

# Options for mitigating ozone pollution impacts on crop yield

At ground level, ozone is a damaging pollutant. It is formed from reactions in sunlight involving pollutants emitted mainly from vehicle and industrial sources. The pre-cursor molecules can travel on the wind for thousands of miles so that increased ozone formation can occur far away from where the precursors were released. Ozone concentrations tend to be highest in suburban and rural areas downwind of major sources.



Bean



Wheat



Lettuce

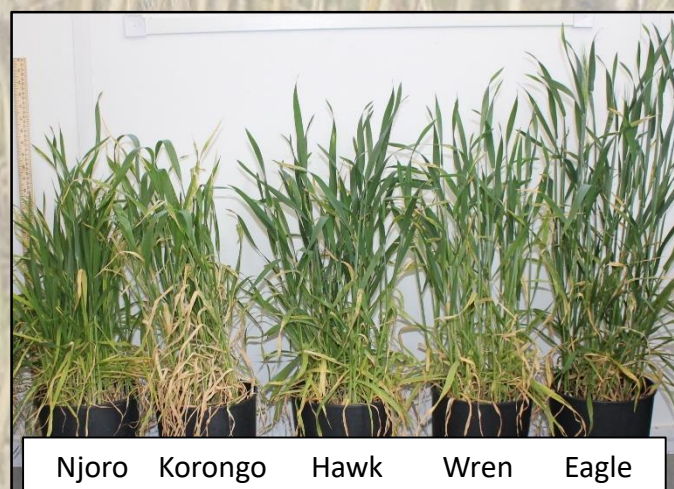
*Examples of visible ozone injury*

When ozone enters leaves of sensitive crop species, it causes localised cell death visible on the leaf surface and early die-back of the crop, resulting in reduced crop yield (both quantity and quality). The magnitude of the negative impacts of ozone on crop yield is determined by the cumulative uptake. For leafy crops, ozone damage reduces their marketable value. Crop species and cultivars vary in their sensitivity to ozone.

*Crops grouped by sensitivity to ozone*

Highly sensitive	Moderately sensitive
Beans & peas	Watermelon
Sweet potato	Tomato
Orange	Olive
Onion	Mustard
Lettuce	Oilseed rape
Wheat	Maize
Soybean	Rice
Tobacco	Potato
Spinach	Grapes

*Kenyan wheat cultivars after ozone exposure*



*Korongo most ozone-sensitive of varieties tested*

## Options to reduce ozone impacts on crops

- ❑ In high ozone areas, use more ozone-resistant species and varieties, including those that have a shorter maturity period (reducing the accumulative ozone uptake). Crop improvement programmes should test ozone pollution as a stressor, aiming to improve tolerance in crops together with tolerance for other stresses.
- ❑ Avoid growing ozone-sensitive crops in regions with high ozone during flowering and seed filling when adverse impacts on crops yield tend to be most prominent.
- ❑ Avoid/reduce irrigation during high ozone episodes during the daytime (whilst being careful to avoid drought stress). High soil water availability stimulates ozone uptake, causing increased leaf injury, reduced photosynthesis & early leaf dieback.
- ❑ In wheat, the weight of individual grains is reduced at high ozone when plants are well-watered compared to reduced irrigation.
- ❑ In an effort to reduce water usage in agriculture, alternate wetting and drying, inducing moderate drought, has shown to increase for example rice yield whilst reducing opening of the leaf pores. The latter will reduce ozone uptake.

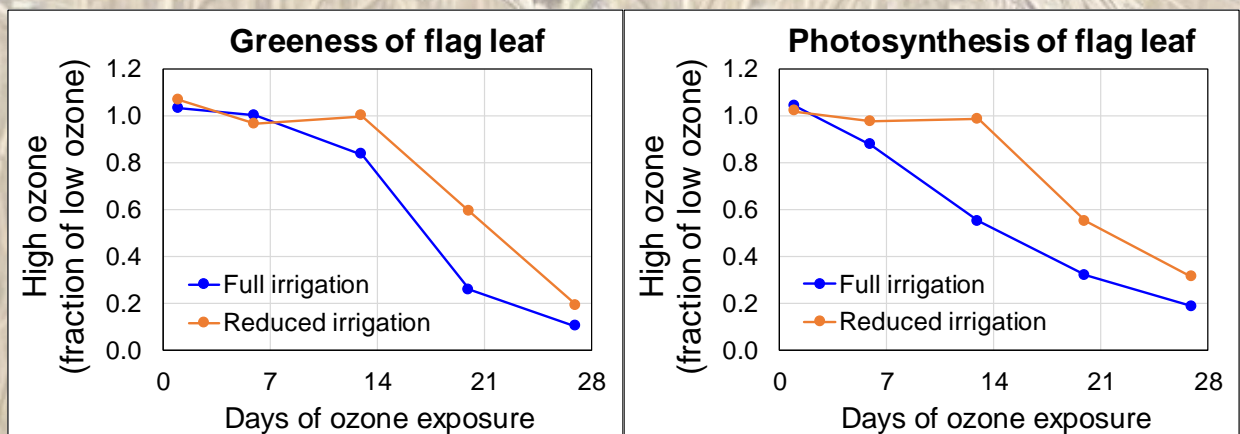
### Wheat flag leaf



**Full irrigation**



**Reduced irrigation**



### For further information please contact:

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