**Kenya Eastern Upper Fertilizer Use Optimizer: paper version, 11th Feb. 2016**

**The below assumes:**

* Calibration measurement is with i) a 5 ml water bottle lid (lid) that holds about 3.5 g urea and 5.5 g DAP and MOP, ii) a 500 ml water bottle of 5 cm diameter cut to height of 4m has approx. 80 ml to hold 56 g urea, and 88 g DAP and MOP.
* It is assumed maize is planted with 75 cm row spacing, banana 3m row spacing, rice 25cm row spacing, Irish potatoes 75cm row spacing and beans 50cm row spacing .
* It is assumed grain prices per kg (Ksh): 25 maize; 30 bananas; 50 rice, 60 beans and 30 Irish potato.
* It is assumed 50 kg of fertilizer costs (Ksh): 2850 urea; 3600 DAP and 3600 MOP.
* Level 1 financial ability needs a benefit: cost ratio (BC) of 0.1-2; Level 2: BC **2 - 4**; Level 3: BC >4.
* Application rates are in kg/ac.
* If any fertilizer rate application is less than 10 kg/acre it is not economical and should be converted to another fertilizer.

**Level 1 financial ability**

* Banana: Apply 17 kg DAP and 27 kg MOP by point application (one cut bottle for 2 plants for each fertilizer) at planting and at the start of the rainy season. Apply 17 kg Urea at the start of the rainy season (one cut bottle for 1.5 plants).
* Irish potato: Apply 49 kg DAP (1 lid for 0.5m) and 14 kg MOP by banding (1 lid for 2.1 m) at planting.
* Maize HP >4t: Apply 10 kg DAP (1 lid for 1.8 m) by banding at planting.
* Lowland rice: Apply 38 kg DAP (one cut bottle for 4.4 m) and 14 kg MOP (one cut bottle for 12 m) by broadcast at time of planting.

**Level 2 financial ability**

* Banana: Apply 32 kg DAP and 36 kg MOP by point application (one cut bottle for 1.2 plants for each fertilizer) at planting and at the start of the rainy season. Apply 17 kg Urea at the start of the rainy season (one cut bottle for 1 plant).
* Irish potato: Apply 76 kg DAP (1 lid for 0.3 m) and 21 kg MOP by banding (1 lid for 1.0 m) at planting.
* Maize HP >4t: Apply 29 kg DAP (1 lid for 0.8 m) by banding at planting and 20 kg Urea (1 lid for 0.7 m) at 6 WAP.
* Maize LP <4t: Apply 19 kg DAP (1 lid for 1.2 m) by banding at planting.
* For maize-bean intercropping: Apply 28 kg DAP (1 lid for 0.8 m) by banding at planting.
* Lowland rice: Broadcast apply 96 kg DAP (one cut bottle for 1.3 m) and 14 kg MOP (one lid for 12 m) at planting.
* Beans. Apply 10 kg DAP by banding at planting (1 lid for 3 m).

**Level 3 financial ability (maximize profit per acre).**

* Banana: Apply 49 kg DAP (one cut bottle for 0.7 plant hole) and 40 kg MOP (one cut bottle for 1.1 plants) by point application at planting and at the start of the rainy season. Apply 23 kg Urea at the start of the rainy season (one cut bottle for 1 plant).
* Irish potato: Apply 81 kg DAP (1 lid for 0.3 m) and 33 kg MOP by banding (1 lid for 0.7 m) at planting.
* Maize HP >4t: Apply 67 kg DAP (1 lid for 0.3 m) by banding at planting and 34 kg Urea (1 lid for 0.4 m) at 6 WAP.
* Maize LP <4t: Apply 48 kg DAP (1 lid for 0.5 m) by banding at planting.
* For maize-bean intercropping: Apply 50 kg DAP (1 lid for 0.5 m) by banding at planting.
* Lowland rice: Broadcast apply 101 kg DAP (one cut bottle for 1.7 m) and 22 kg MOP (one lid for 8 m) at planting.
* Beans. Apply 25 kg DAP by banding at planting (1 lid for 1.8 m).