## COMMENTS TEMPLATE

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| **No. & Title:** | KS 157: 2018 Monoammonium and Diammonium Phosphate Fertilizers |
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| Organization | Clause | Type of comment (General/Technical/ Editorial) | Comments | Proposed Change | TC Observation(s) |
|---|---|---|---|---|---|
| OCP Kenya | Heavy metal contaminants | General and technical | Please see the pages immediately below. | For the cadmium (Cd) max. content, in the column on "*limits in ppm*", please replace the number "***15.0***" with "***30.0***". | |

# OCP KENYA

# KS 157: 2018 MONOAMMONIUM AND DIAMMONIUM PHOSPHATE FERTILIZERS

**Recommendation**

1. The current limit of 30ppm cadmium in DAP and MAP fertilizers should be retained.

**OCP Kenya**

2. OCP Kenya was incorporated in 2016. It is a wholly owned subsidiary of OCP S.A., a Moroccan state majority-owned company founded in 1920. With a century of experience, OCP S.A. together with its subsidiaries worldwide (referred to as the "**OCP Group**") is a leading player in the production of phosphate fertilizers. OCP Group has a global reach, with over 160 customers on five continents.

3. OCP Kenya's mission is to contribute to sustainable, long-term productivity-led agricultural growth in Kenya, of both its domestic and export sectors. Its commitment to Kenya's agricultural growth and development is evidenced in a wide range of areas:

    a) **An African company**. OCP Group is fully committed to South-South cooperation and to an African solidarity and growth. It supplies the African market with 2,5 million metric tons/year of fertilizers that are not only adapted to African soils but also affordable for farmers. It has significant operations in many African countries including Kenya, Ethiopia, Nigeria, Ghana, Rwanda, etc.;

    b) **Secure, reliable supplies**. OCP Kenya has access, through its parent company OCP S.A, to the world's largest phosphate reserves which represent over 70% of global reserves. These phosphate reserves are located in Morocco and aim to provide reliable and secure supplies for several hundred years;

    c) **Expertise**. OCP Kenya is committed to supporting the Kenyan government in increasing local value-added for fertilizers and responding to the rising demand for soil and crop-specific formulas by leveraging its extensive industrial experience and agronomical expertise for the benefit of Kenyan farmers, Kenya's agricultural development and food security;

    d) **Fertilizers developed specifically for Kenyan soils.** OCP Kenya's products are specifically customized to Kenyan soils, climate and crops. Between 2012 and 2015, OCP Kenya conducted field trials in collaboration with KALRO on a new product "*NPS*" (a nitrogen and phosphate fertilizer including specifically calibrated quantities of the micronutrient sulphur) to address a generalized deficiency of sulphur in Kenyan soils, highlighted by scientific studies issued by KALRO. The trials aimed to evaluate, demonstrate and disseminate

sustainable, efficient fertilizer nutrients management for increased yields of maize, climbing beans and soybeans in smallholder farming systems. The OCP Kenya NPS products increased Kenyan yields by up to 20% more than was achieved with other types of "*standard*" fertilizers;

e) **Innovative solutions**. NPS is only the first example of our successful approach based on investment in research and development, in close partnership with local experts and farmers, to produce innovative and effective solutions adapted specifically for the needs of Kenya's farmers;

f) **Extension and advisory services**. OCP Kenya strongly believes that extension and advisory services are the cornerstone of all successful programs aiming at modernizing the agricultural sector. As such, OCP Kenya (working in close collaboration with its partners, local institutions and research capabilities) is committed to continuing to contribute to the development of a strong agriculture extension system capable of adapting technologies and best management practices to local farmers, providing the necessary follow-up required, and ensuring that smallholder farmers benefit from these innovations; and

g) **Affordability.** OCP Kenya provides affordable high-quality fertilizers thanks to OCP Group's efficient production processes. We are not motivated by short-term profits but by the long-term growth of the African agricultural sector.

4. The cadmium content of OCP Kenya's products is comfortably within the long-standing Kenyan limit of 30ppm. However, if the cadmium limit is reduced to 15ppm, as proposed by the KEBS, all of our products will be excluded from Kenya. We will therefore be forced, with the greatest regret, to look to build our African partnerships and to support African agricultural growth elsewhere.

**Scientific Evidence**

5. The protection of public health and the environment, and of Kenya's vital agricultural exports (particularly tea) must of course be paramount. However, there is no scientific evidence that establishes that cadmium levels in phosphate fertilizers pose any such risks in Kenya.

*Cadmium and Health*

6. Cadmium is an element, naturally present in the soil, water and living organisms. The many factors involved in cadmium uptake by plants and by humans are not well understood and are subject to ongoing international research. However, it is already clear that there are wide variations in how much cadmium from the soil is absorbed by humans (source: Wageningen University, 2017[i]):

- Absorbed by food crops: This is strongly affected by factors that include soil acidity, organic matters and clay content, the presence of ions such as zinc and iron, as well as crop species, variety and cultivar (e.g. differences in the latter can affect cadmium uptake by a factor of up to ten);

- Removed by food processing (e.g. wheat products have less than half the cadmium of wheat grains and flour);

- Consumed in different diets (e.g. shellfish have some ten times more cadmium than wheat, which in turn has ten times more than eggs); and

- Absorbed by the human body: this is strongly affected by deficiencies, particularly in iron and zinc.

7. The World Health Organization and the Food and Agricultural Organization jointly concluded in their most recent study on cadmium in 2010 that "*exposure to cadmium through the diet for all age groups, including consumers with high exposure and subgroups with special dietary habits, is below the Provisional Tolerable Intake*".[ii] The European Food Safety Agency concluded, in its most recent study in 2012, that in the EU (which currently has no limits whatsoever on cadmium in fertilizers): "*adverse effects are unlikely to occur in an individual with current dietary exposure*" and that "*the concentration of cadmium in soils is not the primary determinant of cadmium in crops*".[iii] The U.S. International Plant Nutrition Institute concluded in 2014 that "*scientific risk assessments have shown that phosphate fertilizer containing cadmium is safe and does not pose risk to human health*".[iv]

8. It should be noted that the only case of cadmium toxicity worldwide that has ever occurred was in the 1950s, in Japan, with subsistence farmers who grew rice on soils that were contaminated with industrial wastes.[v] This did not stop Japan from regulating on the basis of 67ppm, especially since there have been no documented cases worldwide since then of cadmium affecting public health. Even the latest international scientific evidence has established that there is no link whatsoever between phosphate fertilizer use and areas of health issues.

*Cadmium in the Soil*

9. Overwhelmingly, the main source of cadmium in the soil is the natural bedrock. Average levels of cadmium in Kenyan agricultural soils are less than 0.5 ppm. At such levels of cadmium in soils, a change in inputs from decreased levels in fertilizers will make a negligible difference. One of the most recent studies by the National Research Council of Canada concluded, in 2018, that even after 1,000 years of using a typical phosphate fertilizer, the total cadmium input to soil would remain negligible and that placing limits on cadmium content is "*expensive and futile"* since it has "*no discernible effect on the cadmium content in soil or crops*".[vi]) In the EU, parent rock contributes approximately 900g/ha to the soil; by contrast, annual cadmium inputs to the soil from fertilizers amount to less than 0.5g, from an average application rate that is approximately four times higher than the one in Kenya. Other inputs of cadmium into the soil come from industrial activity, vehicle emissions, atmospheric deposition, manure, use of untreated effluents for irrigation and fertilization, and improper waste disposal.

10. There are several studies that have found elevated levels of cadmium in soils in Kenya or elsewhere in Africa. However, these studies attribute the causes of the elevated levels of cadmium to the natural weathering of the parent rock, industrial activity, untreated effluents and to poor waste management, particularly to the improper disposal of nickel-cadmium batteries, electronic equipment and plastics. For example:

- Fluoride and selected heavy metals around Fluorspar mining Plant, Kenya – Kibet et al. (2019)[vii]
- Heavy metal risks in Kenyan soils – Mungai et al. (2016)[viii]
- Heavy metal pollution in Africa – Yabe et al (2010)[ix]
- Kabwe, Zambia - Tembo et al. (2006)[x]
- Ikeja, Nigeria - Fakayaode and Onianwa (2002)[xi]

*Cadmium in Water*

11. We are not aware that the results of official water quality tests in Kenya have given rise to any concern, other than water polluted by industrial and domestic waste. Elsewhere in the world, cadmium in drinking water is not generally a cause for concern. The level of cadmium in EU drinking water is almost undetectable at an average of 0.21ug/kg, and water is one of the lowest contributors to cadmium in EU diets. (Source: European Food Safety Agency, 2012[xii].)

12. Several studies have found that average levels of cadmium in Kenya are well within international standards, for example:

    - Selected Water Quality in River Sio, Busia County, Kenya – Ondoo et al. (2019)[xiii]: Cadmium is below the limit of detection
    - Lake Naivasha water and fish – Ogendi et al (2014)[xiv]: Cadmium in water is within WHO and USEPA guidelines, and cadmium in fish is significantly below the WHO guidelines.
    - Fish at Mombasa – Mwashote (2003)[xv]: Cadmium in the water is "*below detection limits*" and in fish is within FAO standards.
    - Drinking Water Quality in Shallow Wells in Uasin Gishu County– Kipchumba (2015)[xvi]: "*cadmium was found to be nil*".

13. Several other studies have also found incidence of elevated levels of cadmium in water but, as in the case of excess levels in soils, these were all attributed to the parent rock, industrial activity or poor waste management. For example:

    - Lake Victoria - Nabulo et al (2006)[xvii]
    - Akaki River, Ethiopia – Prabu (2009)[xviii]
    - Heavy Metals in Nairobi Dam Water - Ndeda et al (2014)[xix]
    - Dandora Municipal Dump, Nairobi – UNEP[xx]

*Cadmium in Tea*

14. We understand that there are some concerns over high levels of cadmium in tea. However, we have seen no evidence whatsoever for this nor any connection with the use of phosphate fertilizers. A comprehensive Kenyan study (Moseti, 2013)[xxi] concluded that:

- Cadmium has the lowest levels in tea of all 5 heavy metals tested;
- All samples of Kenyan tea were within international guidelines for cadmium content; and
- Annual changes in the levels of cadmium in tea were “statistically insignificant”.

15. Furthermore, MAP and DAP - the fertilizer products for which the cadmium limits are proposed to be reduced - are not used for tea production. More specifically, the fertilizer blend that is used for tea production in Kenya has a P2O5 content of only 5%, which makes the cadmium level in this NPK blend not exceed 3 ppm per product in both cases set forth below:

    - *Case 1 - NPK obtained through mechanical blending*: Producing 1 metric ton of NPK fertilizers for tea production requires less than 100 kg of DAP. Thus, with current Kenyan limits of cadmium in DAP (*i.e.* 30ppm), this level shall not exceed 3ppm in NPK fertilizers for tea production.
    - *Case 2 – NPK obtained through chemical granulation (compound NPK):* A 30ppm cadmium limit on DAP fertilizers is equivalent to limiting a cadmium level at 60mg of P2O5. As the NPK formula for tea is comprised of 5% of P2O5, cadmium limits shall not exceed 3ppm per product, which can be easily used for tea productions.

    The above limits are a maximum and, in practice, they are likely to be considerably lower as the NPK currently used in Kenya for tea production is supplied from low-cadmium phosphate rock. At such levels, even with relatively high rates of fertilizer application over 200kg/ha, the input of cadmium from fertilizers will be negligible. Thus, tea growers’ concerns on cadmium levels in fertilizers can be addressed by enforcing a limit of 30ppm on DAP fertilizers and, if necessary, by setting an equivalent limit of cadmium calculated on a P2O5 content, not a DAP/MAP product content (*i.e.* cadmium in P2O5 content, not in total fertilizer content, is the calculation mode used by the EU and many other countries worldwide), which would guarantee the availability of NPK fertilizers with negligible cadmium content for tea production in Kenya. However, there is no justification for reducing the nationwide cadmium limit of 30ppm in DAP and MAP fertilizers as this would impose extra costs on all other farmers without any practical benefit whatsoever for tea growers.

16. Furthermore, there is no evidence of any concern in, for example, the EU over high levels of cadmium in Kenyan tea. The EU average cadmium content for all teas is 0.92ug/kg, making it one of the smallest contributors to cadmium in EU diets, only 0.3% of an adult’s intake. By comparison, fruit juice is 3.51ug/kg, milk drinks 8.77ug/kg, bread 15.2ug/kg, fish 26.0ug/kg and potatoes 46.3ug/kg (source: European Food Safety Agency, 2012.[xxii])

**International Standards**

17. The current Kenyan cadmium limit of 30ppm is already amongst the lowest in the world. A 15ppm limit would be severely disconnected from those in most major countries, for example:

    - USA (Washington) 400ppm;*

- Canada 400ppm;*
- USA (Oregon) 152ppm;
- USA (California) 81ppm;
- Japan 67ppm;
- Australia 59ppm;
- New Zealand 55 ppm;
- Ethiopia: 45ppm
- Tanzania: 30ppm
- Rwanda: 30ppm

(**Washington State and Canada apply limits to the rates of fertilizer application, averaged over 4 years.)*

18. Many of these countries/states have all conducted comprehensive scientific studies and risk assessments of the threat to health from cadmium in fertilizers and have all concluded that limits at the above levels were safe. Furthermore, none of these countries/states has identified any health risks from cadmium in fertilizers. The most recent assessment, in New Zealand in 2016, concluded that with a cadmium limit of 55ppm, cadmium levels in the soil were declining and cadmium intake in the diet of all population groups was less than half the WHO's recommended maximum intake.[xxiii]

19. The EU currently has **no cadmium limits whatsoever** on phosphate fertilizers. In the course of an extensive debate initiated in 2003, many EU governments and Parliamentarians have expressed serious concerns over the potential impact of a cadmium limit in restricting the EU's supplies of fertilizers, increasing prices and harming both farmers and consumers. Overwhelming scientific evidence, unanimously endorsed by the EU's Scientific Committee on Health and Environmental Risks after a comprehensive study in 2015, has clearly indicated that a limit of 40ppm would be sufficiently low to guarantee that the levels of cadmium in EU soils would continue to decline at the current rate of 18% over 100 years, which is occurring even without any cadmium limits.[xxiv] The Secretary-General of the European farmers' association (COPA-COGECA) stated that there is "*no true scientific evidence*" to support cadmium limits.[xxv] Fertilizers Europe (the body representing European fertilizer manufacturers) has stated that limits would "*negatively impact the international competitiveness of European farmers*".[xxvi] Nonetheless, out of an abundance of caution, in May 2019, the EU adopted a cadmium limit of 30ppm.[xxvii] This limit will not come into force until mid-2022 and will apply only to fertilizers to be traded within the EU. Fertilizers sold within individual Member States will continue to follow national rules, most of which impose no cadmium restrictions.

**World Trade Organization Requirements**

20. Kenya is a member of the World Trade Organization and, as such, is required to observe the WTO regulations. The WTO's Sanitary and Phytosanitary Agreement and the Technical Barriers to Trade Agreement both require that any measures to protect human, animal or plant life or health - such as the cadmium limits in fertilizers - shall be no more trade-restrictive than necessary to fulfil a legitimate objective. However, where the scientific evidence is insufficient, the SPS Agreement requires that further information be obtained for a more objective

assessment of the risks and that a review of the measure be undertaken within a reasonable time period. Consequently, imposing limits that are not based on sufficiently substantiated scientific evidence and which are disproportionate and more restrictive than necessary to fulfil the objectives pursued by KEBS would risk creating a technical barrier to international trade. In the case of the cadmium limits, there is no conclusive scientific evidence worldwide on fertilizers' contribution to cadmium in the soil and its transfer to plants and to humans.

**Kenya's Supplies of Phosphate Fertilizers**

21. Kenya is entirely dependent on foreign sources of phosphate raw materials and fertilizer products. Kenyan farmers currently consume some 370 KT of phosphate fertilizers on an annual basis, which represents more than 60% of the whole country's fertilizers' consumption. OCP is supplied in 2016 approximately 40% of the country's needs in DAP or equivalent (DAP / MAP / TSP / NPS).

22. A 15ppm limit would exclude Kenya from having access to 95% of global phosphate reserves and to 87% of global production, as well as to OCP Kenya's DAP and MAP fertilizer supplies. This would render Kenya entirely dependent on the only alternative sources of supply available, whose phosphate deposits are within the 15ppm limit (*i.e.* Saudi Arabia, China and Russia). However, their reserves are very limited compared to those in Morocco (which have several centuries of reserves left). Their production capacity is also strictly limited while their domestic demand is growing. Consequently, by severely restricting the diversity of its sources of supply, Kenya would reduce its access to quality and adapted fertilizers and restrict competition in the fertilizer market.

*Decadmiation*

23. It has been suggested that the solution to the restriction on sources of supply imposed by a low cadmium limit is to introduce an industrial process to reduce the amounts of cadmium in phosphates that would otherwise exceed the limit. However, the development of decadmiation technologies remains at an early stage. There is no industrial-scale process to reduce cadmium in phosphate fertilizers in operation anywhere, worldwide. The only process capable of decadmiating phosphate rock is widely accepted to be not viable since it uses large amounts of energy and emits pollutants. Consequently, fertilizers made directly from phosphate rock cannot benefit from decadmiation.

**Kenya's Fertilizer Prices**

24. Restricting the range of available supplies will reduce competition among suppliers and inevitably drive up fertilizer prices in Kenya.

**Kenya's Development and Food Security**

25. Phosphate fertilizers are vital to preserve soil quality and crop productivity. An increase in fertilizer prices would increase the profits of the few suppliers and traders that are able to remain active in the market, and this would directly impact farmers. It would also increase their costs,

undermine government efforts and subsidies to increase Kenya's low fertilizer use, hit the competitiveness of export products on global markets, and reverse progress in boosting yields.

26. The severity of such consequences cannot be overstated. The increased cost of fertilizers resulting directly from a reduction in the cadmium limit proposed by the KEBS would simply threaten Kenya's sustainable development, its earnings from agricultural exports (therefore its foreign exchange earnings) and ultimately the Kenyan food security.

**Conclusion**

27. OCP Kenya is concerned that the proposed very low cadmium limit is not based on well-established and clear scientific evidence. Imposing such proposed limit would cause serious risks:

    a) To the development of the Kenyan agricultural supply chain, which is based on fertilizers that are adapted to Kenyan soils for the benefit of Kenyan farmers and the Kenyan economy;

    b) To a diverse and secure range of supplies;

    c) To an open and competitive market amongst suppliers; and

    d) To the price of fertilizers, which would increase the profits of the few suppliers and traders that are able to remain active in the Kenyan market, increase farmers costs, undermine the Kenyan government policy to increase fertilizer use, threaten the competitiveness of Kenya's vital agricultural and exports on global markets, reverse progress in boosting yields and maintaining soil health, and weaken Kenya's food security.

28. Considering all of the above, we strongly request that the members of the Technical Committee leave the cadmium limit for DAP and MAP fertilizers **unchanged at 30ppm** and commission independent standards/norms-setting policies on the basis of scientific studies that will allow the gathering of objective scientific evidence in order to provide a sound basis for future policy making.

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**i)** https://research.wur.nl/en/publications/cadmium-in-soil-crops-and-resultant-dietary-exposure
**ii)** https://www.who.int/foodsafety/publications/chem/summary73.pdf
**iii)** https://www.efsa.europa.eu/en/efsajournal/pub/2551
**iv)** https://core.ac.uk/download/pdf/81969927.pdf
**v)** https://www.int-res.com/articles/esep2012/12/e012p099.pdf
**vi)** https://www.ncbi.nlm.nih.gov/pubmed/29936671

**vii)**
https://www.researchgate.net/profile/George_Achieng4/publication/331678735_Assessment_of_Fluoride_and_selected_heavy_metals_in_food_chain_around_Fluorspar_mining_Plant_Kenya/links/5c8fab0892851c1df949cf29/Assessment-of-Fluoride-and-selected-heavy-metals-in-food-chain-around-Fluorspar-mining-Plant-Kenya.pdf
**viii)** http://link.springer.com/article/10.1007/s11356-016-7042-1
**ix)** https://www.jstage.jst.go.jp/article/jvms/72/10/72_10-0058/_article
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**xii)** https://www.efsa.europa.eu/en/efsajournal/pub/2551
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**xiv)** http://www.airitilibrary.com/Publication/alDetailedMesh?docid=20410492-201408-201503100028-201503100028-416-423
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**xix)** http://www.iosrjournals.org/iosr-jestft/papers/vol8-issue5/Version-4/L08546873.pdf
**xx)** http://www.unep.org/urban_environment/PDFs/DandoraWasteDump-ReportSummary.pdf
**xxi)** http://search.proquest.com/openview/e6db3d059a33d2a49243be3e18e038a4/1?pq-origsite=gscholar
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**xxiii)** https://www.europeanscientist.com/en/agriculture/eu-plans-to-limit-cadmium-in-fertiliser-spark-controversy/
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**xxv)** https://www.consilium.europa.eu/en/press/press-releases/2019/05/21/eu-adopts-new-rules-on-fertilisers/