

# THE REAL COST OF PLANT NUTRIENTS – A CALL TO ACTION

The cost of what you pay on-line or at the counter for plant nutrients does not end there by a long shot; the real costs go much deeper than that. Agriculture, albeit necessary and horticulture albeit unavoidable, are one of the most harmful activities engaged in by man for the devastating effects on our eco-system. Accelerated eutrophication resulting from plant nutrient leaching is the reason. Two nutrients, phosphate-phosphorus and nitrate-nitrogen that are essential for garden and crop growth are of particular concern. Both of these nutrients when leached make way to our lakes, rivers, streams and oceans causing intense algae growth most notably, cyanobacteria (blue-green algae) leading to accelerated “eutrophication” of our waters, whereas excessive organic matter buildup as the algae die & decompose depletes dissolved oxygen in the affected waters to levels less than 2ppm. Oxygen depletion to that extent causes serious harm and eventually death to all aquatic life present in the area further fueling the hypoxic (oxygen starved) condition creating dead zones.

## DEAD ZONES

The Gulf of Mexico dead zone covers an area ranging in size from 6,000 – 7,000 square miles and originates from the mouth of the Mississippi River. The affected area starts from the inner and mid-continental shelf in the northern Gulf beginning at the Mississippi River Delta and extends westward to the upper Texas coast.

The upper photo of the trio below clearly shows the affected area of the Mississippi River Delta as discussed above along with two other similarly affected regions in other parts of the world. This is a global problem and these dead zones are increasing in size annually.



**Eutrophication** - the process by which a body of water acquires a high concentration of nutrients, especially phosphates and nitrates. These typically promote excessive growth of algae. As the algae die and decompose, high levels of organic matter and the decomposing organisms deplete the water of available oxygen, causing the death of other organisms, such as fish. Eutrophication is a natural, slow-aging process for a water body, but human activity greatly speeds up the process by as much as a factor of 100.

**Photo 1** - The upper photo of the trio, the Mississippi River Delta clearly depicts the very large area now affected, the other two show the affected Yangtze River and the Pearl River Delta regions in China, three of our planets many affected regions.

(Photo courtesy of NASA)

## HIDDEN COSTS OF NUTRIENTS

The environmental cost of this man-made toxicity is virtually immeasurable, and the cleanup costs are profound. As reported by the US EPA, the Obama administration committed nearly \$500M <sup>(1)</sup> in 2010 to the Great Lake Restoration Initiative alone and that is a mere pittance as compared to what is really required from both US and Canada. Other notable initiatives reported in the EPA document included \$4.3B for Clean and Safe Water and

\$814M for Compliance and Environmental Stewardship. According to the USGS, water use in the US is down slightly to approximately 80-100 gallons per person per day; or on the low end 29,200 gallons per person per year (all of which eventually makes its way back to our waters one way or another). Across the nation that's - 311,742,383 <sup>(2)</sup> people x 29,200 gallons equating to 910 billion gallons of water per year, a significant majority of which makes its way through our sanitary treatment facilities. It is estimated that the Total Annual Economic Cost (TAEC) to treat that volume of water per year for the removal of phosphorus to acceptable remedial levels (0.5mg/L) would be \$118.3 billion dollars <sup>(3)</sup> and require more than 24 purpose built systems within existing water treatment facilities capable of processing 100M gallons of wastewater per day per facility system. Taxation, meaning every taxpayer would pay these costs.

## THERE IS HOPE

It's really simple; our first call to action is to minimize the emissions of problematic nutrients at the source. Nutrient companies like **Erupt Plant Nutrients** are using new technologies to supply plants based upon plant demand for nutrition. Using a patent pending nano-technology, Erupt encapsulates nutrient ions like phosphate-phosphorus and nitrate-nitrogen holding them harmless to the environment while being plant accessible. The result is up to 90% less nutrient leaching <sup>(4)</sup> into the environment. Further scientific research is required to develop technologies and cost effective systems for nutrient application at the commercial farm scale. Other considerations would be to treat effluent from hydroponic grow operations at the source and reduce to remedial levels the level of harmful nutrient content in the effluent and putting the onus on the hydroponic grower to achieve a certain performance level. Yes there is hope, but it is very dependent upon our actions.

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