ASSOCIATION DES PRODUCTEURS EUROPEENS DE POTASSE
EUROPEAN POTASH PRODUCERS ASSOCIATION

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POSITION PAPER

concerning the importance of the use of potassium chloride ("potash") as mineral fertiliser for agriculture, the production of food and the nourishment of the growing population.

A contribution of the European Potash Producers Association (APEP) to the Commission's considerations with respect to the use of fertilisers in the "European Green Deal" communicated by 20.05.2020 as well as the "Farm to Fork Strategy" and “Biodiversity Strategy” documents, for a fair, healthy and environmentally friendly food system.

(i) Introduction

1. APEP represents the European Producers of potassium chloride ("potash"), located in France, Germany and Spain. This industry is essential for mining and distribution of potash as well as related fertilising products to the European agriculture.

2. The above mentioned strategies of the European Green Deal are setting the goal to reduce nutrient losses to the environment, especially nitrogen and phosphorous. This is expected to reduce the demand for fertilisers (both or-

ganic and mineral fertilisers), which will be an outcome of improvements of the nutrient use efficiency. For this purpose the Commission will have to identify the measures needed to bring about these reductions based on a stakeholder dialog. These goals will be achieved by applying balanced fertilisation and sustainable nutrient management. This requires the development of integrated nutrient management plans on farm and field level.

3. The Commission has set the goal to increase organic farming acreage to at least 25% of the land used for agriculture in Europe. This goal will be addressed by CAP measures and an action plan on organic farming. But productivity of organic farming is low, mainly due to a lack of plant available nutrients. It is impossible to achieve a balanced fertilisation only based on organic fertiliser since nutrients are not contained in the right ratio and in the right amount as required by the crop. To bail out the natural yield potential of agricultural land it is essential to complement organic fertilisers with mineral fertilisers, especially with potash, to meet the crops nutrient demand.

4. APEP and its members, will support activities minimizing nutrient losses to the environment and preventing natural habitats from negative effects.. APEP is of the opinion that a technical debate based on scientific experiences from applied research bodies is needed to achieve these goals in the different regions and farming systems of the EU.

5. European agriculture is very heterogeneous. There exist very small farms of less than one hectare as well as very large farms working several thousands of hectares. The production ranges from extensive grazing systems to intensively managed and highly technical production systems. The farming systems are very diverse, and each system offers specific possibilities to reach the strategic goals. Thus, precise and individual solutions are required to reduce nutrient losses and to improve efficiency of fertilisers within the highly diverse agricultural production systems.

6. Farming can be very specialised with focus on one permanent crop or very diversified with a broad range of cultivated crops. There are systems with or

without animal husbandry, rainfed or irrigated farming, all across the wide diversity of agroclimatic regions in Europe. Among these systems, there is farming following organic production standards and there is “conventional farming”, which includes a broad combination of management strategies. But a typical European farm or farming system does not exist. It is a broad mixture of the above and according to this diversity the characteristics of the fertilisation systems are even more divers.

7. This diversity of farming systems is a result of many different factors influencing the farmers’ professional decisions and possibilities. Agroclimatic conditions, soil types and characteristics, climate, availability of land and water for irrigation, access to markets, consumer demand, prices for farming equipment, revenues for agricultural produce, etc.. All this together has formed agricultural systems as diverse as we know them today. These conditions determine the ideal management practices in each location. In each farming system balanced fertilisation management aims at maintaining (or improving) soil fertility with minimum losses of nutrients to the environment, especially nitrogen and phosphorous. This can be achieved by balancing the nutrient contents in the soil, with those nutrient inputs from crop residues, soil amendments and fertilisers (organic and/or mineral).

(ii) Importance of the use of potassium chloride under agronomic considerations

1. <u>Need for a balanced fertilisation management, improved use efficiencies, and reduced nitrogen and phosphorous losses</u>

Balanced fertilisation management means ensuring adequate supply of all macronutrients and micronutrients that a crop requires for its growth and development. In order to meet this requirement with maximum efficiency, fertiliser application of both, organic and mineral fertiliser, need to be managed in such a way that the nutrients are available to the crop at the right quantities, at the right ratios, and right in time. Only then, nutrients are taken up by the crop, and losses to the environment are avoided.

An adequate supply of potassium is required as part of a balanced nutrient management to maintain soil fertility which is also requested by the "Farm to Fork Strategy". Balanced fertilization improves crop growth, yield and quality, and reduces losses of nitrogen and phosphorous.

Reference to sources and evidence see **annex 1**

2. Balanced fertilisation management to protect soil fertility, reduce soil erosion and sequester carbon

Crops absorb mineral nutrients available in the soil. These are partly removed from the agro ecosystem through harvesting, while the nutrients contained in the crop residues remain in the field. The remaining organic matter will then be partly mineralised again, or stabilised as soil organic matter (SOM). But these remaining and mineralised nutrients do not meet the nutrient demand of the subsequent crop neither in quantity nor in the crop specific ratio.

The sustainable intensification of farming systems, with the use of cover crops, diversified crop rotations and an improved productivity by optimised management practices, increases the amount of biomass remaining in the field and contributing to SOM content as well as to soil fertility. But it also increases the removal of nutrients from the soil, immobilized in SOM, and the need for replenishing nutrients with mineral fertiliser to maintain soil fertility. Thus, balanced fertilization management is pivotal for a sustainable intensification of agricultural production.

Potassium is an essential nutrient required in large quantities by crops, and exported in large quantities from the systems by harvesting. Soil minerals such as clay, slowly release potassium by weathering, but the rate is much too low to provide the large amounts required by crops, and to replenish the exported potassium. In the long term, a reduction of K fertilisation will lead to declining soil K contents, which will inevitably result in declining soil fertility and declining yields.

Hence, fertilisation management needs to take into account the replacement of nutrients removed by the crop, especially potassium, to assure soil fertility

for the future. Soil tests allow diagnosis of nutrient availability in the soil.To maintain soil fertility, soil analysis may consider extra supply to improve low soil K contents. Without causing imbalances, extra potassium can only be provided through potash applications.

Reference to sources and evidence see **annex 2**

3. Land use change and biodiversity

Maintaining high yields as described above is an essential measure to avoid land use change and to preserve biodiversity. Declining yields do not correlate with a declining demand, on the contrary, the demand for food, feed, fibre, or biofuels will steadily grow in future and will be satisfied by extending agricultural land somewhere else (Wissenschaftlicher Beirat für Agrarpolitik, Ernährung und gesundheitlichen Verbraucherschutz, 2020). A sustainable intensification of agricultural production will impede land use change, protect natural habitats and secure biodiversity.

Reference to sources and evidence see **annex 3**

4. Potassium as quality element

Potassium is involved in many processes of plants metabolism. It plays an essential role in the activation of enzymes, which are especially fundamental to the production of proteins and sugars. A potassium deficiency reduces not just growth and yield, but quality also. Deficiencies may lead to a reduction of e.g., starch content of potatoes, increased internal bruising of potatoes, low sugar content of sugar beets, low oil content of oil seed rape, or low protein contents induced by a low nitrogen use efficiency, as well as lo crude protein contents and low soluble sugar concentrations in forage from grassland, etc. Concerning grassland, a well-balanced potassium and phosphorus supply at low mineral nitrogen dosing’s maintains high grass yields, a good palatability and promotes herbs within the swards. Thus, especially in grassland, biodiversity can be enhanced by an adequate potassium supply.

But also, vegetable and fruit production are highly demanding on potassium supply to the crop, allowing healthy crop growth and development, and also

positively contributing to high quality and nutritious value of vegetables, fruits and legumes.

Potassium chloride is the main source of potassium used in the production of complex and crop specific fertilisers, for both solid fertiliser and water-soluble products for fertigation. It is also a source of chloride, which benefits is starting to be rediscovered (Rosales et al., 2020), with positive impacts as well as on NUE (nutrient use efficiently) and food quality.

Reference to other sources / evidence see **annex 4**

5. Potassium does not contribute to eutrophication

On the contrary to nitrogen and phosphorus, potassium is not polluting the environment. In addition, potassium is exchangeable bound to the clay-humus-complex in the soil and thus remains plant available without being prone to leaching. Potassium is often neglected in fertilisation plans. This results in depletion of the soil K, and finally in reduced yields and quality.

Reference to other sources - **annex 5**

6. Potash to balance nutrient supply

A principle of farming is to return farm yard manures and other organic residues to the fields after the crop was harvested. Many of the contained nutrients are either not plant available nor available in the right quantity or at the right time. Furthermore, the nutrient ratio of farm yard manures and organic residues differs from the specific demand of the respective crop. Analysis of these organic fertilisers enable the farmer to compensate the lacking nutrients by applying the specific amounts as mineral fertiliser – such as potash. Thus, mineral fertilisation is the ideal measure to adjust nutrient supply to the crops demand and thereby increase nutrient use efficiency.

Reference to other sources / evidence see **annex 6**

7. Potassium improves cell walls

Potassium directly improves the performance of photosynthesis and thereby the formation of carbohydrates. While growing, well K-supplied plants develop thicker cell and stem walls by accumulation of lignin and cellulose in the cell

walls and thus tissue becomes stronger making plants more resistant to pathogens trying to penetrate the plant, and avoiding lodging and frost damage. Especially with regard to climate change, strong cell walls support resilience to increasing pressure of fungi disease during warm moist weather periods and to mitigate susceptibility to increasing late frost events when vegetation period starts more and more early.

Reference to other sources / evidence: **see annex 7**

8. Potash improves water availability for the plant and adaptation to climate change

Potassium is important to maintain the plants water-status. It lowers the osmotic potential and thus enables the plant to take up water and dissolved nutrients from the soil into the roots. The lower the osmotic potential of the plant, the longer the plant can take up water against the suction power of drying soil.

In addition, potassium is involved in the opening and closure of stomata and thus regulates transpiration. A good supply with the osmotic agent K results in a continuous transpirational pull even under drought conditions (Grzebisz et al., 2013).

An improved water availability enables the plant to proceed with photosynthesis and achieve better yields under dry conditions (Wang et al. 2013). Large amounts of potash are needed for maintaining the plants water-status. A good potassium supply is crucial to overcome the increasing drought periods caused by climate change. Potassium deficiency will lead to wilting and reduced photosynthesis resulting in yield reductions and reduced nitrogen uptake. Besides, lower protein levels of the crop, more nitrogen remains unused in the soil and is prone to leaching.

As an indirect effect, potassium increases the ability of soils to store water by improving soil capillarity. Increased yields go along with an increased biomass production, i.e. more crop residues such as roots and straw remain on the site

contributing to soil organic matter content and thus improving soil physical properties such as water holding capacity and infiltration rates.

Independent from the soil organic matter content, potassium contributes to the formation of clay mineral bridges increasing the number of medium sized pores. Thus, potassium directly improves the capacity to retain plant available soil water and to prolong growth under dry conditions (Damm et al., 2012; Holthusen et al., 2010).

The above described mechanisms improving the crops water status are an essential instrument to mitigate negative effects of climate change such as lacking precipitation during the growing period and to sustain European food production.

Further references and evidences see **annex 8**

(iii) Conclusion of the agronomic advantages of the use of potash (in view of the "Farm to Fork" and "Biodiversity" Strategies)

The use of potassium chloride as fertiliser fully supports the strategies pursuant to the Farm to Fork and Biodiversity initiatives of the Commission:

(1) There is no need and no justification for any reduction of the use of potash as fertiliser, but a need to make sure of the right supply of K to crops is used. An indiscriminate reduction "by at least 20 % by 2030" - as outlined in the Farm to Fork Strategy announcement would be counterproductive.

(2) Potash as nutrient used in agriculture is effectively absorbed by plants and contributes in achieving circular economy.

(3) Potassium crop nutrition is required by all crops, to ensure optimum and resilient crop growth and development, and the right food quality with nutritious value. Potassium chloride is the main source of potassium used in the production of complex and crop specific fertilizers, for both solid fertilizer and water-soluble products for fertilisation.

(4) Potash is also a source of chloride, with positive impacts on nutrient use efficiency.

(5) Potash is not responsible for any reduction of biodiversity in rivers, lakes, wetlands and seas, on the contrary, it is an element for sustainable intensification and diversification of farming systems, allowing protection of natural habitats and conservation of biodiversity.

(6) Potash contributes to the production of sufficient, healthy, and nutritious food for all and thus ensures the nourishment of the growing population.

(7) Potash is essential to mitigate the negative effects of climate change.

(8) Potash is playing a pivotal role in avoiding land use change.

APEP hopes that its "Position Paper" may help to understand the importance of the use of potash as a mineral fertiliser as a raw material available in the European Union.

APEP's experts are prepared to discuss the various items qualifying potash with the experts of the EU Commission and to justify further APEP's request that any reduction of the use of potash as fertiliser would not be in line with the Commissions new strategies.

Experts of the
European Potash Producers
Association