



F PS-Africa



FARM INPUT PROMOTIONS AFRICA LTD.

Effective public-private sector partnership to rapidly create demand for improved fertilizers amongst small farmers in Kenya



1. Fertilizers are essential to increase crop production but are inaccessible to most small farmers in SSA

1, Description of approach

Millions of smallholder farmers in Africa suffer poverty and hunger because not only are they unable to obtain appropriate fertilizers and improved seed varieties, but also many farmers unaware of the correct inputs required to achieve even subsistence yields from increasingly depleted soils. Fertilizers are a key to alleviating these constraints but must be integrated with other inputs, together with management of soil health, to achieve their economic potential. Farm Input Promotions Africa (FIPS-Africa) has achieved widespread impact in Kenya through the dual approach of stimulating the demand for farm inputs by increasing farmer awareness, while improving the availability of inputs through stockists and private sector partnerships to meet the increased demands.

This strategy has involved alleviating four main constraints to fertilizer usage:

(i) Appropriate fertilizers are not available; stockists mainly supply the most commonly-used fertilizers for food production (DAP, CAN and urea) that have been used effectively for decades while soils retained much of their inherent fertility. Increasingly, under continuous nutrient mining without appropriate inputs, maize and vegetable yields are limited by potassium, sulphur and even trace elements. Soils are also becoming increasingly acidic. However, even if farmers understand these constraints, the demand by the rural community is insufficient for local suppliers to stock appropriate fertilizers.

(ii) High cost of standard bags of fertilizer; fertilizers are conventionally packaged in 50 kg bags which retail at up to US\$25. These units are too expensive for small-scale farmers, most of who live below the poverty line of US\$1/day. At this price, farmers can not experiment with different fertilizers to assess their suitability. In addition many small farmers have small plots of land and may not need to purchase 50 kg. There is a large demand for fertilizers in smaller 1 kg sizes, and rural stockists repackage in 1 kg bags in accordance with farmer demands, but government legislation prohibits this practice because of the dangers of adulteration, reduced quality and sales of inappropriate formulations that are do not have the manufacturer's label.

(iii) Inefficient use of fertilizers; where fertilizers are used by small-scale farmers, they are often poorly managed. DAP is often placed on top of the seed causing scorching and poor establishment, and topdressing fertilizers, if used, are left on the soil surface which are exposed to losses through volatilization and surface runoff. Consequently, returns from fertilizer use may not be financially attractive.

(iv) Private Sector Companies are reluctant to invest in development of markets for small-scale farmers; the high cost involved in developing markets for small-scale farmers is prohibitive for companies marketing fertilizers that are a high volume/low margin commodity.

In order to address these four constraints, FIPS-Africa, with the support of the Rockefeller Foundation, DfID and USAID, and in co-operation with private sector fertilizer and seed companies, and the Ministry of Agriculture, has developed and implemented an approach to make the appropriate fertilizers, and improved seed varieties, more accessible to small farmers. The approach is based on the mass extension/promotion of improved technology in small affordable packs of seeds and fertilizers. Operations in some of the poorest areas have shown that

farmers, who are empowered to try out new technology using small affordable packages, return to their local stockists to purchase larger quantities of inputs to improve their food security independently of the need for credit.

2. Implementation details

FIPS-Africa developed private sector partnerships with fertilizer and seed companies to make improved fertilizers and seed varieties more accessible to small-scale farmers. The maize streak virus (MSV) is widespread in Kenya and can result in crop failure. Hence promoting fertilizers and seeds are closely coupled to maximize value to the farmers.

2.1 Improving supply

Since June 2003, Athi River Mining (ARM), a Kenyan mining company, has co-operated with FIPS-Africa in the development of two new multi-nutrient fertilizers called 'Mavuno': а planting formulation containing N, P, K, S, Ca, Mg, and traces of B, Zn, Mo, Cu and Mn, and a top-dressing fertilizer which is a blend of urea and gypsum providing N, Ca, and S. Mavuno is packaged by ARM in attractively-branded 1 kg bags (see photo 2) that retail for as little as US\$ 0.4-0.5 per kg. This encouraged farmers to experiment with the new fertilizers and see the benefits. ARM assisted in the distribution of the fertilizers to wholesalers and stockists in rural areas to ensure supply.



FIPS-Africa also solicited 150g mini-packs of seed and improved maize varieties from commercial seed companies. Three companies, Kenya Seed Co., Western Seed Co., and Monsanto donated a total of 150,000 small packs of seed for FIPS-Africa's promotion campaigns. These small packs, worth US\$ 0.25, were given away free of charge, because government legislation currently prohibits the repackaging of seeds into small packs for sale. Since the package was very small, it has not reduced the incentive to purchase larger quantities.

2.2 Stimulating demand

Demand for inputs was stimulated through three main approaches in which FIPS-Africa acts as an 'honest broker' empowering farmers to select the most appropriate products for local usage:

(i) Small plot demonstrations

Small plot demonstrations of fertilizer, improved and appropriate crop and seed. soil management, are conducted to enable the farmers to choose the appropriate fertilizer and variety for their farms, and how they should be managed. Seed companies are requested to contribute seed of their recommended variety for the particular agro-ecological zone. In this way, up to 8 varieties are demonstrated alongside each other on small plot. New fertilizers are also demonstrated alongside conventional fertilizers. Other demonstrations address other aspects of crop and soil management including the importance of organic resource management, the use of the chisel plough to break plough pans, and the introduction of pre-emergence and postemergence herbicides as components of conservation agriculture.



Demonstrations form the foci of farmer field days in which neighboring communities are invited to learn about improved crop management. At the end of the field day, farmers receive small packs of fertilizer and seed (see photo 3) to assess their performance on their own land.

(ii) Promotions through stockists and focal villages Demonstrations reach a relatively small number of people, and diffusion of technology from within farmer groups to surrounding communities is often FIPS-Africa therefore complements its limited. demonstration programme with promotions through stockists in village markets, through farmer groups, and at farmer-field days where large numbers of farmers gather. FIPS-Africa has developed a promotion method through which any farmer purchasing a 1kg pack of improved Mavuno fertilizer receive a small introductory pack of improved seed for free (see photo 4). Megaphones are used on market days to attract maximum attention and up to 300 farmers purchase the promotion package on a busy market day.



The programme approach is implemented by teams of 2-3 FIPS-Africa staff working at a district level with university graduates recruited on a casual basis locally to assist with establishing demonstrations and promotional campaigns during peak periods. All activities are implemented in close co-operation with the Ministry of Agriculture to ensure that the same extension message is disseminated and to reach farmers at a wider scale.

(iii) Development and Dissemination of Advisory Materials

Farmers need advice on how to use fertilizers most efficiently. FIPS-Africa develops and disseminates advisory materials on correct fertilizer application methods. These are complemented with advice on land preparation, seed spacing, selection of appropriate varieties, weed, pest, and disease management, all of which contribute to efficient use of fertilizer.



3. Results / impact

Between June and November 2003, FIPS-Africa staff promoted over 100,000 packets of Mavuno fertilizer through farm input stockists throughout Kenya (see photo 5). Having seen the benefits, farmers started to demand Mavuno from their local stockists. By April 2004, approximately 10,000 tonnes of Mavuno fertilizer had been supplied to stockists in Trans-Nzoia, Uasin Gishu, Bungoma, Kisii, Nyamira, Embu, Kirinyaga, Nyeri, Meru, Nakuru and Bomet districts, most of it in 50 kg bags. Demand for the Mavuno fertilizers quickly exceeded the production capacity of ARM.

Between June 2003 and December 2005, FIPS-Africa conducted approximately 6000 demonstrations throughout the country comparing *Mavuno* and DAP fertilizer in co-operation with farmers, stockists and the Ministry of Agriculture. Results showed that *Mavuno* fertilizers performed better than DAP + Urea under some soil conditions, particularly for vegetable crops, but the key outcome is that the farmers were empowered to make an informed choice of product.

As a result of the rapid increase in demand for the *Mavuno* fertilizers from farmers, in September 2004, ARM decided to invest US\$ 8 million in scaling-up production from a current capacity of about 3000 T/year to 30,000 T/year. By December 2005, ARM had sold approximately 10,000 T of fertilizer. As a result of the success of the *Mavuno* fertilizers, another Company, Supplies & Services, has imported a similar multi-nutrient fertilizer and is also packaging in 1 kg bags with the brand name "*Chapa Simba*".

Co-operating seed companies simultaneously experienced a massive increase in demand for their new seed varieties as a consequence of FIPS-Africa's promotions. Western Seed Company sold out of their WH505 and WH403 varieties, and Kenya Seed Co. sold out of its H6210 and H6213 varieties in advance of the March 2005 long rainy season.



Mining firm to invest Sh600m in fertiliser By NATION Reporter

Athi River Mining Company Ltd will next year invest over Sh600 million in production of cheaper fertiliser for local farmers.

Managing director, Pradeep Paunrana, said that currently, the company pro-



An impact assessment study on the effects of FIPS-Africa's "Western Seed varieties/ Mavuno" fertilizers promotions over a 3 year period on the adoption of improved inputs and maize crop management practices in Kirinyaga district has shown big increases in vields and increases in the number of farmers reaching food security. One hundred farmers who had experimented with the small packs following FIPS-Africa's promotions were interviewed. Farmers recalled that before advice from FIPS-Africa they would harvest on average 3.82 x 90 kg bags/0.81 acre (equivalent to 5.36 bags/acre). After trying out the small packs, 98% reported that they had subsequently purchased Western Seed Co. varieties, and 95% said they had purchased Mavuno fertilizers (see photo 6).

In the 2005 long rainy season, mean yield of farmers had increased to 9.44 bags/0.69 acre (equivalent to 16.1 bags/acre). Extra quantity of maize produced per farmer was 5.65 bags equivalent to KSh 6780 (US\$ 97). In terms of food security, only 30% of farmers produced 5 bags or more before the promotions. After trying out the small packs, 80% of those farmers produced 5 bags or more of maize. Assuming families need 5 bags per season for food security, it can be concluded that the number of food secure families increased from 30 to 80%. Interestingly, farmers reduced their acreage under maize from 0.81 to 0.69 acres. Benefits are therefore likely to be underestimated as farmers could have benefited from growing higher value crops on the land taken out of maize.

A case study of the market development of *Mavuno* fertilizers and Western Seed Co. varieties in Nyeri district is documented in appendix 1.

4. Lessons learnt

✓ This project has demonstrated that demand for new improved fertilizers and other inputs can be quickly stimulated amongst small farmers in close co-operation with the private sector using the small bag approach. The provision of small bags of fertilizers and seeds enabled even the poorest farmers to achieve incremental gains in food and income over a few seasons; many farmers purchasing 1 kg bags, having "learnt-by-doing", quickly graduate to larger amounts.

✓The costs of repacking, and distribution were effectively borne by private sector. By maintaining realistic prices, and never giving away fertilizer, farmers were able to assess the benefits of investment.

✓ It is critical that empowering farmers in basic principles of crop nutrition and management underpins product promotions and availability. Simply improving planting techniques and fertilizer placement can more than double yields while reducing inputs of seed and fertilizers. Maintenance of soil health is vital to achieving the economic returns from inputs and the integration of inorganic fertilizers and organic matter management is essential for sustainable development. Many poor farmers, with small farms and depleted soils, have limited organic resources even if fertilizer availability is improved. FIPS-Africa is therefore developing a 'food security' package to enable farmers to concentrate resources on small plots with integrates soil, water, organic matter and nutrient management to achieve moderate and reliable yield increments within their resource constraints. Also, FIPS-Africa is finding that farmers who plant along the same row the following season in a reduced tillage system can increase the residual effects of fertilizer, and can therefore reduce the need for fertilizer in following seasons (appendix 2).

✓The approach is highly cost-effective. Current cost of FIPS-Africa's operations is only US\$ 500,000/year with a team of 35 field extension workers supported by an administrative unit of only 4 persons.

✓ Experience has shown the difficulty of matching supply with demand. Promotions were so effective that demand for new improved inputs often exceeded the ability of the producers to supply and resulted in farmers being disappointment at not being able to procure the inputs of their choice in time. This emphasizes the important point that generating demand must be coupled to supply and vice versa.

5. Further reading

Malcolm Blackie & Kerry Albright. 2005. A lesson learning study of the Farm Input Promotions Africa project (FIPS) in Kenya, (with a special emphasis on public/private sector partnerships for input provision and possibilities for regional upscaling). UK: NRI Crop Protection Research Programme.

Seward PD & Okello D. 1998. Methods to develop an infrastructure for the supply of the appropriate fertilizers by small farmers in sub-Saharan Africa: experience from western Kenya. Paper presented at the IFA Regional Conference, Maputo, Mozambique, 8-12 June 1998 (mimeo).

Appendix 1: Case study of market development of Mavuno fertilizers in Nyeri district

FIPS-Africa started to promote Mavuno fertilizers and Western Seed Co. varieties in Nyeri district in March 2004 at which time the products were largely unknown. One Promoter was employed to introduce the products to stockists and to raise awareness of the products amongst farmers. Western Seed Co. donated approximately 25,000 x 150g packs of seeds for distribution to farmers. FIPS-Africa's promotion methodology was very successful as can be seen by the massive increase in sales of *Mavuno* fertilizers, and Western Seed Co. varieties within the districts. In 2005, there was a massive increase in the quantity of *Mavuno* fertilizers supplied to stockists in Nyeri district. Sales increased more than 10 times from 43.5 in 2004 to 473.5 tonnes in 2005 (see figure 1). Sales of Western Seed Co. varieties also increased from 1.84 tonnes in 2004 to 39.62 tonnes in 2005 (see figure 2).



Figure 1: Sales of Mavuno fertilizers (tonnes) through stockists in Nyeri district between 2004-2005.



Figure 2: Quantities (Tonnes) of Western Seed Co. varieties supplied to stockists in Nyeri district in the 2004 short rainy season (SR2004), the 2005 long rains season (LR2005), and the 2005 short rains season (SR2005).



Photo: Boston Animal Feed Agrovet in Karatina participated in FIPS-Africa's promotions by attending field days.

In December 2005, a survey was conducted of 73 farmers who had received the 1 kg bag of Mavuno planting fertilizer and a 150g mini-pack a Western Seed Co. varietv. of Farmers were selected at random and interviewed concerning the fertilizers and varieties used before and after receipt of the small packs, and also yield levels. 97% and 89% of farmers said that they had used Western Seed Co. varieties and Mavuno fertilizers in the 2005 long rainy season. Before receiving instruction from FIPS-Africa, farmers said that they had on average produced 3.89 bags/0.86 acres (5.71 bags / acre). After receipt of the small and instruction on improved packs maize crop management, vields increased on average to 9.07 bags/0.77 acres (14.4 bags / acre).

Extra yield produced/farmer was on average 5.2 bags, equivalent to KSh 6,224 (US\$ 89). Interestingly, whilst maize yields increased by a factor of 2.33, mean land area under maize cultivation declined by 10% presumably as farmers realised they could produce enough for their needs from a smaller land area.

Most importantly the number of farmers who attained the food security target of at least 5 bags / season increased from 32% before FIPS-Africa's intervention to 73% by the end of the 2005 long rains season. It should be noted that this impact was achieved in less than 2 years.

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Appendix 1: Case study of market development of *Mavuno* fertilizers in Nyeri district (cont.) Farmers in Nyeri district experimented with *Mavuno* fertilizers not only on maize but on different crops. Two success stories of farmers using *Mavuno* on coffee and passion-fruits are documented below.

1. Dickson Kamau, Ruthagati Village, Nyeri district

Dickson Kamau is a small-scale farmer in Nyeri district. He has 250 coffee bushes. After attending a FIPS-Africa field day in his village, he decided to buy 25 kg *Mavuno* planting fertilizer which he applied to his coffee in October 2004. He applied 25 kg *Mavuno* topdressing fertilizer in March 2005.

He normally harvests 60 kg coffee per day using 17-17-17 and CAN fertilizers. With *Mavuno* he is harvesting 180 kg/day! As he harvests 3 times a week, over a six week period, he estimates that use of the *Mavuno* fertilizer will earn him an extra US\$576!

Dickson has also doubled the yields of his potatoes by using Mavuno!



Photo: Dickson Kamau (left) together with his local stockist from whom he purchased the Mavuno fertilizer shows off his day's harvest.



2. Richard Karumba, Kiamachimbi Village, Nyeri district



Photo: Richard Karumba and his day's harvest.

Richard Karumba is a small-scale farmer in Nyeri district. He has 3000 vines of passion-fruits grown on 2 acres. He first encountered FIPS-Africa staff outside Boston Agrovet in Karatina Town. They told him about *Mavuno* fertilizers and he agreed to visit another farmer who was succeeding with *Mavuno* on his passion-fruits.

He was convinced. In 2004, he started to use *Mavuno* fertilizers and he has not looked back.

He used to use 17-17-17 and CAN fertilizers. He would harvest about 750,000 fruits/year, but fruits were small and he would fill a carton with 60 fruits and sell them for the local market at KSh 70/carton. This meant that he would produce 12,500 cartons

generating income of KSh 875,000.

Through using *Mavuno* fertilizers he discovered that he could produce larger fruits of export quality. He increased the number of fruits harvested by only 500, but because the fruits were larger, he would fill a carton with only 48 fruits which meant he could fill an extra 3,125 cartons. Because quality was higher, he earned KSh 120/carton. As a result, through the use of *Mavuno* fertilizers he generated income of KSh 1,876,200!

Therefore by changing from 17-17-17 and CAN fertilizers to *Mavuno* basal and *Mavuno* top fertilizers, at no extra cost, Richard found that he could earn an extra KSh 1 million/year from his 2 acres. This is equivalent to US\$ 14,285 or US\$ 7,142/acre!







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Appendix 2: Reduced tillage with chisel plough increases yields and reduces land preparation and fertilizer costs in Trans-Nzoia district



The Chisel Plough is essential for breaking plough pans. This chisel plough, manufactured locally by Ndume Ltd., has tines set 75 cm apart. Following a pass with the chisel plough, farmers plant within the furrows. The technique is suitable for those farmers who mechanically cultivate and hand plant. After years of cultivation by plough or jembe, a hard pan may form at plough depth (1). This forms a barrier to prevent water infiltration and/or root penetration. As a result, crops suffer from intermittent waterlogging as water can not drain away and drought as roots can not access the sub-soil to obtain water.



Rainwater is able to drain through the furrows, and roots can penetrate deep within the subsoil to access more water and nutrients (3).

In 2005, 10 farmers from the Kiungani Maize Self-Help farmers Group experimented with the chisel plough. Results were excellent. Mr. Tom Walubengo increased yields of maize from 22 to 34 bags/acre! (4)



The following season, Mr Walubengo did not cultivate again, but planted maize and vegetables without fertilizer within the furrow made by the chisel the previous season (5). Early crop growth was excellent indicating that the plants in the second season were able to benefit from residues of fertilizer not used by the crop the previous season!

The method has great potential to improve soil fertility, reduce land preparation and fertilizer costs! All 165 members of the farmer group want to use the chisel plough next season!



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