

AGRICULTURAL CONJUNCTIVE USE IN THE DELTA

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Agriculture is and will remain Mississippi's largest industry. This state has been blessed with 17.4 million acres of forest land and about 10.9 million acres of soils that are recognized as prime and unique farm land.

Irrigation is used on about 500 thousand acres, 85 percent of which are located in the Delta. It is estimated that during a dry year irrigation accounts for 1.2 million acre-feet of water and for a normal year 1.0 million acre-feet. About 85 percent of this water comes from ground water aquifers. Irrigated acres have dramatically increased during recent years. With uncertain rainfall patterns cotton and soybean farmers have become more dependent on irrigation.

Water requirements for livestock and poultry are over 30 million gallons per day, divided equally between surface and ground water.

Rice acreage has fluctuated somewhat over the years and will probably increase in the future. Aquaculture is experiencing a dramatic increase in the number of acres under water. More than 200 thousand acre-feet of water are required to support this industry. Estimates for the near future indicate that this water requirement, all of which is ground water, may double.

In the past farmers took it for granted that they could expect to make only one good crop every three or four years. The most prevalent reason was inadequate rainfall.

The investment required by farmers today is far too great to make a good crop only every third or fourth year. Not many farmers can afford to finance this production for two or three years, waiting for the one year with adequate rainfall.

To add some assurance that they will have enough soil moisture needed for healthy plant growth more frequently, they have turned to irrigation. Even though irrigation equipment and pumping are capital intensive, they prove to be one answer in assuring higher yields and in making the good years come more frequently.

Mississippi farmers are being called on not only to provide food and fiber for our state and the nation, but for the world. We must export agricultural commodities to food-deficit countries for two reasons: first, it is a humane act to feed those people with an insufficient agricultural base to feed themselves, and second, without exporting agricultural products, our trade deficit would be more than the wealthiest of nations could endure.

Unlike several states in the East, Northeast and Midwest, Mississippi's agricultural base does not have to be diminished because of industrial expansion. The dollar value of agricultural products produced in this state will continue to grow.

Other nations are increasing their industrial capacity and have taken many of our foreign markets. Twenty years ago you could still buy American-made watches, television sets, cameras, clothing and toys. One of the few products this nation produces for export which remains competitive is food.

With the great number of manufactured items and petroleum products we now import, we must maintain a viable agriculture to reduce

our trade deficit. Approximately two-thirds of all agriculture crops grown in this state are sold to foreign markets.

Mississippi has a diverse agriculture and is on the threshold of becoming this nation's breadbasket. We have the opportunity and responsibility to preserve our ability to feed and clothe the world.

We realize that if we are to continue as farmers we must take steps now to protect one of our most valuable resources — WATER — not only for ourselves but for generations of farmers who follow.

I give you this background information to point out that Mississippi agriculture is a major water user and that trends toward irrigation will increase the water demand in the future. For the purpose of this presentation I will confine most of my remarks to more efficient use of water in the Delta.

The alluvial aquifer that underlies the Mississippi Delta is no doubt one of the most prolific aquifers in the nation. Along the Mississippi River on the west and the hills to the east, the aquifer recharges itself during the winter rainy season. Practically no amount of irrigation could cause draw-down to the point of degrading this aquifer, but only on the eastern and western edges.

As we approach the center of the Delta, recharge is not as rapid and annually we see draw-down during the irrigation season faster than recharge can occur. With this in mind farmers must use alternate sources of water for irrigation.

But even if ground water recharge was such that an inexhaustible supply was available, from an economic standpoint farmers would benefit greatly by using surface water for irrigation when available. The production cost of rice, for example, can be reduced by as much as \$40 to \$50 per acre by making maximum use of available surface water. Fuel and electricity costs for operating motors and pumps are reaching the point of being uneconomical except for use during the growing season when crops become drouth-stressed.

Many innovative farmers have already projected future water needs and costs. Their farm plan now includes a system of ditches with weirs and dikes to collect drainage water from other irrigated fields to be recycled.

This is the case of my farm. When I started my farm plan it was to get water off the land rather than slope it for irrigation. Originally the slope on my land was about one-tenth of a foot per one thousand feet. With a lot of work I now have it where it will drain with a slope of two-tenths per one hundred feet. For my plan this is the best slope because it will grow cotton, soybeans and rice.

This slope does work well for drainage but it is also ideal for flood irrigation. So you might say I kind of backed in to irrigation.

There are three excellent sources of surface water on my farm for irrigating cotton, rice and soybeans. Quiver River is a good steady supply of water. The Levee Board put weirs in it so the water level is pretty good in it the whole year. When farmers start pumping from the ground up above me then all that water comes on down.

I will discuss how I use this river in a few minutes.

There are two ditches or bayous that run through my place: Pecan and Dugan Bayous. These two bayous collect a lot of water from the whole drainage area. Again, when people start pumping and losing water whether they are irrigating cotton or soybeans or flooding rice, this water drains into these two ditches or bayous and builds up a head at a weir we have in the ditch so we can pump out.

If nobody is pumping and losing water we have to turn on one or more of the thirteen wells and pump into the ditch to build a head for our surface water pumps. We can keep a good supply in the ditch by conjunctively using ground water to augment the surface water sources. We had to use the wells early last year because there was insufficient surface water for our needs.

Now back to the Quiver River. When the river has a good supply of water and our ditches run low, then we pump from the river by a pipe system into the ditches to maintain a good head of water there.

Even though two lifts are involved when we pump from the Quiver River to the ditch and then through the pipes to the fields, it is still more economical than pumping from the ground. When we have to pump from a well to a ditch and then out of the ditch to the fields it is not very economical. Only when we have to have water is it worth it.

Now let me say something about the importance of putting weirs in the ditches. Weirs actually improve the drainage. They hold water in the ditch and keep down vegetation. In the Delta if you don't maintain a good water level, you will have willows and other vegetation growing in the channel. Then when you have flood waters, this vegetation tends to cause worse flooding.

Now I have said whenever possible I use surface water instead of ground water. I have been doing this for some years, even before we knew the alluvial aquifer was being over-drafted.

Just about all of our pumps, surface and ground, run on electricity and electricity is getting more expensive every year. I have irrigated rice for as little as \$20 per acre using surface water. When I have to depend on ground water alone, my irrigation costs can run as high as \$60 per acre.

Some years due to crop rotation patterns I will have rice close to surface water sources. Of course, rice requires much more water than soybeans or cotton. Cotton is a fairly dry weather crop and needs only about two inches of water during the growing season. I can irrigate this crop from ground water sources at no great expense or harm to the aquifer. When my cropping patterns are just right, around 75% of my total water use comes from surface water sources.

Most of my surface water pumps are powered by 15 horsepower motors. I do have two 20 horsepower motors and a few 5 and 7 horsepower motors. This compares to the 60 horsepower motors that I must use when pumping ground water. Naturally, it takes less power to pump from 6 to 10 feet from surface water sources than it does from 100 feet from the ground.

I have not gone into the mechanics of how I distribute the water in the fields after I pump it from the ditches or the wells. I think the most important point to be made is that where possible I use surface water and all of us as farmers should make better use of this resource.

Until lately we did not worry about the over-draft occurring from the alluvial aquifer. But after seeing the water table dropping in the Delta and after hearing some of the presentations during this conference, I am even more convinced that conjunctively using surface and ground water is not only more economical but will aid in better managing our ground water resource.