

II Potential Gains from Infrastructural and Natural Resource Investment Coordination in Africa

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I Introduction

In a continent balkanised into arbitrary nation states, frequently with scant social, geographical or economic coherence, regional integration has always been a key element in African development strategies. The globalisation of the world economy since the mid 1970s, and the consequent profound changes in the nature of production and the requirements of competitiveness, have added further to the need for African countries to coordinate and collaborate. However, with a small number of exceptions, the record of regional cooperation and integration in Africa has been dismal and this constitutes one of the elements in explaining Africa's abysmal performance when compared with other developing regions of the world. For example, in reviewing the period between World Bank assessments of Africa published in 1989, Adam observes that "five years on, the condition of the 540 million people of the sub-continent remains critical: the GDP of the ten per cent of the world's population that live in sub-Saharan Africa (excluding South Africa) was little more than that of Indonesia, a country which was poorer than Nigeria as recently as thirty years ago. By any objective measures of well-being, the region has fared badly over the last decade. The people are poorer, less well educated, less healthy and, arguably, no less vulnerable to the dangers of civil war and insurrection ... for many, conditions are worse than at independence thirty years ago" (Adam, 1995, p. 729).

Given the severity of the problems and the "single country" focus of structural adjustment programmes, many African countries are in fact now pursuing policies antithetical to regional integration. Yet the theoretical arguments, starting from the seminal work by Viner in 1950, clearly indicate that the largest gains from regionalism are to be achieved by pursuing the deepest forms of integration, which necessarily involve trade and investment integration. Once the simple static framework put forward by Viner is replaced with considerations of dynamic gains, there is difficulty in actually enumerating the gains which are of even greater significance in

the era of globalisation. Dynamic gains involve the capturing of externalities in areas such as technology and skill acquisition, leading to progressive efficiency gains which are sustained and augmented by incremental investment (Mistry, 1995, pp. 15-19).

The requirements for making reasonably complete forms of regional integration work are demanding: the distribution of gains has to be carefully enumerated, compensation mechanisms established to make the distribution equitable and a degree of national sovereignty surrendered in order to achieve the necessary harmonisation at the regional level. In the case of Africa, the lack of compensation mechanisms and an unwillingness to surrender sovereignty are two significant components of the failure of past regional integration efforts in the continent (Aryeetey and Oduro, 1996).

By contrast, regional cooperation in infrastructure and natural resources is far less demanding. Typically, there are clear gains for all the countries involved in regional cooperation in infrastructure, irrespective of their size and level of economic development. There may be need to share costs and set tariffs to achieve an equitable distribution of gains, but the thorny issues of devising explicit compensation mechanisms and the need to surrender sovereignty do not arise. Yet the record of regional cooperation in Africa is not much more encouraging than performance in more ambitious schemes of integration. One of the aims of the paper is to try to explain why this is so and to analyse whether current political and economic trends provide any reason for greater optimism about regional cooperation for the future.

A related theme in the paper is that regional cooperation is attractive as a complementary strategy to deeper forms of integration rather than as a rival approach. In contrast, in some of the literature offering taxonomies of different forms of regionalism, regional cooperation is categorised as a distinct option¹ to be compared with a number of other specific alternatives. This leads to conclusions being drawn such as the following by Foroutan of the World Bank: "It appears unlikely that complete trade and factor market integration is any more feasible today or in the near future than it has been in the past for all of the existing regional (African) groupings ... Cooperation, coordination and harmonisation hold greater promise." (Foroutan, 1992, p. 30).

While supporting the view that regional cooperation has greater immediate potential, the aspects of cooperation feeding directly into integration should be capitalised on, such as improved communication and transport

1 For example, the *neo-functional model* identified by Oden (1995), page 8.

facilitating greater regional trade, and exports of energy, water and services providing a direct increment to regional trade flows. Indeed, in many specific settings on the continent, regional cooperation may be a prerequisite for trade expansion. Regional cooperation is equally valid as a strategy whether the ultimate objective is integration into the world economy, as assumed in orthodox theory and promoted by the World Bank, or a self-reliant form of regional integration, justified in terms of dynamic gains and advocated in initiatives such as the Lagos Plan of Action.² If regional cooperation is a building block, it is important that the process is managed efficiently, so that success in cooperating in infrastructure and natural resources feeds into the growth of a constituency in favour of deeper forms of integration.

The next section identifies the specific sources of potential gains of regional cooperation in infrastructure and natural resource development from a theoretical viewpoint. Section Three documents specific experience in the past and discusses, in general terms, prospects for the future. In Section Four, prospects in specific sectors are analysed in more detail. In Section Five, the important and increasingly related questions of institutional arrangements for and financing of regional projects and programmes is considered. Finally, there are some concluding comments in Section Six.

II Potential Gains from Regional Cooperation in Infrastructure and Natural Resource Development

Contribution to Economic Growth

Regional cooperation in infrastructure has the potential for making a positive contribution to the economic growth of each of the countries involved. There are a number of mechanisms through which economic growth may be augmented by cooperation in infrastructure:

Direct Cost Reductions

Regional cooperation in infrastructure can lead to a reduction in capital or operating costs or both. Direct reductions in costs arise when there are economies of scale in infrastructure provision or possibilities of improving

² The Bank is in favour of regional integration only if it is an intermediate stage towards general liberalisation. See Keet (1994) for a comparison of the Bank's regional integration agenda with that of some groups of African countries.

the reliability of supply through using shared facilities rather than investing in spare capacity.

Significant economies of scale are characteristic of several infrastructural sectors such as electricity generation, oil refining, water storage, transport of bulk commodities, maintenance of transport equipment such as locomotives and aircraft and telecommunication interconnections between countries in the region and the outside world. There is scope for increasing reliability of supply through sharing spare capacity in a number of infrastructural sectors including electricity generation (sharing “spinning reserve”), water supply (reducing vulnerability to drought through developing a number of different catchments) and provision of services in transport or telecommunications (sharing equipment to meet contingencies, and providing alternative routes in the event of problems arising on normally used corridors).

Reduced Opportunity Cost of Unserved Demand

The cost reduction viewpoint implicitly assumes a level of demand that has to be met at a specified level of reliability. However, financial constraints are such in many African countries that necessary infrastructure projects are not undertaken, reliability is greatly reduced, supply falls short of demand and market allocation mechanisms are often replaced by rationing which inevitably prejudices efficiency and frequently also equity. Where regional cooperation makes it possible to overcome financial constraints and supply is increased, the contribution to economic growth arises from a reduction in the opportunity costs associated with unmet demand.

In situations where, for example, investment is inhibited by lack of access to electricity, water, transport or telecommunications facilities, the opportunity cost associated with unmet demand can be high.³ Less important economically, but more visible, are the opportunity costs arising from unreliable supplies. These tend to be much higher in some sub-sectors than in others. For example, an electricity shut-down for certain batch chemical or metallurgical processes which result in the loss of raw materials and the loss of production time is extremely costly. In the transport sector, a clothing firm exporting by air may not be penalised for a day’s delay, whereas the horticultural exporter may lose an entire consignment.

3 ZESA, the Zimbabwe Electricity Supply Authority, estimates the opportunity cost for the economy of unmet demand at US\$1/kWh. This compares with the current unit cost, including finance charges, of around US\$0.04/kWh.

The reaction of private sector agents to unreliability is often to replicate public supply investments with private investments which are very inefficient from the national viewpoint. Not only are such investments a duplication of supply capacity, but the unit costs are typically quite high because of the loss of economies of scale. In the case of water supplies, for example, small dams lose a higher proportion of storage to evaporation than a large dam. In the electricity sector, the purchase of standby generators would typically be more expensive in terms of capital costs than large power stations, and for countries with hydro and coal resources, unit running costs would also be much higher. In transport, once fleets of private trucks have been acquired to overcome problems of unreliability in the public rail service, road transport tends to supplant rail on a permanent basis, making the public rail company less viable and thus progressively less able to provide a competitive service. All of these factors have a negative effect on national economic performance.⁴

Additional Supply Through Conjunctive System Operation

Through joint operation of an infrastructural supply system, it may be possible to derive a higher level of output, at no extra cost, than could be achieved from operating system components in an individual fashion. This is known as conjunctive operation.

For example, if one reservoir were spilling while the water level in another reservoir on an interconnected system was low, conjunctive operation would allow generation at the spilling reservoir to be increased while electricity production at the other is reduced, thereby effectively transferring water and storing energy for subsequent use. More subtle conjunctive possibilities arise on such systems even when dams are not spilling. Although less often exploited in practice, conjunctive possibilities also exist in other infrastructural areas including water supply and transport.

Positive Impact on Trade

Economic growth can also be stimulated through regional trade expansion by cooperation in infrastructure. This occurs through two main mechanisms. The first arises from recognising that payments associated with shared infrastructure themselves constitute trade in goods or services

⁴ In Nigeria it is the rule, rather than the exception, for companies to supply their own electricity, transport and communications, and also where possible water. See *The Costs of Infrastructure Deficiencies: The Nigerian Experience*, Box 1.2, in World Bank (1989).

for the countries involved, and that payments made for infrastructural items may lead to a general increase in trade, particularly where trade was previously inhibited by foreign exchange shortages.

The second mechanism for regional trade stimulation is more closely connected with the type of infrastructure involved: improvements such as better road and rail transport and telecommunications facilitate greater exchange of goods and services between neighbouring countries.

The trade benefits may arise from a stimulus being given to trade with third parties. This is the specific intention of some specific forms of cooperation, such as regional tourism initiatives targeted at an overseas clientele. But even in cases where the direct effect is an increase in trade between only one of the regional countries and the rest of the world, there may still be second-round trade benefits for other regional countries as increasing incomes result in higher demand for regional as well as international products.

The country that is a net importer of infrastructural services may well end up being better off as a result of the stimulating effect on overall trade than it would have been under a more inward-looking infrastructural strategy. This point is frequently overlooked by those advocating self-reliance in sectors such as energy.

Savings When Infrastructural Investments are “Lumpy”

In many areas of infrastructural investment, economies of scale can be achieved through making large investments. A sizeable dam for hydro-electricity generation provides a good example. The planning problem is that such investments have to be scheduled well in advance of commissioning, over ten years in the case of a large dam, and the project justification has therefore to be based on long-term demand forecasts. When considering the fortunes of a single country operating in isolation, the economic costs of getting the demand forecasts wrong can be very high.

This applies whether the out-turn is higher or lower than forecast. In the hydro-electricity example, if demand rises faster than projected, there is likely to be shortfall in supply before the new dam is commissioned. The economic cost is the production lost as a result of shortages in electricity and/or welfare losses if the shortages are made to affect households rather than enterprises. If, on the other hand, demand rises more slowly than projected, but the investment is nonetheless made, the project will become non-viable as there will not be sufficient revenue to service project loans. The economic cost in a small country of an unnecessary, large infrastructural project is the “crowding out” effect as development capital and foreign currency is expended on the one big project at the expense of a

diverse range of activities in the productive sectors. Whether via a shortage of inputs such as electricity or of access to capital and foreign exchange, it is not only in the short term that the level of activity and of investment might be adversely affected: such economic problems could well affect investor perceptions and thereby have a dampening effect on economic growth over a much longer time period.

Given the impossibility of making accurate demand forecasts over long periods, costs arising from infrastructural investment planning in an isolated economy are virtually inevitable. However, through regional cooperation involving trade in commodities such as electricity, there is potential for these costs to be greatly reduced, if not eliminated altogether. Once there are options for imports and exports of electricity, the timing of major supply augmentation projects is no longer quite so crucial because shortfalls prior to commissioning can be covered by imports, while excess capacity after commissioning can be profitably exploited by exporting. As a large economies-of-scale project is being assumed, an initial excess capacity would be anticipated even if demand forecasts were accurate, and the possibility of exports would thus considerably enhance the viability of the project. This, in turn, may lead to increased profitability if the project is implemented earlier than would be the case without the regional dimension. A complementary advantage of bringing the project forward is that the risk of supply shortfalls prior to commissioning would be reduced.

In sum, when investments are “lumpy”, infrastructural planning in a single country is likely to result in either oversupply or undersupply, both of which give rise to immediate losses of output and to longer-term negative impacts on investor intentions. The associated economic costs may thus be substantial. Regional cooperation in many cases offers the opportunity to augment economic growth in participating countries through obviating the problems arising from too little or too much investment in infrastructure.

Dynamic Gains

It was mentioned in Section One that dynamic gains, difficult though they are to measure, are thought to be far more important in assessing the benefits of regional trade arrangements than the traditional, more readily quantified static gains. Dynamic gains are also likely to accrue from regional cooperation in infrastructure. In infrastructural systems which operate more efficiently as a result of regional cooperation, technological and managerial skills are acquired by the nationals of the countries involved, and these will spread into other activities in the same sector, or into other sectors, contributing to progressive efficiency gains. Foreign in-

vestors participating in regional projects are also more likely to participate in member countries when they have acquired some experience and familiarity with the region.

With the focus shifting from the neo-classical conception of capital and labour as the basic factors of production to the notion of industrialisation and growth being driven by technological capability, the longer-term significance of successful regional cooperation in infrastructure could well exceed the more directly measurable benefits (Lall, 1993). Care should be taken in designing regional infrastructure projects to maximise opportunities for skill acquisition, not just in technological areas but also in managerial and regulatory aspects.

Contribution to Sustainable Development

Increasing the pace of economic growth does not, of course, ensure that broad socio-economic goals will be met. However, as the lack of growth precludes achieving goals such as higher standards of living for the majority of the populace, economic growth is back in vogue as a primary objective, although controversially so to the extent that growth has an adverse effect on the environment. Sustainable development is a more widely endorsed objective, with growth being broadened into “development” and “sustainable” referring partly to political and institutional issues but primarily to the environment.

In the realm of natural resource management and tourism, properly conceived regional cooperation has considerable potential to contribute to sustainable growth. In the global environmental issues, such as carbon dioxide emissions, Africa plays a small part. But in a continent of 50 countries, there is significant sharing of resources such as river basins, lakes, forests, wildlife and coastal environments. Exploitation of these resources by one country very often affects neighbouring countries or even, in the case of major rivers, distant countries. Thus, the scope for exploiting resources for the benefit of all is considerable.

Environmental management in many African countries is tied to tourism which is increasingly important as a source of foreign currency and employment. Africa’s natural resource-based tourism potential is immense and at present unevenly developed across the continent. Africa accounts for only 3.4% of world tourism arrivals,⁵ and even a small increase in this proportion would have a marked effect on revenues and employment in the sector. Where the primary interest of the high-paying foreign visitors is in

5 African Development Bank (1993), Table 8.1, Volume 3, page 227.

the environment, relatively modest capital investments produce high returns, but only if the natural resource base is preserved. As a result, care must be taken to limit development of tourism to environmentally acceptable limits.

Fortunately, market forces point in that direction. The airfare structure is such that a large proportion of those flying to sub-Saharan African destinations (as opposed to north African destinations) want and are prepared to pay for facilities which blend into the environment and offer a degree of exclusivity. There is less incentive for tourist operators to aim at large-scale tourism at the lower end of the market for which big hotels, far more injurious to the environment, would be required. The regional possibilities are also important in relation to the airfare structure because the tourist sites of several countries may be needed to tip the balance in favour of Africa as a destination.

Through its positive effects on economic growth and more broadly on sustainable development, regional cooperation in infrastructure and natural resource development can contribute momentum to a “virtuous circle” of growth coupled with measures to protect the environment. While this may be partly endogenously driven, the momentum can be increased through the involvement of donors and private financiers eager to support environmentally sound growth. Examples of successful regional cooperation may also contribute to a constituency emerging in favour of deeper forms of integration, including the removal of regional barriers to trade and financial flows. At least in theory, the consequent rising levels of economic prosperity should, in turn, provide the basis for enhanced political sustainability and military security, issues of fundamental concern if regional integration is itself to be sustainable.

III Past and Future Regional Cooperation in Infrastructure

Past Experience

Compensation schemes are often needed to make regional integration acceptable to all the parties involved in trade, investment and financial integration, where difficult-to-quantify gains accrue highly differentially. In Africa, the record of designing and implementing compensation schemes has been particularly weak. In contrast, one of the interesting features of regional cooperation in infrastructure and natural resources is that the gains are typically clearer and tend to accrue to all of the countries involved. Negotiations would still be necessary for items such as the sharing of costs and the structure and levels of tariffs, but the focus is on the distribution of gains rather than on compensation *per se*. Despite this

“win-win” characteristic, the level of regional cooperation in infrastructure and natural resources in the past has been disappointingly low. In view of the size of the potential benefits and the political rhetoric in favour of regionalism, an important question is why national approaches have so often been preferred over regional ones.

One reason is that the benefits of regional cooperation have not always been properly quantified and fully understood and appreciated by the governments involved. As is clear from Section Two, direct cost savings may be only one component of the benefits of regional cooperation. To appreciate the full picture requires adopting a wide framework of analysis incorporating trade options and implications for rationalising future investments. This may be difficult to achieve in a government structure where responsibilities are divided and where, typically, responsibility for regional cooperation is weak or diffuse.

More fundamentally, nationalism has had a strong influence in decisions relating to infrastructural development. Following the high degree of *de facto* regional cooperation under colonialism, when countries became independent they sought to go their own way. In areas such as electricity, transport and telecommunications, parastatal supply companies were set up and the strategic nature of such industries was cited as reason for their appropriation of national resources, often without adequate cost recovery being in place. The failure of cooperation efforts such as the East African Community fed into hesitancy to opt for regional projects, despite the higher costs of national solutions. In practice, lack of financial viability of the parastatals led to underinvestment, poor maintenance and operational inefficiency. Inadequate infrastructure became a significant constraint on development in many countries and regions where infrastructural facilities were shared. An example of this is provided by the Dar-es-Salaam and Beira Corridors (see Box 1).

In response to political instability in neighbouring countries, security of supply has often been cited as a reason for pursuing national rather than regional projects. This overlooks the likelihood that part of the reason for instability and, in extreme cases, armed conflict is poor economic performance, and regional cooperation can contribute to reversing this negative spiral. There has been a tendency for self-reliance, the logical concomitant of the nationalist approach, to be confused with security of supply. Zimbabwe’s energy policy during the 1980’s provides a good example (see Box 2). Similarly, in Tanzania an unacceptably high level of unreliability in the supply of electricity “probably would not have happened if Tanzania had taken a regional approach in energy planning. It has come to be recognised in Tanzania that connecting to the Uganda and Zambia grids could enhance security of power supply” (see Wangwe comment).

Box 1 Problems Arising From Inefficiency in the Dar and Beira Corridors

The TAZARA railway line linking the Zambian Copperbelt to the port of Dar-es-Salaam, was built in the mid-1970s specifically to enable Zambia to avoid having to rail its major exports and return flows of imports via the hostile regimes in Rhodesia and South Africa. Beira, by contrast, had been linked to its hinterland countries at a much earlier stage (Salisbury, now Harare, in 1900 and Blantyre in 1935), but was closed to Rhodesian traffic when FRELIMO came to power in Mozambique in 1974. The lack of revenues, coupled with inexperienced personnel taking over operations, resulted in a significant deterioration in facilities of the port and the rail system by the time of Zimbabwe's independence in 1980. Through inefficient public management, the Dar Corridor system suffered a similar fate.

For Malawi, Zambia and Zimbabwe, the port systems of Tanzania and Mozambique are closer than other options and should be used for the bulk of overseas cargoes. Yet by the mid-1980s high port charges, lack of shipping options because of low levels of traffic and high implicit costs due to delays and inefficiencies, resulted in the bulk of cargoes being routed through South Africa. In the case of Zambia, for example, despite having its own facilities at the port of Dar 2,150 km away, a significant proportion of copper exports were shipped through East London (2,980 km) and Durban (2,805 km). Malawi was in a much worse position, having to use road and lake transport rather than rail, and the country's bridging costs rose to over 40% of export revenues, compared with an already high figure of about 25% for SADC as a whole. By 1985, Beira was handling less than one-third of the cargoes handled 20 years previously.

Concern was rising in SADC countries at that time about the direct costs of using South African transport routes and, in an atmosphere of rising political tension, the threat of curtailment of transport services if South Africa chose to exert this form of pressure on neighbouring countries. With considerable assistance of external donors, massive rehabilitation programmes for the Dar and Beira Corridor systems were initiated.

A major part of the explanation of the failure of past regional integration attempts lies in the disparities between member countries. The tendency has been for the benefits to accrue disproportionately to the members already somewhat better off than their neighbours. This could have been obviated by establishing an equitable distribution of benefits clearly in advance or, better still, a flexible mechanism to alter the distribution as circumstances change. Disparities between countries also explain why

Box 2 Zimbabwe's Energy Policy in the 1980s

Under normal circumstances, Zimbabwe imports its main liquid fuels via a pipeline from the port of Beira in Mozambique. An attack by South African saboteurs on the tankfarm at the head of the pipeline in 1982 made Zimbabwe totally dependent on South Africa for fuel imports by rail. The authorities there kept down deliveries to such an extent that by the end of 1982 there was an acute shortage of fuel which almost brought Zimbabwe to a standstill. While the country had no immediate alternative to importing liquid fuels, this incident rekindled interest in enormously expensive oil-from-coal technology and provided the backdrop to a costly policy of self-sufficiency in the electricity sector.

This was embodied in the building of Stage I (480 MW) and Stage II (440 MW) of the Hwange coal-fired power station in preference to building a transmission line from the underutilised Cahora Bassa hydro station in Mozambique and increasing imports of power from Zambia. Because of its sheer size, the Hwange project imposed significant macroeconomic costs on the economy. It has been estimated that, compared with a scenario of delaying the project for 5 years through importing electricity from Mozambique and Zambia, the total economic costs were approximately double the nominal cost of the project. Expensive self-sufficiency did not, however, result in security of supply because of persistent operational difficulties and specific events, including a boiler explosion in 1984 which delayed the commissioning of Stage I and mechanical problems in 1989 which put 260 MW out of commission just when there was a fire at Kafue in Zambia which removed 900 MW from the Zambia-Zimbabwe interconnected grid.

Lack of grid interconnections was a major problem in 1991-92, when the severe drought exposed just how vulnerable the Zambia-Zimbabwe system had become. Since that time, grid interconnection projects with South Africa and Mozambique have gone ahead. Strengthening of the links to Zaire, and other options within the context of the Southern Africa Power Pool, are under active consideration (see Section IV).

many potentially beneficial regional projects have not been implemented at all. projects are stalled 'first, if one of the parties does not have the capacity to contract and service a loan, second, if the same party has (at least in the short term) the capacity and ability to supply services to the deficit country, and third, if it is perceived that the other cooperating country or countries would reap more benefits than the supplying country" (see Ngwenya's comment).

Box 3 African River Basin Organisations

A recent study by the World Bank (Rangeley et al., 1994 reports on eleven international river basin organisations in sub-Saharan Africa. These vary in scope from those concerned only with water management and environmental issues, to organisations having responsibilities in a range of other activities such as agriculture, energy, transport, fisheries and forestry. While careful to document successes as well as failures, the agenda emerging from the report indicates that the majority of the organisations require extensive revamping if they are to be really effective.

The *Niger Basin Authority* (NBA) is a case in point. It is one of the earliest river basin organisations to be formed (1964) and has the largest area of operation (over 1,2 million square kilometres, covering 100 million people). The Niger has highly variable seasonal flows, and is also affected by periodic droughts. About 30 million people live in the arid part of the basin, where continuous degradation of the ecosystem is taking place. The main objectives of the NBA are to raise funds and promote the study and implementation of storage works.

The assessment of the World Bank mission (p. 9) is that “the NBA has been beset by difficulties since its creation. As a result, it has little to show for the considerable sums of money invested in it (about US\$30 million, 1993). Some of the main difficulties arise because there are too many member states (nine) and because the objectives have often been diffuse without a clear identification of real beneficial targets. At present, NBA has ceased to be operational and the Hydroniger project is in danger of similar collapse unless urgent action is taken”. An in-depth diagnostic study to review the objectives, structure, constitution and programme of the NBA is recommended.

The Hydroniger project is NBA’s main activity at present. It involves sixty-five data collection platforms for the measurement and retrieval of real time meteorological data. Even Hydroniger shows “the difficulties of cooperation, as the project almost foundered on the desire of one country to prevent a neighbour knowing what the flows were in its rivers”.

The problem of disparities in levels of development is also important in explaining why so many institutions set up to execute programmes of regional cooperation have failed to achieve their objectives. Conditions of service must be established which are at least as good as those of the wealthiest country member, and this may well lead to obstructive problems from officials in national governments. This is exacerbated by the previously

mentioned problem of responsibility in governments for regional issues being weak or diffuse. Regional matters are more often handled by political ministries, such as foreign affairs, and the economic significance of regional cooperation opportunities and importance of creating appropriate institutions to exploit them, is not often appreciated. African river-basin organisations provide a good illustration (see Box 3). It is not by chance that the commitment to regionalism is downplayed by politicians and civil servants: national solutions typically offer greater opportunities for rent-seeking behaviour than would be the case in regional projects.

Finally, in documenting the reasons why past regional cooperation has not been as extensive and as effective as might have been expected, the role of donors must be mentioned. As pointed out by Sindiso Ngwenya, the high level of dependence on donor financing for capital and, in recent years, recurrent expenditures is somewhat ironic given the rhetoric of regional cooperation in Africa which emphasises the promotion of self-reliant development (see Ngwenya's comment). In Wangwe's view, this contradiction could be overcome to some extent if recipient countries rose to the challenge of establishing coherent regional programmes, and then inviting donor support (see Wangwe's comment). All too often, however, it has been the other way around with recipient activity fitting into programmes reflecting donor priorities. While donor enthusiasm for regional over national programmes has varied, the high level of resources which have been put into regional efforts has not led to a consistent regional focus in donor activity. Such a focus could have helped reduce the nationalistic tendencies amongst the countries themselves. Most agencies remain clearly structured to deal with national governments rather than with regional organisations. Almost inevitably, therefore, programmes tend to be national rather than regional in character.

Regional programmes may require working with several governments at once and this is difficult and time consuming. It may even be considered inefficient. The World Bank's Operations Evaluation Department reports that "the Bank should not engage in projects with excessively complex managerial arrangements: for example, with two separate utilities involved in a project". Talking of the Great Lakes Region, another Bank document, prepared jointly with the PTA, candidly admits that the six affected countries "are allocated among three divisions of the Bank (AF2, AF3 and AF6), and the problem of cooperation and coordination within the region seem mirrored in Washington" (World Bank, 1990, p. 93).

Another problem which may arise from donor interventions is incompat-

6 Quoted in World Bank/European Commission (1995), page 27.

ibility of equipment and institutional arrangements when different donors support the same sector in neighbouring countries. When donors do get involved in regional cooperation efforts, cycles of floods and droughts of interest and offers of financing are not uncommon. The Niger Basin Authority again provides a good example: in 1976 a \$27.5 million action plan was launched, but this was “stillborn mainly because the enthusiasm of the donors in the mid-1970s built it up to a size that was quite beyond the counterpart implementation capacity of the then Niger Basin Commission or indeed of the member states themselves” (Rangeley et al., 1994, p. 45). In 1981, the pattern was repeated with a \$56 million programme being proposed by the donors, \$22 million pledged but only a small portion actually materialising as projects.

Future Prospects

With the extensive catalogue of problems outlined in the previous section, is there any reason to suppose that prospects for regional cooperation will be brighter in future?

The first positive factor is the improvement in the security situation in some parts of the continent, in part due to the end of the Cold War. The persistence of old conflicts and emergence of new ones shows, however, that there is no assurance of an end to war and the reaping of a peace dividend. At least in southern Africa the elimination of apartheid and the end to conscious acts of regional destabilisation perpetrated by the former minority government in South Africa has positive implications. While the stance against South Africa forged important elements of cooperation amongst the frontline states, the main expression being the formation of the Southern African Development Coordination Conference (now transformed, with South African membership, into the Southern African Development Community), it also led to states adopting an inward-looking view when it was possible for them to do so. Zimbabwe’s electricity supply policy (Box 2) is a case in point. More importantly, as documented in the massive 1993 African Development Bank study on *Economic Integration in Southern Africa*, legitimate government in South Africa has opened up an enormous spectrum of areas of potentially fruitful cooperation.

A second factor relates to the widespread adoption of economic reform programmes which, whatever their immediate effects, do require governments to take resource constraints seriously. The considerable cost savings associated with regional options are thus more likely to attract attention in the current economic climate. Structural adjustment programmes also require parastatals to be more efficient and market-oriented and pave the way for some categories of infrastructural services to be supplied by the

private sector, offering some prospect of overcoming resource, technology and skill constraints. This could well include private suppliers tackling regional projects through finding ways of working with several governments at once in order to execute schemes of mutual economic benefit to all parties. This is yet to be tried, but in certain areas it could well be that private suppliers may be able to overcome the seemingly intractable problems which characterise present government- and donor-backed regional projects and institutions.

These general factors underpin prospects in specific sectors. Energy, water, transport and telecommunications are considered in some detail in the next section.

IV Sectoral Perspectives

Energy

In terms of the range and size of benefits and the extent of potential linkage, electricity is clearly the most promising infrastructural sub-sector for regional cooperation. Yet, besides a number of relatively minor cross-border supply arrangements, the only effective interconnections currently on the continent are the West African Grid, between Côte d'Ivoire, Ghana, Togo and Benin (2,128 MW) and that between Zambia and Zimbabwe (3,660 MW). This compares with total potential of hydro alone of over 300,000 MW, of which less than 15,000 MW (5%) has already been developed.

The African Development Bank has been taking the lead in exploring options for further grid interconnections at the continental level. In a key study carried out in 1990, it was concluded that "there is not a single region in Africa which, according to this review, cannot benefit from joint power development, and thus share the project costs without denying investment in other productive sectors of the economy. Joint power development is therefore considered a means to aid the recovery of economic performance and reverse the erosion of the continent's productive base and human resources" (AfDB, 1990, p. 56).

The study divided the continent into ten regions and examined the possibilities for strengthening interconnections within and between each region. The epicentre of Africa's electricity generation potential is a remarkable site, Inga on the Zaire River. At that one site, with very limited civil works and negligible direct environmental impact, there is 44,000 MW of hydro-electricity generation potential, more than the present entire installed capacity of South Africa or the rest of the African continent excluding South Africa. At present, only 2,486 MW have been developed,

but even this allows exports of power to the Zambia-Zimbabwe integrated grid via a DC transmission line running through Shaba province. The African Development Bank study envisages Inga eventually supplying power both northwards and southwards, and to this end recommends interconnections and strengthening of existing transmission lines to provide key “backbones” across the continent.

The northern backbone would require an interconnection from Zaire to Nigeria, a link from Nigeria to the West African Grid and an extension west into Senegal and Mauritania. One southern backbone already exists via the DC transmission line from Inga, but the linkage to the Zambian grid needs to be upgraded as a first step, and a duplication of the lines considered subsequently. With the completion of the Bulwayo-Mathimba line, the Zambia-Zimbabwe system is now connected to the South African grid via a 500 MW link. A further development would be a second southern backbone from Inga through Angola and Namibia to Cape Town.

On the east coast, the first step is the rehabilitation, now underway, of the 1750 megawatt DC transmission line from outside Pretoria to Cahora Bassa on the Zambezi in Mozambique (533 kilowatt, 1360 km). Connections into Malawi and Tanzania are under consideration, and the east coast backbone would become a reality with links from Tanzania into Kenya, from northern Kenya into Ethiopia and from Ethiopia into Sudan. To make electricity trade between Zaire, the West African Grid and Egypt possible, a cross-continent loop connection would be required which might be routed through the Sudan. The final recommended connection is an inland link from Nigeria/Niger through Mali to Mauritania, taking advantage of hydro resources on the western rivers, providing power to the countries through which it runs and reinforcing the coastal interconnection already discussed.

Work in the SADC region gives an indication of the size of potential benefits likely to accrue from grid interconnections. A study carried out in 1991-92 calculated the capital costs of providing electricity to the year 2010 through strengthening regional interconnections as being \$8.6 billion. This was 24% less than the corresponding combined costs of independent country programmes of \$11.3 billion.⁷ The benefits would be most marked for countries which presently have very high unit costs, for example Tanzania at 11 cents per kilowatt hour as compared with Zambia at less than 3 cents per kilowatt hour because a regional strategy would reduce these wide disparities in costs. Total costs would also be minimised. According to the World Bank, for all of sub-Saharan Africa, electricity

7 Results from SADC Project AAA 3.8, quoted in Chapter 5 of AfDB (1993).

investment should be over \$4 billion per annum over the next decade, a sum widely felt to be unfeasible. If regional cooperation could reduce these requirements by \$1 billion per annum, it is far more likely that adequate provision of electricity will be possible.

At the time that the SADC interconnector study was carried out, South Africa was still under apartheid and was excluded from the core recommendations. However, the benefits of linking the predominantly thermal system in South Africa with the mainly hydro systems to the north are considerable, a point that came to be widely appreciated in Zambia and Zimbabwe during the load shedding and electricity rationing consequent on the severe drought of 1991-92. For Zimbabwe, the immediate benefit of the recently completed Mathimba link is the restoration of adequate reserves on its system, and hence a considerable improvement in reliability. In the early years of next century, when South Africa's present surplus of generating capacity is expected to be exhausted, the link can be used to export hydroelectricity, either from Batoka if that joint Zambia/Zimbabwe project goes ahead, or from lower Kafue in Zambia or power wheeled from Inga in Zaire. Exports from coal or coal bed methane projects in Zimbabwe or elsewhere are also possible. While the DC line from Cahora Bassa to Johannesburg is being restored, Zimbabwe has negotiated to import power from Cahora Bassa via a 500 MW link to a point near Harare which is due to be completed in 1996.

Particularly for a country like Mozambique, which has limited merchandise exports and large import requirements, exports of electricity (and transport services - see next section) have a crucial role to play in economic recovery. For each 1000 MW at an 80% load factor, the revenues accruing from energy sales would be \$70 million for each 1 cent per kilowatt hour negotiated in the tariff. The indicative figure for energy trade in the region is presently 1.5 cents per kilowatt hour, implying a revenue potential of over \$100 million for each 1000 MW. Cahora Bassa has 2075 MW of installed capacity, implying a revenue potential of over \$200 million per annum, or 33% more than the 1994 level of merchandise exports of the country.

West Africa has similar opportunities for stabilising electricity provision by integrating hydro and thermal systems, and thereby creating considerable opportunities for trade in energy. There are untapped natural gas fields in Angola, Cameroon, Congo, Côte d'Ivoire and Ghana. In Nigeria, the equivalent of 10,000 MW of gas is presently being flared, with significant adverse environmental consequences. The now politically controversial projects to utilise albeit a small proportion of this gas could form the basis of a thermal generation system to counterbalance existing and future hydro capacity. The signing of the West African Pipeline Company (WAPCO)

agreement, covering the supply of gas from Nigeria to Benin, Ghana and Togo, in September 1995 was the culmination of a process started in the early 1970s, illustrating, in the words of the Executive Secretary of ECO-WAS, “the length of time that it takes to finalise projects such as this one”.⁸ It is significant that the project is to operate purely as a commercial concern with the company being owned by private sector interests. The associated power generation and transmission projects are also likely to be undertaken by private sector interests, although in some cases in partnership with public energy utilities.

As a complement to continental scale electricity grids, there are proposals for a gas pipeline which would link all of the west coast gas resources from Côte d’Ivoire through Namibia to South Africa. The Chief Executive of the Ghana Petroleum Corporation, Tsatsu Tsikata, claims that unit costs of gas in such an extensive trunkline would be attractive, and that “the availability of cheap gas can be a tremendous catalyst for natural resource development”.⁹ In east and southern Africa, natural gas deposits in Tanzania and Mozambique and coal bed methane associated with many of the coal deposits of the region could be similarly linked, or else used to generate electricity to be fed into the regional grid.

Water

Shared river basins are a common feature in Africa, in part because many major rivers were designated as national boundaries under colonial rule. There are 17 international drainage basins with catchment areas greater than 100,000 square km, and an additional 11 with catchment areas greater than 30,000 square km. The largest of these in terms of discharge are the Zaire River, the Volta, the Zambezi, the Niger-Benue and the Nile.

The development of shared water resources embraces not only hydro-electricity potential, but supply of bulk water for urban, industrial and mining (UIM) use, irrigation, tourism and inland transport. The largest and arguably most successful regional project is the Lesotho Highlands Development Project which involves the construction of dams and tunnels to supply 2,000 million cubic metres per annum of water from the headwaters of the Orange River in Lesotho to the Gauteng area, the urban-industrial heartland of South Africa, and supply electricity from a 166 MW hydro station to Lesotho. The eventual cost of the four phases of the

8 *Africa Review*, November 1995, page 45.

9 Quoted in *Africa Review*, October 1995, page 30.

project is expected to be \$7.5 billion, one third of which is to be spent in the first phase currently underway. The advantage to South Africa of the scheme is the avoided cost of pumping the Orange River water from the much lower elevation where it enters South Africa, while for Lesotho, in addition to the hydro-electricity plant, the project offers royalties (\$3.5 million per annum), training and employment opportunities and compensation for the negative environmental impacts.

Part of the success of the project to date has been ascribed to the legal agreements and institutional structure which was established for it, although given the David and Goliath status of the two countries involved, the size of the royalties payable by South Africa remains controversial. There is also concern about the longer-term environmental consequences of inter-basin transfers. Once the Lesotho Highlands water is fully utilised, Gauteng would seek other large-scale transfers, from the Zambezi or perhaps the Okavango. Draining the swamps would, however, have a devastating effect on the ecosystem of a unique wilderness area, and it is unlikely that the Botswana government would readily agree.

In contrast to the potential offered by Africa's rivers for hydro-electric generation, the potential in aggregate for irrigation (20 million hectares) is modest in relation to the size of the continent (3,000 million hectares). Irrigation is nonetheless an important component of some regional water development programmes. In a case such as the dams built by the *Organisation pour la Mise en Valeur du Fleuve Senegal* (OMVS), the bulk of the expected benefits have not materialised because the irrigation projects under national rather than regional control have fallen far short of intended targets.

Inter-basin transfers and irrigation are hydrologically significant because they reduce overall catchment flows. Other uses, such as navigation and tourism, are non-consumptive. Except for the lower Niger and Zaire rivers, navigation on rivers has never been commercially important and proposals for the Senegal River have not proved economical. Inter-country transport on inland lakes, such as Victoria, is much more significant. Tourism-related river and lake activities are also common. Fishing is an important activity in major lakes, locally providing employment and income and nationally contributing a vital source of affordable high quality protein. Provided riparian countries cooperate, there is considerable scope for beneficially expanding these activities. For example, data for the land-locked SADC countries indicate that less than 50% of the potential inland fish yield is being harvested.¹⁰

10 AfDB (1993), Table 4.6, based on FAO data.

Transport

As compared with electricity and water, the potential for and benefits from cooperation in transport are diverse and far more difficult to quantify. For a start, there are usually several different modal and routing options for cargoes or passengers, so a multiplicity of alternatives has to be taken into account. Costs are a function not merely of distance, but of facilities and alternatives available at origin and destination and the efficiency with which traffic is handled. Starting from a position where “the landlocked countries pay up to 90% of CIF (cost, insurance and freight) value of imports as total transport costs of their cargo”,¹¹ the cost savings can be substantial. For example, a 1995 World Bank/EC study of the Great Lakes Corridor suggests that potential savings for the landlocked countries from simple policy changes (improvements in road services and transit trade procedures) would be of the order of \$13-30 per tonne, equivalent to between 14% and 33% of typical values of the commodities being carried (World Bank/European Commission, 1995, p. 73).

The above serves to emphasise that for the 15 landlocked countries,¹² regional cooperation in transport is essential for survival. The same can be said for many of their neighbours for whom revenues from transport services provide a crucial component of national income. Yet, as outlined earlier, various forms of inefficiency in the past have limited the effectiveness and economic benefits of regional transport arrangements and there is plenty of scope for benefits to be increased.

COMESA (formerly the PTA) has made a major effort to coordinate the removal of non-physical barriers to transit with the development of the physical infrastructure. Lack of commitment from member states and overlap with other regional organisations has to some extent frustrated these efforts. An example of the latter is the establishment of different Axle Load Limits and Gross Vehicle Mass by the PTA and SADCC, necessitating further studies and negotiations in order to achieve harmonisation.¹³

At the regional level, the Sub-Saharan Africa Transport Programme, which has been running since 1988, has formed the basis for the formulation of subsectoral objectives and strategies for the second UN Decade for

11 USAID (1994), page 132. Another reference quotes the cost of ocean freight in 1987 as 5% of GDP for Mali, 7% of GDP for Burkina Fasso and 3% of GDP for Niger (Creightney, 1993, page 25).

12 Mali, Burkina Faso, Niger, Chad, Central African Republic, Ethiopia - following the independence of Eritrea in 1993, Uganda, Rwanda, Burundi, Malawi, Zambia, Zimbabwe, Botswana, Swaziland and Lesotho.

13 World Bank/European Commission (1995), Annex 2, page 2.

Transport and Communications in Africa. The emphasis in the programme is on policy and institutional reform, including a gradual opening up to the private sector, and priority being given to repair and maintenance rather than to the building of new capacity.

Maintenance, especially of roads, has emerged as a central issue in the transport sector. The reason is clear: the cost of restoring a damaged road far exceeds what annual maintenance costs should be. For example, a recent European Commission study puts the cost rehabilitation at ECU 26,800 per km for a non-surfaced road and ECU 180,000 per km for a surfaced road, as compared with an annual routine maintenance charge of between ECU 270 and ECU 1340 per km. As of 1993, only 50% of paved roads and less than 30% of unsurfaced roads were said to be in an acceptable condition (European Commission, 1994, p. 11). According to Ngwenya, the persistent underspending on maintenance that this reflects is not due "to budgetary constraints, as conventional wisdom would have us believe, but to the absence of appropriate pricing policies and institutional arrangements" (Ngwenya, 1994, p. 9). The solution lies in a coherent system of user charges and accountable institutions capable of using the funds to good effect, including maximising on opportunities to use local firms and labour intensive construction methods.

In the rail sector, similar issues dominate. For example, at the World Bank/Union of African Railways seminar on *Railway Restructuring* held in Bulawayo in 1992, the main areas of discussion were the policy, institutional, management and operational reforms needed for railways to become efficient and commercial and hence to have the ability to contribute effectively to economic development. In comparison with railways in other parts of the world, African railways have high overheads and low labour productivity. In terms of measurable technical indicators, performance is poor. For example, figures for 11 sub-Saharan railways in 1987 are an average of 14 million traffic units per locomotive, compared to 44 million in Asia; and 240,000 tonne-kilometres per wagon, compared to 700,000 tonne-kilometres in Asia. In 1990, for example, SADCC locomotive availability was 47-70% and wagon availability 42-64%, as against comparable figures of 75-80% for locomotives and 90% for wagons elsewhere in the world.¹⁴ While the starting point for improvements is the national railway authorities, collaboration between railways and, ultimately, the formation of regional coordinating institutions or fully-fledged regional companies, could have a significant role.

Similarly in the airline industry, there is considerable scope to ration-

14 Figures from Doyen (1992).

alise operations and achieve economies of scale through having regional companies rather than national ones. A national airline is one of the symbols of nationhood, however, and regional companies, such as *Air Afrique*, are very much the exception rather than the rule. As privatisation gains ground, inefficient and inappropriate parastatals will be challenged to reform or be supplanted, a recent example being the demise of *Zambian Airways* and its replacement by a smaller, leaner private carrier. Significantly, this firm is based in South Africa. In the rail sector, too, the South African company Spoornet is already heavily involved with railways elsewhere in Africa. The formation of a joint venture with a Belgian company and the national rail company of Zaire as a means to recover outstanding loans from Zaire through making the rail system pay, is an interesting pilot development which may well lead to similar arrangements elsewhere on the continent.

Telecommunications

The development of telecommunications has been relatively neglected in the past in the majority of countries of sub-Saharan Africa. In part this has been the outcome of policies such as poor pricing, inadequate public investment resources and exclusion of private participation common to other infrastructure sectors. There has also been a tendency for telecommunications to be regarded as something of a luxury and has not attracted significant donor financing. That view has changed dramatically in recent years, as telecommunications has rightly come to be recognised as “a fundamental factor of production, alongside capital and labour” (World Bank, 1992, p. 1).

Over 80% of telephone lines in African countries are typically used for Government or business purposes, and an inefficient telephone service becomes a severe dampening factor on economic performance. In the World Bank’s view, the main economic benefits of telecommunications are realised by improving the efficiency through which markets operate. Efficient telecommunications have thus become an increasingly important factor in determining the success of the structural adjustment programmes, based on trade and market liberalisation, which many countries are in the process of implementing (World Bank, 1991a, p. 4). The explosive growth of services which go beyond basic voice communication, including fax, information services and e-mail, further enhances the economic significance of having an efficient telecommunications service.

In sub-Saharan Africa, access to telecommunications is extremely low and the quality of service is poor. The average density of telecommunications service is about 0.3 direct exchange lines per 100 people, as compared

with 0.6 in Asia (excluding Japan, which has 41.7) and 3.4 in Latin America. Local call completion rates are less than 30%, as compared with more than 70% in OECD and many developing countries.¹⁵ Unreliability is partly a reflection of African telecommunications companies using antiquated equipment, and in many cases wholesale replacement of equipment is required. In this regard, however, the rapid advances in telecommunications technology can be seen as offering an opportunity to modernise and upgrade at the same time as expanding capacity at a unit cost which, in real terms, is often lower than it would have been even a few years ago.

The level of required investment is, however, daunting partly because of the replacement aspect and partly because of the fact that a much higher growth in telecommunications is required to underpin any given target rate of growth in GDP. The World Bank has estimated that the difference may involve a factor of 3: telecommunications growth of the order of 15% per annum may be required to underpin GDP growth of 5% per annum (World Bank, 1991b, p. 19). With national budgets already under pressure, there is no possibility of telecommunication investment targets being met without the significant participation of the private sector. To illustrate with a particular example, the investments required in Zimbabwe's telecommunications sector in the next five years to underpin a GDP growth rate of 5% per annum are equivalent to over 40% of the total public investment budget over the period. In practice, at most a small proportion might come from the Public Sector Investment Programme, and the remainder will have to be sourced from the domestic capital market and from attracting private participants.

However, in Zimbabwe as in other African countries, there is no experience and institutional structure to effectively regulate the telecommunications sector when it is opened to a mix of public and private ownership and is required to operate on commercial lines but without exploiting monopolistic positions. With a weak regulatory structure, the expected efficiency benefits of sector reform may well not materialise.

Telecommunications in Africa is becoming constrained by the twin inability of governments to finance the massive investments required from national budgets and to effectively manage the participation of the private sector. Regional cooperation in telecommunications development could help overcome both of these problems, by taking advantage of economies of scale to reduce unit investment costs and by using scarce skilled manpower to manage and regulate the sector effectively at a regional level for the benefit of participating countries.

15 Figures from World Bank (1991a) and World Bank (1991b).

The size of investment savings which can be expected may be illustrated with data from a recent study commissioned by COMESA (COMESA, 1996). The study found that the national investment costs of a 1000 line digital international exchange were on average \$4.2 million, whereas in a regional project with joint procurement at world market prices, a similar exchange would cost about \$2.2 million, a 47% saving. Savings would also be made on transit out-payments, which presently accrue to countries outside the region, but which after implementation of the interconnected network would remain within the region, making possible further infrastructural expansion.

Significantly, however, the study warns that “the impact on national development and the economic costs and benefits for each member state will not be proportionate ... What member states should appreciate is that the programme will benefit the region as a whole in the long term ... We recommend that the COMESA Secretariat ... make sufficient and effective dialogue and consultations to ensure that all members share a common vision on both the short-term and long-term economic costs and benefits. Without this dialogue, the project will face problems in mobilising the required political goodwill, commitment and a spirit of give and take, all of which are important ingredients to the success of such regional cooperation initiatives” (COMESA, 1996, p. 103).

V Financing and Institutional Arrangements

Section Two addressed the potential gains from a theoretical viewpoint, while Section Four outlined some of the specific opportunities for mutually beneficial cooperation in a number of infrastructural sectors. The realisation of that potential, and sharing of gains, depends crucially on overcoming the constraints encountered in the past which were outlined in Section Three. Some of these are macro issues related only indirectly to cooperation in infrastructural and natural resource development, principally the existence of political, military, social and economic stability. Other issues are more directly related, in particular the existence of effective institutions to direct and manage opportunities for regional cooperation.

Private interests are increasingly likely to play a role to ensure that benefits are maximised, while parastatal institutions will have regulatory functions to ensure that benefits are equitably distributed. This is because the widespread acceptance of the view that the private sector is better equipped to manage an organisation with a commercial function than a parastatal one has coincided with a sharp reduction in the capacity of sovereign states in Africa to guarantee loans for infrastructural development. Achieving the right balance within financing packages and institu-

tional arrangements is a major challenge for the future. A mixed solution with some public provision of services remaining seems likely in most countries, but some may favour the extreme route of immediate and full privatisation of state-owned utilities. This would at least have the benefit of putting considerable momentum into direct foreign investment with likely spill-over effects in other sectors.

Despite the impression that innovative private sector arrangements are common elsewhere in the developing world, there are in fact a relatively small number of examples of such projects in other continents.¹⁶ Very rapid growth is predicted, however, and Africa can usefully draw on experience of the various options, such as BOO (build, own, operate), BOOT (build, own, operate, transfer), DBFO (design, build, finance, operate).¹⁷ Major issues in such arrangements are the extent of responsibilities of different actors (including ownership of facilities), risk sharing, tariff structures and financial arrangements over the entire lifetime of projects. Governments need to gear themselves up very quickly to understand the complexity and the richness of the options which can be negotiated with private investors.

As regards private sector participation in the specific sectors already discussed:

- In **electricity**, there is scope for independent power producers at the generation end, but also for private transmission and distribution companies. At the regional level, a private Power Pool company is certainly feasible. The institutional structure for the Southern Africa Power Pool is yet to be finalised, and could embrace private participation to a greater or lesser degree. Similarly, in other forms of **energy** private sector participation is also feasible: in Section Four, mention was made of the private role in the WAPCO gas utilisation project.
- In **water**, operational roles such as hydrology, water management, dam operation and management and environmental management could increasingly be contracted out to private concerns with public institutions assuming regulatory functions. This could dramatically reduce the size of many of the river basin organisations while, in all likelihood, improving the performance and cost effectiveness of specific functions.
- In **transport**, changes in the direction of private or quasi-private institutions have already been alluded to in Section Four. There are poten-

¹⁶ See, for example, *The Economist*, "Asia delivers an electric shock", October 28th, 1995, page 77.

¹⁷ There are African examples, too, from which much can be learnt. See, for example, Van Wyck (1995) for an analysis of financing major African water projects.

tial benefits from moving in this direction in the institutional arrangements for all transport modes.

- In **telecommunications**, the argument has been made that the scale of investments required is well beyond the means of national budgets in most African countries. In addition, in a sector characterised by rapid technological change, effective collaboration with partners with technical expertise may also be critically important in determining the success of telecommunications strategies.
- In **tourism**, in most African countries the private sector is dominant. What is required is more sophisticated regulation of the sector to ensure that the gains for the nation from tourism are maximised and that environmental sustainability is given due weight.

To avoid expensive duplication and inefficiency as the extent of private sector participation grows, it is important that the role of existing parastatal institutions be changed in step. Even where areas remain in control of the government-owned regional institutions, cost recovery policies, coupled with continuous efficiency improvements to minimise costs, are needed to ensure sustainability. Where continued subsidies are justified on equity grounds, these can be provided from tax revenues or from cross-subsidisation within the tariff structure. The direct approach is more satisfactory from an economic viewpoint, but the cross-subsidisation route in many cases is more workable and hence sustainable.

Across all the areas, donor support will continue to be important, but the scale of infrastructural investments that is required and the need for countries to become less dependent on direct donor subventions implies that imaginative new financing arrangements will have to be found. With the projects being executed increasingly by private sector entities, donor funds might best be devoted to strengthening financial institutions, such as the COMESA Trade and Investment Bank and the Development Bank of Southern Africa as well as the African Development Bank, which in future could play key roles in arranging financing packages for regional infrastructure projects. The capacity of development finance institutions needs to be rapidly enhanced if targets are to be met, but the potential of existing institutions should be fully explored before new ones are created. Useful lessons can be drawn from the financing of regional cooperation elsewhere, such as the experience of the European Investment Bank in financing infrastructural investments in the European Union and a growing body of experience in developing countries.¹⁸

¹⁸ See, for example, World Bank (1994), Chapter Five. As countries develop their capital markets and the sophistication of the banking system increases, the options for financing become much broader.

VI Conclusions

Regional cooperation in infrastructure and natural resources in Africa has a potentially significant role to play in increasing the pace of economic growth and underpinning sustainable development. Direct gains arise from trade in areas such as electricity, water, transport and telecommunications services and from the reductions in national investment costs, especially where supply expansion is “lumpy”. Greater reliability in supply, reductions in unmet demand and learning externalities, such as technical and managerial skills, are developed through operating complex systems. Common natural resources, such as shared river basins, coastal ecosystems and wildlife habitats, cannot be effectively managed without regional cooperation. Properly managed regional tourism strategies could contribute to that process while increasing the revenue and employment benefits for participating countries.

Electricity is the sector with the greatest scope for cooperation. Grid inter-connections, fed by hydro and gas-fired power stations, offer considerable benefits, potentially reducing continent-wide investment requirements in this sector from around \$4 billion per annum to \$3 billion per annum. Ultimately, backbone connections could span the entire continent, with national and sub-regional electricity grids being secured with connections to the main supply channels.

In water management, there is considerable scope for better use of shared water resources for hydro-electricity generation, urban supply, agricultural development, fisheries development and tourism. In the transport sector, improvements in facilities and the quality of service is essential to reduce high bridging costs, especially for the 15 landlocked countries of Africa. In many cases, nominal capacity of transport systems is more than adequate for present levels of traffic, but is in need of rehabilitation, proper maintenance and improved management for an effective service to be provided. This is not the case in telecommunications, where high levels of investment are required to replace antiquated equipment and to expand capacity ahead of economic growth. Regional cooperation in telecommunications offers the potential to significantly reduce investment and recurrent costs. With an increasing role envisaged for the private sector and the consequent need for effective regulation, the emphasis in current transport and telecommunications programmes is on institutional reform.

In the past, despite obvious benefits typically for all participating countries, the potential for regional cooperation in infrastructure and natural resources has not been exploited for a number of inter-related reasons. The benefits may not have been properly quantified and understood; nationalism, compounded by confusion between self-reliance and security

of supply, was a strong influence despite rhetorical commitment to regionalism; regional projects tended to stall when disparities between countries meant one country not being able to raise the necessary loan, or being less committed because of a perception of disparate gains accruing; inefficient parastatal control of facilities and inappropriate institutions responsible for regional programmes undermined the attainment of regional goals. Despite considerable donor support for regional projects and programmes, donor procedures, which are oriented to nations rather than regions, also contributed to the bias towards national rather than regional projects in the past.

These problems will not immediately be overcome in the future, but the emergence of peace in Southern Africa and in some other parts of the continent and the greater degree of economic realism characteristic of the structural adjustment era, including acceptance of a role for the private sector in infrastructure provision, are reasons for greater optimism about the prospects for regional cooperation in the years to come. The challenge will be to design financing and institutional structures which will turn potential regional benefits in infrastructure and natural resource management into reality on a sustained basis. In this, the mix between private sector resources and management to maximise benefits and public sector regulation to ensure their equitable distribution, will need to be carefully handled, drawing on experience in other continents. Rather than financing projects directly, donor finance should be channelled towards building up development finance institutions capable of arranging the increasingly complex financial packages which are likely to be required in future regional infrastructure projects.

Success in regional cooperation could well contribute to building a constituency in favour of deeper forms of integration, including the removal of barriers to trade and financial flows, this in turn sustaining the pace of regional development. Regional cooperation is thus not an alternative to regional integration, but a complementary strategy which can advantageously be pursued in parallel to the more difficult forms of regionalism.

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