

PUBLIC INVESTMENT AND THE POOR: INITIAL EVIDENCE FROM EAST AFRICA AND POLICY IMPLICATIONS FOR WEST AFRICA

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A. Summary Note^{*}

The past two decades saw a decline in the number of poor at the global level. In Africa, however, both the absolute number and the share of poor in the total population have increased, and the prognosis is that poverty will continue to worsen in this region. Government spending, if used wisely, can play a crucial role in promoting economic growth and reducing poverty. This role is particularly important for the rural sector, as the majority of poor reside in rural areas. However, despite an increasing trend over the past two decades, public expenditure, particularly in agriculture and in rural areas, remains low in Africa compared with Asia and Latin America. For West Africa, the picture is even dimmer. For example, agriculture spending accounted for 4 percent of total government expenditures in West Africa in 1998 compared with 10 percent for Asia and 5 percent for East Africa.

Government spending affects rural poverty through many channels. For example, public investment in agricultural research, rural education, and infrastructure increases farmers' income directly by increasing agricultural productivity, which in turn reduces rural poverty. Indirect impacts come from higher agricultural wages and improved nonfarm employment opportunities induced by higher agricultural productivity. In addition to their productivity impact, public investments in rural education, health, and infrastructure directly promote rural wages, nonfarm employment, and migration, thereby reducing rural poverty. For example, improved infrastructure access will help farmers set up small rural nonfarm businesses such as food processing and marketing enterprises, electronic repair shops, transportation and trade, and restaurant services. Understanding these different effects provides useful policy insights to improve the effectiveness of a government's poverty reduction strategies. In particular, this knowledge provides information on how public investment can be used to strengthen weak links between poverty reduction channels to increase efficiency in targeting public resources on poverty reduction.

The literature on the impact of public investment on growth and poverty reduction in Sub-Saharan Africa is sparse. Two recent studies undertaken at IFPRI estimated the productivity and poverty reduction effects of public investments in rural Uganda and Tanzania. One important finding to emerge from the case study on Uganda is that all types of public spending (namely, agricultural research, roads, education, and health) reduce poverty while increasing the country's agricultural production. For the country as a whole, government expenditure on agricultural extension and research has the highest return to labor productivity and to poverty reduction, followed closely by investment in feeder roads. Education ranked third in terms of productivity and poverty reduction effects. Regional disaggregation reveals that, for all types of investments except health, the returns in terms of increased agricultural productivity is the highest in the western region. In terms of poverty reduction, the northern region, which is Uganda's poorest region, has the highest returns for all types of investment except for health.

In Tanzania, the preliminary results reveal that education has the largest effect on poverty, and the second-largest impact on household per capita income. On the other hand, road investment has the largest marginal impact on per capita income, and the second-largest impact on poverty reduction. As in Uganda, regional variation is observed in the marginal impact of public expenditures on poverty

^{*} Original summary was written in English.

alleviation. For example, the marginal impact of education on poverty was the highest in the western zone and in Lake Victoria, whereas roads yielded the highest return in central and western Tanzania.

West Africa's performance on economic growth and poverty reduction has been dismal for the past several decades. Insufficient level, misallocation, and low efficiency in the use of public funds have been identified as some of the reasons behind this poor performance, together with other key factors such as poor governance and absence of peace and stability. Despite the geographical, cultural, and socioeconomic differences, the case studies for Uganda and Tanzania have important implications for West Africa. The cases highlighted the importance of public investments in rural areas in generating economic growth and promoting poverty reduction. Moreover, these investments yielded high returns on both economic growth and poverty reduction. These two case studies also showed that returns to public investments vary across regions within the same country. As considerable diversity exists in the West African region, better targeting is crucial to improve the effectiveness of limited public resources.

INVESTISSEMENT PUBLIC ET PAUVRETÉ: PREMIERS ÉLÉMENTS D'AFRIQUE DE L'EST ET IMPLICATIONS POLITIQUES POUR L'AFRIQUE DE L'OUEST

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B. Résumé*

Alors qu'au cours des deux dernières décennies, le nombre de pauvres a diminué au niveau mondial, en Afrique, le nombre absolu de pauvres et leur part relative dans la population totale se sont accrus et, selon les prévisions, cette pauvreté va s'aggraver dans cette région du monde. Les dépenses de l'Etat, utilisées à bon escient, peuvent jouer un rôle crucial en favorisant la croissance économique et en réduisant la pauvreté. Cela est particulièrement décisif pour le secteur rural, car la majorité des pauvres réside en milieu rural. Cependant, en dépit d'une tendance à l'accroissement au cours des deux dernières décennies, les dépenses publiques, en particulier dans l'agriculture et le secteur rural, restent faibles en Afrique comparativement à l'Asie et l'Amérique latine. Pour Afrique de l'Ouest, ce constat est plus grave encore. En effet, en 1998, les dépenses pour l'agriculture représentaient 4 % des dépenses publiques totales en Afrique occidentale, alors qu'elles étaient de 10 % en Asie, et de 5 % en Afrique de l'Est.

Les dépenses de l'Etat interviennent sur la réduction de la pauvreté rurale à travers de multiples voies. Les investissements publics, par exemple, dans la recherche agricole, l'éducation en milieu rural et les infrastructures accroissent directement les revenus des producteurs en augmentant la productivité agricole, qui en retour réduit la pauvreté rurale (schéma 1). Les effets indirects proviennent de salaires agricoles plus élevés et d'une plus grande opportunité d'emplois non agricoles induits par une amélioration de la productivité agricole. Outre leur impact sur la productivité, les investissements publics dans l'éducation, la santé et les infrastructures rurales ont des effets directs favorables sur les salaires ruraux, les emplois non agricoles et la migration, et de ce fait contribuent à la réduction de la pauvreté rurale. Ainsi, l'amélioration de l'accès aux infrastructures favorise l'installation de petites entreprises non agricoles rurales comme les entreprises de transformation et de vente de produits alimentaires, les ateliers de réparations électroniques, les entreprises de transport et de commerce, et les services... La prise en compte de ces différents effets apporte un nouvel éclairage susceptible d'améliorer l'efficacité des stratégies nationales de réduction de la pauvreté. En particulier, elle fournit des informations sur la façon dont l'investissement public peut être employé pour renforcer des liens entre les différents moyens de réduction de la pauvreté, augmenter l'efficacité des ressources publiques destinées à lutter contre la pauvreté.

Les études concernant l'impact des investissements publics sur la croissance et la réduction de la pauvreté en Afrique subsaharienne sont assez rares. Deux études récentes entreprises à IFPRI ont évalué les effets des investissements publics en milieu rural sur la productivité et la réduction de la pauvreté en Ouganda et en Tanzanie. Une des principale conclusion tirée de l'étude de cas sur l'Ouganda est que toute dépense publique visant l'augmentation de la production nationale, quel que soit son type, (agriculture, défense, éducation, santé, sécurité sociale, et transport et communication) contribue à la réduction de la pauvreté. Dans l'ensemble national, les dépenses publiques pour l'accroissement agricole et la recherche ont l'impact le plus important sur la productivité du travail et la réduction de la pauvreté, suivies de près par les investissements routiers. L'éducation vient en troisième position en termes d'effets sur la productivité et la réduction de la pauvreté. La distribution régionale indique que, pour tous les types d'investissements, à l'exception de la santé, les effets en termes d'accroissement de la productivité

* Résumé original écrit en anglais.

agricole sont les plus élevés dans la région occidentale. En termes de réduction de la pauvreté, la région nord, qui est la région la plus pauvre de l'Ouganda, enregistre les réponses les plus élevées pour tous les types d'investissement à l'exception de la santé. En Tanzanie, les résultats préliminaires indiquent que c'est l'éducation qui a l'impact le plus important sur la pauvreté, et vient en deuxième position pour ses effets sur le revenu des ménages *per capita*. D'autre part, les investissements routiers ont l'impact marginal le plus élevé sur le revenu *per capita*, et viennent en deuxième position pour leurs effets sur la réduction de la pauvreté. Comme en Ouganda, on observe une variation régionale de l'impact marginal des dépenses publiques sur la réduction de la pauvreté. Par exemple, l'impact marginal de l'éducation sur la pauvreté est le plus important dans la région Ouest et la région du lac Victoria, tandis que les investissements routiers ont une meilleure répercussion dans les régions Centre et Ouest de Tanzanie.

Les performances de l'Afrique de l'Ouest concernant la croissance économique et la réduction de la pauvreté ont été médiocres au cours des dernières décennies. Un niveau insuffisant, une mauvaise répartition et une piètre efficacité des ressources publiques apparaissent parmi les principales causes de ces faibles performances avec entre autres une direction politique déficiente, une absence de stabilité politique et de paix. En dépit de différences géographiques, culturelles et socio-économiques, les études de cas sur l'Ouganda et la Tanzanie ont des implications importantes pour l'Afrique de l'Ouest. Les études de cas ont mis en lumière l'importance des investissements publics en milieu rural en générant la croissance économique, qui elle-même crée des retours sur investissements et favorise ainsi la réduction de la pauvreté. Ces deux études de cas ont également montré que les retours sur investissements varient d'une région à l'autre dans un même pays. Compte tenu de l'extrême diversité existant en Afrique de l'Ouest, une meilleure optimisation des ressources publiques, d'autant plus qu'elles sont limitées, est indispensable pour améliorer leur efficacité.

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C. Background Paper

Introduction

The past two decades saw a decline in the number of poor at the global level. In Africa, however, both the absolute number and the share of poor in the total population have increased, and the prognosis is that poverty will continue to worsen in this region.

Economic growth and improved income distribution are fundamental forces to achieve poverty reduction. Government spending, if used wisely, can play a crucial role in promoting economic growth and reducing poverty. This role is particularly important for the rural sector, as the majority of poor reside in rural areas. Evidence shows that public investment in rural areas has stagnated in recent years in many developing countries and has fallen as a share of total government expenditure and of agricultural gross domestic product (AgGDP; Fan and Rao 2003). This stagnation has been driven in part by the need to cut total public expenditure as part of structural adjustment programs, but also by the low priority attached to agriculture since the mid-1980s by many governments and donor agencies.

It is unlikely that governments in developing countries will have the resources to increase public investment in rural areas in the future. Thus, governments are asked to do more with less. Information on the relative returns to various types of investments can help governments better target these limited resources to achieve the twin goals of economic growth and poverty reduction. The objectives of this paper are to (1) review the trend and composition of public expenditures in Africa, (2) synthesize evidence on the impact of public investment on agricultural growth and poverty reduction from two recent studies conducted in East Africa, and (3) outline lessons on investment strategies for West Africa.

Government Spending and Composition

Public spending includes long-term investment in R&D, education, and infrastructure, as well as social spending such as social security or direct food subsidies to poor households. The trends and composition of government spending over time provide important insights toward understanding government priorities on agricultural growth and poverty reduction.

Across all regions, Asia experienced the most rapid growth from 1980 to 1998, while public expenditure in Africa and Latin America increased at a much slower pace (Table 1). Among the African countries, Nigeria ranked first in terms of total public expenditures in 1998, followed by Zimbabwe, while Malawi trailed behind. Public spending as a share of GDP, which measures the amount a country spends relative to the size of its economy, was surprisingly higher in Africa, at 26 to 28 percent over the last two decades, than in Asia and Latin America. Within Africa, public expenditure as a proportion of GDP was the largest in Zimbabwe and Botswana in 1998 and the lowest in Uganda. Among the seven West African countries in Table 1, Cote d'Ivoire had the highest expenditure-to-GDP ratio in 1998, followed closely by Mali and Burkina Faso.

Table 1 — Government expenditures

Region/country	Total public expenditures (1995 international dollars, billions)			Public expenditures as share of GDP (percentage)		
	1980	1990	1998	1980	1990	1998
West Africa						
Burkina Faso	0.61	1.03	2.19	12.20	14.98	22.89
Cameroon	2.33	4.34	3.50	15.74	21.17	16.18
Cote d'Ivoire	5.42	4.50	5.71	31.68	24.48	23.99
Ghana	2.05	3.09	6.36	10.89	13.25	19.40
Mali	1.01	1.38	1.69	19.44	25.00	22.72
Nigeria	9.43	20.05	20.16	12.80	24.49	19.79
Togo	1.55	0.93	1.33	30.80	16.70	21.05
Other African countries						
Botswana	0.78	2.32	3.49	29.82	33.80	35.94
Egypt	41.78	39.36	58.90	50.28	27.81	30.12
Ethiopia	4.50	7.50	9.10	18.75	27.17	25.20
Kenya	4.25	6.89	8.23	25.26	27.46	28.03
Malawi	1.16	1.11	1.29	34.59	26.55	22.90
Morocco	17.43	22.16	29.45	33.09	28.82	31.31
Tunisia	8.02	12.48	16.29	31.56	34.60	31.51
Uganda	0.90	2.11	3.70	9.47	15.60	16.15
Zambia	2.22	1.81	1.96	37.05	27.26	27.51
Zimbabwe	4.85	7.30	16.67	27.92	27.32	52.23
Africa ^a	108.30	138.38	190.01	28.46	26.25	27.64
Asia ^b	454.70	789.30	1273.30	19.06	16.82	15.23
Latin America and the Caribbean ^c	212.57	219.97	326.55	16.84	15.47	16.60
Developing countries	775.56	1,147.65	1,789.86	19.25	17.28	16.25

Source: Calculated by Fan and Rao (2003) using data from IMF (various issues).

^aThe 17 countries included are Botswana, Burkina Faso, Cameroon, Côte D'Ivoire, Egypt, Ethiopia, Ghana, Kenya, Malawi, Mali, Morocco, Nigeria, Togo, Tunisia, Uganda, Zambia and Zimbabwe.

^bThe 11 countries included are Bangladesh, China, India, Indonesia, Korea, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, and Thailand.

^cFor 15 countries included are Argentina, Belize, Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Panama, Paraguay, Uruguay and Venezuela.

Equally important is the composition of government expenditures, which reflects government spending priorities. Table 2 gives a detailed breakdown by expenditure category in West Africa, Africa, Asia, and Latin America.⁴⁰ Between 1980 and 1998, the share of education spending nearly doubled in West Africa, increasing from 9 to 17 percent, whereas the share of defense and transportation and telecommunication dropped sharply from 11 to 4 percent. For Africa as a whole, the top three expenditure categories in 1998 were education, defense, and health. Although education had the largest share of all expenditure categories (15.9 percent), the percentage is smaller than that in Asia (19.6 percent) and Latin America (18.5 percent). Defense accounted for 10 percent of total government expenditures in the region in 1998, similar to Asia but more than Latin America. On average, African countries spend only 5 percent of total government expenditures on health. This is particularly disturbing considering that HIV/AIDS is widespread among the general population. Another discouraging trend is that African countries spend very little on transportation and telecommunication compared with the other two regions and that their share in total government expenditures declined over time from 5.9 percent in 1980 to 3.9 percent in 1998.

Table 2 — Composition of total expenditure, 1980 and 1998 (percent)

Expenditure category	West Africa		Africa		Asia		Latin America	
	1980	1998	1980	1998	1980	1998	1980	1998
Agriculture ^a	4.37	4.34	6.27	4.88	14.78	10.37	7.92	3.28
Education	9.14	17.23	11.65	15.92	13.82	19.66	15.61	18.55
Health	3.68	3.67	3.49	5.10	5.30	3.96	4.17	6.70
Transport and communication	11.33	2.78	5.87	3.85	11.76	4.92	11.17	6.37
Social Security	2.34	3.15	5.48	3.46	3.72	3.45	18.60	25.66
Defense	11.48	4.43	12.48	10.02	17.58	11.10	7.32	7.21
Other ^b	57.66	64.40	54.57	56.78	33.05	47.24	35.21	32.23
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Sources: Calculated using data from IMF (various issues).

^a Includes agriculture, forestry, fishing, and hunting.

^b Includes fuel and energy; mining, manufacturing, and construction; and general administration.

Other expenditures (which include government spending in fuel and energy, mining, manufacturing and construction, and general administration) accounted for 57 percent of total government spending in Africa in 1998, compared with 64 percent in West Africa. Most of these expenditures consist of either government subsidies or expenses relating to general administration, which may have competed with more productive spending items such as agriculture, education, and infrastructure.

Table 3 presents public spending in agriculture by African region in 1980, 1990, and 1998. Between 1980 and 1998, total agricultural expenditure increased in East, West, and North Africa but declined by half in southern Africa. North Africa ranked first in terms of public spending in agriculture in 1998, followed by West and East Africa. Agricultural spending as a share of agriculture GDP was also the highest in North Africa in 1998, whereas southern Africa ranked second and West Africa last.

⁴⁰ Comparison is made across six sectors, namely, agriculture, education, health, defense, social security, and transportation and communication. Other sectors, such as mining, manufacturing and construction, fuel and energy, and general administration, are not included in our analysis and are collectively termed “other” expenditures.

Table 3 — Government expenditure in agriculture in Africa

Region	Total agricultural expenditure (1995 international dollars, billions)			Agricultural expenditure as a share of AgGDP(percent)		
	1980	1990	1998	1980	1990	1998
East Africa ^a	0.66	0.96	1.5	3.65	3.66	4.62
West Africa	0.98	1.45	1.77	2.48	2.67	3.00
North Africa	4.11	3.96	5.51	14.79	8.73	10.19
Southern Africa	1.04	1.14	0.48	20.59	15.95	5.50

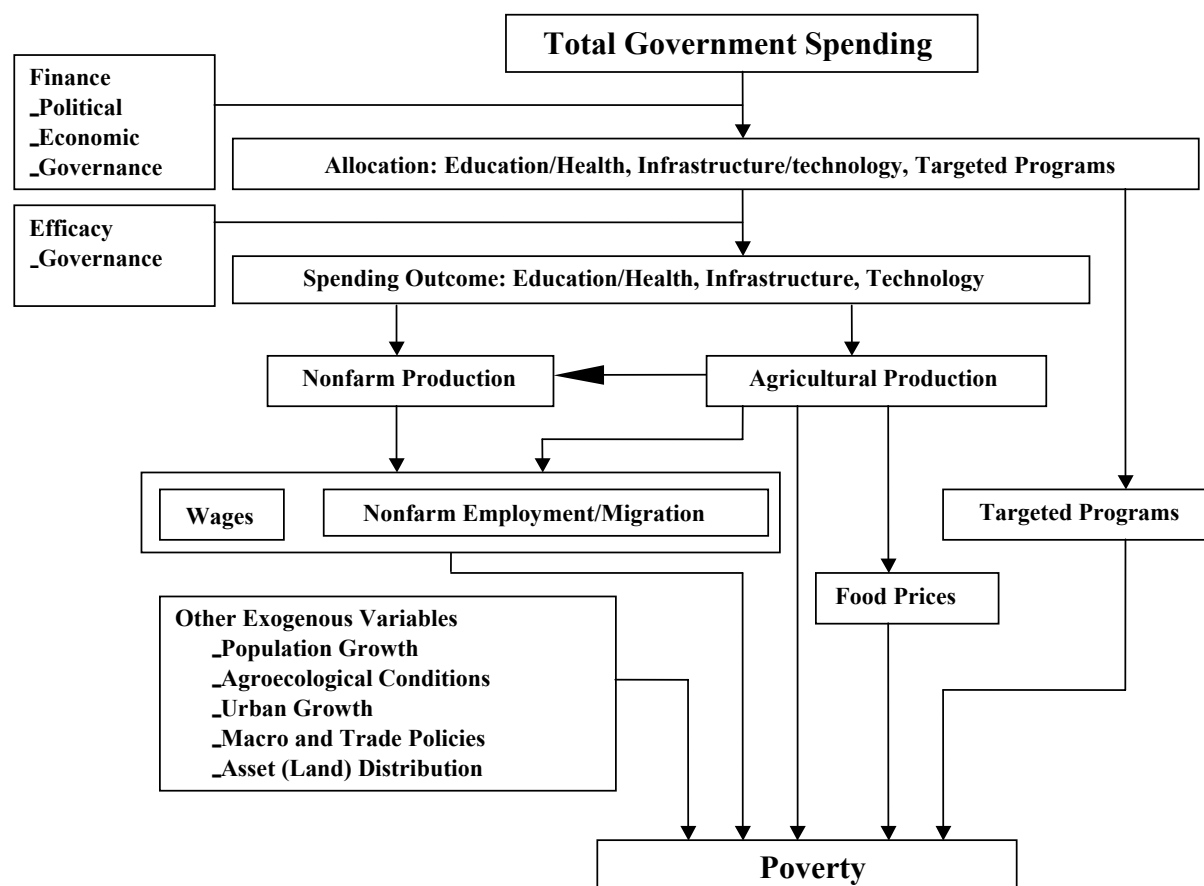
Source: Calculated using data from IMF (various issues).

^a Excluding Uganda.

How Government Spending Affects the Poor

Government spending affects rural poverty through many channels. Public investment in agricultural research, rural education, and infrastructure increases farmers' income directly by increasing agricultural productivity, which in turn reduces rural poverty (Figure 1). Indirect impacts come from higher agricultural wages and improved nonfarm employment opportunities induced by higher agricultural productivity. In addition to their productivity impact, public investments in rural education, health, and infrastructure directly promote rural wages, nonfarm employment, and migration, thereby reducing rural poverty. For example, improved infrastructure access will help farmers set up small rural nonfarm businesses such as food processing and marketing enterprises, electronic repair shops, transportation and trade, and restaurant services. Understanding these different effects provides useful policy insights to improve the effectiveness of a government's poverty reduction strategies. In particular, this knowledge provides information on how public investment can be used to strengthen weak links between poverty reduction channels in order to increase efficiency in targeting public resources on poverty reduction.

Figure 1 — Government spending and poverty



Several studies conducted at the IFPRI used a simultaneous equations model in order to systematically assess the impact of different types of public investment on both agricultural growth and poverty reduction (for example, Fan, Hazell, and Thorat 1999; Fan, Zhang, and Zhang 2002). This approach differs from a single equation method in several aspects. First, most types of public investment and expenditures are included in the assessment to avoid biased estimates of returns when only one single type of investment (for example, agricultural research) is considered, which allows one to compare and rank returns of various types of investment. Second, the model helps to identify different channels through which government investments impact growth, inequality, and poverty. Understanding these different effects provides useful policy insights to improve the effectiveness of government poverty alleviation strategies. Third, the model permits calculation of economic returns, which measures the number of poor people raised above the poverty line per additional investment in an infrastructure or technology.

Empirical Results

The literature on the impact of public investment in Sub-Saharan Africa is sparse. Two recent studies undertaken at IFPRI estimated the productivity and poverty reduction effects of public investments in rural Uganda and Tanzania.

Uganda

Using district- and household-level data for 1992, 1995, and 1999, Fan, Zhang, and Rao (2004) estimated the effects of different types of government expenditure on agricultural growth and rural poverty in Uganda following the multiple equations system described in the previous section. The authors considered six sectors of government spending, namely, agriculture, defense, education, health, social security, and transportation and communication.

For the country as a whole, the results from the estimated poverty equation showed that growth in labor productivity and nonfarm employment are all important factors in explaining rural poverty in Uganda. In contrast, rural wages did not significantly affect rural poverty. This may be because there is surplus rural labor, consistent with the so-called efficiency wage theory.

Turning to the marginal returns of different types of government expenditures on growth and reduction of rural poverty, the authors found that all types of public spending reduce poverty while increasing agricultural production in Uganda (Table 4). However, there were sizeable differences in the production and poverty reduction gains among expenditure items. For the country as a whole, government expenditure on agricultural extension and research has the highest return to labor productivity and poverty reduction, followed closely by investment in feeder roads. Education ranked third in terms of productivity and poverty reduction effects, whereas health had the smallest impact.

Table 4 — Returns to government investment in rural Uganda

Investment	Central	East	North	West	Uganda
Benefit–cost ratio					
Agricultural R&D	12.49	10.77	11.77	14.74	12.38
Education	2.05	3.51	2.10	3.80	2.72
Feeder roads	6.03	8.74	4.88	9.19	7.16
Murram roads	n.s.	n.s.	n.s.	n.s.	n.s.
Tarmac roads	n.s.	n.s.	n.s.	n.s.	n.s.
Health	1.37	0.92	0.37	0.96	0.90
Number of poor people reduced per million shillings					
Agricultural R&D	21.75	66.31	175.52	48.91	58.39
Education	3.57	21.60	31.38	12.62	12.81
Feeder roads	10.51	53.85	72.82	30.49	33.77
Murram roads	4.08	11.88	14.80	9.77	9.70
Tarmac roads	2.59	13.12	62.92	9.39	9.73
Health	2.60	6.15	5.95	3.46	4.60

Source: Fan, Zhang, and Rao (2004).

Note: n.s. indicates returns are not significant.

Large regional variations are also observed in the marginal impact of public expenditures on poverty alleviation. Uganda is characterized by a variety of agroclimatic conditions and is commonly divided into four regions. The central region enjoys good rainfall and is the most developed region in terms of social and economic indicators. The poverty incidence in central Uganda is the lowest among all regions. Eastern Uganda is the second-most-developed region in terms of social and economic indicators but rural poverty is high, averaging 38.4 percent in 1999. The western region has mountainous areas where the altitude permits cultivation of temperate fruits, vegetables, and some traditional food crops. The rural poverty rate averaged 29 percent in 1999. The northern region is the poorest of the four and is home to 67 percent of Uganda's rural population. Incidentally, this region has also been struggling with war between the government and rebels for a long time.

Regional disaggregation reveals that, for all types of investments except health, the returns in terms of increased agricultural productivity is the highest in the western region. For agricultural extension, the eastern region has the lowest return, while the central and northern regions fall in between. For education and roads, the central and northern regions have the lowest return, while the eastern region ranks in the middle. In terms of poverty reduction, the northern region, which is Uganda's poorest region, has the highest returns except for health, whereas for all types of investments, the poverty impact was the smallest in the central region.

Tanzania

Tanzania's performance in economic growth and poverty reduction has been disappointing until recently. This poor performance has been attributed to the macroeconomic instability that characterized the country in the 1970s, 1980s, and early 1990s. Government development expenditures as a proportion of total public spending declined during this period of instability, which led to the deterioration in the country's infrastructure, education, and health system.⁴¹ It is clear that household welfare including income and poverty status is highly correlated with education, access to infrastructure such as roads and electricity, and access to technology. In an ongoing study, Fan, Nyange, and Rao (2004) used household-level data combined with secondary-level data to estimate the impact of access to infrastructure, technology, and education on household income and poverty status in Tanzania. Given that Tanzania is characterized by large regional variations, the authors divided the country into seven different zones. The preliminary econometric results from this study show that agricultural and nonagricultural incomes are statistically significant in determining the probability of being poor. However, agricultural income had a greater impact than nonagricultural income on the probability of being poor in the northern and northern coast zones, whereas the opposite is true in the western, central, and southern coast zones. The results also show that in all regions, labor as well as access to land and electricity are statistically significant in determining household income. Moreover, urban households appear to enjoy higher income than their rural counterparts.

Using government investment data, the authors calculated the marginal impact of additional government spending on poverty and per capita income. The results are reported in Table 5. For the country as a whole, education has the largest effect on poverty. Returns to per capital household income are also very large with a benefit–cost ratio of 9. Therefore, increased education should be part of the government development strategy. The marginal impact of education on poverty was the highest in the western and central zones and in Lake Victoria and the lowest in the northern Zone. On the other hand,

⁴¹ Public expenditure is broadly categorized into recurrent and development budgets. While recurrent expenditure is for financing daily operations of the government (for example, salary for employees and overhead) and delivery of public services (for example, school books and medicines), development budget is for public investment (for example, public civil works in roads, bridges, waterlines, and so on.).

education yielded the highest return on per capita income in the western zone and northern coast, while the southern coast and the southern highlands trailed behind.

Table 5 — Returns of public investments to income and poverty reduction in Tanzania

Region	Education	Roads	Agriculture	Electricity
Returns on income per capita		Shillings per shilling invested		
Northern Zone	5.81	1.78	9.23	
Northern Coast	13.41	0.18	—	
Lake Victoria	9.50	—	15.79	
Western Zone	14.01	12.00	—	
Central Zone	8.66	14.22	46.92	
South Highlands	7.71	19.73	14.69	
Southern Coast	5.75	0.92	21.51	
Average	9.00	9.13	12.46	
Poverty reduction	Number of poor people reduced per million shillings		Number of poor reduced per 1 percent increase in connection	
Northern Zone	18.23	1.83	16.54	28,003
Northern Coast	30.02	0.56	—	75,479
Lake Victoria	43.40	—	57.03	379,323
Western Zone	91.49	65.72	—	87,400
Central Zone	54.56	74.60	81.13	150,715
South Highlands	26.48	60.37	21.38	108,915
Southern Coast	29.91	13.78	40.91	93,278
Average	43.10	26.53	40.39	141,962

Source: Fan, Nyange, and Rao (2004).

Agricultural spending has the largest marginal impact on per capita income and the second-largest impact on poverty reduction in Tanzania. Returns to per capita income from roads are similar to the returns from education; the poverty reduction impact from roads is also large, though less than the impact of agricultural spending and education investment. Regional targeting is even more crucial in cost-effectively achieving the stated objective for both agricultural spending and road investment. Agricultural spending has the largest returns in the central zone, both in terms of increased per capita income and poverty reduction, but roads yielded the highest return in per capita income and poverty reduction in central and western zones and southern highlands. Hence, these areas should be the government's top priority for road investment.

Finally, access to electricity appears to have a tremendous impact on poverty. Table 5 shows that if 1 percent more households are connected with electricity, more than 140,000 poor people will be lifted out of poverty. The effects are particularly large in Lake Victoria and the central and southern highlands.

Conclusions and Policy Implication for West Africa

West Africa's performance on economic growth and poverty reduction has been dismal for the last several decades. Insufficient levels, misallocation, and low efficiency in the use of public spending have been identified as one of the key reasons behind this poor performance, together with other important factors such as lack of peace, stability, and poor governance.

There have been very few studies on the relative returns of various types of public investments in Africa. To our knowledge, there are only two case studies conducted in East Africa, while there have been no such studies in West Africa to date. The case studies from East Africa indicate that public expenditures can play a large role in promoting production or productivity growth and poverty reduction. In Uganda, expenditures on agricultural extension and research generated the highest return to labor productivity and to poverty reduction, followed closely by road investment. In Tanzania, education had the largest impact on poverty and the second-largest impact on household per capita income. In contrast, road investment had the largest marginal impact on per capita income and the second-largest impact on poverty reduction.

Evidence from these two case studies has important implications for West Africa. Two-thirds of West Africa's population is rural and is directly engaged in the use of natural resources for its livelihood. The agriculture sector in this region is thus very important for food security, economic growth, and development. The poverty level is also extremely high in West Africa. For example, about 70 percent of the population in Mali and in Nigeria is poor using the international poverty line of \$1 a day. Poverty is also heavily concentrated in rural areas: in Burkina Faso, 51 percent of the rural population live under the national poverty line compared with 16 percent in urban areas (World Bank 2003). The low levels of income and human development, as well as the fragile resource base present in the West African region, contribute to the high levels of poverty. Despite the geographical, cultural, and socioeconomic differences, the case studies for Uganda and Tanzania highlighted the importance of public investments in rural areas in generating economic growth and promoting poverty reduction. Moreover, these investments yielded high returns on both economic growth and poverty reduction. These two case studies also showed that returns to public investments vary across regions within the same country. As considerable diversity exists in the West African region, better targeting is crucial to improve the effectiveness of limited public resources.

References

- Fan, S., and N. Rao. 2003. *Public spending in developing countries: Trends, determination, and impact*. Environment and Production Technology Division Discussion Paper 99. Washington, D.C.: International Food Policy Research Institute.
- Fan, S., P. Hazell, and S. Thorat. 1999. *Linkages between government spending, growth, and poverty in rural India*. IFPRI Research Report 110. Washington, D.C.: International Food Policy Research Institute.
- Fan, S., D. Nyange, and N. Rao. 2004. Public investment and poverty reduction: Evidence from household survey data. International Food Policy Research Institute, Washington, D.C. Mimeo.
- Fan, S., X. Zhang, and N. Rao. 2004. *Public spending, growth and poverty reduction in Uganda*. Development Strategy and Governance Division Discussion Paper 4. Washington, D.C.: International Food Policy Research Institute.
- Fan, S., L. Zhang, and X. Zhang. 2002. *Growth, inequality, and poverty in rural China: The role of public investment*. IFPRI Research Report 125. Washington, D.C.: International Food Policy Research Institute.
- IMF (International Monetary Fund). (various issues). *Government finance statistics yearbook*. Washington, D.C.
- World Bank. 2003. *World development report, 2003*. Washington, D.C.