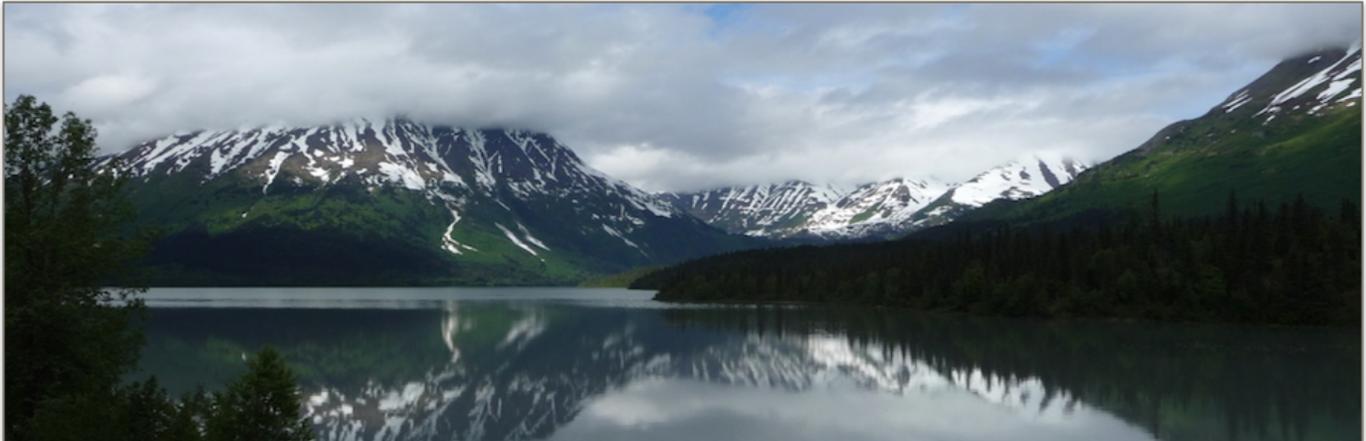


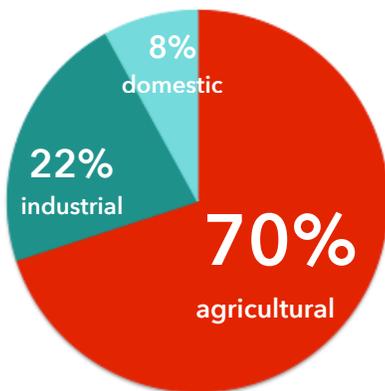
# Meeting Global Challenges

Rising demands on global resources and the search for solutions



*First in a series of Athena Intelligence's articles describing a roadmap aligning people, planet, and profits with water, food, and energy security.*

## Global human use of water



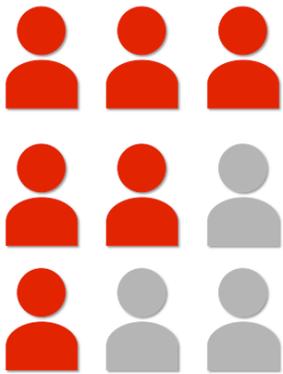
Source: *The cultural and food value chain: Entering a new era of cooperation*, KPMG 2013

Pressures on global food, water, and energy systems are compounding to force an evolution within each industry. Agriculture in particular has profound impacts on fresh water, land, and greenhouse gas emissions. According to a 2013 KPMG report, agriculture utilizes about 70 percent of freshwater demand (not including environmental use), uses around 38 percent of land area globally, and produces 14 percent of greenhouse gas emissions.<sup>1</sup> While the pressures on food, water, and energy systems have historically been ameliorated by increased production, constrained resources and rapidly rising demands are driving each industry to an inflection point which will require behavioral changes to more efficiently use the resources available to us today.<sup>2</sup>

<sup>1</sup> *The cultural and food value chain: Entering a new era of cooperation* (KPMG International Cooperative, 2013), 25. <https://www.kpmg.com/US/en/IssuesAndInsights/ArticlesPublications/Documents/agricultural-food-value-chain-report.pdf>

<sup>2</sup> *The State of the World's Land and Water Resources for Food and Agriculture* (Food and Agriculture Organization of the United Nations, 2011), 37. <http://www.fao.org/docrep/017/i1688e/i1688e.pdf>

By 2025



2 of every 3

people will live in  
areas impacted by  
water stress.

Source: *Rethinking Supply in Food and Beverage*, A.T. Kearney 2014

Shifting climatic patterns and the resulting effects on arable land ensures that the management of food and water supplies will become a constantly evolving landscape. As water supplies continue to shift away from longer-term sources like snowpack to short and intense surges of rainfall, providing water for irrigating cropland, residential and industrial use, and energy endeavors such as natural gas fracking is becoming a constant issue.<sup>3</sup> Crop production, already dictated by existing climate constraints, will become less stable and production areas by crop type will need to have the ability to shift accordingly and frequently.<sup>4</sup>

Additional pressures effect cropping systems, such as the increased diversion of crop production from food sources to crops used as alternative fuels and feed for livestock. As emerging markets experience booming economic success and large numbers of their citizens ascend to middle class lifestyles, the demand for meat and other animal products increases correspondingly.<sup>5</sup> In developed markets, consumers are quickly becoming more cognizant of sustainable production practices, GMO products, and traceability for food safety, thereby forcing suppliers to report extensively.<sup>6</sup>

Freshwater resources are becoming increasingly scarce; a trend that is unlikely to subside in the foreseeable future. Water usage has been increasing at more than twice the rate of population growth. It is estimated that by 2025, 1.8 billion people will live in areas affected by water scarcity, while a full two thirds of the global population may be living in areas impacted by water stress.<sup>7</sup> As droughts reduce the amount of available surface water, unsustainable pumping of groundwater has led to the rapid salinization of underground aquifers in some coastal regions. Salinization and chemical contamination threatens both surface

<sup>3</sup> *The State of the World's Land and Water Resources for Food and Agriculture*, 13.

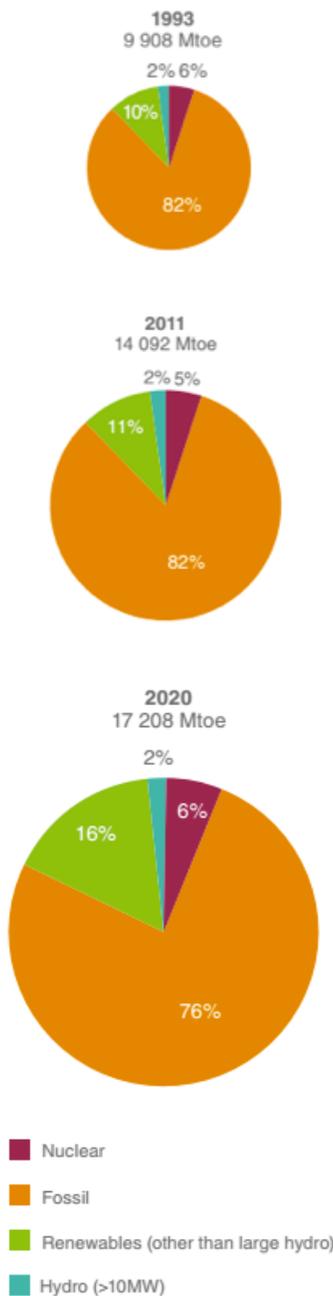
<sup>4</sup> *The cultural and food value chain*, 12.

<sup>5</sup> Dave Donnan, Erik R. Peterson, and Justin Shepherd, *Recipe for Change: Can We Feed the World?* (A.T. Kearney, 2012), 2. <https://www.atkearney.com/documents/10192/642475/Recipe+for+Change+-+Can+We+Feed+the+World.pdf/>

<sup>6</sup> *The cultural and food value chain*, 24.

<sup>7</sup> Dave Donnan et al., *Rethinking Supply in Food and Beverage* (A.T. Kearney, 2014), 2. <https://www.atkearney.com/documents/10192/5304443/Rethinking+Supply+in+Food+and+Beverage.pdf/>

**Total primary energy supply by resource, 1993, 2011, and 2020**



Source: World Energy Resources, 2013 Survey

water bodies and groundwater supplies alike, further diminishing previously reliable fresh water sources.<sup>8</sup>

Simultaneously, demands for energy have routinely outstripped even the highest previous consumption predictions for the last two decades.<sup>9</sup> While advances are being made in renewable energy technologies, storage, cost-effectiveness, and political will are persistent barriers to larger scale adoption.<sup>10</sup> Consequently, coal consumption will continue to rise as an absolute value in the coming years, although its percentage of total power consumed will drop.<sup>11</sup> If this trend continues and the energy usage continues to grow much faster than expected, efficient and informed management will become even more essential to combat the potential effects of this spike in demand.

## Looking forward

As pressures on land, food, water, and energy systems continue to rise, we are faced with having to simultaneously meet increasing demand with fewer resources while also managing remaining resources to prevent additional scarcity. All possible solutions to this conundrum lie in more efficient and intelligent management of existing resources. Primary catalysts for this change will be the accessibility and usability of the information required to make better management decisions, aided by the development of new technologies and closed loop production systems that adequately mitigate or utilize waste products.

An A.T. Kearney report has described the “market’s future leaders” as those that are “pursuing solutions to take advantage of global opportunities while mitigating global risks. They are collaborating with key suppliers to drive innovation, establish sustainability strategies that reach across the entire supply chain, [and] manage their supply risk.”<sup>12</sup> Across the board, consulting companies and

<sup>8</sup> *The State of the World’s Land and Water Resources for Food and Agriculture*, 5.

<sup>9</sup> *World Energy Resources: 2013 Survey* (London: World Energy Council, 2013), 7. [https://www.worldenergy.org/wp-content/uploads/2013/09/Complete\\_WER\\_2013\\_Survey.pdf](https://www.worldenergy.org/wp-content/uploads/2013/09/Complete_WER_2013_Survey.pdf)

<sup>10</sup> *Ibid.*, 18.

<sup>11</sup> *Ibid.*, 10.

<sup>12</sup> Donnan et al., *Rethinking Supply in Food and Beverage*, 5.

industry specialists are calling for increased collaboration and better decision-making to spur efficiencies. And better decision-making and collaboration requires easier access to more timely and accurate information. In short, intelligent and agile data management is the backbone of all the changes that must happen in the food, water, and energy industries.

While technological advances with machinery, robotics, and engineering require years of research and development efforts, the software needed to enable an information revolution within each of the industries already exists. Data processing tools, in tandem with industry expertise, have the ability to create the data-driven, real-time awareness that is needed to address the pervasive challenges we face. Athena Intelligence is a data processing platform that was specifically developed to process the data of land, food, water and energy. From our proprietary processes, we deliver new business intelligence value from previously inaccessible or unusable data. To learn more about the competitive advantage we offer stakeholders in the food, water, and energy industries, contact us at [info@project-athena.com](mailto:info@project-athena.com) with the title “Meeting Global Challenges” in the subject line.