Quinoa and Olive Trees: Strengthening the Lord's Vineyard

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I am honored to be able to speak to the BYU community in today's devotional. I hope and pray that what I say today might be accompanied by the Spirit so that you can be edified and uplifted.

By way of background, I joined The Church of Jesus Christ of Latter-day Saints when I was fifteen, in May 1978. My brother and I were raised by our father, who was a secular Jew, in Southern California. We gathered for the High Holy Days with our aunts and uncles and in many ways were deeply affected by our cultural background. Although indoctrination in the Christian religion was not a part of my upbringing, I had nevertheless read much of both the Old and New Testaments in my own personal search for truth as a teenager and was gradually drawn toward the persona and teachings of Jesus Christ.

God's People of Talent and Goodness

I thought I would focus my talk on two experiences that have had enduring impacts on my life. These happened when I was a recent convert to the Church.

The first experience happened just a week or so after my baptism. I was invited by a friend of my brother to attend a home worship service of an Evangelical fellowship. After the meeting, the preacher invited me to stay and discuss my new religion. Although we shared a common belief in the divine mission of Jesus Christ, his ensuing attack on the character of Joseph Smith was ruthless, and as a fifteen-year-old convert, I was unprepared to defend the Church. I discovered that night that we disagreed on two points: my very personal witness from the Spirit regarding the truthfulness of the Book of Mormon and the foundational belief that we are not *creatures* but actually *spirit children* of God.

As the apostle Paul taught the ignorant Athenians on Areopagus, "[God] hath made of one blood all nations of men" who "are the offspring of God" (Acts 17:26, 29). I think this doctrine resonated so deeply with me because I had been raised in a single-parent household by my father. I had a deep-seated emotional understanding of Dad's love for us and gradually came to understand and appreciate intellectually how

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much as a single parent he had sacrificed to raise my brother and me. Consequently, although Dad was far from perfect, it was natural and easy for me to embrace the concept of a loving Heavenly Father as the great universal God.

The second experience occurred some weeks or months after I had joined the Church. My father was an accomplished musician, a cellist in the Los Angeles Philharmonic. He could also play a half dozen other musical instruments and was a very talented painter. One day we were talking, and my agnostic father posed a question that went something like this: "The Jews claim to be God's chosen people, and when I look at their tremendous historical influence in the arts, philosophy, science, and business—disproportionately large, relative to their small numbers—I have to acknowledge that it is not an outrageous claim. If the members of The Church of Jesus Christ of Latter-day Saints are also God's chosen people, how come I don't see similar accomplishments and influence from members of your church?"

My father's assumption—a common expectation—is that God's true religion should have the power to transform its believers into people who are not only loving, compassionate, industrious, and generous—in other words, good—but also people who are capable of extraordinary achievements in the arts, sciences, sports, business, government, and religion. For example, the Jewish people can count more than two hundred Nobel Prize winners—around 20 percent of the total laureates. I believe that President Spencer W. Kimball also believed this, as he issued a bold declaration and challenge in his 1975 landmark address titled "The Second Century of Brigham Young University":

I am both hopeful and expectant that out of this university and the Church Educational System there will rise brilliant stars in drama, literature, music, sculpture, painting, science, and in all the scholarly graces. This university can be the refining host for many such individuals who will touch men and women the world over long after they have left this campus.[1]

The Love of a Father

Putting these two experiences together, I believe that our loving Heavenly Father has afforded us additional grace through the covenants we have made. One potential purpose of those covenants is to empower us to become "brilliant stars" and "refining" agents, should we elect to do so. The gospel should also engender in us a heightened awareness of and empathy for the suffering of our neighbor. I have noticed this in my own almost forty-three years of discipleship as I have sought to know God through studying the scriptures, serving in Church callings, and serving mankind in other ways. I am a father of four sons and now also a grandfather of three adorable little boys. I naturally hope that they will emulate the kinds of life choices that have brought me great happiness. If God is also my Father, shouldn't He logically have the same hope and expectations for all of His children?

In his general conference talk entitled "The Grandeur of God," Elder Jeffrey R. Holland taught us one key truth about how we can come to know God:

Of the many magnificent purposes served in the life and ministry of the Lord Jesus Christ, one great aspect of that mission often goes uncelebrated. His followers did not understand it fully at the time, and many in modern Christianity do not grasp it now, but the Savior Himself spoke of it repeatedly and emphatically. It is the grand truth that in all that Jesus came to say and do, including and especially in His atoning suffering and sacrifice, He was showing us who and what God our Eternal Father is like. . . . In word and in deed Jesus was trying to reveal and make personal to us the true nature of His Father, our Father in Heaven.

He did this at least in part because then and now all of us need to know God more fully in order to love Him more deeply and obey Him more completely.[2]

Incidentally, I did a word count and found that Jesus referred to God by the title of "Father" 180 times in 3 Nephi and 113 times in the Gospel of John—far more frequently than any other title for Deity.

After citing the Prophet Joseph Smith in *Lectures on Faith* and also the Savior's great Intercessory Prayer in John 17, Elder Holland went on to emphasize that having a correct knowledge of God's character and attributes is essential in order for us to be able to exercise the kind of faith that leads us to eternal life. Hence, the Savior taught in the great Intercessory Prayer that "this is life eternal, that they might know thee the only true God, and Jesus Christ, whom thou hast sent" (John 17:3). Elder Holland also highlighted two scriptural examples from Moses 7 and Zenos's allegory of the olive trees in Jacob 5. Both of these accounts feature a despondent Heavenly Father weeping over His violent and corrupted children.[3] How wonderful it is to think of God as our Father, endowed with a glorified body and passions, among them the great emotions of love and empathy—and we are all His children!

The Father's empathy is echoed in the empathy of the Son. I love how Alma taught the people of Gideon that Jesus would purposely "take upon him[self] the pains and the sicknesses . . . [and] infirmities" of humanity so "that he [would] know according to the flesh how to succor his people" (Alma 7:11–12) and become "a man of sorrows, and acquainted with grief" (Isaiah 53:3) for our sakes. I wonder what these scriptures imply about the need for disciples to emulate the Savior and acquaint themselves with the suffering of our fellow men and women.

Intriguingly, the master of the vineyard in Jacob 5:49 seemed to test the empathy of the servant when he proposed, "Let us go to and hew down the trees of the vineyard and cast them into the fire, that they shall not cumber the ground of my vineyard, for I have done all." This was followed by a question that the master had asked twice previously: "What could I have done more for my vineyard?"

The servant then issued this plea: "Spare it a little longer" (Jacob 5:50).

The Tame and the Wild

The allegory of the olive trees is especially interesting to me since I am a crop geneticist. My wonderful colleagues, students, and I study two crops and their relationships with wild relatives: quinoa and oats. These crops are totally unrelated to olive trees, and the three originate in different hemispheres, but quinoa, oats, and olive trees share two characteristics: first, they were domesticated from invasive weeds; and, second, they tend to revert back to their ancestral weedy forms.

It is interesting to me that the "tame" or domesticated olives that produce large, edible fruit are frequently produced by grafting domesticated olive branches (the horticultural term is *scions*) onto wild olive rootstocks. The wild olive rootstock's diverse genetics provide the whole plant, cultivated scion included, with natural resistance to pests, diseases, and environmental stress factors like drought and extreme heat. Because the wild rootstock is so well-adapted and vigorous, if it is not carefully tended with regular pruning, shoots that emerge from the rootstock can grow to choke out the upper scion branches, and the latter will eventually wither away and die. Similarly, if the upper scion is not carefully pruned, this portion of the tree can become too productive and heavy, exerting lethal strain on the rootstock.

It is not hard to see that olive trees, oats, and quinoa can serve as wonderful metaphors that represent people and the importance of human diversity. In plant breeding, we usually refer to tame plants as being domesticated or "elite," and although we do frequently refer to "wild" plants, the preferred term is *exotic* when we are talking about germplasm (or plant material) that we intend to use in crop breeding.

Of course, in this metaphor the tame (or elite) germplasm represents the true believers who, following in the footsteps of their Master, bring forth the "good fruit" (3 Nephi 14:17) of the gospel: acting in kindness and compassion; engaging in missionary and temple work; creating homes filled with love in which families are taught by the Spirit; and carrying out many other good works that bless humanity in a myriad of ways. But couldn't the good fruit also represent artistic masterpieces and groundbreaking scientific discoveries?

In contrast, the wild (or exotic) germplasm represents lives devoted to careless self-indulgence, irresponsibility, violence, and disobedience to the conscience that "lighteth every man that cometh

into the world" (D&C 93:2). Nonetheless, both the lord of the vineyard and the servant see that there is value in the wild olive trees; they have the potential to become domesticated or tamed by the refining value of experience because, after all, they are also children of God.

The Risk of Sacrificing Diversity

Early on in my career, I received an excellent real-world lesson in the importance of genetic diversity in crop breeding. In the fall semester of 1985, during my senior year at BYU, I was surprised one day to receive a recruiting call from Dr. Don Rasmussen, the director of graduate studies in the plant breeding program at the University of Minnesota Twin Cities. He was a Utah State graduate, a native of Ephraim, Utah, and possibly the most successful malting barley breeder in the United States. In the end, I decided to attend the University of Minnesota, and the next fall I found myself in Dr. Rasmussen's course on breeding self-pollinated crops.

Dr. Rasmussen's primary breeding objectives were to produce malting barleys of exceptional quality that had high yields and a major genetic resistance to the two most severe barley diseases at the time. In order to improve the traits of complex malting and high yield, his program sacrificed genetic diversity; all of his best varieties—which are still considered the standard for malting quality—were closely related to each other in an effort to concentrate gene forms (or alleles) for these two traits. Consequently, he and his colleagues paid little attention to minor diseases that would occasionally appear and cause minor yield losses.

In the spring of 1993, the year after I had graduated with my doctorate, the upper Midwest experienced its wettest spring in centuries. The high humidity and cool temperatures created perfect conditions for one of those otherwise minor barley diseases: Fusarium head scab or head blight. The *Fusarium* fungus not only reduces grain yield but also produces a toxin, deoxynivalenol (DON)—commonly called vomitoxin, due to its effect on hogs that are fed infested grain. That was the first of a series of consecutive wet years that saw Fusarium head scab rise to become the main disease of barley and wheat in the great spring cereal production region of the Red River Valley. USDA barley production statistics from 1987 to 2002 show a dramatic decrease in barley production in this area that includes eastern North Dakota as well as parts of Minnesota and South Dakota and extends up into the Canadian province of Manitoba. At the same time, many growers in the drier western states of Montana, Idaho, and Washington switched from producing feed to producing malting barley. Almost thirty years later, wheat and barley breeders are still desperately searching for genetically diverse, exotic sources of resistance to this disease, and much of the malting barley production in the United States appears to have permanently relocated to the western states.

The Reclaimed Quinoa Region

Our research group at BYU—which is codirected by me and Drs. Jeff Maughan and David Jarvis—is part of an international effort to breed quinoa that is better adapted to grow throughout the world, including the lowland tropics. Farmers in Africa, South Asia, and lowland regions of Latin America would like to be able to grow quinoa and feed it to their children because of its excellent protein and mineral content. This has been especially true since the quinoa boom began around the year 2005.

Elite quinoa strains were bred by the ancient civilizations of the high Andes Mountains to be productive in very cold, high-elevation environments. (The main production area is in Andean valleys and plateaus more than twelve thousand feet above sea level, hundreds of feet higher than the top of Mount Timpanogos looming above BYU campus!) However, other cultivated quinoas are present along the narrow coastal strip of south-central Chile, and weedy types (commonly known as "goosefoot," due to the peculiar shape of the leaf) can be found throughout lowland regions of Chile, Argentina, and the United States. Before we started working on the problem, the North American weedy goosefoot strains were not recognized as valuable exotic germplasm for breeding lowland quinoa.

Early in 2003, just two years into our quinoa research project, I visited traditional quinoa

production fields in the Bolivian Altiplano. There, highly diverse quinoa fields were partly infested with the local weedy goosefoot, and the two often cross-pollinated. Impoverished subsistence farmers who lacked mechanization would walk through the fields and separately harvest the black-seeded weedy quinoa, which they often consumed in popped form. Later, in early November 2003, I broke away for a day from a scientific conference in Denver to see what quinoa production looked like in the United States, visiting the main growing region around Alamosa in southern Colorado. The discouraged Colorado grower I met with complained that every three years they had suffered near-total yield losses due to pressure from insect pests and excessive heat. From those two experiences, my colleagues and I started thinking that maybe the solution to failed quinoa production in the United States was to cross it with lowland-adapted strains of goosefoot.

The next year, in 2004, we started collecting seeds from weedy populations, mostly in Utah and Arizona. Since then, our collection has expanded to include samples from hundreds of goosefoot populations growing in environments as diverse as the Sonoran and Mojave Deserts, the coast of the Gulf of Mexico, the Great Plains, California, and even as far east as the coast of New England. We are now crossing elite quinoas with these exotic goosefoot strains and producing breeding populations that we share with quinoa breeders in a dozen countries on four continents.

Two years ago, while revisiting the Colorado quinoa region, this time during the growing season, we noticed that the production fields had native goosefoot plants growing around their margins. In addition, the quinoa fields contained many plants showing intermediate characteristics between quinoa and the weedy form—just like we were accustomed to seeing in Andean quinoa fields in Bolivia and Peru. The next year we sampled fifteen plants showing varying degrees of goosefoot characteristics, and after DNA sequence analysis by one of my students, Jake Taylor, and Drs. Maughan and Jarvis, we confirmed the extensive introgression of goosefoot genes into this population. Interestingly, many years after the quinoa disaster of 2003, the problem was no longer failure to set seed; it was now a problem of heterogeneity due to the natural outcrossing process, which was converting quinoa into an adapted crop through genetic mixing with its weedy but native cousin. In other words, weedy goosefoot genes had literally saved the Colorado quinoa industry.

Although Andean quinoa has been bred for a very specific type of environment, within the DNA of quinoa cells is additional genetic diversity because it is a polyploid—a plant that anciently combined the chromosomes of two distinct eighteen-chromosome species into a single thirty-six-chromosome plant. Because of this enhanced diversity, that thirty-six-chromosome ancestor was more vigorous than its diploid, eighteen-chromosome relatives and was thus able to invade and colonize a much wider range of habitats—hence its dispersion throughout lowland and highland environments of North and South America as weedy goosefoot. As humans migrated into the Western Hemisphere, weedy goosefoot was already adapted to the disturbances that humans made as they cleared land for hunting camps and, eventually, gardens and villages. Humans started consuming goosefoot leaves, whose flavor is reminiscent of its cousin spinach, and eventually began consuming the small but nutritious black seeds. In time, early indigenous farmers picked out plants having larger, nonblack seeds and began to sow these—and so the domestication of quinoa began in the Andes and in at least two other places in ancient North America.

The Culture of Christ

If genetic diversity is so important for crop survival, what about in human beings? While the genetic answer to this question is a resounding yes, I believe that the cultural answer to this question is also yes. With Dr. Len Novilla, a BYU professor of public health, I cochair our college's Diversity and Inclusion Committee. We have reviewed carefully executed organizational and leadership literature from around the country. The data—including from such reputable sources as the *Harvard Business Review*—indicate that businesses and other organizations having

ethnic- and gender-diverse leadership structures consistently outperform more homogeneous ones. It was amazing to witness the parade of cultural and ethnic diversity purposely displayed in the Sunday morning session of April 2021 general conference! Clearly our Church leadership recognizes the value of our varied ethnic and cultural backgrounds and experiences. We will become even more successful as our leadership reflects the ever-diversifying landscape of international Church membership.

In returning to Dad's question about the accomplishments of the Jews relative to members of our church, is it possible that the difference in output among our two groups of believers can be traced to diversity? In looking at the history of the Jews, we see a religiously and ethnically cohesive group of people who initially migrated from or were driven out of their Near Eastern homeland into tumultuous and often perilous multicultural environments in places like central and eastern Europe, Iberia and Morocco, the eastern Mediterranean, southern Arabia, and Ethiopia. We call this the Jewish Diaspora; appropriately, this word comes from a botanical term, *diaspore*, referring to the seed and all associated plant tissue that is necessary for successful separation from the mother plant. Within these diverse environments arose distinct Ashkenazi, Sephardi, Mizrachi, Temani, and Falasha Jewish cultures.

Contrast that historical experience with the early Church of Jesus Christ of Latter-day Saints. By revelation we basically did the exact opposite; we fled persecution in the eastern United States for the relative seclusion of the western wilderness. Although the Church sent missionaries out to many parts of the world, for the first century we brought the converts back for assimilation here in Zion. Consequently, although the Church gathered tens of thousands of Scandinavian converts here to Utah—comprising 16 percent of Utah's population in the 1900 census[4]—the descendants of Swedes and Norwegians who I lived with for six years in Minnesota seemed to have a stronger affinity for their multicultural roots than their cousins here in Utah. This is in spite of our very strong dedication to temple and family history work in the Church.

I wonder if one result of the physical gathering to Zion is that we sometimes conflate the prevalent Intermountain West culture in which we live here in Utah and southeastern Idaho with an official "Church culture," expecting that our converts from multicultural and international backgrounds will adopt the cultural patterns here as evidence of their complete conversion. In last October's general conference, Elder William K. Jackson of the Seventy spoke of a universal "culture of Christ." He noted:

[The culture of Christ] *comes from the gospel of Jesus Christ, which is eternal and explains the why, what, and where of our existence. (It is inclusive, not exclusive.) . . .*

The Church of Jesus Christ of Latter-day Saints is hardly a Western society or an American cultural phenomenon. It is an international church, as it was always meant to be. . . . New members from around the world bring richness, diversity, and excitement into our ever-growing family.[5]

For BYU to fulfill the prophetic hope, expectation, and challenge—the gauntlet thrown down forty-five years ago by President Kimball—and fully become a "refining host" of "brilliant stars," I believe we need to welcome and nurture the expanding diversity of our multicultural American and international brothers and sisters in all of their ethnicities, cultures, languages, and life experiences. The very same Savior who beckoned us to "know . . . the only true God, and Jesus Christ, whom [He] hast sent," in almost the same breath prayed to our Father "that they all may be one; as thou, Father, art in me, and I in thee, that they also may be one in us" (John 17:3, 21). Moreover, I believe that our Father in Heaven expects us to develop this unity and cultivate our diverse talents and abilities so that we can be counted among the "few" servants in the allegory of the olive trees charged with pruning and edifying His vineyard (Jacob 5:70). He has spared the vineyard, as well as all of us, for this sacred purpose.

I am deeply grateful for the two young missionaries, Elders Leavitt and Jenkins, who knocked on my door so many years ago. I testify that the gospel of Jesus Christ they taught me is true.

I believe that Jesus Christ is our atoning Savior who perfectly exemplified the qualities of His, and our, loving Heavenly Father. In the name of Jesus Christ, amen.

Notes

1. Spencer W. Kimball, "The Second Century of Brigham Young University," BYU devotional address, 10 October 1975.

2. Jeffrey R. Holland, "The Grandeur of God," *Ensign,* November 2003.

3. See Holland, "Grandeur"; see Moses 7:29–33, 37, and Jacob 5:41, 47, 49.

4. See William Mulder, "Scandinavian Saga," in *The Peoples of Utah*, ed. Helen Z. Papanikolas (Salt Lake City: Utah State Historical Society, 1976), 142.

5. William K. Jackson, "The Culture of Christ," *Ensign,* November 2020.