



**UN**  
environment

*Policies and Incentives to promote access to fertilizers and more effective application*

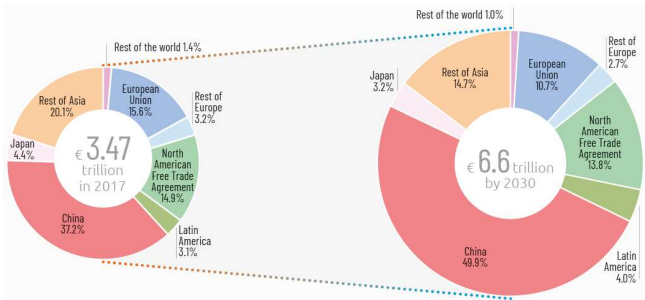
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High Level Forum on Plant Nutrition  
Paris, France, 19 November 2019

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## Chemicals production and consumption

- More than USD 5 trillion industry in 2017 (incl. pharmaceuticals)
- Sales projected to double by 2030
- Production and consumption shifting to emerging economies
- Production of fertilizers increasing in many regions.

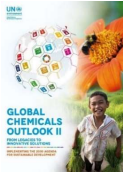


| Region                              | 2017 (%) | 2030 (%) |
|-------------------------------------|----------|----------|
| China                               | 37.2%    | 49.8%    |
| Rest of Asia                        | 20.1%    | 14.7%    |
| Rest of the world                   | 14.4%    | 10.0%    |
| European Union                      | 16.6%    | 10.7%    |
| Rest of Europe                      | 3.2%     | 2.7%     |
| North American Free Trade Agreement | 14.9%    | 13.8%    |
| Latin America                       | 3.1%     | 4.0%     |
| Japan                               | 4.4%     | 3.2%     |

€3.47 trillion in 2017

€6.6 trillion by 2030

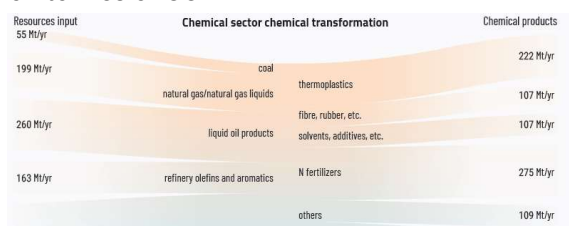
Projected growth in world chemical sales (excl. pharmaceuticals) (CEFIC)



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## Chemical Industry Global resource flows

- Production of basic inorganics (e.g. fertilizers) relies on the extraction of fuels and minerals
- 1,700 million tonnes (Mt) of feedstocks used to produce 820 Mt of chemical products in 2013
- Around 34 % of nitrogen fertilizers
- 815 Mt of secondary products, including 140 Mt of methane and 287 million tonnes of CO<sub>2</sub>.



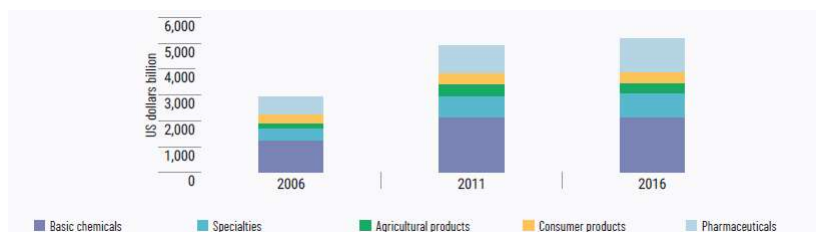
Resource extraction by the chemical sector and related chemicals production, 2013 in millions of tonnes (Mt) (Levi and Cullen 2018)

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## Market segments in the chemical industry

- Basic organic and inorganic chemicals represent the largest share
- Agricultural and consumer products account for 8 per cent of global chemical shipments
- Slower growth of chemical shipments between 2011 and 2016



Global chemical shipments by segment in 2006, 2011 and 2016 (US dollars billion) (ACC)

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## Market for agricultural chemicals

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- Fertilizers make up largest share of agricultural chemicals by volume.
- N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O consumption at 186.67 million tonnes in 2016.
- Projected to grow by 1.5, 2.2 and 2.4 per cent annually until 2020
- USD 98 billion to be invested between 2018 and 2022 adding 78 MT of production capacity of fertilizers.
- Consumption and fertilizer market growing most rapidly in Asia



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## MegaTrends

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- Digitalization e.g. soil analysis sensors, data-driven fertilizer application
- Food production needs to increase by 60 per cent between 2005/07 and 2050.
- Freshwater pollution may aggravate water scarcity
- Growing global population and more resource-intensive diets
- Global biological crop protection market growing.

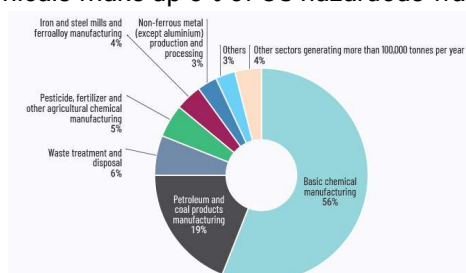


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## Chemical pollution: emissions, releases and wastes

- Total application to soil increasing, application rates decreasing
- Nitrogen-based fertilizer use up from 11 Mt in 1961 to 108 Mt in 2014. Released nitrous oxide an extremely potent GHG.
- Trace elements such e.g. Cadmium, increasing in agricultural soils
- Agrochemicals make up 5% of US hazardous waste



Sources of hazardous waste in the United States by sector, 2011 (per cent of volume) (UNEP and ISWA)

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## Data challenges and opportunities

- Substantial gaps in release and pollution data.
- Inconsistent at the national or regional levels
- New initiatives could provide models e.g. Global Mercury Observation System and GAPS
- Positive trends in reducing concentrations of chemicals regulated or restricted by governments (e.g. lead) and multilateral treaties (e.g. some POPs and mercury).



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## Market-based instruments

- Regulatory actions, non-regulatory strategies and voluntary initiatives are drivers
- Market-based instruments (e.g. tax) in agricultural systems can reduce application and risk.
- Can be combined with command and control regulatory measures (e.g. prohibitions or restrictions)
- Reforming subsidy programmes that incentivize use
- Countries with limited capacities face challenging setting up chemicals management programmes



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## Chemical and non-chemical alternatives

- Regulatory actions, public pressure and voluntary initiatives
- Informed substitution – replacement or technological change
- Substitution as an innovation driver
- Government established mandates for alternatives assessment and substitution

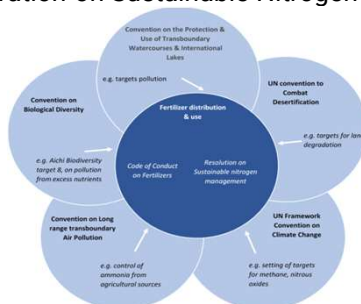


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## International Conventions and Policy Instruments

- International Code of conduct for the Sustainable Use and Management of Fertilizers
- CBD, UNFCCC, UNCCD, Codex Alimentarius etc.
- UNEA resolution 4/14 on sustainable nitrogen management
- Colombo Declaration on Sustainable Nitrogen Management



International Conventions with potential to influence fertilizer distribution and use

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## International partnerships

- Soil - Global Soil Partnership
- Nutrient Management - INI, GPNM, INMS project, The Global Phosphorus Research Initiative
- INMS-4 endorsed UNEA-4 proposal.
- Product Initiatives - the International EPD system and WTO agreements
- Pollution & Marine environment - GPA



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## Regional conventions and Policy Instruments

- Prioritization - developing countries face other challenges including food insecurity and poverty.
- Regional partnerships can be part of international initiatives e.g. INI regional centers and 7 Regional Soil Partnerships
- Specific to the region, e.g. ECOWAS regional policies, EU Nitrates Directive, The MERCOSUR environmental policy



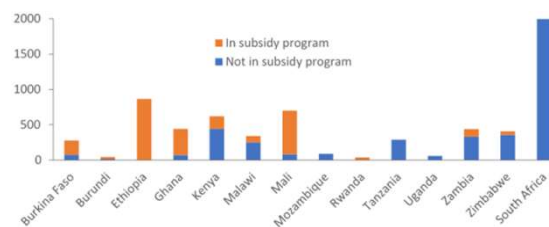
Regional Soil Partnerships (FAO)

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## National legislation on fertilizers

- Registration with a designated authority usually required
- Fertilizer factory regulations have become more stringent
- Policies encourage private sector involvement to reduce costs
- Policies sometimes outdated and not specific to fertilizers. Enforcement also a challenge, poor inspection capacity.



Amounts of fertilizer consumed in selected African countries from, and not from subsidized programs (AFAP, IFDC, UNECA and AfDB)

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## Types of incentives

- Subsidies - market distortions and nutrient use imbalances
- Code of practice on handling of fertilizers
- Regulations on manure - challenges in developing countries
- National Nutrient platforms
- Water and Air regulations and Carbon tax schemes

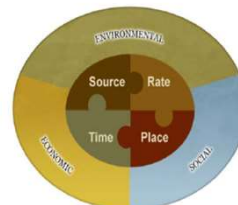


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## Corporate responsibility and stewardship

- The 4R Nutrient Stewardship: framework for increasing crop yields while protecting the environment.
- Use 4R practices along with agronomic practices for efficiency
- 4R Research Fund sustainability indicators and environmental impact data
- The SAI Platform offers capacity building and communication support
- The Sustainability consortium – sustainable products and best practices.
- Fertilizer Europe Stewardship Program specifies best practices and issues advice.



The 4R Nutrient Stewardship concept (Johnsons and Bruulsema 2014)

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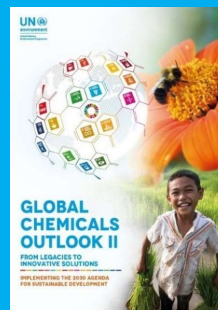
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Thank you for your attention

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