



## Geosynthetics in Agricultural Applications

Agricultural use of [geosynthetics](#) is one of the fastest growing market segments worldwide. The earliest geosynthetics applications were for on farm use and some of the earliest specifications were directed at agricultural use of pond linings. These early uses included the lining of ditches to help save valuable water as well as the lining of farm ponds and water harvesting catchments in the arid regions of the world. Today, there is a wide variety of applications ranging from covered and uncovered ditch linings and ponds to protection of the groundwater and surface waters that are being polluted by animal waste. The use of geosynthetics and in particular geo-membranes on the farm has come a long way and has grown significantly in recent years, especially with more stringent governmental legislation as well as public awareness through programs such as those developed by the USDA/NRCS, U.S. EPA and governmental agencies in other countries.

### **CONTAINMENT AS A REQUIREMENT**

Potable water sources are becoming more and more scarce and water is becoming more costly. The requirement to provide a barrier against high rates of water seepage loss is already a reality in many more areas than just the arid and semiarid regions of the world. And, just as water is important to conserve, it is even more important to environmentally protect surface and groundwater sources from pollution due to animal waste and the air we breath from noxious gases and odors. Again, containment with a reliable time proven method is a requirement, not just an option due to recently enacted environmental legislation in many parts of the world.



Anaerobic digesters with waste lagoon

Geosynthetics will provide a reliable cost effective alternative to traditional compacted soil and clay liners that provide much less in seepage control, are highly variable in quality and may not be acceptable for design and regulatory compliance. Although geo-membranes are the primary type for use as a barrier or odor control cover, other geosynthetics are used in conjunction with [geo-membranes and include geotextiles, geo-composites, and geonets.](#)

## **ANIMAL WASTE LAGOON LINERS**

Animal waste lagoons contribute to the pollution of ground and surface waters worldwide. To control waste seepage, compacted earth linings as well as geosynthetics are utilized. However, with the increasing concern over pollution and governmental legislation, the use of geosynthetics has been increasing very rapidly. In particular, exposed geo-membranes, geo-membranes with soil cover and GCL's with soil cover are currently being used. In addition, geo-textiles and geo-net composites are utilized for protection / gas transmission.

## **ANIMAL WASTE ODOR CONTROL COVERS**

A growing number of scientists and public health officials have traced a variety of health problems to vast amounts of concentrated animal waste which emit toxic gases such as hydrogen sulfide and ammonia. Odor control covers can be a low cost geo-membrane or coated fabric or they can be a more expensive engineered floating geo-composite cover system dependent on the design and criticality of the contain-

## **WATER CONVEYANCE**

Geosynthetics and most notably geo-membranes have been used for decades in preserving and transporting clean water for on farm use. The conveyance of water in ditches, laterals and main canals for delivery to crops is as common as on farm water storage tanks and ponds. However, water is becoming more and more scarce and more costly especially with the drought conditions in many parts of the World. Seepage loss in canals and ditches can approach 30 to 50% but loss of valuable water can be eliminated with the use of geosynthetics as lining systems. Both soil covered and exposed geo-membranes are used extensively in the lining of both new and old canals that require rehabilitation. In addition, old cracked concrete lined canals have lost their effectiveness over the years and are being replaced or repaired with geo-membranes. Water conveyance systems utilize other geosynthetics in conjunction with geo-membranes such as protection geo-textiles, geo-composites and geo-grids.



**Irrigation canal**

## WATER CONTAINMENT

Water containment in ponds and concrete tanks for on farm use is just as important as water conveyance in that seepage and loss of valuable water should be minimized, especially for remote ponds and tanks. Soil covered geo-membranes and GCL's are used for the construction of new or the rehabilitation of old ponds. Exposed geo-membranes are used to re-line old stock water concrete tanks or to line

## ANAEROBIC DIGESTERS

Anaerobic digesters are used to rapidly decompose animal waste in a controlled environment thus allowing the recovery and use of methane-rich low Btu biogas. Biogas is used to fuel combined heat and power (CHP) generators that produce on farm electricity, process heat and domestic hot water. They are also a viable method of waste management due to the fact that both bottom lining systems as described above and flexible cover systems are used. With every digester constructed, geosynthetics are used to either line the anaerobic lagoon or cover the lagoon for collection of biogas. The number of operating digesters is rapidly increasing worldwide as government funding is becoming available for farm installations.

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[www.ErosionPollution.com](http://www.ErosionPollution.com)

Data provided with compliments [www.geosyntheticssociety.org](http://www.geosyntheticssociety.org) and R. Frobel.

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