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The Performance and Future of Ag Supply Chains

A. G. Kawamura

We live during remarkable times. In the course of a living farmer's lifetime, tractors have replaced plow horses, but the memories of the "ice-man" and the "coal-man" bringing blocks of ice for the ice box and lumps of coal for home heating still remain. Some of us remember the first color TV in the neighborhood . . . the first office fax machine, the first computer, the first man on the moon. In just the last hundred years an avalanche of new technologies and new thinking continue to mark an acceleration of mankind's potentiality to evolve on our path of civilization for better and for worse. The idea of a 21st-Century Agricultural Renaissance is certainly not speculation. It is the realization that this cascade of invention is altering our theories for change. It opens the door for a Change of Theory in how mankind may embrace successful agriculture in the decades ahead.

In 1985, the United Nations rolled out their Millennial Goals, a list of aspirational objectives for the betterment of humanity that all nations could work to achieve by the turn of the century. The successful accomplishment of those modest but important goals led to the UN's 2015 *Sustainable Development Goals* (SDGs). The timeline for completion of these ambitious 17 goals was set for a rapidly approaching 2030. For those who spend their lives working in the world of policy and development, the SDGs at first

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glance seem to be an overreach of what is possible for humans to deliver in a 15-year span of time. How will the world's nations eliminate poverty and hunger (Goals #1 & #2) by 2030? Many of the other 17 *SDGs* seemed equally daunting and unachievable when examined one by one. Indeed, that is how the 20th-century global community has approached so many of our world's greatest problems: One issue area at a time, with silo-like thinking and narrow discipline methodology driven by carefully hoarded streams of funding. Old thinking for old problems that never get solved.

When we look at the *SDGs* as a whole set of incredibly achievable challenges that require interconnected solution pathways, innovative collaboration may be needed—that is, new thinking. Like a quilt comprised of many aligned and woven components, it suddenly becomes clear that these *SDGs* cannot be accomplished individually, but only collectively. And the remarkable observation that has emerged for many dedicated world changers is that agriculture can play a primary role in accomplishing them. The many “Solutions from the Land” are the catalysts for a multi-benefit platform upon which the *SDGs* can be delivered.

You cannot trust your judgement if your imagination is out of focus.
—Mark Twain

When we see the world through a different lens, our vision changes. The *SDGs* let us imagine a world of human endeavor that has never existed and yet is within our grasp . . . and imagination. The pace of change, delayed by old thinking and old conflicts, is giving way to an accelerated kind of progress disclosed every day by the expanded sharing of knowledge and events worldwide. New tools, new thinking driven by liberated imagination can create a unique and exciting tapestry of life for every region of the planet.

What makes us believe that an Agricultural Renaissance is well underway? With eyes open, it's happening all around us in all corners of the world where food is produced, harvested, processed, prepared, cooked, and delivered. We can be frustrated with the perceived pace of change . . . but the rapidity of this transformation is staggering.

In 1994, I participated in a Western Growers trade tour to China to explore the opportunities for exporting fresh produce by ocean and air freight. What we found was a country with no existing infrastructure of cold storage, transportation, and market distribution for our perishable products. We turned around and said let's focus on Japan and Australia. The point to be made is that 17 years later, the world has certainly changed. China is soon to be the planet's biggest economy, and the opportunities for trade expansion continue to progress as old ways of getting things done give way to new alliances. Today global sourcing is on steroids as a world of almost 8 billion steps into the century with new appetites, expectations, and desires to leave the past behind.

What does a renaissance look like? In the 40 plus seasons during which I've had the privilege of stewarding my farm, the progression of our farming method has been staggering. We've gone from furrow to sprinkler to precision drip irrigation and fertigation. We've gone from molecular chemistry pest control to Integrated Pest Management (IPM) to bio-control with biological predators, repellents, and antagonists. We have fertilized and augmented our soils with chicken and dairy manure, petroleum-based NPK products, seaweed, fish and bone meal, green waste compost blends, earthworm castings, pulverized volcanic rocks delivering micro-nutrients. We are experimenting with oxygen-enriched nano-bubbles, hydroponics, aquaponics, and aeroponics in various arrays of vertical, horizontal, and platform aboveground systems . . . always looking for a new practice or methodology to add to our toolbox of crop implements, technology, and knowledge. Our hand-guided tractors are now satellite driven for precision field cultivation. We anticipate demo use of a hydrogen fuel cell tractor in the year ahead, with autonomous driverless tractors on the horizon. Our fresh produce is food-safety tracked and scanned and ID'd so that a consumer knows when, where, and even who might have harvested the product. We sell our products at farmer's markets, terminal markets, restaurants, food service, chain stores, school cafeterias, and food banks. The world is our marketplace; our strawberries can be airfreighted to the other side of the world faster than we can get them to the state next door. We have learned to partner with other growers in other countries and teach them how to grow the products we want to sell year round. Not surprisingly, with time, the transfer of knowledge turns the table and we find out that our farm partners have learned to grow crops better than we do and we now learn from each other how to be better, safer, and more efficient. This leap-frogging of talent and technology is accelerating at unprecedented levels.

The enormous global disruption caused by the COVID-19 pandemic must be viewed from many angles. While it is clear that the impact across so many sectors of human activity was severe and unpredictable, it is also important to observe that many sectors responded with a never-before-seen competency and focus. The swift reaction of the food supply chain sectors was remarkable. Yes, weaknesses and vulnerabilities were exposed, and panic almost prevailed in some regions. We learned that essential services are defined in terms of critical infrastructure and that agriculture was among the most important core services to protect. The ability of the global agricultural food supply chain to turn and pivot and still deliver sustenance to a demanding public sector was admirable. For those who claim that the food system is broken, it may well be that the performance of our 21st-century agricultural system here in the US was more than resilient in the face of the food service shutdown—it was innovative and collaborative. One clear example of “pivot and turn” took place when the Navajo nation approached a desperate grower-shipper of fresh produce who had been disking down his

fields of perishable lettuce and vegetables during the early days of the food service shutdown. Certain communities who live in so-called food deserts around the country found themselves with no backup food supply when their primary convenience or liquor store and restaurants shut down. The Navajo nation redirected their own revenue sources to work collaboratively with the farmer and in just days he was able to redirect his fresh produce to their own struggling communities. What happened next is a lesson in the unexpected consequences of innovative solutions. The families were given 30-pound boxes of farm-fresh produce delivered directly to their homes. These communities exist at the tail end of a food chain that delivers some of the oldest and worst-quality, end-of-life perishable products. The tears of joy from family members who had never seen or tasted such fresh produce exposed conditions that had become the norm. These communities suddenly became collaborative partners in a shift in priorities and resource alignment.

Disruption caused by the pandemic caused many producers to reassess their own farms and reimagine how to streamline their operations. Many are asking how they can become more productive members of their communities. We are in the process of significantly expanding our production of nutrient-dense foods for a direct link to regional food banks. For over 30 years we have been custom-growing food for our local food banks with small proof-of-concept community hunger projects of 2 to 8 acres annually. We asked ourselves, Why isn't it 20, 40, or 80 acres? Or 200, 400, to 800 acres? And suddenly we realized it was because our imagination had been stalled in single-minded thinking. Innovative collaboration has opened our eyes and minds to what's possible. We are focusing on being a "do tank" and no longer a "think tank" waiting for some perfect solution to leap forward. In an Agricultural Renaissance, the limitations we place on ourselves are ours to own.

As the agricultural sector plays an increasingly central role, perhaps this can be a time of dynamic transformation, even greater than in the past. We are currently watching a significant leap forward in artificial intelligence (AI), robotics, and data-driven decision making. Eye-opening systems and technologies are already being used: comprehensive farm monitoring and control systems that irrigate, chemigate, and fertigate autonomously; sound wave chamber pulverization of grains, volcanic rocks, waste by-products; mineral extraction from brackish water where commercial-grade potassium and phosphorous leave potable water as a by-product; atmospheric water extraction; temperature- and humidity-controlled clean rooms for nursery production that use 60 percent less energy; new plant breeding breakthroughs such as nitrogen-fixing grains, vitamin-fortified cultivars, plants that are tolerant of and resistant to drought, salinity, heat, and disease. We are witnessing the development and production of new and surprising foods, as well as their introduction to the consumer: novel protein products, seaweed, insects, earthworms, and grubs. How we eat, what we eat, and how

we procure our daily bread continues to evolve. The capacity to feed a planet is improving at just the right moment.

The performance and future of agricultural supply chains has never been more exciting. These remarkable times are characterized by the unprecedented acceleration of invention, design, manufacturing, transport, and delivery. Humanity has moved to a new framework of whatever is possible is feasible and whatever is feasible is now achievable in record time. An Agricultural Renaissance thoughtfully guided and supported can deliver abundance and multiple benefits to society, the environment, and the economies of communities from rural towns to urban metropolises. Agriculture in all its different forms and sizes needs to be successful in order for the world to thrive. Anything less moves us toward a world of survival, not living.