



NeWold Times



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Sustainability Issue

Welcome to the sustainability issue of NeWold Times! At 3MG we are dedicated to sustainability and environmental responsibility and we are hoping to start a productive conversation with you, our loyal readers. Please give us your feedback. Do you have suggestions on how to be more sustainable? Do you agree or disagree with the information presented? Drop us a line! We really do want to hear from you!



Sustainable Behavior

By: Ed Baumgartner

I had the opportunity this past winter to re-connect with several college friends from the University of Minnesota St. Paul campus that I had not seen in 30 plus years. They traveled down to Puerto Rico to see what we are doing here and of course we had to discuss old times as well. A little more background to the story is that we were all fraternity brothers and we are from the Delta chapter of Delta Theta Sigma. Although we were not as depicted in the movie Animal House, some would say there were similarities. In our adult lives we became farmers, bankers, businessmen and a mail carrier. It is very interesting how after all these years our youthfulness (or attempt at youthfulness) showed up.



Needless to say we enjoyed many Medallas and Don Q beverages over the course of their stay. Near the end of the trip one of my college buddies told me that this behavior was not sustainable. I agreed whole-heartedly with him and said that this was not a requirement for future visits. We also had our third grandchild this past March. A healthy little girl named Norah Elizabeth. What a treasure these three grandchildren are to us. I was able to spend a week with the family and Debbie has been able to stay with them for 2 months. They are a huge motivator for us.

The combination of these two events, as diverse as they are, led me to think about my behaviors both personal and business and if they are sustainable into the future. Am I doing the right things in my life to leave a bright future for our grandchildren? In the end, is that what life is for, to provide for our family, generations of family? I was amazed to see how easy it was to slip into 30 plus year old habits when presented with the appropriate circumstances. Are these good for me? No. Was it fun? Oh yeah. So I started observing all of my actions. Do I use paper cups instead of a ceramic cup so I do not have to wash it? Do I grab a bottle of water for convenience rather than utilize a reusable container when I am active or in the field? Do I purchase disposable items or items with a longer serviceable life? I can go on and on here. I did not like what convenience has done to me. This leads me to share a sign that my high school biology teacher had up in his room in the 70's. **"Where do you throw it when there is no more away?"** At that time I knew where our landfill was and it had lots of space. No need to worry in Olivia, MN. Just a short forty plus years later it is not empty and is becoming a mountain now. I have seen the same thing during our 18 years in Puerto Rico and suspect it is happening all over the world. I am motivated in my personal life to make changes. I ask you to join me in thinking about each of our actions daily and what effect they have on our children in the future.

Then, I attempted to examine the business side of my life. I grew up in the better living through chemistry age. My agricultural education was focused on utilizing synthetic compounds and scientific methods for growing high yielding crops to feed the world. We still have the mantra to feed the world circulating in agriculture as motivation. I have been questioning how we do this for some time and at what cost to our environment. I have had to use quite a variety of herbicides, insecticides, fungicides, fertilizers and irrigation to produce crops where I have had the



opportunity to farm over the years. I have had no problem researching what chemicals will control the problems I am facing and even get quite creative on their application methods. My concern has always been the immediate situation at hand since my survival depended on it. Long-term consequences were not an issue because there was no long term if I did not get through the current problem. Somehow, some way, I have made it through so many situations that when I look back I can see that I could have looked at the

issues differently and applied different solutions. Solutions that could be considered long term friendly. Some of these solutions are not economical short term, did not exist at the time or I did not consider them due to my personal biases.

Where does this leave me now? Our service business uses a lot of chemistry per crop cycle and for the near future I do not see a change on the horizon unless we have some type of crop management breakthrough from our continuous improvement efforts. What can I do in the meantime? We are leveraging what I have learned the past 18 years of farming in Puerto Rico in our seed development businesses, 3MG R&D. Growing temperate crops in the tropics is a difficult proposition. It requires that the grower be on top of everything every day. Growing tropical crops in the tropics is still a challenge but more similar to growing temperate crops in a temperate zone as you have a little room to breathe during the growing season since you have a normal growing season length and the genetics to handle the climate. The challenge going forward to ensure a sustainable and reliable food supply for our children, how do we prepare for the changing climate while minimizing our impact on the environment? I think there are many similarities that can be learned from growing temperate crops in the tropics on what we need to do to be ready for the future in the highly productive temperate zones. What we face in the tropics is high temperatures, wind, nutritional challenges, rapidly changing insect pressures and populations, a wide range of diseases in addition to proper irrigation or we experience drought conditions. It has been my theory for some time now to apply all these stressors at a level near the breaking point of the genetics to be truly able to select the fittest survivors. We then work with these survivors to be the base of Durayield. I can see the first generation of products we have developed working now in real farm situations. They are improving with each cycle of development work and deserve to be on the farm. The second cycle of our work is moving to farmer's fields in 2017. We are now working in Puerto Rico on the third cycle of products, which are showing another level up of improvement from the first two cycles. I believe that these methodologies we utilize, which were developed in corn, can be used in other crops too.

We work with multiple traits and multiple naturally occurring genes in corn simultaneously to ensure the broadest spectrum of coverage for durable products under stress. This is a long-term solution for crop development. The single gene approach for a specific pest currently used by our industry is not sustainable. Mother Nature is just too resilient and can quickly overcome single gene activity as we have observed many times. I have just read an article that has several large grain merchandising companies are refusing to buy grain from farmers containing newest transgenes that are not approved in all potential export countries for US grains. For the US farmer, future transgenics or GMO's are becoming not sustainable due to slow acceptance by the global marketplace. If our products do not have acceptance worldwide, why do we grow them and limit our market space? We need to realize that the US does not control the marketplace and need to pay attention to what is going on outside of our borders or face the loss of some very good customers, which will result in even lower crop prices at the farm gate. The continued use of one herbicide on all crops is not sustainable due to weed resistance. Our agricultural industry has been spoiled by the ease of growing our current high tech crops. These products must be updated regularly with newer technology to prevent being overrun by Mother Nature. These updated products are now running into regulatory approval issues. I now promote working with Mother Nature rather than against her, as she has been a formidable opponent for me over the years in Puerto Rico. She will help us if we work to understand the tools she provides us. It is my belief that if all of the money spent on just the regulatory portion of GMO crop development was spent on traditional plant breeding working on the same traits to solve the same issues that GMO's address, we would be farther ahead than we are today with sustainable solutions. Let's use the genetic knowledge gained from the creation of GMO's, the understanding of market restrictions caused by GMO's, the tools used in the management of GMO's to create more productive and less controversial crops that can sustain us well into the future.



I suspect that our large company trait developers see a roadblock developing for new GMO seed traits in the future too and thus their intense interest in biological treatments for seeds, soils and foliar applications. The biological approach is not well understood since it is very complicated and could use the large investment by these companies and the venture capital companies. The end result should be sustainable products too, utilizing the untapped power of Mother Nature. If we do this correctly by working with nature and communicate properly with the consumers of our agricultural products, we will be more in tune with nature along with a more stable market for food supplies. As a scientist and a business owner I am dedicated to look for methodologies that allow us to work in harmony with our environment for all phases of crop production while maintaining the high yields required for success in the marketplace and communicating this to the consumer.

Our current market conditions in agriculture actually will assist us in seeking alternative methods to crop production. It takes courage and an economic incentive to change from what is currently working well for high yields. As farmers are pushed to look at all of their input costs, perhaps this is where the water and nutrient efficient varieties can gain a foothold to prove their value. Putting on less fertilizer and water while maintaining yields is not thought possible yet. This could be the time to learn at a commercial scale how much progress has been made. We will be forced into using less just in-case applications of technology and put more boots back in the field scouting to see what is actually happening in the field again to make timely applications of products only when they are needed to keep costs down. This will put more independent eyes on the crops to verify if the new generation of crops and technology are working as advertised. This is a good thing as it will help with the transparency needed in agriculture for the consumer.

I encourage each of you reading this to seriously examine your lifestyles, work lives and consumer choices to see what small changes we can make each day at home and at work for a more sustainable future for our children's world.
Where do we throw it when there is no more away?



Ed's Recommended Reading

▶ **Weighing GMO Safety**

Report Examines Effects of GM Crops on Health, Environment, Society
<https://goo.gl/a4XVIJ>

▶ **Adoption of Genetically Engineered Crops in the U.S.**

<http://goo.gl/5xbgjz>

▶ **Todd's Take**

As important as the health concerns are, my curiosity as a market analyst turned to the impacts on yield. Was there any evidence that the advent of GMO crops altered the course of trend-line yields?
<https://goo.gl/JLDSK8>



Sustainable Pest Control

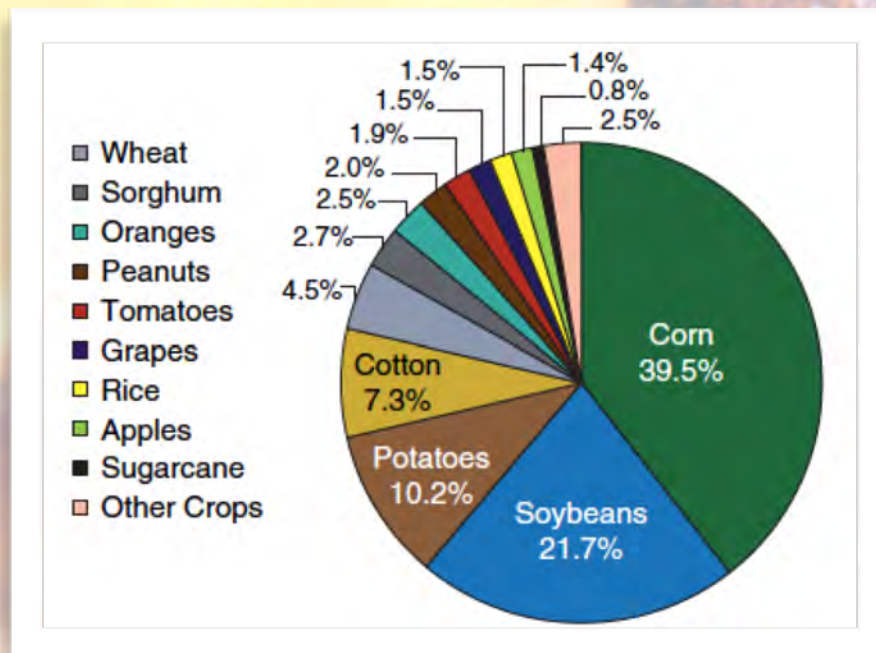
by Erin Rodríguez

Sustainability in the area of pest control is one of the most difficult balancing acts in agriculture to maintain. Any farmer worth his salt knows that there is a fine line between pest control and total crop devastation due to either over spraying or under spraying. To truly understand this balancing act, we have to put pest control into perspective. I am not just talking about the pest control systems; I am talking about the ecological, agronomic and applied systems and the need to view them as a holistic system as well.

Pesticides have been used for over 4000 years. Ancient Sumerian farmers used sulfur compounds to control insects and ancient Romans used oil compounds for the same purpose. In 300 AD Chinese farmers used predatory insects to help minimize harmful caterpillar and beetle populations. Fast forward to 1930 and we see the first synthetic pesticides being used. The rapid chemical and technological advances in pesticides over the last 80 years have had its setbacks. In 1962 the book "Silent Spring" by Rachel Carson, she raised concerns about modern pest control practices and specifically the use of DDT and the harmful repercussions of using this chemical compound.

The natural ecosystem of soil, plant and animal life is one of interdependence and interconnectedness. When one of the facets is out of balance we see the effects reach beyond a single facet of the ecosystem and it affects it as a whole. We can see examples of this when chemical or pesticide resistance is seen in certain insect species, and that resistance can prove fatal to a crop.

The wide spread and overuse of pesticides, fungicides and herbicides in agriculture have contributed to a disruption of the ecosystem on various levels including; ground water and stream contamination, air pollution, soil contamination and adverse physiological effects on various species- including human beings. Some of this contamination is a result of ignorance- for years we did not know the ways we were affecting the environment. Some of this contamination can be chalked up to a lack of consciousness and in the most horrible cases it is a result of unethical practices. In the diagram below from the USDA we can see which crops use the most pesticides:



In recent decades the modus operandi has been spray ! Spray! Spray! This approach has not proven to be viable in regards to long-term sustainability. As a result of this we have facilitated chemical resistance in pests, we have adversely affected the environment and we have put our children's future food security at risk. How can we find balance? That is what being sustainable all is about. We are looking for ways to leave future generations the knowledge and tools to feed themselves. The only way to do that is to implement and maintain sustainable pest control practices.

We are constantly looking for effective ways to strike this balance sometimes successfully and sometimes not. When it comes to our breeding program, breeding for natural pest tolerance is at the forefront of our goals. By using traditional breeding practices we are looking to reduce the use of pesticides and other resources. As I have mentioned in previous issues, we are constantly looking for ways to breed conventional seed that can reduce the impact farmers make on the environment and our eco-systems.



We have the knowledge and understanding of the long-term effects of this type of pollution, we can no longer claim that we didn't know any better. Now it is time that we start implementing these practices on a global level. We must be willing to make short term sacrifices for the long term benefit.

So, what can we do? How can we find the balance between producing an acceptable yield and maintaining ecological responsibility? How can we coalesce as an industry to effect long term change and sustainability? Crop Rotation, Cover Crops, Soil Enrichment, Natural Pest Predators, Isolation Borders, Natural Resistance Traits, Bio-intensive Integrated Pest Management are a just few ways that farmers are working to be sustainable. We cannot stop there, we must continue to grow, evolve, and innovate. Let us take on the collective responsibility of sustainability and provide a better future and healthy planet for generations to come.

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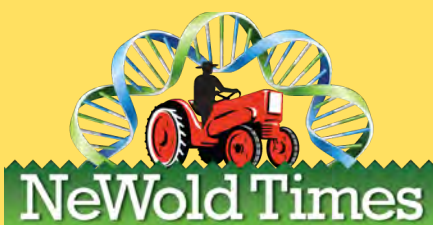
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Founded in 2012, 3MG R&D has been involved in the creation of innovative products that we hope will be in the forefront of the seed market. Guided by our principle that we can develop food crops that combat environmental pressures naturally and economically, we continuously research new solutions using a mix of millennia-old breeding techniques with high-end modern genetic technologies.