

In 2000, the member states of the Economic Community of West African States (ECOWAS) signaled their commitment to the United Nations' Millennium Development Goal of halving hunger and poverty by 2015 (MDG1). To achieve that goal, agriculture in the region needed to grow by 6.8 percent annually (Johnson et al. 2008). From 2000 to 2009, however, West African agriculture grew at half the desired rate—3.7 percent—due to many biophysical and socioeconomic constraints, including heavy reliance on rainfed production systems, traditional practices of soil fertility maintenance, and limited access to markets. Consequently, crop yields in West Africa are significantly lower than global averages, and their rate of increase has barely kept up with population growth. Cereal production in West Africa increased by 4.4 percent per annum from 1980 to 2009, an annual growth rate only marginally above the population growth rate. About two-thirds of

this growth was accounted for by expanding cultivated area; one-third represented yield growth.

This trend will have to change, as land becomes scarcer while demand for cereals and other agricultural products continues to grow, as a result of population and income growth as well as urbanization. Future agricultural growth will have to rely more on productivity gains through the adoption of improved technologies based on fertilizers, improved seeds, water harvesting, and better agronomic practices. Yields for most crops have the potential to almost double, with greater intensification in these inputs (Nin-Pratt et al. 2011), especially given their current low levels of adoption. The average fertilizer use in the region in 2008 was only 8 kilograms of nutrients per hectare, while the area planted under improved seed amounted to less than 25 percent.

Figure 1—Performance of the fertilizer supply chain in Ghana

Policy Environment	Actors	Functions	Performance <sup>a</sup>
Infrastructure, Institutional and Regulatory Environment	Import Blenders	International procurement and processing/blending	Three importers and blenders negotiate retail price with government. Estimated importer marketing cost plus margin average 20% (\$3.1/50 kg) of domestic cost.
	Ports	Port services and <i>stevedores</i> (for unloading and bagging services)	Port charges average 18% (\$2.67/50 kg) of domestic cost.
	Banking/Financial System	Credit for procurement	Up to 30% interest rate with 100% or more collateral. Finance costs along the domestic supply chain, average 32% (\$4.6/50 kg) of domestic cost.
	Domestic Transportation	Movement of product from Port to domestic markets	Transportation costs along the domestic supply chain (from port to retailer) average 21% (\$3.16/50 kg) of domestic cost.
Market Development, Extension and R&D	Distribution/Retail Network	Distribution of product through domestic retail (or other) outlets	Estimated distribution margins of the domestic distribution network average 7% (\$1.08/50 kg) of domestic cost.
	Subsidy	Farmers	Demand and access to product

Source: Fuentes, Bumb, and Johnson forthcoming.

Notes: <sup>a</sup> Performance indicators are average percentages and monetary values across different products, for a 50-kilogram bag. <sup>b</sup> Government charges account for 3.8 percent (\$0.62/50 kg) of domestic cost.

A long-term policy objective must be to promote agricultural productivity and profitability, and to induce the adoption and greater use of appropriate inputs. Fertilizer is particularly important to replenish soil nutrient depletion and soil degradation from increased crop production, but underdeveloped national fertilizer markets and recent global trends have kept fertilizer prices high, profitability low, and accessibility poor. Improving the functioning and performance of national and regional fertilizer markets will be essential to reduce transaction costs and increase profitability, and to enhance fertilizer use in ECOWAS member states.

## Structure and Performance of Fertilizer Markets

A survey of four West African fertilizer markets, in Ghana, Mali, Senegal, and Nigeria, provides insights into the constraints that keep adoption below optimal levels. A combination of policy, institutional, and infrastructure improvements is recommended to address these constraints and increase agricultural production.

Nigeria's fertilizer market is the largest in West Africa, accounting for more than half of West Africa's fertilizer consumption. Cote d'Ivoire, Mali, and Ghana together account for about another third. Although some fertilizer importers have multi-country operations, such as Yara, Toguna, and La Cigogne, there is no well-established regional fertilizer market. At the country level, the structure of the fertilizer market resembles a pyramid, as illustrated for Ghana in Figure 1—with importers and port authorities at the top, wholesalers (along with bankers and transporters) in the middle, and agrodealers and farmers at the base of the pyramid. Of course, importers link up with suppliers and shipping companies in the global market. Whereas the global fertilizer market is highly competitive, a survey of dominant

national fertilizer markets in West Africa (Ghana, Mali, Senegal, and Nigeria) suggests they are generally oligopolistic at the import level while being more competitive at the wholesale and retail levels.

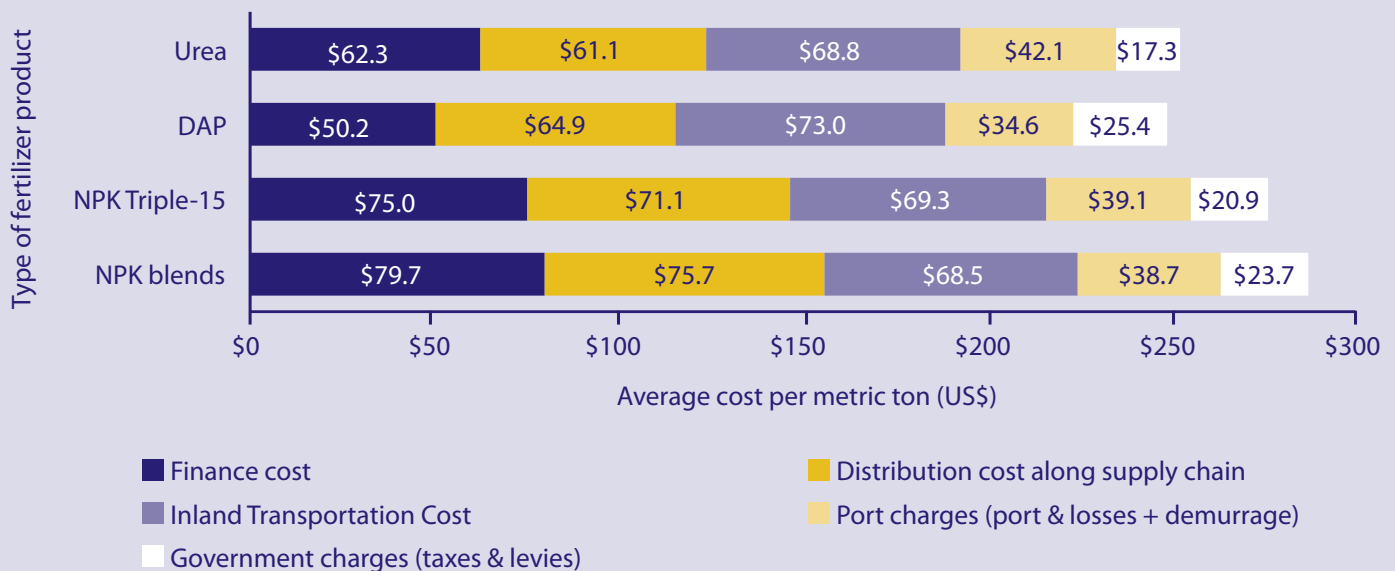
The fertilizer industry is capital-intensive and logistically demanding. It requires a huge up-front investment for production and procurement, which yields economies of scale but also creates a natural monopoly in small markets: larger companies, with access to international and internal financing, tend to dominate the market. High interest rates, stringent collateral requirements, and limited access to domestic financing make it difficult for local traders to become fertilizer importers of significant size.

Among the four countries surveyed, financing, transportation, and distribution costs account for 74 to 80 percent of the total cost along the domestic supply chain (see Figure 2). High transport costs reflect both long distances and inefficient transport services in West Africa. Taxes and government levies varied from \$11.2 in Ghana to \$28.6 per metric ton in Senegal—a charge that can be significantly reduced.<sup>1</sup>

## Constraints Affecting the Functioning of Fertilizer Markets

Both supply-side and demand-side constraints affect the functioning and performance of West Africa's fertilizer markets. Demand-side constraints prevent access and hamper the efficient use of fertilizer, which in turn makes its use less profitable for farmers. Policy interventions can help increase demand through research and extension, rural services and institutions (such as farmers' organizations), and improved infrastructure (rural roads and access to markets and information). Individual farmers, with limited access to input and output markets, typically face higher price risks, and therefore cannot afford

Figure 2—Domestic supply-chain cost components, averaged across four sample countries, 2009\*



Source: Authors, based on in-country surveys.

Note: \*Averages are non-weighted.

investments in purchased inputs such as fertilizer (Reardon et al. 1999). Efforts to increase fertilizer demand must therefore be part of an overall agricultural intensification strategy.

Supply-side constraints can affect the profitability of fertilizer use by introducing high transaction and distribution costs that raise fertilizer prices. These constraints affect both the accessibility and affordability of fertilizer in rural areas by increasing the transaction costs at each stage in the supply chain. If these constraints are removed, the resulting decrease in prices paid by farmers will naturally enhance its profitability and thus increase demand for fertilizer.

Among the key supply-side constraints is the non-conducive policy environment in West Africa for business and market development. The regulation of pricing and marketing arrangements restricts the freedom of entry and incentives for market development. Moreover, non-market-friendly arrangements for subsidy implementation have introduced distortions and fragmentations in the market by creating parallel market structures both within and across borders (as in Nigeria). When procurement of fertilizers for subsidy programs is done through tendering, it introduces risk and uncertainty and discourages private-sector participation (as in Senegal and Mali).

At all levels of the supply chain, access to financing is highly constrained for many reasons, including high interest rates and stringent collateral requirements. Interest rates can be prohibitively high, typically between 14 and 30 percent in nominal terms for many countries in the region. These rates reflect a combination of currency depreciation, inflationary pressures, crowding out of the private sector by public sector borrowing, high transaction costs, and high (perceived or real) risks in agriculture and agribusiness. Collateral requirements can be as high as 150 percent, which makes it difficult for local importers and agrodealers to borrow funds for business development and operations. Thus, the limited access to financing has acted as a pseudo-barrier to business development and scale of operations. This forces agrodealers to use their own funds and to operate on a small scale, increasing their per-unit procurement and transaction costs.

High transport costs and bottlenecks also contribute to significant supply-side constraints, especially in landlocked countries. These can result from many factors, such as roadblocks for inspection and clearance, the need for an escort system for cross-border movement, a quota system for truckers, the lack of competition among truckers, taxes and levies, worn-out vehicles, and poor road conditions (Annequin et al. 2010). All of these factors can raise the price of fertilizer and restrict accessibility.

## Recommendations to Improve Market Performance

### Addressing Supply-Side Bottlenecks: Establish a Common Fertilizer Market in West Africa

Increasing fertilizer availability and use, especially for smallholder farmers, will require a range of interventions at both the national and regional levels. As there is no well-established regional fertilizer market, we propose a way forward that involves strengthening efforts by ECOWAS and its development partners to establish a common fertilizer market in West Africa that would realize economies of scale in procurement, encourage investment in regional production, reduce transaction costs, and improve accessibility and affordability by small-

holder farmers. This initiative would require several policy, institutional, and infrastructure improvements:

- **Create a policy environment conducive to fertilizer market development** by removing tariff and non-tariff barriers, eliminating direct government procurement of fertilizers for fertilizer support programs, and implementing targeted fertilizer subsidy programs. Subsidies should be based on voucher systems, including adequate monitoring, appropriate financial arrangements, and exit plans.
- **Enhance efficiencies along the supply chain** by improving port operations, removing transportation bottlenecks, developing efficient trade corridors, strengthening human capital, and exploring the feasibility of regional fertilizer warehouses.
- **Rationalize fertilizer regulation and institutional arrangements** by harmonizing fertilizer products and recommendations, improving access to finance and marketing services, and strengthening human and institutional capacity for quality regulation.

A common fertilizer market could be realized by furthering current efforts at promoting synergies across national and regional input markets. However, the details of establishing such a market will require more detailed assessments by ECOWAS, member states, and development partners. ECOWAS is already laying the groundwork: adopting a Common Agricultural Policy; coming to an agreement with the West African Economic and Monetary Union on a common protocol for seed testing and certification; and establishing a common external tariff regime. With additional measures such as a regional legal framework for trade in agricultural inputs, these changes will further strengthen the regional markets.

### Removing Demand-Side Constraints: Strengthen Farmer Domains

While improving the supply-side efficiencies, efforts should also be focused on strengthening demand-side domains. To do this, we suggest a number of investments and actions:

- **Improve linkages between farmers and input and output markets** through a variety of institutional and organizational arrangements, such as producer organizations, farmers' groups, agro-trading centers, and farmer-based cooperatives.
- **Strengthen research and development systems in the region** by providing resources for adaptive research and transfer of improved technologies between countries, including information on best farming practices and use of modern inputs.
- **Improve extension and technology transfer:** support research and extension to educate farmers about new fertilizer products and recommendations.
- **Develop "seeding" programs** to demonstrate the use of new fertilizer products on a large scale.
- **Train agrodealers to disseminate knowledge** about new agricultural practices; link them with subject matter specialists to upgrade their skills in new technologies and agronomic practices.

- Promote other proven natural resource management techniques.

## Concluding Remarks

While increasing agricultural productivity in West Africa faces numerous challenges, one of the keys will be fertilizer market development. The region can gain large economies of scale, as well as efficiency improvements in marketing and distribution, by promoting a common fertilizer market. This is not to suggest that efforts to improve the functioning of fertilizer markets at the national level will no longer be needed. On the contrary, successful integration of country markets into a larger regional market will depend on the success of these national-level efforts. Nevertheless, successful integration at the regional level will yield larger potential benefits than the sum of such national improvements. It is encouraging to note that policymakers, development partners, the private sector, and the farming community in West Africa recognize that creating regional common markets is essential for accelerating future economic growth, poverty reduction, and food security.

## References

- Annequin, C., A. Eshum, A. Cook, and N. Rasmussen. 2010. "Transport and Logistics Costs on the Tema–Ouagadougou Corridor." Mimeo. Washington, DC: US Agency for International Development.
- Fuentes, P., B. Bumb, and M. Johnson. Forthcoming. *Improving Fertilizer Markets in West Africa: The Fertilizer Supply Chain in Ghana*. Washington, DC: International Fertilizer Development Center and International Food Policy Research Institute.
- Johnson, M., R. Birner, J. Chamberlin, X. Diao, S. Fan, A. Nin-Pratt, D. Resnick, L. You, and B. Yu. 2008. *Regional Strategic Alternatives for Agriculture–Led Growth and Poverty Reduction in West Africa*. ReSAKSS Working Paper 22. Washington, DC: International Food Policy Research Institute.
- Nin-Pratt, A., M. Johnson, E. Magalhaes, L. You, X. Diao, and J. Chamberlin. 2011. *Yield Gaps and Potential Agricultural Growth in West and Central Africa*. Research Monograph 170. Washington, DC: International Food Policy Research Institute.
- Reardon, T., C. Barrett, V. Kelly, and K. Savadogo. 1999. "Policy Reforms and Sustainable Agricultural Intensification in Africa," *Development Policy Review* 17 (4): 375–95.

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<sup>1</sup> All dollar figures are US dollars.

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**Balu L. Bumb** is a consulting policy economist and trade specialist for the International Fertilizer Development Center (IFDC).

**Michael E. Johnson** is a research fellow in the Development Strategy and Governance Division of the International Food Policy Research Institute (IFPRI). **Porfirio A. Fuentes** is a senior scientist in IFDC's Research and Development Division.

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