

United Nations Conference on Trade and Development

13th Multi-Year Expert Meeting on Commodities and Development

10-12 October 2022, Geneva

Present status and future trend of phosphate industry in Sri Lanka

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Present Status and Future Trend of Phosphate Industry in Sri Lanka

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Introduction

- Phosphorus is an essential nutrient required by all crops and animals for their living
- It is a non-renewable and a dwindling resource worldwide
- Phosphate deposits worldwide are getting depleted drastically
- Available high quality deposits will be depleted in 50 years and the reserves in 150 years (Herring and Fentel, 1993)

At the first glance: Phosphorous use in Sri Lanka

- Triple Super Phosphate (TSP) is the commonest fertilizer used in Sri Lanka
 - Annuals/ Food crops (Rice, OFC, Vegetables etc.)
 - Perennials/Plantation crops (Tea, Rubber, Coconut, Minor export crops etc.)
- Annual TSP requirement is about 164,000 tons (NFS, 2022)
- Requirement is met by importation from various countries
- Cost of importation is about 177 Mn US\$/ annum
- 78% of total import used for Major food crops
 - Nearly 37% used in paddy sector
 - 41% used in fruits & vegetables

Apatite deposits

- In Sri Lanka, two apatite occurrences have been discovered in Eppawala and Ridigama
- Eppawala Apatite deposit discovered in 1971
- It is a valuable Phosphate deposit with a very high Phosphorous percentage of 33%-40%

Eppawala Apatite deposit

- Located in Anuradhapura District, North Central Province of Sri Lanka
- Within a region of high grade igneous rock phosphate deposit
- The rock phosphate deposit covers an area of approximately 324ha of land



Eppawala Apatite...

- Pale blue mineral
- Contains phosphate crystals and rocks
- Rocks are covered in red brown earth and occasional vegetation



Eppawala Apatite...

- The Eppawala phosphate deposit is currently estimated to contain about 60 million metric tons of apatite
 - Northern area has 40 MMT and Southern has 20 MMT
- The Phosphate deposit classified as a valuable, high grade deposit
 - contains 33%-40% of Phosphorous as P₂O₅
 - one of the ten lowest Cd containing deposits out of 414 phosphate deposits of the world
 - One of the richest and unique apatite deposits in the world
- Sustainable use of phosphate reserve will ensure providing raw material to produce soluble phosphate fertilizer for at least **200 years**



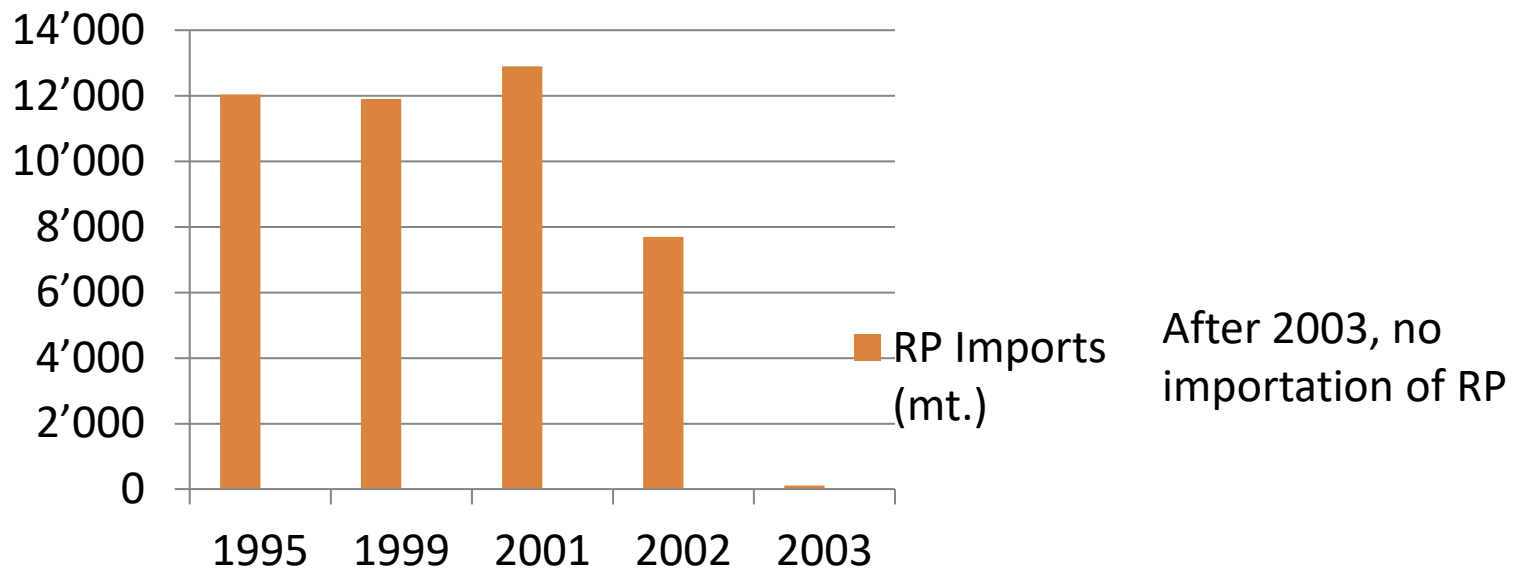
Quality of Eppawala Apatite

- Chemical analysis of the Eppawala deposit shows a concentration of 40.57% P₂O₅ for the apatite crystals and 33.24% for the matrix
- Solubility is very low
 - Water solubility – 0.5%
 - Citric acid Solubility– 6%
- Eppawala apatite has more Chlorine than Fluorine
- High Iron and Aluminum compounds contain in rock phosphate

Usage of Eppawala deposit

Although it is a valuable asset has it yet been fully utilized ???

- Production of ERP fertilizer began in 1974
- Commercial utilization of ERP commenced in 1979 with the sale of 3000 mt and now it has come to 60,000mt/annum



Usage of Eppawala deposit ...

Although it is a valuable asset has it yet been fully utilized ???...

- Plantation crop sector is self sufficient in local phosphates
 - Powdered form of this rock is being used to fulfill the phosphorus requirement of perennials such as tea, rubber, coconut and spice crops such as pepper, coffee etc.
- This deposit is not suitable for short term crops due to its low solubility
- So far, 2.6M mt of phosphate ie. around **3% of the reserves** were utilized

Usage of Eppawala...

- *What action can be taken to reap the full benefit of national asset*
- After a long term comprehensive research, DOA has suggested Single Super Phosphate (SSP) fertilizer as an equally efficient phosphate fertilizer as TSP for rice
- Therefore, it was suggested to convert ERP to a soluble form such as SSP or TSP through chemical process
- The composition of this deposit with high chlorine content cause to corrosion problems during manufacture
- It unsuitable to produce phosphoric acid that used to make Triple Superphosphate (TSP) and ammonium phosphate
- **Due to the high Iron and Aluminum compounds contained in rock phosphate, SSP production is more suitable than TSP production**

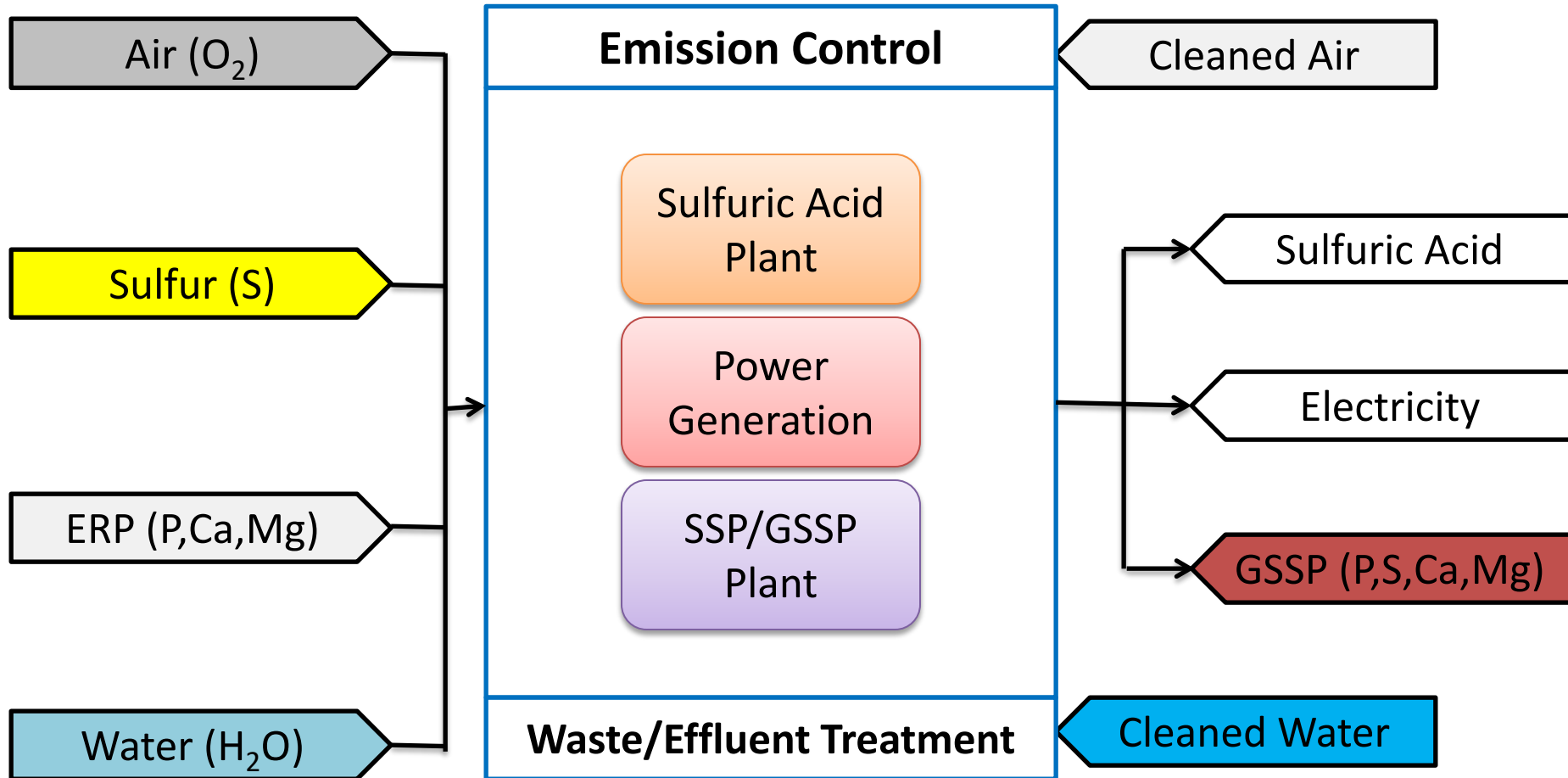
Production of SSP using apatite from Eppawala deposit

- Achieving the objective of production of soluble phosphate fertilizer for short term crops results in:
 - Achieving self sufficiency in phosphate fertilizer
 - Saving valuable foreign exchange of about 177 Mn US\$/ annum
 - Generation of Employment
 - Sulphur added to the soil
 - Fertilizer subsidy reduced
 - Cheaper fertilizer to the farmer
 - Crop productivity increased

Current status

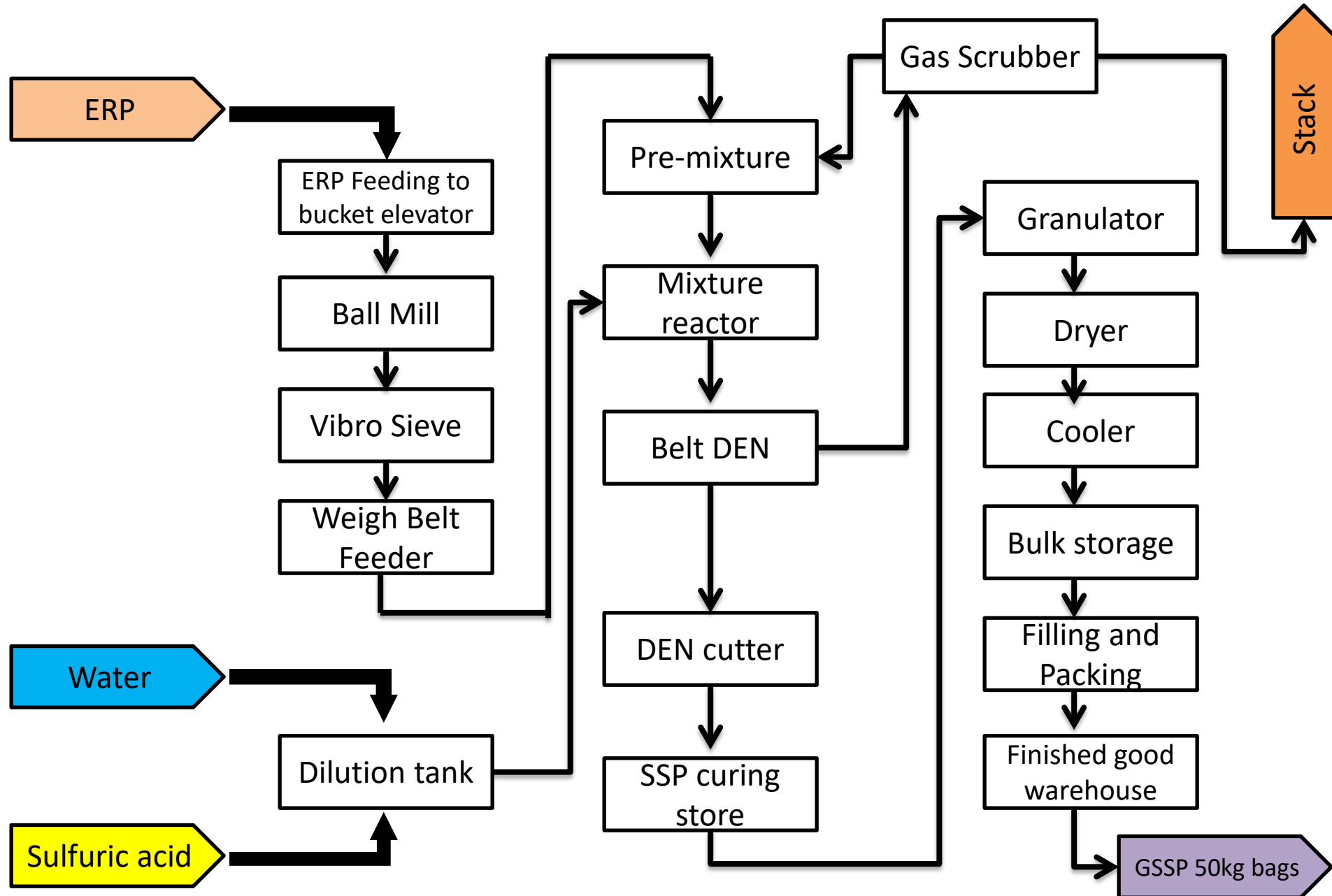
- Cabinet has approved to produce SSP from Eppawala Rock Phosphate in 2020
- The production target is to replace the current imports of TSP with nearly 220,000 tons of SSP annually
- Exploration of the Eppawala Rock Phosphate deposit has been carried out by the Geological Survey and Mines Bureau
 - necessary preliminary studies have been completed
- Evaluation of submitted proposals for Phosphate production

Proposed Process of Making Granular Single Super Phosphate (GSSP)



The estimated cost of the production plant is 3.6 mn USD

GSSP Fertilizer Manufacturing Process



Future Trend

- Value addition to the locally available Eppawala rock phosphate has an important role to play in agricultural production
- The GOSL intend to call for Expression of Interest (EOI) for **Public Private Partnership** to manufacture **SSP / TSP**
- Nano technology

Summary

- Producing locally made phosphate fertilizer will have a direct benefit to the Economy of the country
- Rate of exploitation of this deposit should be carefully controlled
- Investors for Public Private Partnership to manufacture SSP/ TSP is expected

Thank you