



RWANDA (EASTERN) FERTILIZER USE OPTIMIZER: paper version



The below assumes:

- Measurement is with a Inyange water bottle cap of 8.4 ml that holds about 5.9 g urea and 9.2 g of DAP, KCL, and TSP, or with Inyange bottle cut at 2 cm (89 ml) to hold 62 g urea and 98 g of DAP, KCl, and TSP.
- It is assumed maize and sorghum are planted with 75 cm row spacing (30 cm plant spacing) and the legumes (bean, soybean, groundnuts) are planted with 50 cm row spacing. Sweet potato 80 x 30 cm. Banana 300 x 300 cm.
- Fertilizer costs per 50 kg bags are: FRW 30,000 for urea; 40,000 each for TSP and DAP; 34,000 for KCl.
- Commodity values per kg are: 110 for maize; 450 wheat; 400 each for sorghum, rice, bean, and soybean; sweet potato 150; and 120 banana.
- Broadcast will be done at 1.5m width. Application rates are in kg/are. WAP = weeks after planting.

Level 1 financial ability (< Rwf 360 / are)

Banana. Apply in a circle around the plant 0.62 kg/are urea (1 2-cm bottle per 1.1 plant) and 0.62 kg/are KCl (a 2-cm bottle for 1.8 plants).

Lowland rice. Broadcast at planting 0.4 kg/are DAP (CAP for 1.6 m) and 0.45 kg/are KCl (CAP per 1.4 m); sidedress with 0.82 kg/are urea (CAP for 0.5 m) at panicle initiation.

Soybean. Band at planting 0.4 kg/are DAP (CAP for 5 m).

Sweet potato. Point apply 0.42 kg/are urea at 6 WAP (CAP for 6 plants).

Level 2 financial ability (Rwf 360 to 900 / are)

Banana. Apply in a circle around the plant 0.82 kg/are urea (1 2-cm bottle per 0.8 plant) and 1.0 kg/are KCl (a 2-cm bottle per 1.1 plants).

Maize. Point apply 0.5 kg/are urea at 6 WAP (CAP for 5.3 plants).

Sorghum. Point apply 0.45 kg/are urea 6 WAP (CAP for 6.3 plants).

Lowland rice. Broadcast at planting 0.62 kg/are urea, (CAP per 0.6 m); and 0.95 kg/are DAP (CAP per 0.7 m) and 0.7 kg/are KCl (CAP per 1.5 m); sidedress with 0.77 kg/are urea (CAP for 0.5 m) at panicle initiation.

Bean. Band at planting 0.5 kg/are DAP (CAP for 3.7 m) and 0.52 kg/are KCL (CAP for 3.6 m).

Soybean. Band at planting time 0.82 kg/are DAP (CAP for 2.5 m).

Sweet potato. Point apply 0.7 kg/are urea at planting and 0.7 kg/are urea at 6 WAP (CAP for 3.8 plants each time).

Level 3 financial ability (maximizes profit per are due to fertilizer use) (RwF > 900 / are)

Banana. Apply in a circle around the plant 1 kg/are urea (2-cm bottle per 0.7 plant) and 1 kg/are KCl (a 2-cm bottle per 1.1 plants).

Maize. Point apply 0.6 kg/are DAP (CAP for 7 plants) and 0.35 kg/are KCl at planting (CAP for 11 plants). Point apply 1.22 kg/are urea 6 WAP (CAP for 2.2 plants).

Sorghum. Point apply 0.4 kg/are DAP at planting () and 0.57 kg/are urea 6 WAP (CAP for 3.9 plants).

Lowland rice. Broadcast at planting 0.35 kg/are urea (CAP per 0.5 m); and 58 kg/are DAP (CAP per 0.4 m) and 0.92 kg/are KCl (CAP per 0.7 m); sidedress with 42 kg/are urea (CAP for 0.4 m) at panicle initiation.

Bean. Band at planting 0.30 kg/are DAP (CAP for 2.6 m) and 0.42 kg/ha KCl (CAP for 4.4 m).

Soybean. Band at planting time 1.22 kg/are DAP (CAP for 1.7 m).

Sweet potato. Point apply 0.92 kg/are urea at planting and 0.92 kg/are urea at 6 WAP (CAP for 2.8 plants each time).



**RWANDA (NORTH-WEST)
FERTILIZER USE OPTIMIZER:
paper version**



The below assumes:

- Measurement is with a Inyange water bottle cap of 8.4 ml that holds about 5.9 g urea and 9.2 g of DAP, KCL, and TSP, or with Inyange bottle cut at 2 cm (89 ml) to hold 62 g urea and 98 g of DAP, KCl, and TSP.
- It is assumed maize and sorghum are planted with 75 cm row spacing and the legumes (bean, soybean, groundnuts) are planted with 50 cm row spacing. Sweet potato and Irish potato 80 x 30 cm. Banana 300 x 300 cm.
- Fertilizer costs per 50 kg bags are: FRW 30,000 for urea; 40,000 each for TSP and DAP; 34,000 for KCl.
- Commodity values per kg are: 110 for maize; 450 wheat; 400 each for sorghum, rice, bean, and soybean; and 120 for banana.
- Broadcast is done 1.5m width. Application rates are in kg/are. WAP = weeks after planting.

Level 1 financial ability (< RwF 400 / are)

Wheat. Broadcast 0.4 kg/are urea at tillering (2-cm bottle per 10.5 m).

Irish potato. Point apply 0.42 kg/are DAP (CAP for 9.2 plants) and 0.32 kg/are KCl (CAP for 12 plants) at planting.

Climbing bean. Band 0.25 kg/are DAP at planting (CAP for 7.5 m)

Banana. Apply in a circle around the plant 0.75 kg/are urea (1 2-cm bottle per 0.9 plant) and 0.85 kg/are KCl (a 2-cm bottle per 1.3 plants).

Level 2 financial ability (RwF 400 to 1000 / are)

Wheat. Broadcast at planting 0.47 kg/are DAP (CAP for 1.3 m) and 0.37 kg/are KCL (CAP for 1.7 m); broadcast 1.17 kg/are urea at tillering (2-cm bottle per 3.6 m).

Maize. Point apply 0.7 kg/are urea at 30 days after emergence (CAP for 5 plants). Apply 1.02 kg/are DAP (CAP for 4.3 plants) and 0.4 kg/are KCl at planting (CAP for 10.3 plants).

Irish potato. Point apply 0.75 kg/are DAP (CAP for 5.2 plants) and 0.52 kg/are KCl (CAP for 7.4 plants) at planting and 0.52 kg/are urea 6 WAP (CAP for 7 plants).

Climbing bean. Band apply 0.55 kg/are DAP at planting (CAP 3.4 m) and 0.42 kg/are KCl (CAP for 4.4 m)

Soybean. Band at planting time 0.7 kg/are DAP (CAP for 2.9 m).

Banana. Apply in a circle around the plant 0.92 kg/are urea (a 2-cm bottle per 0.8 plant) and 0.85 kg/are KCl (a 2-cm bottle per 1.3 plants).

Bean (bush). Band apply 0.45 kg/are DAP (CAP for 4.4 m) and 0.25 kg/are KCl at planting (CAP for 7.4 meters).

Level 3 financial ability (maximizes profit per are due to fertilizer use) (RwF > 1000 / are)

Wheat. Broadcast 0.67 kg/are DAP (CAP for 0.9 m), 0.62 kg/are urea (CAP for 0.6 m), and 0.55 kg KCl () at planting (CAP for 1.1 m) and 1.12 kg/are urea at tillering (a 2-cm bottle per 3.7 m

Irish potato. At planting, point apply 1.04 kg/are DAP (CAP for 3.7 plants) and 0.72 kg/are KCl (CAP for 5.4 plants). Point apply 0.77 kg/are urea 6 WAP (CAP for 2.6 plants).

Climbing bean. Band 0.87 kg/are DAP (CAP per 2.1 m) and 0.52 kg/are KCl (CAP per 3.6 m).

Maize. Point apply 0.25 kg/are DAP (CAP for 0.42 plants) and 0.27 kg/are KCl (CAP for 15 plants) at planting and 0.8 kg/are urea 30 days after emergence (CAP per 3.3 plants).

Soybean. Band at planting time 0.52 kg/are DAP (CAP for 3.8 m) and 0.55 kg/are TSP (CAP for 3.8 m).

Banana. Apply in a circle around the plant 1.1 kg/are urea (2-cm bottle per 0.6 plant) and 1 kg/are KCl (a 2-cm bottle per 1.1 plants).

Bean (bush). Band apply 0.55 kg/are DAP (CAP for 3.4 m) and 0.4 kg/are KCl (CAP for 4.6 m).



RWANDA (SOUTHERN) FERTILIZER USE OPTIMIZER: paper version



The below

assumes:

- Measurement is with a Inyange water bottle cap of 8.4 ml that holds about 5.9 g urea and 9.2 g of DAP, KCL, and TSP, or with Inyange bottle cut at 2 cm (89 ml) to hold 62 g urea and 98 g of DAP, KCl, and TSP.
- It is assumed maize and sorghum are planted with 75 cm row spacing and the legumes (bean, soybean, groundnuts) are planted with 50 cm row spacing. Sweet potato 80 x 30 cm. Banana 300 x 300 cm.
- Fertilizer costs per 50 kg bags are: FRW 30,000 for urea; 40,000 each for TSP and DAP; 34,000 for KCl.
- Commodity values per kg are: 110 for maize; 450 wheat; 400 each for sorghum, rice, bean, and soybean; and 120 for banana.
- Broadcast is done 1.5m width. Application rates are in kg/are. WAP = weeks after planting.

Level 1 financial ability (< RwF 470 / are).

Wheat. Broadcast 0.9 kg/are urea at tillering (2-cm bottle for 4.7 m).

Climbing bean. Band apply 0.32 kg/are DAP (CAP for 5.8 m) and 0.32 kg/are KCl (CAP for 5.8 m) at planting.

Low land rice. Broadcast 0.32 kg/are DAP (CAP for 1.9 m) and 0.4 kg/are KCl (CAP for 1.6 m) at planting; broadcast 0.72 kg/are urea at panicle initiation (CAP for 0.5 m).

Soybean. Band apply 0.45 kg/are DAP at planting (CAP per 4.2 m).

Sweet potato. Band apply 0.35 kg/are urea 6 weeks after planting (CAP per 19 m).

Level 2 financial ability (RwF 470 to 1170 / are)

Wheat. Broadcast 0.5 kg/are urea (8.4), 0.4 kg/are DAP (CAP for 1.6 m) and 0.32 kg/are KCL (CAP for 1.9 m); broadcast 1.05 kg/are urea at tillering (2-cm bottle for 4.0 m).

Maize. Point apply 0.6 kg/are DAP (CAP for 7 plants).

Climbing bean. Band apply 0.75 kg/are DAP (2.5 m) and 0.57 kg/ha KCl at planting (CAP for 3.3 m)

Low land rice. Broadcast 0.5 kg/are DAP (CAP for 1.2 m) and 0.67 kg/are KCl (CAP for 0.9 m) at planting; broadcast 1.4 kg/are urea at panicle initiation (CAP for 0.3 m).

Bush bean. Band apply 0.47 kg/are DAP (CAP per 5.4 m) and 0.25 kg/are KCl (CAP per 9.2 m) at planting.

Soybean. Band apply 0.8 kg/are DAP at planting (CAP per 2.3 m).

Sweet potato. Band apply 0.57 kg/are urea at planting (CAP per 1.2 m).

Level 3 financial ability (maximizes profit per are due to fertilizer use) (RwF > 1170 / are)

Wheat. broadcast at planting 0.72 kg/are DAP (2-cm bottle for 9.1 m) and 0.45 kg/are KCl (CAP for 1.4 m); broadcast 1.12 kg/are urea at planting and 1.12 kg/are urea at tillering (2-cm bottle for 3.7 m each time);.

Maize. Point apply 1.02 kg/are DAP (CAP for 4.2 plants) and 0.37 kg/are KCl (CAP for 11 plants) at planting; sidedress 0.6 kg/are urea (CAP for 4.4 plants).

Climbing bean. Band apply 1.1 kg/are DAP at planting (CAP for 1.7 m) and 0.82 kg/are KCl (CAP for 2.3 m).

Low land rice. Broadcast 0.87 kg/are urea (CAP for 0.4 m), 0.65 kg/are DAP (CAP for 1.0 m) and 0.92 kg/are KCl (CAP for 0.7 m) at planting; broadcast 1.17 kg/are urea at panicle initiation (CAP for 0.3m). Apply.

Bush bean. Band 0.75 kg/are DAP (CAP per 2.6 m), 0.42 kg/are KCl (CAP per 4.4 m).

Soybean. Band apply 1.2 kg/are DAP at planting (CAP per 1.6 m).

Sweet potato. Point apply 0.82 kg/are urea at 6 weeks after planting (CAP per 2.8 plants).



FERTILIZER USE WITHIN AN INTEGRATED SOIL FERTILITY MANAGEMENT CONTEXT



FERTILIZER SUBSTITUTION AND SOIL TEST IMPLICATIONS

ISFM practice	Urea	DAP or TSP	KCl	NPK 17-17- 17
Fertilizer reduction, % or kg/ha				

Previous crop was a green manure crop	100%	70%	70%	70%
Fresh vegetative material (e.g. prunings of Lantana or tithonia) applied, per 1 t of fresh material	10 kg	5 kg	5 kg	20 kg
Farmyard manure per 1 t of dry material	12 kg	7 kg	5 kg	20 kg
Residual value of FYM applied for the previous crop, per 1 t	5 kg	2 kg	2 kg	7 kg
Dairy or poultry manure, per 1 t dry material	20 kg	10 kg	12 kg	35 kg
Residual value of dairy and poultry manure applied for the previous crop, per 1 t	5 kg	5 kg	2 kg	7 kg
Compost, per 1 t	20 kg	7 kg	7 kg	35 kg
Residual value of compost applied for the previous crop, per 1 t	7 kg	5 kg	2 kg	12 kg
Rotation	0% reduction but more yield expected			
Cereal-bean intercropping	Increase DAP/TSP by 15 kg/ha, but no change in N & K compared with sole cereal fertilizer			
Cereal-other legume (effective in N fixation) intercropping	Increase DAP/TSP by 25 kg/ha, reduce urea by 20 kg/ha, & no change in K compared with sole cereal fertilizer			
If Mehlich III P > 15 ppm	Apply no P			
If soil test K < 100 ppm	Band apply 40 kg/ha KCl			