The Importance of **Protecting Arable Land**

The term "arable land" can at times be difficult to understand. Broadly defined, arable land is any land that people are capable of plowing and using for crops, including land supporting temporary crops, pastures and mowed meadows, gardens, and fallow land (or land that is plowed, but intentionally left unplanted to support soil recovery). At first glance, this definition seems straightforward, but in practice, the categorization of arable land can be very fluid, as any number of factors can contribute to arable land becoming non-arable, and vice-versa.

By Chris Morris – Sales Engineer, Teadit

Experts classify around 1.5 billion hectares (or over 3.7 billion acres) of agricultural land as arable. This equates to about 30% of the total agricultural land in the world. Considerations surrounding arable land are important to every individual because the sustainability of the world's agricultural land is paramount to the survival of the global population. As the planet becomes home to an ever-increasing number of people, the protection of the planet's finite resources, including arable land, is of the utmost importance.

History has shown that when there has been a failure to protect this vital resource by irresponsible farming and land management practices, deforestation, and increased drought or flooding caused by climate change issues, humanity suffers the consequences. Some experts predict that the current trajectory will lead to widespread global famine if there is not a serious commitment to changing how the population lives.

Advancements in Science and Technology

Advancements in farming science and technology, including improved and innovative seed technologies, have sought to create crops that are more resistant to climate changes, require less water, produce higher yields, or reduce the impact of farming on soil. These advancements have produced significant victories by helping to maximize the effectiveness of global farming, but the battle for sustainable food production is far from over.

In the United States, much of the arable land and farming is contained within the central part of the country. This area of land has long been known as the nation's "breadbasket" and is responsible for much of domestic food production, along with massive exports that provide wheat and corn to countries around the world. However, one need not travel very far back into the history of the U.S. to see the potentially devastating impact of an unforeseen natural disaster in this area of the country.

Less than 100 years ago, in the 1930s, severe drought, coupled with poor farming practices led to the drastic transformation of the arable lands of the midwestern U.S. into a nearly unrecognizable desert wasteland. Known as the "Dust Bowl", this period of history, along with the economic collapse of the Great Depression, led to a significant disruption in U.S.

farming that took decades to recover from. Scientists have modeled how such an event might impact not just the U.S., but the global food supply were it to occur today, and the results are scary. So, how does one protect the arable land and global food supply?

Additionally, government and agricultural trade organizations have worked to create policies that promote responsible farming worldwide. However, the largest threat to sustainable food production globally is environmental change. Decades of global greenhouse gas emissions created by the industrialization of the planet have dramatically impacted Earth's climate. This continued warming of the planet has been felt most dramatically by farmers. The math is simple, and one need not be an agricultural expert to understand that crops grow more effectively when conditions are ideal. Rising temperatures and erratic weather patterns have had a negative impact on crop growth and yield.

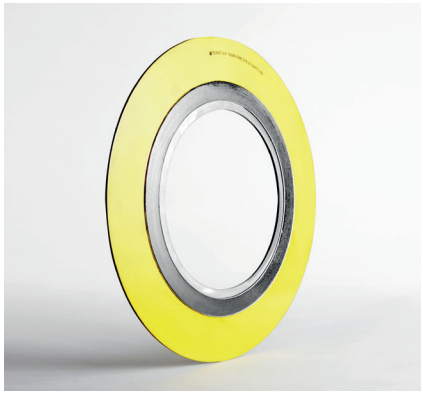
The Seriousness of Climate Change

Of all the reasons for global leaders to take climate change seriously, perhaps none is more pressing than the potential impact on world agriculture.

Global initiatives to reduce emissions of greenhouse gases have continued to gain momentum. It has been over 7 years since 196 countries drafted the Paris Agreement, a global commitment to fight climate change.

According to the United Nation's Intergovernmental Panel on Climate Change, increasing the planet's temperature beyond a 1.5°C threshold risks unleashing significantly more severe climate change impacts than already seen, including more frequent and severe droughts, heatwaves, and rainfall. All of these have the potential to decimate the planet's food production. Experts say that to limit global warming to within the 1.5°C threshold, greenhouse gas emissions must peak before 2025, at the latest, and decline by at least 43% by 2030. As a global community, humanity is quite literally on the clock to fight climate change.

In the U.S., the focus has been on reducing greenhouse gas emissions at its most abundant sources; primarily



the nation's industrial facilities (refineries, power plants, and other industrial manufacturing plants). A significant contributor to fugitive emissions is poor sealing product performance. Leaking valves, pumps, and flange connections on a case-by-case basis may not seem significant but considering that even a medium-sized plant has thousands of potential "leakers" the magnitude of the problem quickly comes into focus.

Recent Developments

Recently, engineers, using standard reporting requirement information have been able to show definitively how a large oil refinery can significantly reduce their emissions reporting values. These savings do not just impact the company's emissions fees, but when coupled with industry installation best practices per ASME PCC-1 requirements, allow sites to show compliance with EPA standards, resulting in the elimination of consent decrees, fines, and penalties. Moreover, these savings are not just "on paper," but industrial sites that utilize the best available, certified low-leak technologies experience improved reliability and operational efficiency, less downtime, and most importantly, significantly reduced emissions, allowing them to enjoy responsible and sustainable real-world operations for years to come.

Additionally, major corporations around the world are investing in renewable energy technologies that utilize non-arable land like off-shore wind and desert-based solar farms to combat over-development and deforestation. This is just one example of the many proposed nature-based solutions (NBS) that are seeking to turn the tide of climate change and help give the global community a real shot at achieving greenhouse gas reductions. The International Union for Conservation of Nature (IUCN) defines nature-based solutions as "actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits" and sees these actions as a critical component to combat global challenges, such as climate change, biodiversity loss, and food security.

Investments in global ecosystems such as forests, grasslands, wetlands, and coastal regions and projects that improve agricultural sustainability help to strengthen natural systems that absorb more CO_2 and prevent the release of greenhouse gases, while also providing ancillary benefits to local communities and promoting biodiversity.

Continued Survival

Human beings have proven to be nothing if not adaptable, but just like a car cannot run without fuel and a cell phone cannot run without a charge, humans cannot survive without food. Protecting the sustainability of global food sources is especially important as the world population continues to increase. The challenge of feeding people will continue to pose challenges for the agricultural industry and world leaders, but eliminating roadblocks and pitfalls along the way will make the task easier.

ABOUT THE **AUTHOR**

Chris Morris is a Sales Engineer for Teadit, supporting customers and commercial interests in the Ohio Valley and Northeast Regions. Chris is a degreed engineer with over 10 years of experience in the gasketing business who specializes in field support and engineered application solutions. He resides in Parkersburg, WV with his wife and children.