures, equipment pooling and leasing, building materials industry and supply markets, credit customs, etc. are to be considered. Since this variety of aspects and factors belong to different disciplines within the sectoral structure and administrative patterns, the establishment of a policy to strengthen the domestic construction and building materials industry is a extremely complicated task and recommends a sophisticated and orchestrated approach. A thorough analysis seems to be indispensable to identify problem areas and to determine an appropriate and systematic sector policy on construction in general and on the strengthening of the domestic construction and building materials industry in particular.

In line with the recommendations for a new orchestrated approach as outlined above, bilateral and multilateral donor agencies may play an important role. Due to the complexity of this task, how-



ever, a fundamental prerequisite for any kind of assistance, should be a firm commitment from the side of the recipient country (government) towards a systematic approach. Otherwise, as experiences sufficiently evidenced, donor programs would risk either to completely fail or at least to be delayed and not yielding the expected benefits. On the other hand, donor agencies need to realize that isolated and partial approaches like previously conceived can hardly be expected to produce a substantial breakthrough in this field.

Donor agencies could serve as agents of innovation, as sponsors for model operations in selected countries and as advisors and sources of financial and technical assistance. With regard to their role of innovation, agencies should (i) expose the multi-sectoral nature of the development process of domestic construction and building materials industry, (ii) conceive consistent and operational strategies for strengthening private and public sector elements simultaneously, (iii) elaborate intervention programs covering the entire range of issues with the aim to serve as guidelines for operational staff in donor agencies' and national governments' administrations, (iv) formulate the various functions and responsibilities which the different acting parties should assume in the proposed orchestration of efforts.

Table A-1: Annual Annual Rates of Growth of Gross Domestic Product, Industrial Activity, Manufacturing, Construction and Gross Fixed Capital Formation at Constant Prices, 1960-1978, by World Regions

	1960-65	1965-70	1970	1971	1972	1973	1974	1975	1976	1977	1978
<b>World</b>											
GDP	5,8	5,6	4,8	4,6	5,8	7,7	1,5	0,3	5,8	4,2	3,9
Industrial Activity	6,8	6,5	4,5	4,0	6,8	8,8	1,5	-0,9	7,4	5,5	4,6
Construction	5,7	4,6	2,8	3,9	5,1	3,9	-0,2	0,4	2,8	3,0	2,9
<b>Developed Market Economies</b>											
GDP	5,3	4,9	3,6	3,6	5,5	6,2	0,6	-0,5	5,2	3,7	3,3
Industrial Activity	6,3	5,4	2,7	2,6	6,3	8,6	-1,5	-3,7	8,0	5,5	4,5
Manufacturing	6,7	5,7	2,5	2,4	6,9	8,9	-1,2	-4,9	8,1	4,6	3,6
Construction	6,2	3,7	1,4	2,8	4,3	2,9	-3,4	-3,2	0,8	1,6	2,2
Gross Fixed Capital Formation	7,5	5,4	4,0	4,7	6,8	7,2	-4,5	-5,6	3,5	4,0	4,5
<b>Developing Market Economies</b>											
GDP	5,5	6,3	6,7	6,5	6,2	8,0	6,3	3,9	6,4	5,8	4,3
Industrial Activity	8,6	8,8	9,0	6,2	8,7	10,0	5,8	-0,3	7,4	4,9	4,9
Manufacturing	6,7	7,9	8,1	8,4	8,9	10,8	6,7	3,6	8,0	5,2	6,7
Construction	4,9	7,2	4,5	6,2	8,9	8,1	7,4	14,4	11,7	9,3	6,5
Gross Fixed Capital Formation	5,6	8,5	5,9	9,2	8,2	9,1	10,8	14,9	9,8	9,0	10,6
<b>Africa<sup>1)</sup></b>											
GDP	5,3	5,9	5,8	5,6	4,0	4,2	7,3	2,6	7,7	5,5	3,8
Industrial Activity	18,7	12,2	7,5	-3,5	4,9	4,4	-0,5	-5,1	13,0	7,0	3,4
Manufacturing	7,4	7,4	8,6	3,3	7,3	11,3	6,3	-1,4	8,2	6,9	7,0
Construction	2,2	5,8	6,9	12,7	13,1	11,3	12,7	14,0	11,6	9,4	2,9
Gross Fixed Capital Formation	4,5	7,0	6,1	8,6	8,6	8,5	11,2	20,7	9,7	12,0	2,1
<b>Caribbean and Latin America</b>											
GDP	5,2	6,2	7,0	6,9	7,3	8,4	7,0	3,7	5,0	4,7	4,6
Industrial Activity	6,6	7,3	8,9	6,2	7,2	9,2	9,6	2,3	4,6	4,1	5,4
Manufacturing	6,0	7,7	8,8	9,6	9,4	10,3	6,5	2,5	5,8	3,4	4,7
Construction	2,8	9,0	6,9	8,0	8,6	8,2	7,2	7,9	6,5	6,7	8,0
Gross Fixed Capital Formation	3,7	9,4	7,0	10,8	7,5	10,5	9,6	9,3	3,5	3,1	7,3
<b>Asia, Middle East</b>											
GDP	7,9	8,1	8,4	11,6	11,5	10,7	7,6	2,2	8,8	6,2	2,0
Industrial Activity	9,1	9,6	10,8	11,4	12,4	12,6	4,6	-3,7	6,3	3,9	2,9
Manufacturing	9,6	11,4	7,5	11,2	11,1	11,2	9,5	8,8	11,5	9,3	8,1
Construction	9,2	6,0	2,7	6,4	10,7	11,9	6,4	25,7	18,5	9,6	5,8
Gross Fixed Capital Formation	7,0	9,3	4,5	10,6	15,3	10,7	18,3	27,1	21,6	13,2	16,1
<b>Asia, East and South East<sup>2)</sup></b>											
GDP	4,7	5,5	5,5	3,2	2,5	7,4	3,4	6,8	5,3	7,3	6,2
Industrial Activity	7,1	7,9	7,3	6,7	8,8	11,5	5,4	5,3	11,7	7,2	9,0
Manufacturing	7,7	7,3	6,6	6,6	7,6	10,9	5,4	5,9	11,6	6,6	10,2
Construction	7,9	6,2	1,8	1,1	6,7	1,8	4,5	15,0	11,6	11,5	7,7
Gross Fixed Capital Formation	9,6	7,4	5,5	6,7	4,8	5,8	5,7	9,4	9,1	11,5	17,0
<b>Centrally Planned Economies</b>											
Net Material Product	5,9	7,2	8,1	6,3	4,9	8,6	6,1	5,3	5,4	4,9	4,3
Industrial Activity	5,0	6,9	5,7	7,0	6,7	6,4	6,2	6,1	4,5	5,3	3,9
Construction	4,1	7,9	8,1	7,3	6,3	5,4	7,5	5,4	3,9	3,3	2,6

1) excluding South Africa

2) excluding Japan

Source: UN-Yearbook of National Accounts Statistics, 1979

Table A-2: Index Numbers of Gross Domestic Product, Gross Fixed Capital Formation, Industry, Manufacturing and Construction (1975 = 100)

	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977	1978
<b>Developed Market Economies</b>											
GDP	53	68	86	89	94	100	101	100	105	109	113
GFCF	50	71	92	97	103	111	106	100	104	108	113
Industry	51	69	89	91	97	105	104	100	105	114	119
Manufacturing	50	69	89	92	98	106	105	100	108	113	117
Construction	61	82	97	100	104	107	103	100	101	102	105
<b>Developing Market Economies</b>											
GDP	42	55	74	79	84	90	96	100	106	113	118
GFCF	31	41	61	66	72	78	86	100	110	120	132
Industry	33	49	75	79	86	95	100	100	107	113	118
Manufacturing	34	48	69	75	82	90	97	100	108	114	122
Construction	37	46	64	69	75	80	87	100	112	123	131
<b>Africa<sup>1)</sup></b>											
GDP	47	60	79	83	87	90	97	100	108	114	119
GFCF	33	43	58	63	68	74	83	100	110	123	126
Industry	29	58	101	97	102	106	105	100	113	121	125
Manufacturing	38	54	77	80	86	95	101	100	108	116	124
Construction	35	40	53	61	69	76	87	100	113	125	130
<b>Caribbean and Latin America</b>											
GDP	41	54	72	77	83	90	96	100	105	110	115
GFCF	34	41	63	70	76	83	91	100	103	107	114
Industry	36	51	72	76	82	89	98	100	105	109	115
Manufacturing	35	48	69	76	83	92	98	100	106	109	115
Construction	40	45	68	74	80	87	93	100	107	114	123
<b>Asia, Middle East</b>											
GDP	31	45	66	74	82	91	98	100	109	116	118
GFCF	21	31	47	52	60	66	79	100	122	138	160
Industry	29	45	70	78	88	99	104	100	106	110	114
Manufacturing	23	36	61	68	75	84	92	100	112	122	132
Construction	28	44	57	60	67	75	80	100	118	130	137
<b>Asia, East and South East<sup>2)</sup></b>											
GDP	50	61	79	82	84	90	93	100	105	113	121
GFCF	34	52	71	76	79	85	88	100	111	124	141
Industry	35	49	69	74	80	90	95	100	112	121	132
Manufacturing	35	51	70	75	80	89	95	100	112	121	133
Construction	40	57	70	77	80	82	86	100	113	125	135
<b>World</b>											
GDP	48	63	82	86	91	98	100	100	106	110	115
Industry	44	61	82	86	91	99	101	100	107	113	119
Construction	53	71	88	91	96	100	99	100	103	106	109

1) excluding South Africa  
2) excluding Japan

Source: UN-Yearbook of National Accounts Statistics, 1979

Table A-3: Index Numbers (1971-1980) and Average Growth Rates (1930/68) of Major Building Materials Production and Total Manufacturing by Country Groups / World Regions

Region	ISIC	1970 = 100						1975 = 100					Annual Growth Rate 1930/68
		1971	1972	1973	1974	1975	1976	1976	1977	1978	1979	1980	
World	3	104	112	123	127	126	137	108	113	119	124	125	4,6
	33	106	114	123	122	118	129	109	113	115	118	116	3,2
	36	106	113	123	127	126	136	108	112	117	122	122	4,5
	37	99	107	118	122	112	122	108	109	115	120	116	2,9
	29							107	113	113	121	119	4,0
Centrally Planned Economies	3	109	118	129	141	154	165	107	114	121	126	133	7,6
	33	107	113	121	128	138	144	105	111	115	116	118	5,5
	36	108	116	126	135	144	152	106	111	116	117	121	6,2
	37	106	112	119	126	135	146	106	109	114	115	119	5,0
	29							104	109	111	115	112	4,6
Market Economies	3	102	110	120	121	115	125	109	113	118	123	125	3,6
	33	105	115	123	119	111	123	110	114	115	119	116	2,7
	36	104	112	122	122	114	125	108	113	118	124	123	3,5
	37	96	105	118	120	102	112	109	109	115	121	116	2,2
	29							108	116	114	125	124	3,7
Developed Market Economies	3	102	109	119	119	112	122	109	113	117	123	122	3,3
	33	105	115	124	119	110	122	110	114	114	118	114	2,4
	36	104	111	120	119	109	119	108	112	117	123	122	3,1
	37	96	104	117	117	99	108	109	108	114	119	112	1,6
	29							105	109	113	120	119	3,3
Developing Market Economies	3	107	117	129	137	142	154	107	114	121	125	128	6,4
	33	110	116	118	120	120	130	105	114	118	123	130	4,4
	36	108	118	130	139	149	164	108	116	123	126	130	6,7
	37	106	118	123	136	142	158	108	117	126	138	143	6,3
	29							118	134	117	140	137	4,8
Caribbean, Central and South America	3	108	119	132	140	143	152	105	109	113	121	125	6,2
	33	112	122	130	136	137	151	99	105	108	116	124	4,0
	36	108	119	133	143	152	163	107	114	120	126	133	6,9
	37	110	124	131	145	147	160	103	115	123	136	142	6,9
	29							107	110	129	128	135	4,8
Asia <sup>1)</sup>	3	106	114	125	134	141	157	110	123	134	131	132	6,6
	33	107	109	101	100	98	104	114	129	132	132	134	4,3
	36	109	115	125	137	148	172	112	122	134	130	127	6,9
	37	98	107	105	121	135	164	119	123	135	146	146	6,6
	29							102	105	108	111	114	6,8

3 = Manufacturing  
 33 = Wood Products and Furniture  
 36 = Nonmetallic mineral Products  
 37 = Basic Metal Products  
 29 = Other Mining Products (including sand, stones, marble, clay, limestone, chalk etc.)

1) excluding Israel and Japan

Source: UN-Yearbook of Industrial Statistics, 1979 and 1980.

Table A-4: Shares of Developed and Developing Market Economies in World Imports and Exports of Major Building Materials Industrial Groups (in percentages)

	SITC	Developed Market Economies				Developing Market Economies			
		Imports		Exports		Imports		Exports	
		1970	1979	1970	1979	1970	1979	1970	1979
Wood rough	242	90,1	87,3	45,4	39,7	9,9	12,7	54,6	60,3
Wood shaped	243	89,6	90,1	85,0	80,8	10,4	9,9	15,0	19,2
Plywood veneers inlaid.	63121	93,2	79,2	64,4	50,2	6,8	20,8	35,6	49,8
Wood simply worked	6318	94,9	97,5	83,8	84,0	5,1	2,5	16,2	16,0
Builders woodwork prefab.	6324	88,4	71,7	96,5	87,1	11,6	19,3	3,5	12,9
Stone, sand and gravel	273	90,4	86,5	94,5	87,7	9,6	13,5	5,5	12,3
Ciment	6612	46,5	21,1	70,6	77,8	53,5	78,9	29,4	22,2
Clay, refractory building prod.	662	79,7	76,7	97,9	95,8	20,3	23,3	2,1	4,2
Glass	664	85,6	78,3	97,8	95,5	14,4	21,7	2,2	4,5
Iron steel primary forms	672	77,1	71,7	96,8	94,5	22,9	29,4	3,2	5,5
Iron and steel shapes	673	79,9	64,3	95,7	95,6	20,1	35,7	4,3	4,4
Iron steel universals plates and sheets	674	78,0	73,3	98,4	95,9	22,0	26,7	1,6	4,1
Steel, copper nails, nuts screws, bolts etc.	694	84,5	85,4	98,3	93,5	15,5	14,6	1,7	6,5
Pigments, paints	533	72,6	71,9	96,2	96,7	27,4	28,1	3,8	3,3
Total	6 + 8 0 - 9	83,0 81,0	77,6 77,9	88,1 80,2	85,7 72,9	17,0 19,0	22,4 22,1	11,9 19,8	14,3 27,1

Source: UN-Yearbook of International Trade Statistics, 1979.

Table A-5: Central Government Expenditure on Housing and Roads as Per Cent of Total Expenditure

	1974	1975	1976	1977	1978	1979	1980
<u>Housing</u>							
World	2,36	2,36	2,32	2,31	2,44	2,47	2,48
Industrial Countries	2,41	2,38	2,27	2,31	2,49	2,45	2,50
Oil Exporting Countries	3,24	3,38	4,64	3,66	2,40	3,04	...
Non-Oil Developing Countries	1,69	1,80	1,88	1,85	2,03	2,38	2,38
- Africa	0,91	1,36	1,32	1,19	1,43	1,30	2,04
- Asia	1,78	2,16	1,98	1,95	2,06	2,74	2,68
- Europe	2,09	2,29	2,20	2,63	2,59	...	...
- Middle East	2,33	1,83	2,77	2,56	2,41	2,60	...
- Central and Latin America	1,62	1,58	1,73	1,60	1,89	1,85	...
<u>Roads</u>							
World	3,09	2,78	2,75	2,54	2,51	2,37	...
Industrial Countries	2,37	2,17	2,15	1,96	1,91	1,98	1,99
Oil Exporting Countries	6,64	5,59	6,88	6,86	...	...	...
Non-Oil Developing Countries	7,15	6,27	5,92	5,51	5,27	4,33	...
- Africa	4,79	4,59	5,48	5,12	3,77	4,04	3,59
- Asia	...	...	...	...	...	...	...
- Europe	11,84	10,05	11,42	11,35	11,24	...	...
- Middle East	1,59	1,49	1,40	1,65	1,23	1,43	1,27
- Central and Latin America	7,35	6,16	5,39	4,66	4,60	3,52	...

Source: International Monetary Fund, Government Finance Statistical Yearbook, Vol. VI, 1982, pp. 41.

Table A-6: Import Savings under the Assumption Construction being Executed by Domestic Contractors:  
A Tentative Estimation for Africa South of Sahara in 1980

Gross National Product (GNP) per capita	US-\$	239				
Population	Mill.	141				
Gross National Product	Bill.US-\$	33,7				
Gross Domestic Product (GNP · 1,05)	Bill.US-\$	35,4				
Gross Domestic Investment (GDI : GDP = 16,3 %)	Bill.US-\$	5,8				
Construction						
Contribution to GDP (5 %)		1,77				
Gross Output		3,54	(90 % make up 55 % of GDI, 10 % are sales (inputs) to other sectors)			
<u>Production Structure</u>	<u>Production Cost</u>	<u>Import (direct) content</u>	<u>Import Savings (direct) Assumed</u>		<u>Execution by Domestic Contractors</u>	
(1)	Bill.US-\$ in % (2) (3)	Bill.US-\$ in % (4) (5)=(4):(2)	Bill.US-\$ (6)	in % (7)=(6):(2)		
Materials	1,77 50	0,71 40	0,35	49		
Value Added	1,77 50	0,92 52	0,46	50		
Wages and Salaries	1,06 30	0,53 50	0,32	60		
Depreciation	0,18 5	0,18 100	0,04	22		
Fiscal Duties	0,18 5	- -	-	-		
Others	0,35 10	0,21 60	0,10	48		
Gross Production	3,54 100	1,63 46	0,81 <sup>a)</sup>	50		

a) This amount makes up 26 % of net ODA funds provided by DAC countries and about 50 % of financing from multilateral donor agencies to African countries south of Sahara in 1978.

Source: World Tables 1979, World Development Report 1980 and unpublished information of the World Bank.

