IMPACTS OF THE CURRENT DROUGHT AND WATER POLICY ON AGRICULTURE

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CHAPTER #

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BIOGRAPHICAL INFORMATION

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Member/Alternate, Lower Colorado River Authority Water Management Plan Revision Committee – 1990 – present
Member/Former Chair, Colorado/Lavaca SB 3 Bay and Basin Stakeholder Committee – 2009 - present
Chair, Colorado Water Issues Committee of the Texas Rice Producers Legislative Group – 2009 –present
Member, Texas State Technical Committee for the Natural Resource Conservation Service – 2002 – present
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Appointed Participant, Senate Natural Resources Committee Collaborative Group on the Future of Groundwater Management in Texas – 2000

2011 Blue Legacy Award for Water Conservation in Agriculture, Gertson Farms Partnership
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Invited Speaker, Texas Alliance of Land Brokers, Topic: Water Issues on the Gulf Coast – September 2012
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Invited Speaker, Rice Federation Leadership Class, Topic: Water Issues Affecting Rice Farming in Texas – April 2012
Invited Speaker, Texas Seed Tradesman Association, Topic: Affect of Drought on Texas Rice Production – 2012
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Impacts of the Current Drought and Water Policy on Agriculture

I. INTRODUCTION

The current drought that began in 2008 has highlighted the critical nature of water supplies for all sectors of the economy. Texas agriculture, however, has taken the brunt of the economic impact, and is slated for further damage as water for irrigation is facing unprecedented curtailments.

Current water policies seem to be based on an assumption that most all consumptive uses of water are, or should be, of higher priority than agricultural uses, or perhaps that water should go to the highest bidder. It is imperative that Texas consider the long-term consequences to agriculture of current water policies and their associated economic, social and cultural impacts.

As a starting point, this paper opens with a global agricultural perspective. Then it takes a look at Texas' role as a producer and consumer of agricultural commodities. Finally, for a river basin-sized perspective, it zeros in on specific policies in the lower Colorado River basin and their impact on irrigated agriculture there.

II. GLOBAL PERSPECTIVE ON AGRICULTURE ACCOUNTING FOR POPULATION EXPANSION

A. World-wide Irrigated Agriculture

Irrigated agriculture accounts for about 20% of the world's current agricultural acreage and contributes about 40% of the world's total food production. To do so it uses about 70% of the total amount of freshwater withdrawn. (Eliasson, et al., 2003)

B. The Demands of Population Growth

In the September, 2011 issue of *The Progressive Farmer* author Charles Johnson reports that there will be nine billion people to feed by 2050 and asks the question, "Can the world's farmers meet the challenge?" He goes on to report that world grain production must double in the next 40 years. (Johnson, 2011)

The Food and Agriculture Organization of the United Nations (FAO) (Bruinsma, 2009) reports that at the same time the world's population increases by 40% to around nine billion in 2050, food production must increase by 70% compared to 2005 production. Land equipped for irrigation will need to expand by 11%, while harvested irrigated acreage expands by 17%.

Total arable land per capita has dropped world-wide from about 1.1 acres per person in 1960 to about 0.6 in 2010 resultant from increases in yield that have made it possible for production increases to generally keep pace with population increases. Crop yields are expected to continue to grow at 0.8% annually, but this is only about half of the 1.7% annual growth rate exhibited in the past. (Bruinsma, 2009)

C. Market Forces vs. Public Intervention

The FAO goes on to make this statement:

> *The projected increases in yield, land and irrigation expansion will not entirely come about spontaneously (i.e. driven by market forces) but require huge public interventions and investments, particularly in agricultural research and in preventing and mitigating environmental damage.* (Bruinsma, 2009)

III. TEXAS' PLACE AS A PRODUCER AND CONSUMER OF AGRICULTURAL COMMODITIES

A. Texas Agriculture Facts

Texas leads the nation in cattle, cotton, hay, sheep and wool, and goats and mohair production. One in seven working Texans (14%) is involved in an agriculture-related job. (*Texas Ag Statistics*, 2012)

Texas farms (including timber) and ranches cover 130.4 million acres, about 96% of Texas' total area. Just over 98% of Texas farms and ranches are family farms, partnerships or family-held corporations. The economic impact of the food and fiber sector of Texas agriculture totals more than $100 billion. (*Texas Ag Statistics*, 2012)

B. Texas' Food Production Deficit

Texas currently operates at a considerable deficit regarding food production within its borders. Of the eighty-three food commodities monitored for this purpose by the Texas Department of Agriculture (*Texas Ag Statistics*, 2012), Texas operates at a deficit in sixty-five commodities, consuming more than it produces. While total consumption of the monitored food commodities hovers at 104.7 billion pounds, Texas only produced 65.2 billion pounds leaving a deficit of 39.5 billion pounds or 37.7%. (Callahan, 2012)

The possibilities for bettering this food production deficit appear dim in the face of population growth and urban sprawl encroaching upon traditional agricultural lands. Urban sprawl in Texas is responsible for taking an estimated 200,000 acres of land permanently out of production each year (*Texas Land Conservancy*, 2012). At this rate 7.7% of current farm and ranch land will be removed from production in 50 years. Texas' projected population growth from 25,650,388 in 2010 to 46,323,725 in 2060 is an increase of 81% in fifty years. (Callahan, 2012) By contrast, it has taken ninety years for Texas to add this number to its population between 1920 and 2010. (*Texas Almanac*, 2012)

IV. IMPORTANCE OF IRRIGATED AGRICULTURE IN TEXAS

A. Texas Irrigation Facts

Of the nearly 25 million acres of cropland in Texas one in four, or about 6.17 million acres, are irrigated and account for more than 10% of irrigated acres in the United States (Wagner, 1012). In 2008, 72.3% of irrigated acres used groundwater and 21.7% used surface water. (*Irrigation Water Use Estimates…*, 2012)

B. Texas Irrigation Water Projections

Irrigated agriculture accounted for about 57% of projected water use in Texas in 2010 according to the state's water plan, *2012 Water for Texas*. There already existed in 2010 an identified unmet need for irrigation water of more than 3.1 million acre-feet under drought conditions. The plan projects total irrigation demands to fall from 10.3 million acre-feet in 2010 to 8.6 million in 2060. It explains the 17% decline as "…largely due to anticipated natural improvements in irrigation efficiency, the loss of irrigated farm land to urban development in some regions, and the economics of pumping water from increasingly greater depths." In the same period demands fall, shortages are slated to continue increasing and would reach 3.8 million acre-feet or about 44% of irrigation demand in 2060 under drought conditions. (Callahan, 2012, pp.141, 178)

C. Future Groundwater Availability

With groundwater providing an estimated 72.3% of irrigation demands it is of note that statewide groundwater supplies are projected to decrease by 32% due to declining levels in the Ogallala Aquifer in the panhandle of Texas and restricted pumping from the Gulf Coast Aquifer resulting from the potential for land subsidence (Callahan, 2012). Both of these areas have a long tradition of irrigated agriculture.

D. Under-Estimating Future Irrigation Demands

Empirical information suggests that some of the State Water Plan's projected reductions in irrigation demands result ironically from other demands being met with the water currently used for irrigation. The conversion of current irrigation supplies to meet demands in other categories of use is assumed to lead to a reduction in irrigation demands when in actuality the demands may still exist, but the supplies have merely been stripped away. The state water plan does not clearly identify the amount of water that would be needed by irrigated agriculture if availability were not limited by other demands on these resources. This shortfall leads to a high potential for the plan's projected unmet irrigation demands to be severely under-estimated.

With considerably higher demands upon agricultural production precipitating from the growing population both in Texas and throughout the world, the future of irrigated agriculture appears extremely bright. But with the majority of future world-wide production increases expected to come from irrigated

agriculture, Texas agriculture may get left out of the economic potential due to under-estimated demands for irrigation water.

E. Sustainability of Current Trends

While Texas is a great state, there is a limit to the growth she can sustainably support with her natural resources. Projected reductions in agricultural water availability, deficit food production and threatened environmental flows in our streams and to our bays and estuaries suggest that the limits of what Texas' water resources can sustain may have already been exceeded.

The transfer of water away from irrigated agriculture into other uses further reduces Texas' ability to sustain its population and its natural environment.

Water policy in Texas does not currently recognize and provide for irrigated agriculture as an essential use with precedence over certain non-essential municipal and domestic uses (i.e. lawn and landscape irrigation). Texas current water policy does not attempt to minimize the negative impacts upon the Texas sources of food and fiber that will be needed in the future to serve the state's burgeoning population.

V. A BASIN PERSPECTIVE – THE LOWER COLORADO RIVER

To understand the present state of irrigated agriculture in the lower Colorado it is necessary to understand the history that has brought the basin to its current state.

A. Irrigation – Pre-LCRA

Irrigation in the lower Colorado River valley began as rice production took hold in the area in the late 1800's. As early as 1915 irrigated acres in Matagorda, Wharton and Colorado Counties totaled 55,000 (Long, 1956, p.38). By 1915 there already existed three of the four major irrigation operation systems in the three lower counties of the Colorado valley that are still in operation today.

In his brief history of the Lower Colorado River Authority, Haskell Simon notes:

> *While there were very early records of massive floods on the river, only after about 1850 was special attention noted. As the population in the valley increased, material and human damage likewise became more significant. Austin suffered mightily from 1900 to 1915 and the burgeoning rice industry likewise sustained major losses. In 1915 the Colorado Improvement Association, composed of representatives from the lower counties, met in Bastrop with the Austin Chamber of Commerce to address the flooding issue. This would be considered the start of the 20-year process that created the Lower Colorado River Authority.* (Simon, 2010, p.2)

Fritz Engelhard, a rice farmer from Eagle Lake in Colorado County served as initially-elected first vice-president of the Colorado Improvement Association while A. J. Eilers of Austin was elected president. (Long, 1956, p.33)

Notes from the August 6, 1915 meeting of the Colorado River Improvement Association (CRIA) with 206 in attendance indicate considerable cooperation between upstream and downstream interests as they report that:

> *[the city of] Austin was thanked by the rice growers for water from the incomplete Austin dam, which saved their crop in July. The sum of $15,000.00 had been paid for the water in Lake Austin, emptied by opening the gates at the bottom of the dam.* (Long, 1956, p.35)

More than 40,000 acres of rice was saved by this release from the semi-completed, though incompetently constructed, Austin Dam. This dam would later be reconstructed and dedicated as Tom Miller Dam in 1940. (Long, 1956, p.39)

B. The LCRA Created

The creation of the LCRA is well documented in other publications and therefore is not detailed here. However, excerpts from some of these publications are provided to clearly indicate the prominence that irrigation was to take in LCRA's future.

After three failed attempts to pass enabling legislation for the LCRA in 1934 in three separate sessions of the legislature, during the fourth session CRIA placed in the hands of every member of the House of Representatives a letter of support for the bill that in part said:

> *…farmers on the lower reaches of the Colorado River who have for the past years had to depend upon the unregulated supply and frequently wholly inadequate supply of water for taking care of their investment of more than one million dollars in irrigation equipment, will make their business a successful one instead of a purely haphazard thing."* (Long, 1956, p.83)

The bill finally passed in this fourth session of the legislature, and in praising the successful passage of the LCRA bill the Annual Report of the Austin Chamber of Commerce of 1934 said in part, "The flow of the Colorado River will be made steady and certain. Crops in the Colorado River Valley will be assured." (Long, 1956, p.85)

The 1934 enabling legislation for the LCRA opens in Section 8503.001(b) with the following notable language regarding irrigation:

> *The authority is created under and is essential to accomplish the purposes of Section 59, Article XVI, Texas Constitution, including the control, storing, preservation, and distribution of the waters of the Colorado River and its tributaries within the boundaries of the authority for* ***irrigation****, generation of electric energy and power, and other useful purposes; the reclamation and* ***irrigation*** *of arid, semiarid, and other lands needing* ***irrigation****; the development of parks on lands owned or acquired by the authority; and the conservation and development of the forests, water, and electric power in this state.* (Emphasis added)

The act continues in this vein in section 85003.016(a) as follows:

> *The authority shall manage and use its facilities, the water impounded by its dams on the Colorado River or its tributaries, and any available net operating revenues to accomplish, to the extent possible, the purposes included in Section 59(a), Article XVI, Texas Constitution, that are enumerated in the provisions of this chapter or other general law, and the authority shall …assure, to the extent possible, an adequate supply of water for* ***irrigation*** *and other useful purposes, as it is needed in the various counties comprising the authority.* (Emphasis added)

Senator Wirtz, whose vital contributions to the creation of the LCRA and its system of dams and lakes are unquestionable, once stated that the LCRA "…was not primarily a power project, but its primary feature is flood control with irrigation secondary and power generation only incidental." (Kesselus, 2002, p.123)

The contributions of downstream irrigation interests and their elected representatives in ultimately winning the protracted battles necessary to create the LCRA are well documented in a number of publications including *Damming the Colorado; Corralling the Colorado*; *Flood to Faucet*; and *Alvin Wirtz*.

A good number of the LCRA's greatest leaders and champions hailed from the lower counties of the Colorado valley, including Senator Alvin Wirtz of Colorado County (after whom Wirtz Dam which creates Lake LBJ was named) and Congressman J. J. Mansfield of Colorado County (after whom Mansfield Dam which creates Lake Travis was named). The first Vice-Chairman of the LCRA Board of Directors was Colorado County rice farmer Fritz Engelhard.

C. Early Negotiations between LCRA and Irrigators

The unfinished Hamilton Dam that pre-dated the LCRA was completed by the LCRA in 1937 and renamed Buchanan Dam in honor of the tremendous efforts Congressman Buchanan of Brenham put into making it a reality. Multiple controversies arose that same year, one over the dam's failure to adequately

control a major flood that occurred and the other over water availability to the irrigation companies.

Legal maneuvers over irrigation water issues in 1937 precipitated a long-term contract for water availability to the rice producers:

> *…to* ***perpetually*** *fix and establish the respective water rights and rights to impound, take and divert water from the Colorado River of the respective Parties…in consideration of the mutual agreements and covenants herein set out…* (*Trip to Galveston…*, 1937) (Emphasis added)

The signatory parties to this agreement included the First Party, being LCRA, and the Second Parties, being Lakeside Irrigation Company (of Eagle Lake), Garwood Irrigation Company (of Garwood), and Gulf Coast Irrigation Company (of Bay City).

The contract, in short:

1) recognized the Second Parties' prior appropriations for water to irrigate certain historically irrigated acres totaling over 53,000;
2) recognized the First Party's right to impound, conserve, use, discharge or otherwise dispose of all waters of the Colorado River, except those prior appropriations of the Second Party;
3) provided for the irrigation of additional acres by Second Parties as well as methods for determining the remuneration of First Party for the quantity of water released to irrigate additional acres and the initial rate for doing so;
4) provided an initial rate for irrigating additional acres and a time frame and methodology for accomplishing rate increases including a method for arbitration;
5) laid out conditions for establishing the availability of stored water for irrigating a crop that exceeds the established fixed acreage by more than 10%.

This contract was acted on in the September 20, 1937 LCRA Board meeting and shown as item 616 in minutes from that meeting.

The 1937 contract served the parties for many decades even as rice production evolved into a two-crop (main and ratoon) production system.

D. LCRA Purchase of Irrigation Systems

The irrigation operations and the bulk of their associated water rights one by one were sold to the LCRA – the Gulf Coast Irrigation Company in 1959, the Lakeside Irrigation Company in 1983, the Garwood Irrigation Company in 1999 and the water rights associated with the Pierce Ranch in 2000.

One can only speculate as to the various motivations that brought parties to the terms that enabled these transactions. Several motivations are clear, though and have been confirmed by various relatives to signatory parties of these agreements. The irrigation system owners were concerned about their continuing ability to sufficiently serve their respective communities. Furthermore, they felt that the LCRA, as the legal guardian of the river with a legal mandate for providing for irrigation, would best be able to continue the water service necessary to sustain those communities.

On the other hand, the LCRA partially demonstrated its motivations for the Garwood transaction by immediately contracting with the City of Austin for its next 100 years of water. Clearly the LCRA sought to acquire the irrigation rights for a new primary goal – enhancing the provision of wholesale municipal water to a fast-growing central Texas.

E. The Adjudication of Water Rights on the Colorado

The strain for the LCRA between living up to its statutory and contractual obligations to the irrigators and its more contemporary obligations to provide "firm" water for development particularly of central Texas were partially and temporarily abated by the 1988 Final Judgment and Decree regarding adjudication of LCRA's rights to store water in Lakes Buchanan and Travis. The Decree recognized that, although the total firm water supply of the reservoirs was uncertain, it appeared that LCRA's commitments already exceeded it. The adjudication set forth two

categories of water for LCRA to make available from the lakes – firm and interruptible. Firm water would be reliable through a repeat of the drought of record, while interruptible water could and would be interrupted as necessary to maintain the reliability of firm use.

The order further required that the LCRA develop and submit a water management plan (WMP) that, among other items, calculated firm yield and set out the criteria for determining the availability of interruptible water. A group of representative stakeholders was to be utilized in the development of the initial WMP and periodic subsequent revisions to the plan. And since the WMP is a legal component of LCRA's water rights, all revisions to the plan are treated as amendments to the water rights and therefore require the approval of the Texas Commission on Environmental Quality (TCEQ).

F. The Evolution of the Water Management Plan

At the time of the adjudication and subsequent approval of the initial WMP, total demands on LCRA's water supply systems were not sufficient to be considered an immediate threat to business as usual for both firm and interruptible water customers, thus only minimal opposition to the first plan was noted from the irrigators.

There were some notable positives for the irrigators that resulted. Among them were:

1) a transparent and known method for determining their water availability;
2) a management structure that assured them a lower water rate than firm customers stemming from the unreliable nature of interruptible water; and
3) an ongoing opportunity through the required stakeholder involvement to have input on and monitor future iterations of the plan.

The adjudication set out four interest groups to be represented on a stakeholder group that would be utilized for WMP development and revision. Those categories are: firm water customers, interruptible water customers (irrigators), environmental interests and recreational interests.

The author of this paper served on all such groups throughout the evolution of the WMP up to the present. Much of what follows is taken directly from the author's firsthand knowledge of proceedings.

Until the 2012 revision all such previous stakeholder groups were used primarily as sounding boards and clearing houses for information. They were provided pertinent data and potential related policy options by LCRA staff and were expected to individually respond with input particularly regarding potential impacts to the various stakeholders each represented. LCRA staff would then attempt to meld this input with statutory mandates and existing policies to formulate specific WMP language for the consideration of the LCRA Board of Directors.

The WMP underwent major revisions requiring stakeholder input that resulted in adopted revised plans in 1992, 1999, 2010 and the current pending revision currently under review by TCEQ.

When a major revision was undertaken, an advisory panel would be assembled, and monthly meetings would be held over the course of about a year. Staff would then spend several months writing and finalizing a draft for LCRA Board consideration. The panel members themselves were not asked to vote or even achieve consensus on the staff's recommendations. Apparently it was presumed that the staff, with Board direction, was best able to properly balance the competing interests while also maintaining adherence to other required elements.

Circumstances conspired to alter the stakeholder process for the current revision. Over the course of the 23 years since the first WMP, increasing environmental awareness combined with increased availability of pertinent information regarding potential environmental impacts to instream flows and bay and estuary inflows resulted in an additional strain on LCRA's abilities to fairly divvy out its water resources.

Due to concerns that environmental flows were not being adequately provided for in the WMP, environmental interests protested the adoption of a 2003 revision of the plan requesting a contested-case hearing. The City of Austin and South Texas Nuclear Operating Company became parties, as well. Interestingly the irrigators did not join in and as a

result were not privy to the resulting negotiations regarding the 2003 revisions, and other contested proceedings developing concurrently between the same parties and LCRA. Negotiations regarding the multiple proceedings dragged on for years until finally all parties withdrew certain protests and cleared the path for the 2003 WMP to be adopted in 2010, on conditions of certain stipulations regarding the next subsequent plan.

It is not this author's goal to detail all such proceedings, but rather to extract for examination only those items particularly pertinent to irrigation interests. The item that fits this purpose in the stipulations to what is now known as the 2010 WMP is the requirement for LCRA to immediately set out to develop another revision to the WMP and to do so while utilizing a stakeholder group made up of the same interest groups as previously utilized, but with the requirement that the group be utilized as a "consensus" group for the purpose of developing the revision.

This "consensus" requirement drastically altered the dynamics of the group's proceedings and LCRA staff's utilization of the group. A major result of this changed dynamic was that each stakeholder now essentially held veto power over consensus. This resulted particularly in lakes area recreational interests exercising considerable new-found authority. It is of note that recreational interest representatives were all from the lakes area, while downstream recreational interests were not included.

The very nature of the WMP revision process and the dynamics associated with the hydrologic relationship between firm and interruptible water essentially dictate that in every successive revision to the WMP, restrictions on interruptible water use have been ramped up in order to maintain drought-of-record reliability for a growing firm water contingent. The irrigation stakeholders enter into each revision process anticipating that the eventual outcome will have a negative impact on their interests, so their best hope is to minimize this impact as much as possible.

This latest round of stakeholder involvement, largely as a result of the required use of consensus, took a total of 18 months with more than 22 day-long meetings of the stakeholders in addition to numerous focus group meetings. Additional meetings following the stakeholder process resulted in further alterations to recommendations. In the end a qualified "consensus" with a lone dissenting vote from Mr. Haskell Simon (one of four irrigation stakeholders) was reached.

The LCRA staff then converted the stakeholder consensus items to specific language changes to the WMP intended to best represent what they understood to be the intent of those consensus items. The resulting draft was taken directly to the Board for their consideration without providing stakeholders the opportunity to verify that the resulting revisions fairly represented their intentions.

This author and his fellow irrigation stakeholders have expressed concern over the ways some of the consensus recommendations were characterized in the language for the WMP revision. Furthermore, additional information has come to light that reflects poorly on data used to arrive at certain consensus items. Due to the sensitivity and on-going nature of activities by the irrigators related to pending action by the Commission on the 2012 WMP, the author will not go into further detail in this paper on the purported discrepancies.

In April 2012, the LCRA Board approved the revised WMP (widely referred to as the 2012 WMP) and referred it to TCEQ for review and approval. The Executive Director, by the order approving the 2010 WMP and subsequent related legislation, is required to make a recommendation on this 2012 WMP within 12 months of administrative completeness, excluding periods of time during which the Executive Director awaits responses from the applicant to staff technical inquiries.

Details of the revisions sought by the 2012 WMP are too numerous and complicated to report here and perhaps not sufficiently germane to the subject of this paper. Suffice it to say that the curtailment criteria imposed on interruptible customers in the 2012 WMP clearly makes the jump from the slight chances of curtailment held by previous plans to the assurance of frequent curtailments of irrigation supplies under the 2012 WMP.

G. Impacts of Emergency Orders Authorizing the LCRA to Temporarily Depart from Requirements of the Current WMP

The LCRA sought and received from the Commission an emergency order to be implemented for the year 2012 that authorized the LCRA to depart from the curtailment plan specified in its 2010 WMP. The result to the irrigators was that three of the four irrigation operations did not receive stored water for the 2012 crop year and thus prevented the irrigation and therefore the planting of about 55,000 acres of rice among other lesser crops. This was a truly historic event, as it was the first time in its 78-year-long history with the rice farmers that a curtailment has occurred.

It may be of note to some that the Garwood irrigation operations were able to operate at about 85% of normal acreage in 2012 due to the fact that the most senior water right on the Colorado is the irrigation right associated with this operation's diversions at Garwood in addition to stipulations in the contract that enabled the LCRA to take title to the operation and its water rights. It may be of further interest that Garwood operations completed both main and ratoon (second) crop irrigation utilizing only run-of-river water diverted under the Garwood water right with the exception of about 5,000 acre-feet of stored water diverted in accordance with the aforementioned contract.

With hydrologic and weather forecast data appearing to indicate similar conditions entering 2013, the LCRA Board has once again sought relief from the Commission in the form of a request for an emergency order largely mimicking the previous order. At the time of this writing the Commission had not taken action on the request, but this author expects that the request will once again be granted.

The legal standards applicable to the application include demonstrating that there is an imminent threat to human health and safety. (Texas Water Code § 11.139) A disturbing facet of the orders sought by the LCRA is the complete failure to place any burden for such an emergency upon any water users other than the irrigators. The irrigators have postulated that the duty to minimize harm to affected parties is inherent when curtailing existing water rights. Also, with public health and safety at issue, it would be prudent, if not essential, for all users to take steps to lessen the threat.

H. Conclusions Related to the Evolution of Irrigation Water Management in the Lower Colorado Basin

Incremental actions and policy developments combined with unrestrained development in central Texas over the course of many decades have coalesced and conspired to deprive irrigators in the lower Colorado River basin of a reliable source of irrigation water, putting at risk rice production in three counties that have long been the mainstay of Texas rice industry. With what looks to be a second year in a row for cut-off of irrigation water vital to this industry, there will be long term impacts in the form of business closures, employee lay-offs and crop financing hindrances.

I. Does the Future of the Lower Colorado Basin Offer Hope for Its Irrigators?

Most any research into the motivations behind the momentum that initiated and drove through to completion major water projects will uncover a calamity of some magnitude. The current calamity of what now appears to be a drought that rivals the drought of record of the 50s offers such motivation. In recognizing this, the LCRA Board has set in motion activities that could lead to the development of multiple off-channel reservoirs downstream to be co-located with major irrigation operations.

The proposed reservoirs would enable more efficient delivery of stored water from the reservoirs of Travis and Buchanan as well as enabling the capture and utilization of floodwaters entering the river below the major existing storage facilities. The financing and management requirement of these potential reservoirs are as yet undetermined. Irrigators are guardedly hopeful that the reservoir will restore much of the reliability of their water supplies that has eroded over the decades.

The proposed reservoirs have been perceived by stakeholders throughout the basin as potentially beneficial to the whole basin with certain reservations, of course. Environmental stakeholders are concerned

that the reservoirs could impinge upon beneficial environmental flows, though recognition has also been given to the positive environmental contribution of the presence of the rice industry that could help to offset other concerns. Upstream recreational interests and downstream agricultural interests alike are concerned that the LCRA's future expansion of firm water contracts will eventually negate the positive impacts that these reservoirs have to offer to the basin.

Water policy, current and future, local and statewide, will ultimately determine the fate of these reservoirs and that of the rice industry whose demise is now motivating their construction. The current situation bears an uncanny resemblance to that which this basin found itself in some 80 years prior when the fate of the rice industry was a key factor in the creation of the LCRA and its current system of dams and lakes. Will history repeat itself as the future threatens to once again conspire to deprive the industry of water supplies that as yet are little more than a gleam in the eyes of LCRA leaders?

VI CONCLUSIONS

Circumstances in the lower Colorado basin serve as a microcosm as well as a forewarning of the precarious condition of irrigated agriculture throughout the state and particularly of that portion of irrigated agriculture that depends upon state-owned surface waters. While the impacts of groundwater policy have not been explored in this paper, the author submits that the recent tort and legislative policy developments, particularly regarding groundwater ownership in place as a property right, offer the same dismal outlook for irrigated agriculture. The current drought has served to lay bare the short-comings of the incremental evolution of water policy – policy that now threatens the current and future existence of irrigated agriculture, an essential component for the future of a sustainable Texas.

According to the FAO, drinking water needs for an individual run about two to four liters per day, but the water required to produce a person's daily food supply runs from 2000 to 5000 liters (Eliasson, 2003). In short, it takes 1000 times as much water to feed a population as it takes to quench its thirst. The reality in Texas is that water is used for much more than the essential purposes of slaking thirst and growing food. An honest look at the demands of providing the mere basics of food, fiber, drinking water and shelter for future Texans demands a re-examination of water policies and uses of water in the state.

Texas currently operates at a considerable deficit in regard to food commodities produced in the state versus those brought into the state for consumption (Fuchs, 2011). With little state-wide effort to stem the tide of reduced agricultural water availability combined with considerable population growth, Texas will grow ever more dependent upon food from beyond its borders.

Texas agriculture is part of a highly connected world food production system that is called upon to greatly increase its productivity in order to provide for the expected needs of a growing world population. Will Texas take the bold steps necessary for the preservation and expansion of its food and fiber production capabilities in order to provide for both its own population growth and contribute its share to the world-wide food and fiber trade?

The answer to that question is highly dependent upon the success or failure of Texas in providing the water that agriculture needs to accomplish this goal. Texas must produce more crop per drop in a sustainable fashion and can only do so with sustainable water resources. The sustainability of these water resources for agriculture is largely in the hands of policy-makers.

"Texas" was once synonymous with agriculture. Daniel Webster once said," *Let us never forget that the cultivation of the earth is the most important labor of man. When tillage begins, other arts follow. The farmers, therefore, are the founders of civilization."* Texas agriculture has long been the foundation for civilization in Texas and the source for many social and cultural norms. Short-sighted water policies must not cause us to forsake and undermine this foundation. Is it too late? What can be done?

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