

## H. Mark Hanna

### Extension Agricultural Engineer Registered Professional Engineer

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### Education

Ph.D. Agricultural Engineering, 1991  
Iowa State University

M.S. Agricultural Engineering, 1975  
Iowa State University

B.S. Agricultural Engineering, 1973  
Iowa State University

### Honors and Awards

American Society of Agricultural Engineers  
AE 50 Design Awards

Superior Engineering Extension Award

Mission Award for Extension (Gamma Sigma  
Delta)

American Society of Agricultural Engineers  
Honorable Mention Paper Award

Achievement Award (Iowa State University  
Extension) (4)

American Society of Agricultural Engineers  
Educational Aids Blue Ribbon Award (6)

American Society of Agronomy Educational  
Materials Award (4)

### Recent Publications

Hanna, H.M., P.M. Boyd, J.L. Baker, and  
T.S. Colvin. 2005. Anhydrous ammonia application  
losses using single-disc and knife fertilizer  
injectors. *Applied Engineering in Agriculture*  
21(4):573-578.

Boyd, P.M., H. M. Hanna, J. L. Baker, and  
T. S. Colvin. 2004. Field evaluation of anhydrous  
ammonia manifold performance. *Applied  
Engineering in Agriculture* 20(6):745-756.

Hanna, H. M. 2004. Farm implements. In  
*Encyclopedia of the Great Plains*, D. J. Wishart  
ed. Univ. of Nebraska Press, Lincoln. pp 417-418.

Hanna, H. M. 2003. Grain production systems. In  
*Encyclopedia of Agricultural, Food, and Biological  
Engineering*, D. R. Heldman, ed. Marcel Dekker,  
New York. pp 451-453.

Hanna, H. M., K. D. Kohl, and D. Haden. 2002.  
Machine losses from conventional vs. narrow row  
corn harvest. *Applied Engineering in Agriculture*  
18(4):405-409.

Hanna, H. M., M. L. White, T. S. Colvin, and  
J. L. Baker. 2002. Anhydrous ammonia distribution  
during field application. *Applied Engineering in  
Agriculture* 18(4):443-451.

Stone, J. F., H. M. Hanna, C. Guo, and P. Imerman.  
2001. Protective headgear for Midwestern  
agriculture: a limited wear study. *Journal of  
Environmental Health* 63(7):13-19.



### Teaching

Equipment cleanout

New grain markets and future non-food uses for grain are placing a premium on identity preservation of grains. Equipment sanitation and cleanout of planters and harvesters will be crucial. Information and materials are being developed to help Extension clientele and alert the agricultural industry to potential problem areas.

### Research

Agriculture must continually find a balance between productivity and environmental sustainability. Mechanized field equipment operations (tillage, planting, chemical application, harvest) have the capacity to help or hinder these objectives. Dr. Hanna's research focuses on developing ways for field equipment to enhance productivity and environmental stewardship as machinery interacts with crops and soils. Applied research is accompanied by field days, conferences, and other outreach activities with the agricultural industry.

Nutrient application

Precision nutrient application across the swath is still just a goal for materials such as anhydrous ammonia and manure. Because of application equipment inaccuracy, many farmers tend to overapply, wasting money and degrading the environment. Dr. Hanna and his research team are working on improved ammonia distribution manifold and spreader designs so overapplication can be reduced.

Tillage/planting

Soil resources can be improved or degraded by the actions of tillage tools and equipment tracks. The effects of reduced- and no-tillage systems on soil and plants are being evaluated. The effects of high axle loads (manure tankers, grain carts) on soil compaction/crop yield are also being assessed.

Harvest

The operation of field machinery affects crop quantity and quality. In turn, evolving cultural developments (e.g., row spacing) and quality demands from end users affect optimum machine design and operation. For those reasons, recent projects have evaluated narrow-row cornheads and mower/conditioner designs.