Public investment in infrastructure: an approach for sustainable development

This document has been prepared as a background document for the 5th NEPAD-OECD Ministerial Conference on 26-27 April 2011 in Dakar, Senegal. This position paper was drafted by Laura Recuero Virto with substantial input from Papa Amadou Sarr and Eugenio Santagata. Andrew Mold, Sebastián Nieto Parra, Mario Pezzini, Carlos Alvarez, Henri-Bernard Solignac-Lecomte, Amalia Johnsson, Martha Baxter, Jan Rielaender, Bakary Traoré and Myriam Dahman Saidi also contributed. The views contained within do not necessarily represent those of NEPAD, the OECD or their member governments.

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Public investment in infrastructure: an approach for sustainable development

An approach for effective investment in infrastructure

What can public investment in infrastructure contribute?

What are the trends in infrastructure investment?

Are there resources for public investment in infrastructure?

Conclusion

Acknowledgments, further information & related reading

Did you know that capital spending in Africa could be around 50% higher if only government institutions had the capacity to spend all of the allocated resources? Infrastructure finance is also increasingly available. Even though capital budgets fall far short of actual needs, most countries can gain much by improving the effectiveness of public investment and policies for infrastructure.

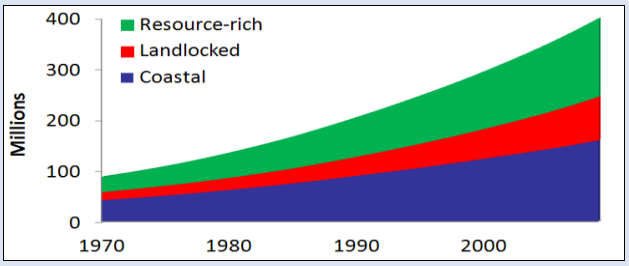
This paper presents the OECD Development Centre's recent work on infrastructure. The objective of this work is to strengthen public investment and policies for infrastructure. The studies and mechanisms developed by the Centre can help governments to analyse effectiveness in the different phases of infrastructure delivery and the interactions among major public and private actors, offering a complementary approach to work developed by other international and financing institutions. The Centre's analysis is based on primary data from governments in a set of African, Latin American and Asian countries. Its framework on infrastructure is based on 10 years of field-experience on policy design with government officials and private sector agents in the framework of the *African Economic Outlook*.

In this paper, we (i) present and explain the Centre's approach and instruments; (ii) put forward how public investment in infrastructure can contribute to intra-African trade and food security; (iii) show that investment in infrastructure in Africa has been increasing over the last decade, even if the funding gap remains large; (iv) illustrate that there are resources in Africa for public investment in infrastructure; and (v) conclude.

Infrastructure planning is essential for sustainable development

Africa's urban population has exploded (Figure 1). Indeed, Africa has as many cities with more than 1 million people as Europe. Appropriate planning and prioritisation of investments in infrastructure will ensure the long-term sustainability of cities in Africa.

Figure 1. Urban population in Africa



Source: OECD Development Centre based on World Development Indicators.

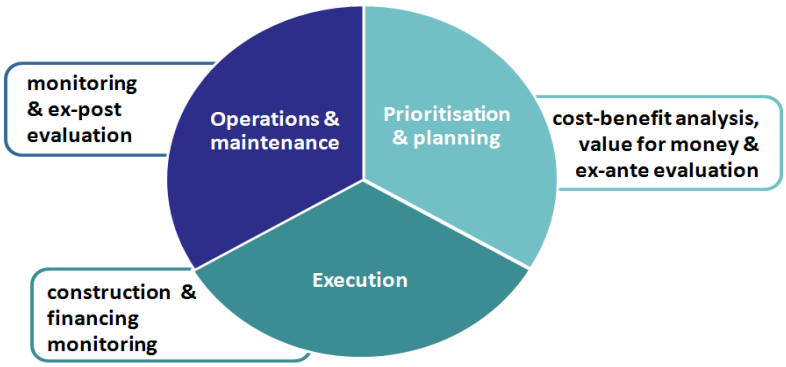
An approach for effective investment in infrastructure

The OECD Development Centre's work on infrastructure provides guidance to governments for improving effectiveness of public investment and policies. The objective is to identify the reforms needed to improve effectiveness in infrastructure policies in order to harness unexploited economic and social opportunities for sustainable development. The Centre analyses effectiveness in the different phases of infrastructure delivery, or the *infrastructure cycle*, with particular attention to two aspects (Figure 2):

- **institutional design:** from the planning and prioritisation stage to investment execution, operation and maintenance, identifying key actors in each stage; and
- **incentive schemes:** examining if proper checks and balances are set and spotting conflicts of interest in roles for monitoring and overseeing investment execution, service provision and ex-ante and ex-post impact evaluation.

The Centre also analyses interactions among major actors throughout the *infrastructure cycle*. In particular, the Centre develops a framework characterised by a comprehensive approach for assessing the political institutions and the interactions between: (i) different ministries at the planning and policy levels; (ii) the executive and the legislative; (iii) local (state/provincial/departmental as well as municipal) and central policy-makers and; (iv) private and public sector with the public institutional design when the private sector is participating.

Figure 2. The Infrastructure Cycle



Source: OECD Development Centre.

The OECD Development Centre follows a complementary approach to that developed by other international organisations and financing bodies. This approach provides necessary guidelines to policy makers for how they can improve infrastructure public policies. More generally, the Centre raises awareness on the need to improve infrastructure institutions in emerging and developing economies.

The methodology is based on surveys and data from local and central governments for a group of countries in Africa, Latin America and Asia. Two types of primary data:

- surveys of major public and private actors in areas of infrastructure policy process; and

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- data from local and central government levels on infrastructure investment, costs and requirements as well as political and institutional information, helping to analyse efficiency, co-ordination and coherence in infrastructure projects.

Surveys and data collection are carried out for a number of countries, including Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Mexico, Burkina Faso, Burundi, Egypt, Kenya, Mauritius, Morocco, Rwanda, Senegal, South Africa, Tanzania, Uganda, Korea, India, Indonesia, Thailand and Viet Nam. This research is used as background material for the Centre's annual flagships: *Southeast Asian Economic Outlook, Latin American Economic Outlook, Perspectives on Global Development* (see Related Reading).

The Centre's analyses and instruments help to identify major bottlenecks and negative incentives that prevent higher quantity and quality of infrastructure services. For instance, shortcomings identified and studied include:

- *Co-ordination failure at the level of ministries*

  Physical capital accumulation is a necessary but not sufficient condition for the creation of services. Governments should regularly associate infrastructure investment with structural reforms in other sectors. For instance, local roads that connect areas of food production and consumption are of little use if the government does not address other bottlenecks in agriculture. Some recurrent problems are the lack of appropriate storage facilities, inadequate land rent pricing and lack of irrigation facilities.

  Governments should complement infrastructure plans with policies that facilitate the delivery of services and, in particular, prioritise those services that match population skills. In Mozambique, infrastructure was built to favour the installation of the so-called mega-projects. For example, Mozal is an aluminium smelter located in Beluluane since 1998. The government created the Beluluane Industrial Park near Mozal so that the local population could provide services to the smelter but the Ministries of Education and Industry were not sufficiently consulted to identify and promote population skills. As a result, the local labour market was not able to fulfil requirements and it is mostly foreign companies that are based in the park, creating very little in the way of local jobs.

- *Co-ordination failure between supra-national and national priorities*

  Countries are often subject to co-ordination failure between different levels of vertical governance. For instance, the roads connecting Mali to the coast through Burkina Faso and Ghana are expensive. There are 6.7 checkpoints per 100 km through Mali-Burkina Faso-Ghana, which means that users have to pay on average 14.9K CFCA and add an extra 1 hour and 15 minutes per 100 km to their journey time. In spite of subsidies, transport prices end up being among the highest in the world. The supply chain counts for 20% of the price of imported/exported goods.

  While transport prices are high, the roads connecting Mali to the coast through Burkina Faso and Ghana are poorly maintained. This situation is particularly harmful in this region because the transport of goods has shifted to roads since the 1980s due to poor rail maintenance and service. Following the Ivory Coast crisis in 2002 their rail-line closed, which resulted in the overloading of roads across Burkina Faso and Ghana. In Burkina Faso alone, road maintenance would need an additional USD 63 million per year to keep up with increasing truck traffic.

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- *Unbalanced expenditure mix between new investment and maintenance*

  Governments sometimes fail to support infrastructure services that are of affordable quality over time. There is, in particular, a systematic bias against maintenance in regimes where both investment and maintenance are funded through the same channels. Investment is favoured because large schemes are politically attractive and have easier access to external financing. Maintenance is not prioritised because its deferral carries a penalty only in future costs. In Mali, the Road Fund was required to provide the national counterpart funding of foreign lending for road construction as well as to finance the servicing of debt on earlier investments. These became the first calls on the Road Fund, and maintenance suffered accordingly.

  In South Africa, the government is introducing a dedicated Road Infrastructure Maintenance Fund to deal with the USD 10.8 billion road maintenance backlog. The government observed at provincial and local level that maintenance was not an attractive method of spending and transport budgets were used to build new roads. As a result, the government estimates that 40% of the roads which fall under provincial authorities are 'in crisis'. The government is seeking a ring-fencing mechanism to set aside dedicated funds for road maintenance and ensure that all provinces will undertake work. A national quality audit is nevertheless necessary to determine the exact extent of the backlogs. Currently, only 4% of municipalities audit their road networks to determine their infrastructure needs.

What can public investment in infrastructure contribute?

Public investment in infrastructure along *local corridors* could raise the low levels of intra-African trade and decrease the high prevalence of undernourishment. According to the World Bank, a 10% drop in transport costs could result in a 25% increase in total African trade, also easing transit between food production and consumption areas. Governments should therefore support *local corridors* inside the African continent with public funds and with the appropriate institutional framework for private participation to achieve better outcomes in trade and food security. At present, the so-called *development corridors* are attracting the bulk of resources both from private and public agents. These *development corridors* connect natural resources to coastal lines to enable extractive industries to export internationally.

The increase of exports to non-African partners is exacerbating the concentration of private and public funds in *development corridors*. In the last decade, African exports to both traditional and emerging partners have been rising. African exports to traditional partners increased from USD 78.3 billion in 2000 to USD 174.7 billion in 2009. African exports to emerging partners evolved even faster: from USD 25.5 billion in 2000 to USD 129.4 billion in 2009. In contrast, intra-African trade has shrunk by 12.8% in the same period. By 2009, intra-African exports only accounted for 10% of total exports from the continent (Figure 3), a trend which explains the concentration of efforts in *development corridors*. These corridors enable extractive industries to commercialise natural resources internationally at the expense of other key products for Africa such as food commodities and manufacturing.

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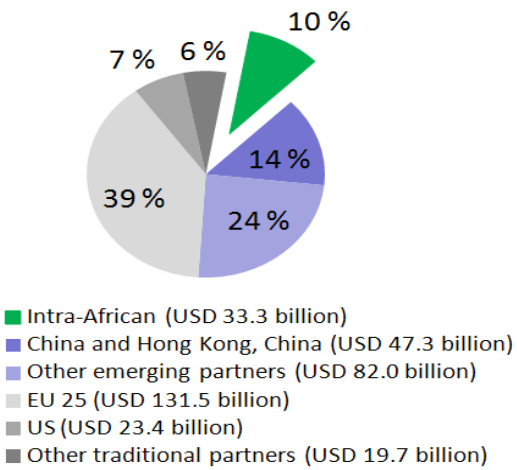
Figure 3. African exports (2009)



Source: OECD Development Centre based on Comtrade.

Food security is a more pressing matter than ever due to the continent's structural dependence on food imports and rising international food prices. Africa is a net importer of all of its basic food commodities. This reliance on food imports renders the continent vulnerable to international price fluctuations. The FAO Food Price Index (FFPI) attained in February 2011 the highest value (in both real and nominal terms) since January 1990. The FFPI is therefore above the peak reached in June 2008 during the global food price crisis that hit many countries in the region extremely hard. Almost 250 million people, or a quarter of the continent's population, are undernourished (Figure 4). The number has already risen by 100 million since 1990.

Infrastructure is a key instrument to tackle food security in Africa. There are absent or inefficient connections across the continent between areas with excess food production and those with pockets of food insecurity. This is a common picture even within the same country (*e.g.* Mozambique, Ethiopia, Togo and Cape Verde). In this context, excess food production often ends up wasted and areas without local production remain dependent on costly food imports. Africa has nevertheless a large potential to address food security concerns. About 70% of Africans are involved in agriculture and, according to World Bank and FAO data, the continent represents about 60% of the potentially available cropland in the world.

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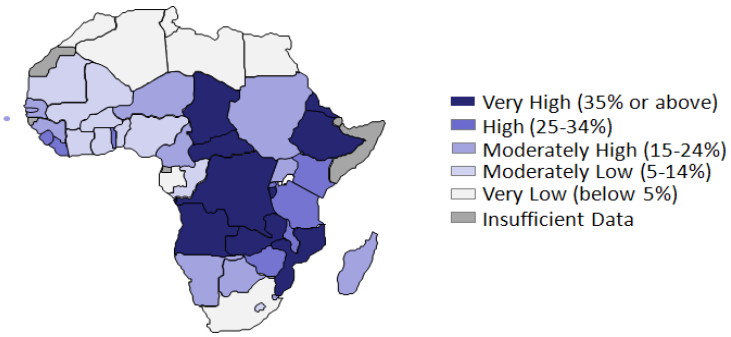
Figure 4. Prevalence of undernourishment (2007-2009)



Source: OECD Development Centre based on FAO.

What are the trends in investment in infrastructure?

In the last decade, there has been increasing investment in infrastructure in Africa, even if the financing gap is still large. Since the 2000s growth rates in Africa have been accelerating in electricity production (Figure 5, left), paved roads (Figure 5, centre) and access to improved water sources (Figure 5, right). Nevertheless, according to the World Bank, Africa needs to invest USD 93 billion annually over the decade to meet infrastructure needs. This implies an additional financing of USD 31 billion a year.

Although there are still enormous deficits in terms of cheap and reliable supply, growth rates in electricity production have risen across many African economies. Oil-producing countries have enjoyed the fastest growth rates in electricity production in the last decade. In Angola, Sudan, Libya and Cameroun, growth rates have been above 24% in the course of five years. Some non-resource-rich countries are also expanding electricity production, at a rate of over 15% in the same period. We observe this growth in countries with relatively high levels of electricity production such as Egypt, Morocco and Mozambique, but also in countries with very low levels of production such as Benin, Tanzania and Ethiopia. Despite this relatively positive outlook, total electricity production in kilowatt-hour in Africa is equivalent to 13.2% of the production in North America and 28.2% of the production in Western Europe.

Some African countries are making impressive efforts to improve road transport, even if the performance is heterogeneous across the continent. For instance, during the 2000s Malawi's transport spending was close to USD 100 million per year, 3% of GDP. This investment helped to increase paved roads as a percentage of total roads from 18% to 45% in 5 years. Djibouti and Guinea-Bissau, both war-affected economies in the 1990s, successfully took up the challenge of the reconstruction of roads. In Djibouti paved roads as a percentage of total roads raised in the course of a decade from 13% to 45%; in Guinea-Bissau from 9% to 27%. Nevertheless, for the continent as a whole, the pending task is enormous. In the first half of the 2000s, the whole of the African continent had only 650 000 km of paved roads which is about 30% less than France, a country roughly the size of Kenya.

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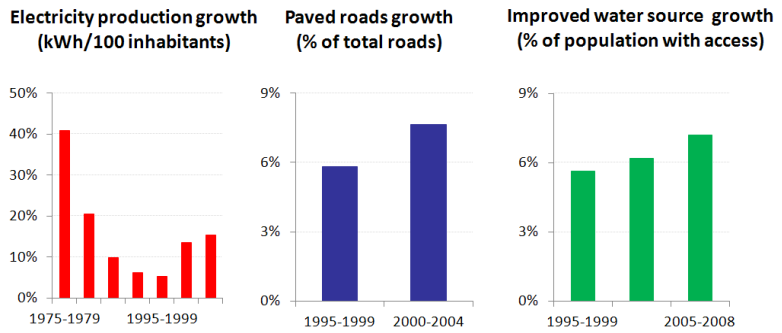
Most African countries are improving their access to water over time even though shortages are persistent. Since the early 1990s, access to improved water sources across Africa has been rising steadily to reach almost 70% by 2008. In the last decade, in Burkina Faso, Ethiopia and Malawi, growth rates in access to water have risen above 50%. Shortages are nevertheless still persistent throughout the year in many countries due to the uneven distribution and poor management of supplies. For example, in terms of uneven distribution, the Congo basin has 30% of the continent's water but is only inhabited by 10% of Africa's population. Water should be shared with areas that have a higher population density. Regarding management, South Africa's "Working for Water" Programme is alleviating water scarcity by removing water-consuming non-indigenous plants such as pines and wattles. This plan increases water flow into rivers without building new dams.

Figure 5. Growth rates in infrastructure investment



Source: OECD Development Centre based on WDI.

Are there resources for public investment in infrastructure?

Public financial management practices and increased access to finance enable the fostering of public investment in infrastructure in Africa. Capital spending on infrastructure in Africa can increase substantially if government institutions spend all the resources they are allocated. Financing infrastructure is not only a matter of finding new sources of investment, but also of managing to spend already allocated budgets. Indeed, budget execution ratios on capital spending range from 89% in Madagascar to 28% in Benin. Poor planning, lack of technical skills and insufficient human resources at provincial and local levels, and delays in procurement are some of the issues that explain low execution rates. Since 2004, senior budget officials from 31 states have been addressing these problems in the Collaborative Africa Budget Reform Initiative (CABRI). Furthermore, since the last decade access to financing has improved in Africa. In the period 2000-10, the export of natural resources, Official Development Assistance (ODA), Foreign Direct Investment (FDI) and lines of credit have contributed to improving the African 'savings-gap'. These sources of finance provide means to support public investment in infrastructure.

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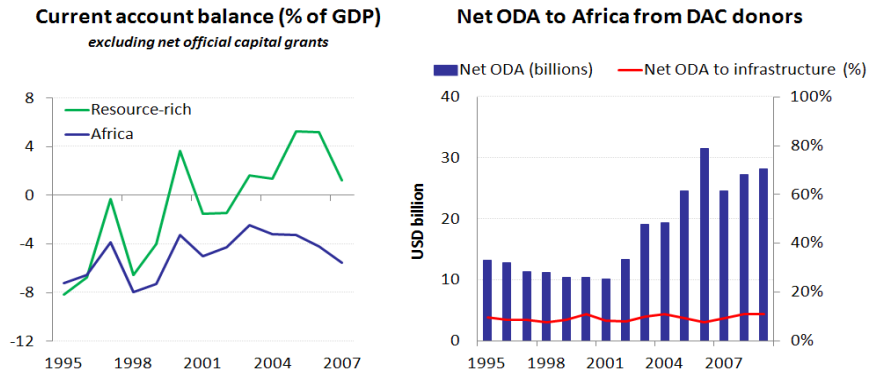
Income from natural resource exports and, to a lesser extent, ODA flows can contribute to investment in infrastructure in Africa. The current account balance over Gross Domestic Product (GDP) has improved significantly in resource-rich countries over the last decade (Figure 6, left). Some resource-scarce coastal and landlocked countries continue nevertheless to confront a quite difficult financing situation (as revealed, for example, by their continued current account deficits). ODA can, to some extent, fill the breach. In terms of ODA, aid to Africa from DAC donors rose substantially from USD 10.3 billion in 2000 to USD 28.2 billion in 2009 (Figure 6, right). The four infrastructure sectors (transport, telecommunications, electricity and water) receive 9.6% of these ODA flows.

Figure 6. Natural resources and ODA



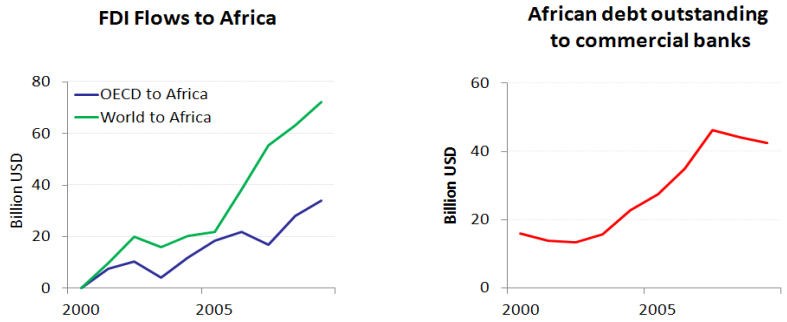
Source: OECD Development Centre based on OECD, CRS and WDI.

FDI from both OECD and non-OECD countries represents an important source of infrastructure financing for Africa. The increase in FDI flows to Africa has been steep, growing from USD 9.8 billion in 2000 to USD 58.5 billion in 2009 (Figure 7, left). The services sector, led by the telecommunications industry, became the dominant FDI recipient and attracted the largest share of cross-border Mergers & Acquisitions (M&A) in Africa. Transactions included the USD 2.4 billion UK Vodafone deal in South Africa and the USD 10.7 billion Indian Bharti's acquisition of Zain's operations in Africa.

Lines of credit from commercial banks and credit export agencies from OECD and non-OECD countries are key sources of infrastructure financing for Africa. African debt to commercial banks rose from USD 15.8 billion in 2000 to USD 42.4 billion in 2009 (Figure 7, right). To illustrate, by the end of 2010 Angola had USD 2.3 billion in lines of credit from commercial banks in OECD countries. During 2008-2010, Chinese non-concessional loan commitments to African projects were estimated in the range of USD 5 billion per year. In addition, export credit agencies in OECD countries are also providing lines of credit. For instance, a credit line of USD 141 million from Portugal is targeted at reducing energy dependence on oil in Cape Verde. The construction of the transmission line of Kenya's Lake Turkana Wind Power is financed with USD 150 million from Spain. This is the largest wind power project in Africa. Export credit agencies in non-OECD countries are also very active in delivering lines of credit. In 2008-2010, preferential export credits from China totalled around USD 2 billion. By 2006, India had 29% of their world project export contracts in Africa, which

amounted to almost USD 1 billion in lines of credit.

Figure 7. FDI and lines of credit



Source: **OECD Development Centre based on IMF, UNCTAD and OECD.**

Conclusion

The OECD Development Centre seeks to emphasise the important role that public investment plays in infrastructure. In this position paper, we explain how public investment in infrastructure can contribute to intra-African trade and food security. The two latter are key issues for Africa's development and its resilience to external shocks. We also show that investment in infrastructure in Africa has been increasing over the last decade, even if the funding gap remains large. Indeed, we illustrate that there are additional resources available for public investment in infrastructure.

This approach on public investment in infrastructure is part of the OECD Development Centre's work on improving the effectiveness of public policies in infrastructure service delivery. The Centre's analyses and instruments pay particular attention to the different phases of the *infrastructure cycle* and to interactions between political institutions. The ultimate objective of this work is to improve the design of public policies in infrastructure in order to harness opportunities for sustainable development.

Acknowledgements

This position paper was drafted by Laura Recuero Virto with substantial input from Papa Amadou Sarr and Eugenio Santagata. Andrew Mold, Sebastián Nieto Parra, Mario Pezzini, Carlos Alvarez, Henri-Bernard Solignac-Lecomte, Amalia Johnsson, Martha Baxter, Jan Rielaender, Bakary Traoré and Myriam Dahman Saidi also contributed.

Further information

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Related reading

On infrastructure in Africa see:

- OECD (2012), *Perspectives of Global Development 2012*, OECD Publishing. *Forthcoming* special issue on the Infrastructure Cycle and its Political Institutions in Transport.
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- OECD (2012), *Perspectives on Global Development 2012*, OECD Publishing. *Forthcoming* special issue on the Infrastructure Cycle and its Political Institutions in Transport.
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- OECD (2010), *Southeast Asian Economic Outlook 2010*, OECD Publishing. Special issue on Transport and Regional Integration.

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Policy solutions to improve lives in developing and emerging economies

Following a proposition by US President John F. Kennedy, the Development Centre was created in 1962 by the Organisation for Economic Co-operation and Development (OECD) in Paris. For nearly 50 years the Centre has served as an interface between OECD member countries and emerging and developing economies, providing an independent platform for policy dialogue and mutual learning on economic and social development policies.

The Centre occupies a unique place within the OECD with its Governing Board composed of 25 OECD and 16 non-OECD members among which are five African countries: Cape Verde, Egypt, Mauritius, Morocco, Senegal and South Africa. All these members finance the Centre and set and monitor its programme, on an equal footing.

- The Centre's flagships include: (i) African Economic Outlook; (ii) Latin American Economic Outlook; (iii) Southeast Asian Economic Outlook; and (iv) Perspectives on Global Development.

- The Centre manages networks: (i) *EmNet,* the Emerging Markets Network dedicated to the private sector; (ii) *DeFiNe*, a global network of think tanks and academic establishments; and (iii) *DevCom* Network which gathers directors of communication/public affairs from the DAC Member countries.

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