Introduction
Spanning seven states, providing water to an estimated 40 million users, generating more than 4,200 megawatts of hydropower, supplying irrigation water for nearly 5.5 million acres of land, and standing as the life force for at least 22 federally recognized tribes, seven National Wildlife Refuges, four National Recreation Areas, and 11 National Parks, the Colorado River is one of the most vital sources of water in the United States and Mexico (USBR, 2012). But as much of the American Southwest enters its nearly 15th consecutive year of drought, the increasing strain put on the Colorado River’s supply by water needs in the basin have become all too apparent. From watering and landscaping restrictions placed on urban centers, to increasing conflicts between different water rights uses in the basin, to the infamous “bathtub ring” around the perimeter of Lake Mead, the combined effects of drought, over-allocation, and increasing demand can be seen by all.

In assessing future water imbalances and possible adaptation and mitigation strategies, the U.S. Bureau of Reclamation’s 2012 Colorado River Basin Supply and Demand Study concluded that without action, the Colorado River system will become increasingly unreliable and may no longer be able to sustain the demands that rely on its supply. Additionally, the study calls for obtaining one million acre feet of water from agriculture to address the looming supply gap threatened by exponential population growth and economic development, and the increasing magnitude and frequency of droughts and climate variability (USBR, 2012). Agricultural water users, who control approximately 75-80 percent of the water in the Colorado River Basin (CRB), are being pressured to conserve water that can be transferred to meet growing municipal, industrial, environmental, recreational, energy, tribal, and other needs (Schaible & Aillery, 2012; Cohen et al., 2013).

Agricultural Water Conservation
Agricultural water conservation is a highly complex, multifaceted issue that is often mistakenly simplified.

Ag Water Conservation Means Different Things
- Decreased crop consumptive use
- Increased crop water use efficiency
- Improved irrigation application efficiency
- Increased irrigation water diversion and delivery efficiencies
- Reduced water use or evaporation through adoption of conservation measures and new technologies
- Increased capture and utilization of precipitation
in public discussions and at the policy level. Factors, such as limited incentives for agricultural water conservation; variability and inconsistency of policies across states sharing water resources; research far surpassing application by many irrigators; financial barriers; cumulative basin-scale impacts and downstream dependency on return flows; limitations imposed by inefficient irrigation equipment and water delivery infrastructure; and current approaches to ditch and reservoir system management and administration all further influence the complexity of agricultural water conservation (Waskom et al., 2012).

In order to sift through these complexities to develop an understanding of agricultural water conservation improvements, it is important to distinguish between practices that lead to improved water use efficiency and those that lead to reduced consumptive use. Increasing irrigation efficiency is likely to reduce losses from deep percolation and runoff (thereby altering historical return flow patterns), but does not necessarily reduce crop consumptive use. Moreover, in some situations increased water use efficiency can even lead to increased consumptive use, as well as an increase in ET (evapotranspiration: the water taken in and transpired by a plant), and/or increase in the proportion of water incorporated into crops or other products resulting in a larger amount of water not returning to the water source as a return flow (Anderson, 2013). For example, an agricultural user may increase efficiencies by improving water delivery (e.g., lining ditches, pipelines, or polyacrylamides) or by on-farm applications (e.g., sprinklers, drip systems), yet still maintain the overall consumptive use in attempting to satisfy crop ET to maximize production on the same land (Waskom et al., 2012; Anderson, 2013).

It is also important to understand that the impacts of agricultural water conservation practices vary by spatial scale. As a producer increases his on-farm water use efficiency by adoption of an improved irrigation system, the water that previously would have been lost due to the inefficiencies of the old system can no longer return to the river or groundwater system for use by downstream users, resulting in impacts that can be experienced at the river basin scale. To truly achieve a reduction in consumptive use that is observable at the farm and (eventually, depending upon a number of site-specific factors) the regional or basin-level, a decrease in irrigated acreage, conversion to less water-consumptive crops, use of deficit irrigation, and/or a reduction in non-beneficial evaporative losses from the field surface must occur (Waskom et al., 2012; Anderson, 2013).

**Colorado River Basin Agricultural Water Conservation Clearinghouse**

Given that available water supplies are not likely to increase, and existing distribution of supplies may shift with continuing changes in climate, future water needs for an expanding urban population will likely come from agriculture. In turn, reduced water resources in agriculture will add to the challenge of meeting a growing global demand for agricultural outputs; therefore, it is increasingly urgent for farmers, water managers, Extension agents, educators, and policy-makers to understand the impacts of agricultural water conservation practices and implement strategies to conserve water at the farm, regional, and basin scales. The Colorado River Basin Agricultural Water Conservation Clearinghouse (CRBAWCC) provides a comprehensive clearinghouse of project websites, tools, and resources to support agricultural water conservation efforts in the basin.

**Project Websites**

- Colorado River Basin Agricultural Water Conservation Clearinghouse
  crbawcc.colostate.edu
- Moving Forward on Agricultural Water Conservation in the Colorado River Basin
  crbagwater.colostate.edu
- Agricultural Water Conservation Clearinghouse
  agwaterconservation.colostate.edu
agricultural water conservation methodology, technology, and policy necessary to make informed management decisions. In response to the need for resources and tools that provide increased knowledge, understanding, and adoption of agricultural water conservation practices in the CRB, the Colorado Water Institute at Colorado State University has developed the Colorado River Basin Agricultural Water Conservation Clearinghouse (CRB AWCC) (http://crbawcc.colostate.edu).

The CRB AWCC is an innovative web-based project that seeks to bring together science-based, objective information, educational resources, and tools, while at the same time joining together communities of practice to collaboratively address the complex issues of agricultural water use and conservation in the CRB. The CRB AWCC is part of the outreach and education initiative of the Moving Forward on Agricultural Water Conservation in the Colorado River Basin project, a study by the Colorado Water Institute at Colorado State University in which engineers and social scientists are learning from agricultural producers what conservation methods are likely to work in their area and what changes to the many surrounding factors may be needed for agricultural water conservation to be fully effective in practice. Furthermore, this resource is an extension of our original Agricultural Water Conservation Clearinghouse website, which addresses agricultural water conservation globally, with a focus on arid and semi-arid areas. Both of these efforts are funded by the USDA-National Institute of Food and Agriculture.

As evidenced above, simply understanding the concept of agricultural water conservation and its assortment of impacting factors and considerations is far from easy. The CRB AWCC was created in response to the increasing need to further develop and expand this understanding, and does so by compiling and making accessible the array of technical information, tools, and water expertise on agricultural water conservation in the CRB. By providing links and information on federal and state Agricultural Experiment Stations and land-grant universities, information on agricultural water related research centers, irrigation management curricula, irrigation tools (e.g. software, manuals, calculators, irrigation schedulers, etc.), and additional CRB state resources, the CRB AWCC connects industry with related research, educators to scientists, and technical experts to resource materials.

The Clearinghouse will also stand as a platform for disseminating what is learned from the other Moving Forward project initiatives. Tools developed within the project that will be displayed on the CRB AWCC will include: a database of conservation practices, costs, and engineering tradeoffs for the CRB; a database of legal, institutional, and socioeconomic aspects of Ag water conservation implementation in the CRB; a set of case studies of successful conservation programs in the CRB; a database of facilitation methods and case studies used for local engagement in conservation decisions; and a decision matrix that leads irrigation districts through a learning and discovery process to local decisions about implementing conservation programs.

**Conclusion**

If innovative new strategies are not forthcoming, water shortage in the CRB will inevitably result in water being transferred from farms and ranches to provide water for other demands. That in turn will affect the economic viability of rural communities, undercutting social stability, and threatening a valued way of life, wildlife habitat, and food production. Many of the problems and potential solutions to water scarcity in the CRB lie within agriculture; thus, agricultural water security is tightly linked to water security for the environmental, industrial, and municipal sectors.

The goal of the CRB AWCC is to research, compile, and assemble current and accurate information regarding agricultural water conservation in the CRB. By increasing access to this information, the CRB AWCC will help build collaborative relationships between and among agencies, provide technical expertise regarding agricultural water conservation, and offer detailed information on the management, policies, and laws surrounding agricultural water conservation in the basin. Through the tools and resources provided in this clearinghouse, better decisions about future water supply and demand in the CRB can be made.