

# Fertilizer Focus



**Global challenges  
for logistics and  
infrastructure**

- African fertilizer market
- Key producer profiles
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# Africa: A one hundred million-tonne market?

*Written by*

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The annual growth of the global fertilizer consumption is easing. The increase during the most recent five years of observation has only been only 1 kg/ha - from 136 kg/ha/year in 2011 to 141 kg/ha/year in 2016. During the ten preceding years, the annual growth was almost 3 kg/ha/year.

At least three factors have played a role in this: Farmers efforts to make fertilizer use more efficient, a growing fear for climate change and in many countries and regions the potential rain fed crop yields are also a factor.

Africa, however, has become a typical growth market. Agricultural development is accelerating for decades and fertilizer use is growing.

In a recently published book, *"From fed by the world to food security. Accelerating agricultural development in Africa"*, the agricultural growth has been described and analyzed in almost all African countries between 1960-2014.

Fertilizer consumption has been one of the key development factors. Adoption of fertilizer use started to generalize in 1990s, but the average African use at the end of the 55 years period had barely reached 20 kg/ha, less than 15% of the world average.

The most recent World Bank figures from 2016 shows that fertilizer use is rapidly increasing. While

***Africa is the only continent where a strong population growth is still expected***

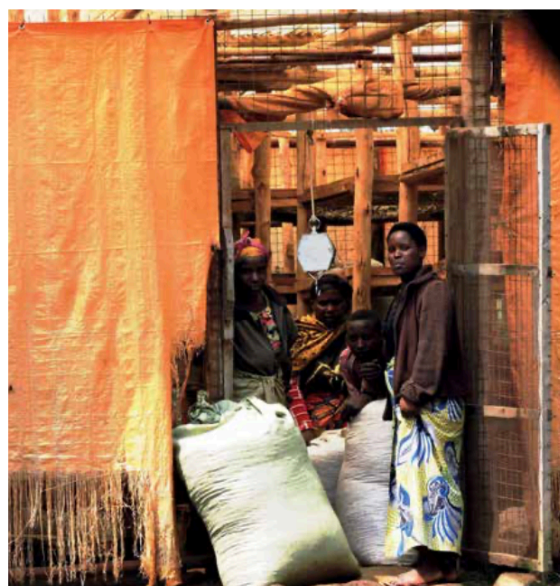
worldwide the annual growth was 0.7%, the average annual African growth reached 7%. For ensuring food security, Africa should catch up with the global consumption level, implying a fertilizer consumption growth on the continent to more than 30 mn t. Africa is the only continent where a strong population growth is still expected. It is expected that Asia will reach soon

its maximum, followed by shrinking of population. If African fertilizer use will keep pace with its growing population, an annual market of 60 mn t could be reached in 2050, and 100 mn t could be seen in 2100.

How to materialize this dream can be derived from the book about the acceleration of African agricultural



**Africa has millions of displaced people**



(top left) Organic-plus-fertilizer Combining the use of organic soil; (top right) Farmer organizations are important links between farmers and the market; (above left and right) The fertilized maize is easily recognized both from a distance and from up close.

development mentioned above\*. Before presenting its main red line, two key elements are summarized for facilitation of the understanding of this red line.

### An empty continent

When the green revolution caught on in South-East Asia in the 1960s and 1970s, the population density there was ten times higher than in Africa -

Africa was still an empty continent. The African population was low, the road density was low and the transport infrastructure was badly developed. Consequently, the farm gate costs of the green revolution external inputs, such as fertilizers and improved seeds, were high, while agricultural products which reached national markets were not competitive.

The main reason for the low population density was the low natural

production potential, the average crop yield expressed in cereal equivalents without using external inputs.

The African continent has an average natural production potential just above 600 kg/ha. Only Australia has a lower production potential, about 500 kg/ha. South East Asia, however, with 1,600 kg/ha has almost the highest possible natural production potential level.

## The key reason for the low production potential is the dominance of poor soils

One may wonder why the Australian agriculture development started early in comparison with Africa. The explanation is that it developed in the extreme South-East of the country by the colonizers, who produced for shipping and for their motherland, using prisoners as cheap labour. South Africa was already using fertilizers before 1960 and so had a similar start in agricultural development. Good prices for agricultural products, in spite of the low natural production potential, enabled early agricultural development.

### Nutrients more limiting than water

The key reason for the low natural production potential is the dominance of poor soils. The way the rainfall impacts on the fertilizer-to-yield relationship has been studied, by comparing contrasting rainfall transects in Western and Southern Africa. On the basis of data from the period 1981–2014 for 28 countries, it is shown that soil fertility dominated over rainfall in determining crop yields. In most of Africa, the low availability of the soil nutrients is limiting the production of crops and rangeland vegetation more than low rainfall.

Cereal yields only increase with higher rainfall between the 200 to 1200 mm isohyets. Levels of rainfall above 1200 mm do not result in higher yields. But between the above-mentioned range, each 100 mm increase in rain appears to



The hoe still plays an important role in African agriculture

increase cereal yields by about 80 kg/ha. By adding just 1 kg of fertilizer increases cereal yields by more than 20 kg.

It is therefore a mistake to encourage investments in irrigation, providing the rain fed agriculture does not optimize the use of fertilizer. Investments in irrigation are at least ten times higher than investments in soil improvement, which are required for the sustainable use of fertilizer.

### Agricultural development policy

The book mentioned above, presents the results of a search for policies and conditions that can help accelerate agricultural development. This development has been characterized quantitatively by country, based on fertilizer use, cereal yields, poverty and the level of food security. Data on the evolution of cereal yield rates over the entire 1961–2014 period

**Table 1.** The differentiated effects of triggering agricultural development in three neighboring African countries, comparing the main indicators for development used in this study.

Indicators agricultural development	Burundi		DR Congo*		Rwanda	
	2005	2014	2005	2014	2005	2014
Fertilizer use (kg/ha)	3	11	0	3	3	13
Average fertilizer price (\$/kg)**		0.9		1.2		0.7
Average CBR (\$/\$)***		0.21		0.38		0.22
Cereal yield (t/ha)	1.3	1.2	0.8	0.8	1.2	2.0

\* Only two provinces, North- and South Kivu

\*\*Average of DAP, KCl, NPK & urea

\*\*\*Average cost : benefit ratio for 3 cereals, maize, rice and wheat, plus beans and potatoes



The main causes of African land degradation are the cutting of trees and the overexploitation of natural resources by extensive agriculture

have been used for dividing the 49 countries into two main groups, subdivided into four and two classes. In the first group of countries the yields per hectare increased in different degrees. In the class 1 countries, the highest average increase is observed, > 75 kg/ha/year. Going from class 1 to 4, the average annual increase decreases down to about 15 kg/ha for class 4 countries. The second group includes a class of countries with stagnating yields since 1961, class 5, and one that at present has lower yields than in 1961, class 6. In this second group, the increase in food production has come from area expansion.

All countries have been characterized on the basis of socio-economic as well as agro-ecological conditions. The comparison of classes enables the identification of stimuli and obstacles for agricultural development and the role of policies for change.

A hopeful tendency emerges from the study: African agricultural development is taking off in response to population growth, as is shown by the cereal yield and fertilizer use

adoption trends in many countries. The present population density and the related average availability of a quarter of a hectare of arable land per capita, is similar to the situation in South-East Asia at the adoption of the green revolution.

Three quarters of the African population live in countries with positive yield growth rates, with some of them, those of class 1, having reached the green revolution growth rate of > 75 kg/ha/year. Policies and conditions are presented that enable accelerated yield growth, which is a matter of life and death for the last quarter of the population, which live in countries with no significant or negative yield growth rates.

The promotion of increased fertilizer use combined with integrated soil fertility management has been identified as a first step towards achieving national food security and decreasing poverty, requirements for increased economic growth and political stability on the continent. To become effective, these measures should become part of a larger policy package aiming for a rural development in which farmers,

businesses and governments are truly partners. Agricultural and broad economic development can only be furthered, if all of these stakeholders are unified in their efforts to bring down the costs of trade and transport and to develop a viable agricultural input and product market. Land-use security and improvement of the gender index are other policy components.

As mentioned, fertilizer consumption in Africa is increasing 10 times faster than the average global increase. A strong difference exists, however, between the countries of the first group with increasing yields per hectare and the countries of the second, with stagnating or decreasing yields. In the period 2014-2016, the average fertilizer use in the first group increased by 8 kg/ha, in the other group the increase was slightly above 1 kg/ha. The socio-economic and policy conditions of both groups, and within the groups, also widely vary. In fact, thanks to effective policies, agricultural development goes hand in hand with socio-economic development, as described by the World Bank.

## The role of fertilizer producers

It has become more difficult to develop agriculture and use external inputs such as fertilizer and improved seeds than during the Asian green revolution. Two key differences are:

- The present neo-liberal free trade, making it very difficult to protect African farmers during the period of transition against cheap agricultural products from countries with developed agriculture
- The past austerity policy of international organization as World Bank and IMF, causing weakening or even disappearance of research and development institutes and extension services in many African countries

In relation to the last point, fertilizer producers who would like to benefit

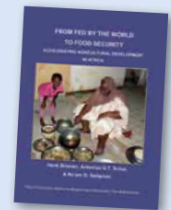
from the growing African fertilizer market could play a crucial role. While promoting their products, the required agricultural policies for growing adoption and effective use of fertilizers could be promoted also. In relation to effective use, integrated soil fertility management has to be promoted. Reinforcement of extension services and fertilizer use demonstrations can be very helpful. It is only after supporting African farmers during the transition from extensive to intensive forms of agriculture, when

general fertilizer use adoption can be reached and then the idea of a one hundred million-tonne market looks more realistic.

Besides the private interest in making these efforts, fertilizer producers contribute in this way in effectively tackling the problem of African migrants and refugees, inside and outside the continent. Agricultural development is the most effective tool for socio-economic development, while the latter is the basis for diminishing population growth. ■

\*To download the full version of the book "*From fed by the world to food security. Accelerating agricultural development in Africa*", please use either of the following two links:

<https://doi.org/10.18174/498300>  
<https://edepot.wur.nl/498300>

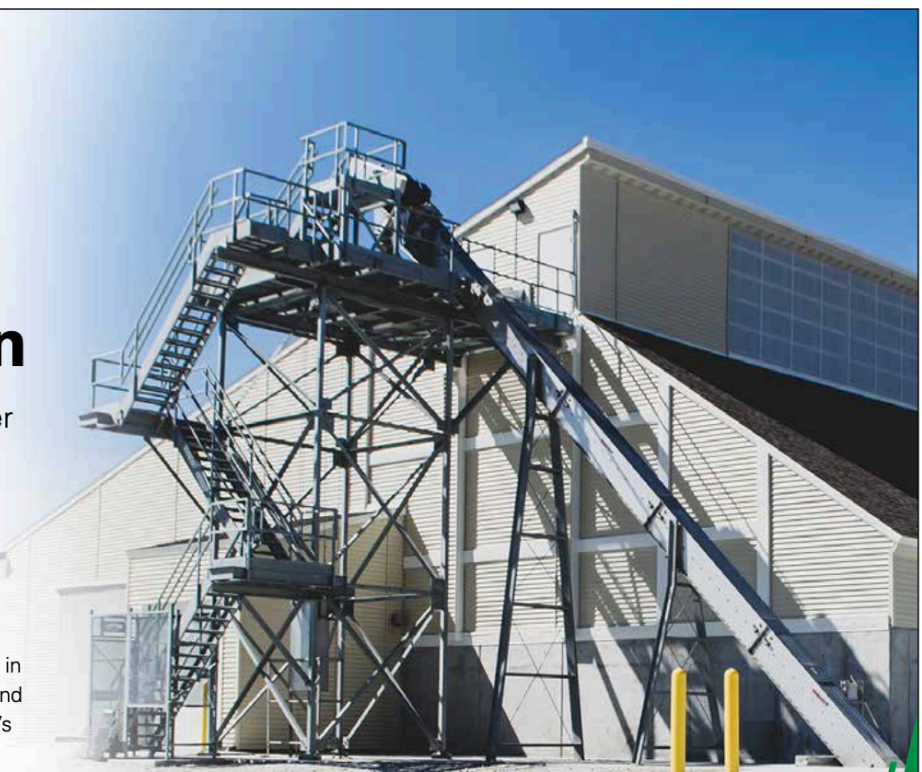


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