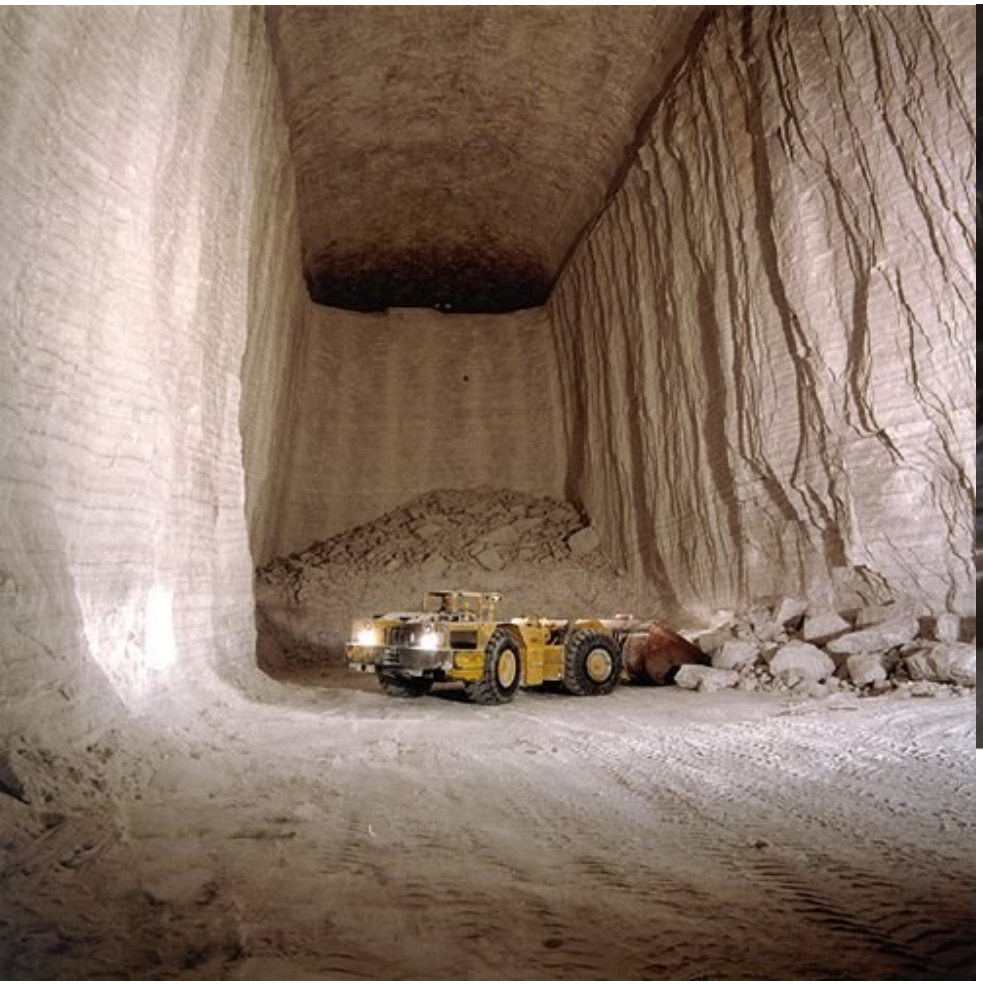
Knowledge grows

Production and use of potassium fertilizers

Potassium deposits are usually deep in the earth



Potassium

- Mostly comes from natural deposits of potassium chloride (KCl)
- Or from high K water such as the Dead Sea
- The salts of potassium are mined, crushed, purified and recrystallized.
- Potassium sulfate and potassium nitrate are sometimes mined or…
- Manufactured by reacting acids on KCl

Potassium form

- KCl is the most common form of potassium
  - It makes up around 85% of the K fertilizers

- The other forms
  - KSO_4
  - KNO_3
  - Are primarily used
    - on high value crops
    - for chloride sensitive crops

Composition of straight potassium fertilizers

Potassium form		N	K_2O	K	MgO	S	Cl
Chemical formula	Full name	Content (%)					
KCl	Muriate of potash (MOP)	-	60 – 62	50 – 51.6	-	0	47-50
K_2SO_4	Sulfate of potash (SOP)	-	50 – 52	41.6 – 43.3	-	18	-
$K_2SO_4 \cdot MgSO_4$	Sulfate of potassium & magnesium (SOPM)	-	22	18.3	11.5	23	1.5
KNO_3	Nitrate of potash (NOP or KN)	14	45	37.5	-	0	-

Plant use of potassium

- Regulates
  - Water balance in cells
  - Water loss through transpiration
- Involved in
  - Production and transport of sugars
  - Enzyme activation
  - Protein synthesis
- Provides tolerance to
  - Pests & diseases
  - Frost
  - Drought
- Improves
  - Color
  - Flavor
  - Storability
  - Of fruits and veges

Potassium deficiency symptoms

- K is very mobile in the plant
  - Therefore oldest leaves show symptoms
- Plants grow slowly
  - Are weak in the stalk and so tend to lodge
- Leaf margins show scorching as spots which then develop into large patches
- Crops use water less efficiently

Potassium deficiency symptoms

Maize

Rice

Sugarcane

Potassium deficiency symptoms

Cotton

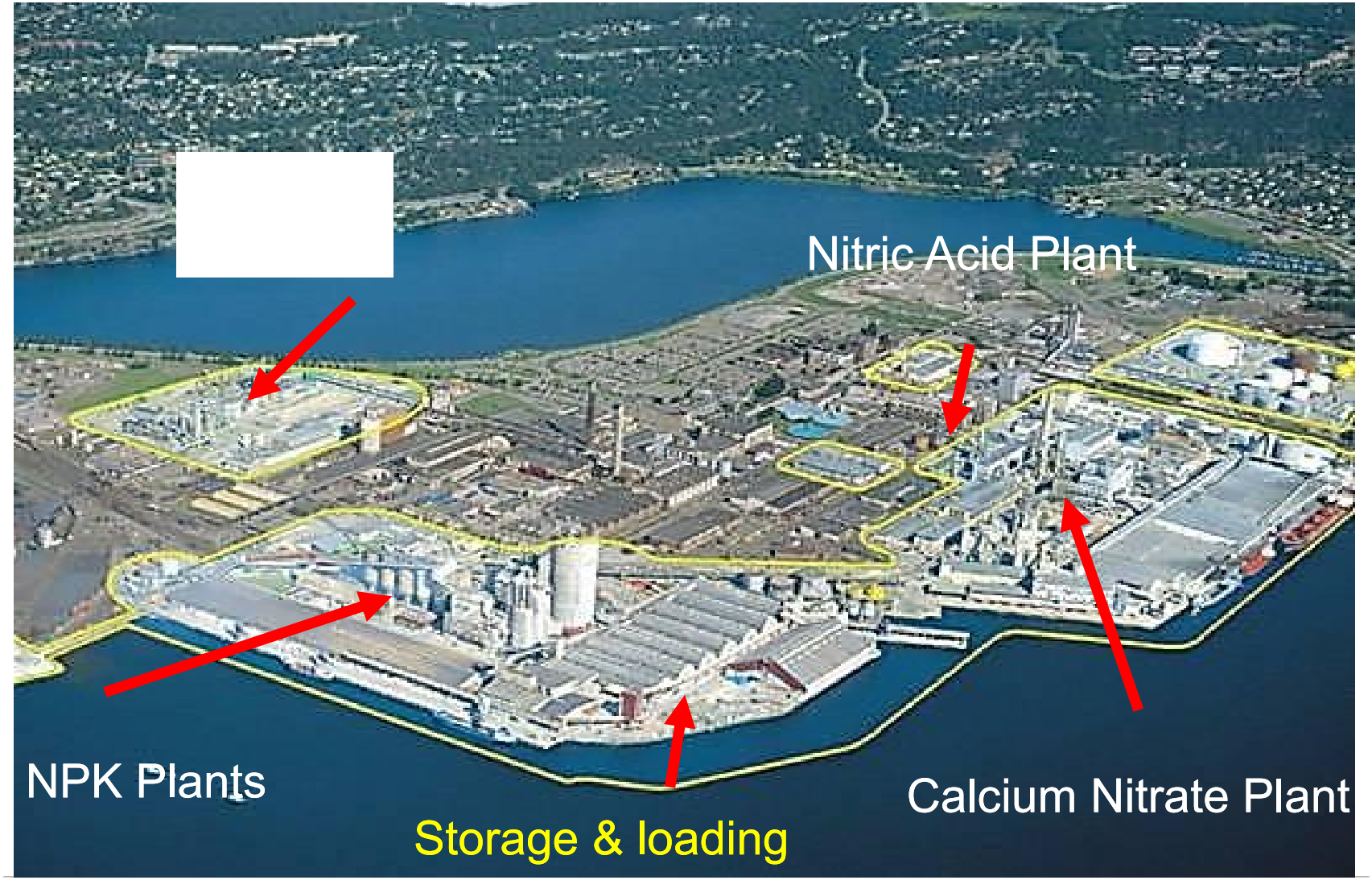
Potato

Tobaco

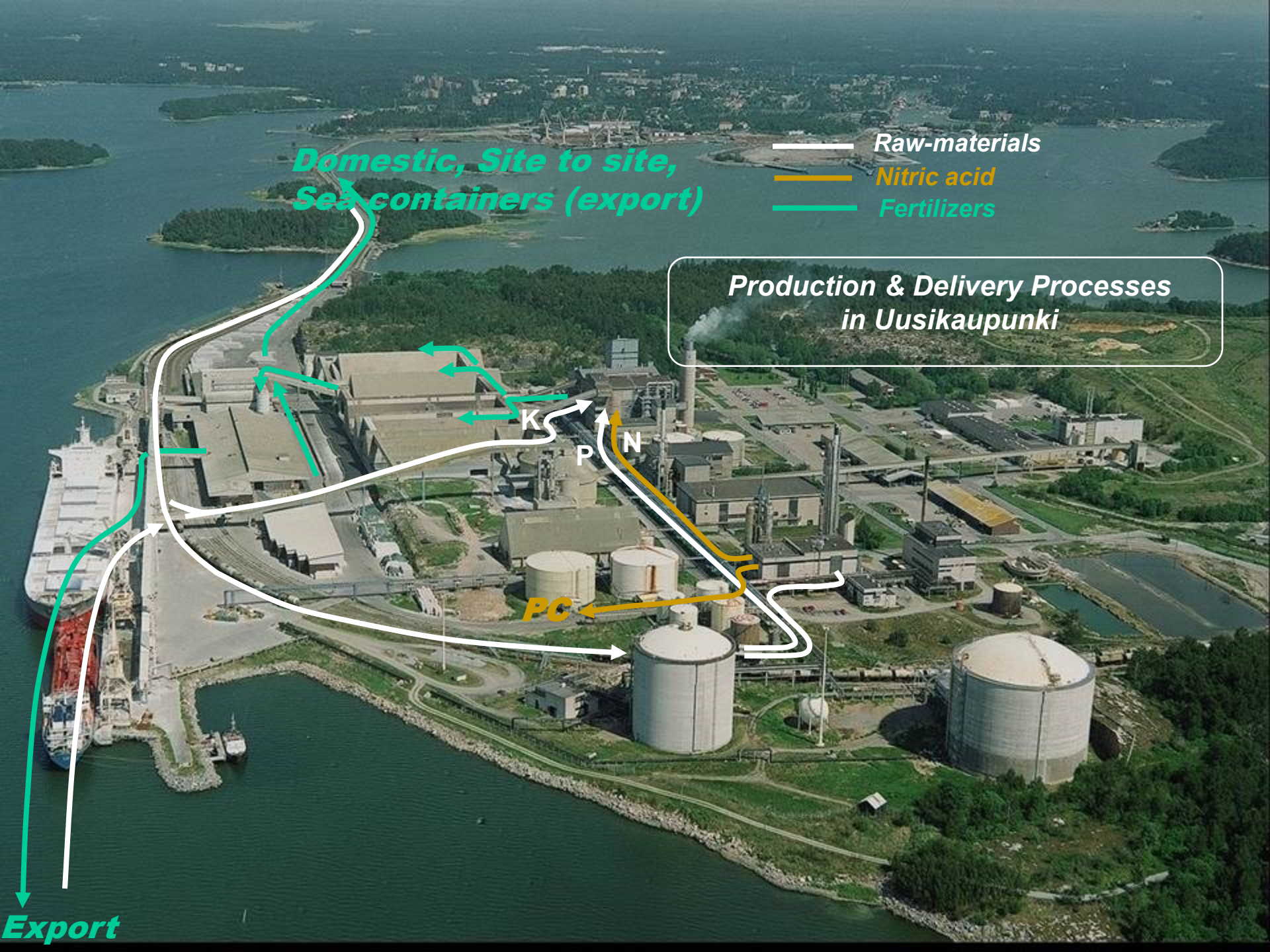
The main points in SOP's favour

- Used on chloride-sensitive and high-value crops
- Advantageous in saline and arid soils
- Salt index of 116 for MOP compared 43 for SOP
- Efficient sulfur source in areas where deficiency is a growing issue
- Improves taste, starch and sugar content, quality, shelf life and crop yield

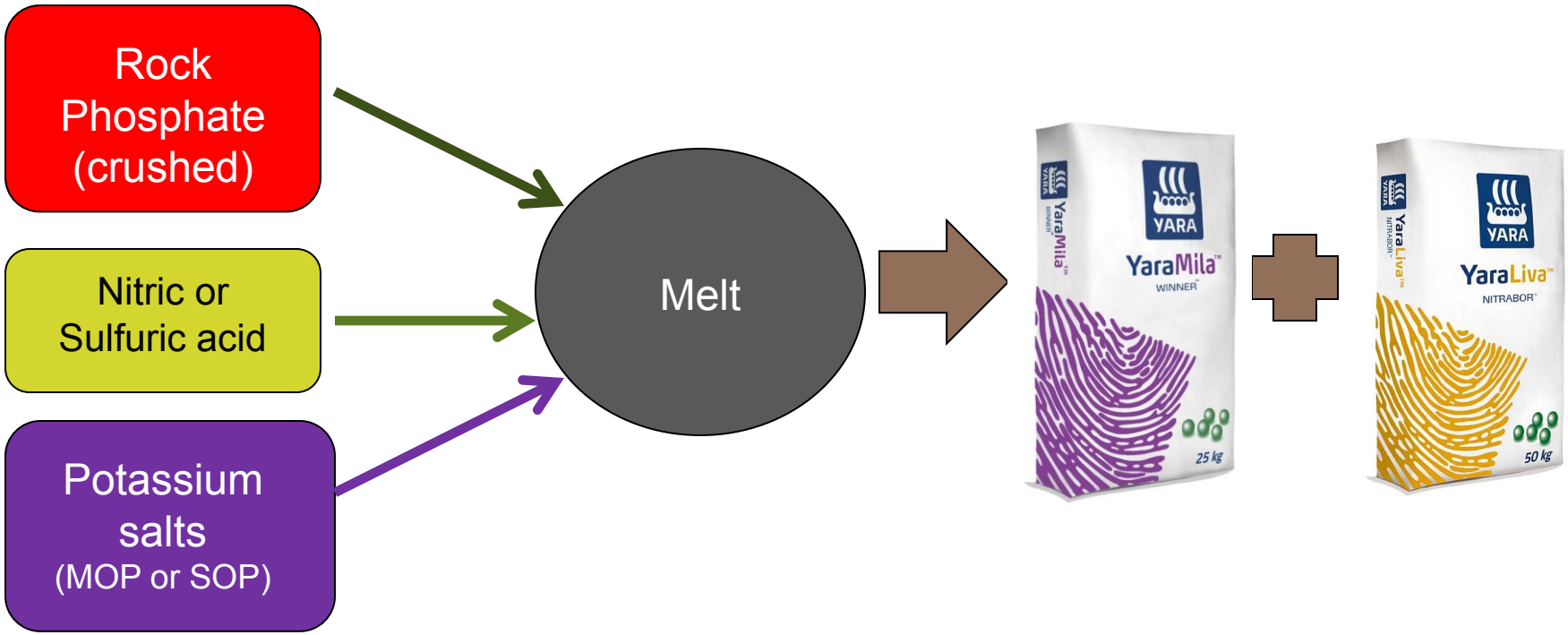
Production of potassium containing YaraMila
Compound fertilizers come from Porsgrunn – Norway



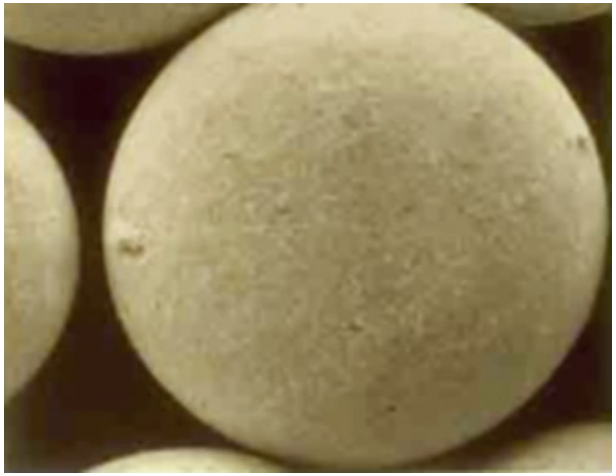

Phosphoric Acid
(Closed 1991)
Laboratory
Sulphuric Acid
(Closed 1982)
Fertiliser
1 & 2
Office
Waste Water
Bulk
Storage
Packing
Maintenance
Raw
Materials
Power Plant
Harbour
Nitric Acid
Ammonia Terminal


Domestic, Site to site,
Sea containers (export)
Raw-materials
Nitric acid
Fertilizers
Production & Delivery Processes
in Uusikaupunki
K
P
N
PC
Export

Production of K containing fertilizers: YaraMila



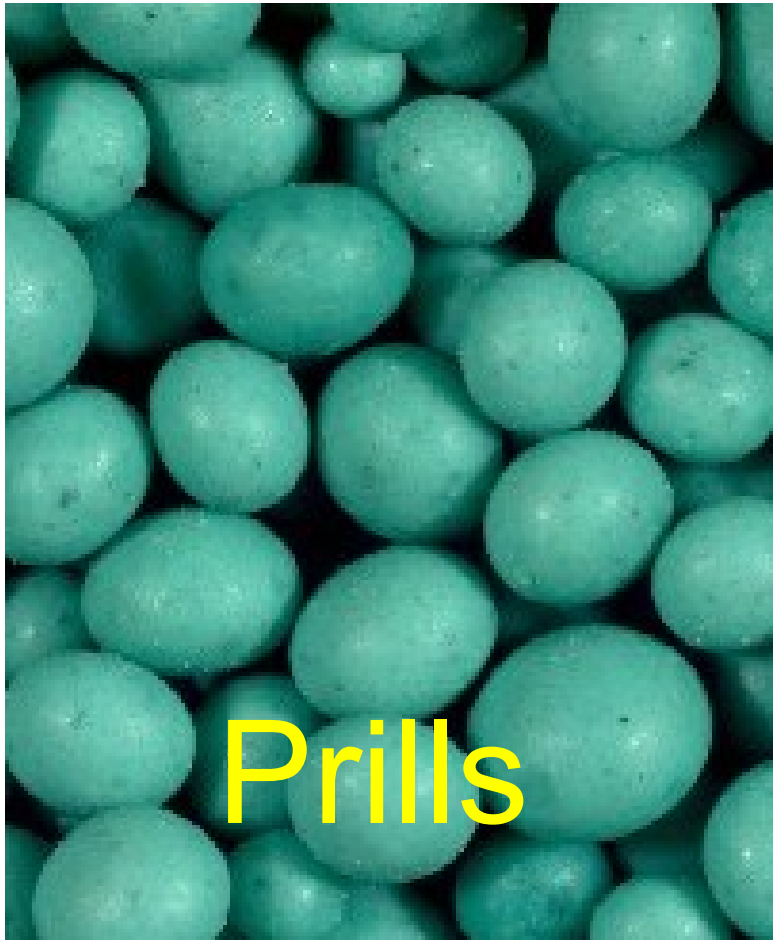
YaraMila is made into prills

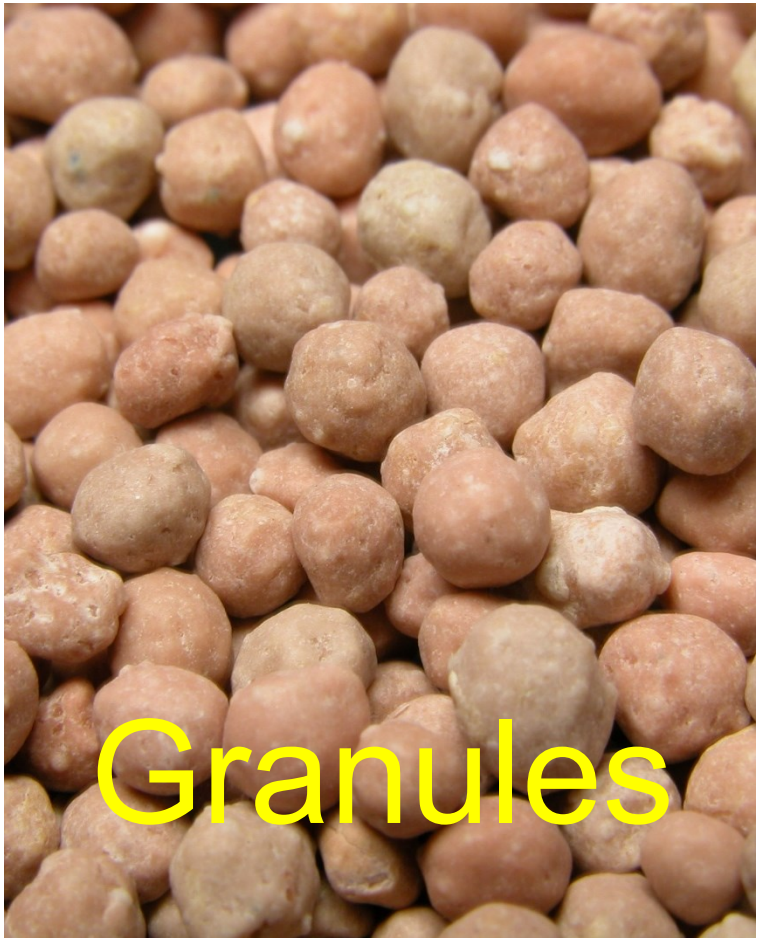


Smooth and round

OR it is made into granules

YaraMila comes as ….

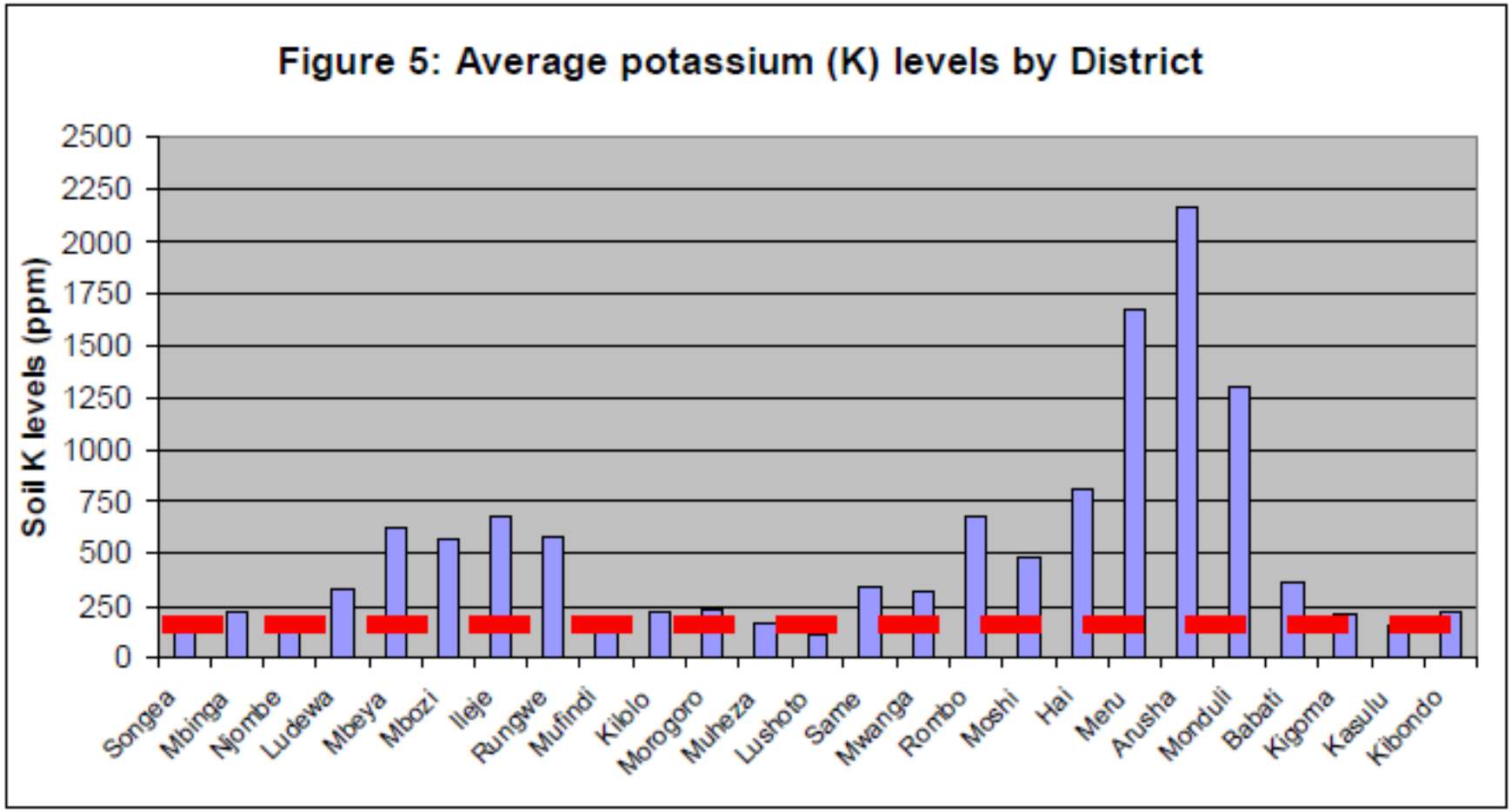




Potassium removal and uptake for one ton of harvest

Crop	Removal by harvest (kg K_2O/T)	Total uptake by above-ground biomass (kg K_2O/T)
Maize	5	20
Rice	3	32
Cassava	3	5.5
Potato	6	7
Tomato	5	11
Leafy veg.	6	7
Tea	25	79
Coffee	33	85
Tobacco	69	137
Cotton	11	23
Sugarcane	1.4	2

Potassium levels in soils under coffee per district



Ref. Cordingley, J (2010)

YaraMila NPK in Tanazania

Trade name	Formula	K from MOP (%)	K from SOP (%)	Crops
YaraMila Tobacco	10 - 18 - 24 + 0.5 MgO+7 S + 0,1 B	6	18	tobacco
YaraMila Winner	15-09-20 + 3.8S+1.8MgO+0.02Zn+ 0.02B+0.02Mn	13	7	coffee, tea, potato, tomato, fruit trees, leafy vegetables, sugarcane
YaraMila Java	22-06-12 + 3S+1MgO+0.2B+ 0.2Zn	-	12	coffee, tea
YaraMila Cereal	23-10-05 + 3S+2MgO + 0.3Zn	-	5	maize, rice

Knowledge grows

THANK YOU FOR YOUR ATTENTION