

WATER: ESSENTIAL TO AGRICULTURE

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REFERENCE: *Proceedings of the 1989 Georgia Water Resources Conference*, held May 16 and 17, 1989, at The University of Georgia. Kathryn J. Hatcher, Editor, Institute of Natural Resources, The University of Georgia, Athens, Georgia, 1989.

INTRODUCTION

The water supply in Georgia has been taken for granted since early times. With an average rainfall of over 50 inches annually, many large and small fresh water lakes, thousands of rivers and streams, and possibly the largest underground aquifer in the world, most Georgians have not seriously thought of the possibility that some day we could have a water shortage. The droughts of 1986 and 1988 made all Georgians keenly aware that what once seemed to be an abundant supply of water is indeed a precious, limited resource. But quantity is only one aspect of the issue, quality is also very important. Agricultural water users are concerned with both of these matters when it comes to water.

AGRICULTURAL WATER USE

Georgia agriculture uses a lot of water. The days of Jack and Jill going up the hill to fetch a pail of water are gone. Now water is used on the farm extensively for livestock and row crop production. Livestock production (including poultry) which generates about 45 percent of the annual 3.6 billion dollars in cash receipts, is a large user of water. Poultry, which produces 33 percent of farm cash receipts in Georgia, is one of the largest farming enterprise water users, even when the considerable needs of processing plants are excluded. On the farm, water use by poultry, including broilers, laying hens, turkeys, and replacement flocks, requires 11.3 billion gallons annually (Treadway, 1979). Beef cattle, dairy operations, and swine facilities are also large consumers of water, not necessarily for the raising of the livestock, but for the cleaning of the confinement building and mechanical equipment used in the production. It is estimated that the needs of these animals are another 10 billion gallons annually (Treadway, 1979).

Looking at the row crop side of agriculture, farmers have found that the risks involved with crop production are reduced significantly if irrigation is part of the operation. Irrigation is by far the largest agricultural water

user in Georgia. Irrigated acreage has grown from 144,629 acres in 1970 to 1,128,544 in 1986 (Harrison and Tyson, 1987). The total system acreage is distributed geographically as follows (Harrison and Tyson, 1987):

Southwest	73.1%
Southeast	20.6%
Central	4.8%
North & North Central	1.5%

Corn and peanuts make up 64% of the irrigated acreage with 341,296 acres of corn and 375,160 acres of peanuts. Chemigation is used on 181,212 acres, being divided as fertilizer on 136,618 acres, herbicides on 31,958 acres, fungicides on 6,617 acres, insecticides on 4,819 acres and nematocides on 1,200 acres (Harrison and Tyson, 1987). Of the 11,294 irrigation systems used by farmers in the state, 4,628 (43%) systems pump from wells and 6,666 (57%) systems use surface water. In 1986, one of the worst drought years on record, the average depth applied on all crops was 9.0 inches (Harrison and Tyson, 1987).

The agricultural need for water will continue into the future. Georgia is in the position to expand certain farming enterprises to provide the needs of the growing Southeast population. The climate, availability of land resources, the transportation system, and the present industrial base all contribute to a bright future for Georgia agriculture. Farmers have changed their opinion as it relates to water use controls. Not too many years ago, agriculture wanted no part of the water resource permitting system, but in 1988 water permitting legislation was a priority legislative item for the Farm Bureau. Farmers realized that water resource planning was necessary, and they wanted to be part of the process rather than being left out of the water budget all together. H.B. 1543, as enacted into Georgia law during 1988, provides protection for the farmers' water rights, but more importantly, the legislation will require consideration of agricultural water use in all future water resource development planning.

Georgia farmers were supportive of S.B. 84, the Georgia Water Supply Act adopted by the 1989 General Assembly. This legislation will allow the State of Georgia to build regional

reservoirs. Even though it is expected that the first reservoirs will be built in north Georgia, we hope that water supply lakes will be built all around the state. By backing up some of our rivers and streams, not only will the water supply lakes provide necessary water for users, the rivers and streams can be regulated to greater flow levels which will benefit all users. Higher flow levels are needed in north and south Georgia.

CLEAN WATER PROTECTION

Quality as well as quantity is important to farmers. We are especially concerned about groundwater protection. The rural population is almost totally dependent upon groundwater as a source of drinking water, and the potential for pesticide contamination is a matter of great concern and discussion within agriculture. While farmers agree that we need to protect this resource, there is also a concern that any such effort must recognize the vital role that agricultural chemicals play in modern farming. Farmers would prefer not to use agricultural chemicals to control weeds, disease and pests, but circumstances dictate otherwise. Until alternate methods of crop protection are commercially practical and until biotechnology products are available, we must be careful not to overreact in limiting agricultural chemicals so that the cure becomes worse than the problem.

Water Quality Assessment

Another reason that we must be cautious in responding to pesticides in groundwater is because of our limited knowledge of the scope, as well as the causes and effects of the problem. Contrary to growing public perception, most pesticides do not leach. Furthermore there appears to be increasing evidence that the cause of the problem is generally not the routine field application, but rather is an atypical factor such as shallow wells, unique soil characteristics, improperly cased or cracked wells, or mixing and loading too close to wells.

Before 1979, relatively little systematic water monitoring was focused on groundwater. Testing of groundwater since that time has revealed some contamination, but the origin has been difficult to trace. A survey of U.S. wells is currently being undertaken by the U.S. Environmental Protection Agency. A report is expected in 1990 that should provide much needed information about the pervasiveness of pesticides in groundwater.

Farmer Initiatives

As an organization, the Farm Bureau has been studying the issue of pesticide contamination, and farmers are adopting new techniques to be more responsible handlers of chemicals. A lot of the new management practices have developed due to economic reasons rather than environmental reasons. Farmers using the "Best Management Practices" are essentially the only farmers left after the agricultural depression of the mid 1980's. "Best Management Practices" involve the use of non-chemical practices such as crop rotation, resistant varieties, cultural practices, biological control, and more judicious use of chemical control measures by monitoring fields more closely. By far the most important improvement is the adoption of an integrated pest management philosophy (Sorensen, 1988).

Integrated Pest Management (IPM) looks at pest control from a broader perspective than just eliminating the pests that threaten a crop, even though IPM technology has been used to eradicate certain pests such as the boll weevil. The Boll Weevil Eradication Program is a good example of IPM that is both financially beneficial for the farmer and provides environment enhancement. It is projected that after the initial program in Georgia has been completed, chemical usage should drop about 70% (Barr, 1988). IPM is the informed selection and use of pest control actions that will result in a good crop and an undamaged environment (Sorensen, 1988).

Two key concepts were introduced to the farm community through IPM. First, the idea of economic thresholds was developed. Since plants evolved along with pests, they can tolerate a certain amount of damage. Pest populations only need to be controlled when the cost of that control is justified. Secondly, to make decisions in a timely manner and with up-to-date information, intensive monitoring of pest population was encouraged.

The Conservation Technology Information Center outlines some of the best management techniques for pesticide use as follows (CTIC, 1988):

(A) Use Pesticides Effectively.

By utilizing an integrated pesticide management (IPM) approach, farmers would use chemicals only when economically beneficial. Knowing key pests, the life cycles of the pest, and the crop's economic thresholds are important. By monitoring fields to pinpoint problems and to determine when infestation levels warrant chemical treatment, pesticides can be applied only when they will increase profits, not just yields. Crop rotations and cultivation practices can also help eliminate recurring insects and weed problem.

(B) Use Non-Leaching Pesticides.

High water solubility, low soil absorption capability, and long persistence in the soil are all characteristics that increase leaching potential. The chemical selection can play an important role in reducing the risk of water contamination. Farmers should be familiar with EPA's list of pesticides which are leachers or potential leachers, and should choose the pesticides with the lowest leaching potential when more than one chemical will do the job.

(C) Know Field Characteristics.

By knowing the on-site characteristics and what properties promote pesticide leaching, farmers can lower the impact of chemicals. Sandy soils, coarse or light textured soils, areas with high rainfall, and shallow water tables are characteristics that promote leaching.

(D) Heed Environmental Conditions.

On-site weather conditions are important to consider when making chemical application. Pesticides should not be used when heavy rains are expected and large quantities of irrigated water should not follow application of chemicals.

(E) Reduce Leaching Potential With Technology.

With the assistance of researchers, farm equipment continues to improve and become more efficient. This new technology is helping reduce the potential problems associated with chemicals. Precise sprayer calibrations that optimize drop size, and electrostatic sprayers that apply a charge to spray droplets, increase the cling to plant surfaces which will reduce the amount of chemicals needed.

(F) Prevent Pesticides Accidents and Spills.

Chemical users must be cautious, not only for their own safety, but for the protection of the environment. Buffer zones need to be designed to protect points of possible direct groundwater recharge (wells, sinkholes, irrigation ditches) from pesticide contamination. The mixing, handling, applying and disposing of chemicals should not occur in the immediate vicinity of a well. Chemicals should be stored in proper facilities. These facilities should have concrete floors, be well ventilated, and be posted and locked. If chemigation is used, anti-back siphoning should be used and checked often to insure proper operation. State law in Georgia requires a check valve and an anti-siphon device installed on irrigation systems using chemigation.

Farm Bureau Involvement

The Farm Bureau has been actively involved in groundwater issues for several years. We

have comprehensive policies on groundwater quality and quantity, agricultural research usage, integrated pest management, and future agricultural research needs. The policies are drafted by our active farmer members during our policy development process. Policy recommendations begin with the county and are discussed on through the national level.

On groundwater quality problems, Farm Bureau has taken the lead among farm organizations with its Groundwater and Environmental Quality Self-Help Checklist which is a 15 page booklet of questions about pollution problems that can occur around farms (AFBF, 1987). A year in development, the checklist was particularly designed to be used in county Farm Bureau meetings where 20 minutes are set aside for everyone to fill in answers to the questions. The checklist analyzes on-farm water supplies and directs the farmer's attention to potential problems. It provides suggestions on best management techniques, proper storage and handling of agricultural chemicals, safe disposal and application of chemicals, and advice on water testing. It also provides a form that can be filled out on an annual basis to keep track of water quality on the farm.

CONCLUSION

Agriculture is big business in Georgia, with farm commodities alone pumping \$3.6 billion annually into the state's economy. The total economic impact of the agriculture industry is estimated at \$18 billion, employing over 300,000 Georgians. Dollars alone do not paint the whole picture. Agricultural or forestry land encompasses nearly 90% of the total land acreage in the state.

This all underscores the need for increased information, education and research into water issues relating to agriculture. In developing responses to the water needs of Georgia, agricultural interests should be directly involved in a full and substantive way.

ACKNOWLEDGEMENTS

I would like to thank my colleagues, Mark Maslyn, Ann Sorensen, & Jim Porterfield, from the American Farm Bureau for supplying me with useful information during the preparation of this paper.

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