The world population is estimated to increase from 7.96 to 10.46 billion in 2050. Population growth and urbanization will lead to an increase in the demand for livestock products by 2050, which inevitably will cause an increase in the generation of livestock waste. The production of livestock waste is much higher than human waste. One “animal unit” (1,000 lbs. of the live weight of an animal) of dairy cows produces 15.24 tons of waste per year, while one “animal unit” of humans produces 5.48 tons of waste per year. As livestock manures are rich in organic matter and nutrients, it is important to develop best available manure management techniques to recover these elements. Livestock manure is commonly disposed of by landspreading, composting and anaerobic digestion – the latter of which utilizes microorganisms to convert organic matter in manure to biogas and also produces nutrient-rich digestate as organic fertilizer. If these techniques are not available and the manure is not properly managed, manure may pollute surface water, ground water, soil and air. In China, according to the First National Survey on Water Pollution Sources issued by the Ministry of Environmental Protection, the Statistics Bureau and the Ministry of Agriculture on the 6th February 2010, the total chemical oxygen demand (COD), total nitrogen (TN) and total phosphorus (TP) discharged to the water environment by the agricultural sector has increased to 13.25, 2.70 and 0.28 million tons annually, which is equivalent to 43.7%, 57.2% and 67.4% of the total COD, TN and TP discharged to the water environment in the whole country. The COD, TN and TP discharges from the livestock farming industry in 2007 were equal to 12.72, 1.03 and 0.16 million tonnes, corresponding to 96%, 38% and 56% of the agricultural discharges. This shows that the livestock farming industry is the largest agricultural pollution source. Pollution caused by the livestock manure occurs not only in developing countries, but also in developed countries. In USA, at present, less than 60% of total livestock manure is properly treated by land-spreading, composting, or anaerobic digestion. In the European Union, the Nitrates Directive is implemented to reduce the pollution of livestock waste land application on ground water.

The improper management of animal manure may also cause other environmental and human health issues, such as the production of odor (e.g. H₂S and NH₃) and greenhouse gas (GHG) emissions during manure handling, transport and use. In the USA, the management of farm animal manure contributes to 25% of the agricultural methane emissions in the whole country. Manure-borne pathogens and parasites will affect farmers and animals’ health and wellbeing if manure is directly applied to land. Much has been written recently about the presence of ‘emerging contaminants’, such as estrogen, antibiotics and antibiotic resistance genes, in animal manure, which, if not effectively removed, may have detrimental impacts on human health and the environment. Therefore, many opportunities exist for the design of manure management systems to address this issue.

This special issue of Environmental Engineering and Management Journal (EEMJ) contains papers that were delivered at the LivestockWaste 2013 conference, which took place in Jiaxing City, Zhejiang Province, China in 25-26 October, 2013. The topic of the conference was on recent advances in resource recovery and pollution control for livestock waste management. The papers included in this special issue focus on the following areas: (1) policies and regulations on management of animal waste; (2) technologies for animal waste prevention; (3) pollution
control technologies; (4) resource recovery technologies and practice; and (5) greenhouse gas emission mitigation for livestock farming.

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