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The Roots of Community in the Historic Río Arriba: Mutualism, Cultural Endurance and Resilience

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Introduction

The community-based *acequias* in New Mexico and southern Colorado are the oldest water management institutions in the United States of European origin. These irrigated agrosystems date to the time of first Spanish settlement in the northern borderlands of *Nueva España* during the late sixteenth century with the first Juan de Oñate colony in 1598 and expanded after the Governor De Vargas resettlement of 1692. At the time, the provinces of the north encompassed a vast semi-arid territory rich in natural and mineral resources but short on water supply. Here the Rocky Mountain range of Colorado joins the great Chihuahuan desert from the south and the Llano Estacado from the plains of Texas on the east. The bioregion is drained principally by the *Río del Norte*, now depicted on maps as the Río Grande heading north from Ciudad Juarez, Mexico and El Paso, Texas.

Due to conditions of aridity, Spanish colonization policies required that officials of the crown must locate their communities in the vicinity of water resources essential for permanent occupation. The irrigation technology employed by the waves of *pobladores* (settlers) was gravity flow of surface water diverted from rivers through a system of earthen canals or *acequias*. The settlers worked mutually to build these irrigation networks throughout the present southwestern United States: Texas, New Mexico, Colorado, Arizona, and California. However, it was in *La Provincia de San Felipe del Nuevo México* along the upper *Río del Norte* that settlement policies were the most effective, particularly with regard to the establishment of civilian towns and agricultural colonies. Once constructed, the local *acequia de común* (commons ditch) wedded the appropriators into a hydraulic society, as currently expressed in the phrase, “Water is the lifeblood of the community.”

Other forms of community mutualism co-existed in settlements along the northern Río Grande, and together they continue to perpetuate a sense of place while maintaining a cultural heritage rooted in the principle of *ayuda mutua*, mutual help for survival: the *acequias de común*, *cofradías de penitentes*, and the *sociedades mutualistas*. In the rest of this article, we explore the motives for collective action that resulted in the formation of these mutual help societies. At the end, we present mutualism and other key factors of resilience that account for continuity of the Río Grande *acequia* culture. We also

address tipping points and other disturbances in the environment that pose threats to sustainability of acequia water management. Will acequias survive in times of increased water demand in the urban centers, prolonged drought cycles, and the effects of climate change?

Acequias de Común **Communal Irrigation Ditches**

Acequia technologies and irrigation methods employed by the Hispanic settlers in the new province were melded from diverse sources. Historians agree that these antecedents included the irrigation practices common to the arid regions in the south of Spain, particularly Andalusia, Castilla and Valencia, based on traditions from the Roman period; the superimposition of Arabic customs and techniques during the seven centuries of occupation of Spain by the Muslims from north Africa and the Middle East; the influence of Pueblo Indian agriculture as observed by early Spanish explorers and expeditions; and the irrigation horticulture of Mesoamerica brought by Mexican Indians who accompanied the Spanish caravans along the *Camino Real de Tierra Adentro*.

Similar to the aboriginal peoples before them, *hispano* irrigators of the upper Río Grande revere water and treasure it as the foundation of the community, and from inception they have utilized water as the main structural factor in spatial and landscape modification. Without the aid of survey instruments or modern tools, centuries ago they engineered irrigation works superimposing *zanjas* or earthen ditches on the desert landscape all by collective human labor. The first step, as instructed by the *ordenanzas de descubrimiento* (Laws of the Indies 1573), was to locate a bend in the river or another suitable feature to build a diversion structure from which to capture water and turn it into ditches on one or sometimes both banks of the natural watercourse. Constructed of locally available materials such as forest timbers, brush and rocks at the diversion point, these irrigation works defined the landscape and demarked the boundaries for irrigation off the main canal and its laterals for several miles downstream extending the riparian zone beyond the narrow confines of the natural channels.

These technologies of construction and irrigation methods were replicated by the successive waves of settlers into the upper watersheds of the Río Grande Basin fostering the growth of agrarian communities along the *Camino Real* from El Paso del Norte (now Ciudad Juarez) to Santa Fe and later to the Taos Basin and parts of southern Colorado. For purposes of this paper, we define the Río Arriba as a bioregion along the northern Río Grande from La Bajada near Santa Fe northward to the San Luis Valley of Colorado. During the colonial period, *la bajada* was the dividing line between the upper (*Río Arriba*) and the lower river (*Río Abajo*), each one representing an administrative district of Spanish government (Sánchez 1987).

During the Spanish colonial period, 1598-1821, water resources were owned and managed by a community of landowners, “*los dueños de propiedad regable*,” all irrigating from a single main canal similar to the organizational arrangements of *la*

comuna of medieval Valencia in southern Spain. According to Glick, the *comuna* was the basic irrigation unit that distributed water, maintained the canal system, and elected a *cequier* (now the *acequero mayor*) to administer the *ordenanzas* (rules) of the canal. In structure, these Spanish irrigation communities adopted institutional forms and executive procedures similar to the craft guilds and their parallel religious confraternities that pre-existed just after the Christian Reconquest when the Valencians took control of the irrigation canals that had been developed by the Muslims during their occupation of Spain. As solidarities, the guilds were the most immediate model for the Valencian farmers to adopt since the Tribal governance of the Muslims based on clans and other kinships would not have been the norm to follow (Glick 1970, 2003).

In New Mexico, the initial settlers too organized themselves as a community of irrigators isomorphic with the village itself: the owners of property with irrigable lands collectively viewed themselves as “*el pueblo*” or town. Each acequia system was built as a commons where the irrigators formed agreements to work collectively, a union of citizens or *mancomunidad*. Given the harsh, semi-arid environment, the ditch was an element of sheer necessity for the establishment and sustenance of the entire village. When a land grant was issued, settlers were required to construct an irrigation system for the common welfare, as in the decree of 1794 establishing the San Miguel del Bado Land Grant. Here the fifty-two petitioners were instructed by the Alcalde de Santa Fe: “That the construction of their Plaza, as well as the opening of the ditches, and all other work that may be deemed proper for the common welfare shall be performed by the community with that union which in their government they must preserve” (cited in Leonard 1970). Construction of the diversion dam upstream and the *acequia madre* through and below the community was only the first step; annually, repairs would be needed, as would the ritual of cleaning the acequias early each spring at the start of the irrigation season (Rivera 1998).

In Meyer’s (1998) view, the mutual aid function of the public works labor force for construction of the canal was primary and akin to the religious societies of the times:

Over time the *mancomunidad*... grew from an instrument of physical survival to one of cultural survival. Just as the ditch itself tied the fields together, the association tied the rural neighborhood together, reinforcing *compadrazgo*, imparting to each village a distinct identity, and offering itself as a mechanism for mutual aid during crises or times of need. In essence it blended the cultural and the material into a kind of secular *cofradía*, a confraternity that formed the nucleus of rural life in Hispanic New Mexico.

Loose and informal, this mutual union of irrigators laid the foundation for the evolution of the community acequia associations recognized and empowered later in the American territorial laws of New Mexico as corporate bodies during the 1890s. Their path to self-government was aided by the lack of municipal structures in the immediate vicinity to prescribe their rules, appoint their officials, or to manage their irrigation system, tasks they undertook by and for themselves based on *arreglos* or local

agreements on how to govern their affairs and allocate water resources in a fair and equitable manner. The community of landowners who cooperated in the settlement of each village, mutually agreed to construct and administer the ditches, devise water sharing plans appropriate to the resources of each watershed, elect a water official (*alcaldes de agua*, later *mayordomos*), and very importantly, resolve their own conflicts and disputes.

Eventually, the methods and practices that worked effectively in one locale were replicated in other settlements along the Río Arriba from the Santa Cruz Valley, westerly along the Río de Chama, north to the Taos Basin, and eventually to the San Luis Valley in southern Colorado. These acequia watercourses in turn served as “*caminos de agua*” by extending the *Camino Real* into the tributaries and creeks of the upper Río Grande wherever pockets of arable land could be found and transformed into agrarian settlements. Today there are about eight hundred local acequia associations in New Mexico and about seventy-five in southern Colorado. In New Mexico the largest concentration of acequias are located in Rio Arriba, Taos, Mora, San Miguel, Santa Fe and Guadalupe counties.

The acequias have maintained and preserved the irrigation customs and helping traditions of earlier times. The Acequia Madre de la Joya, for example, continues to follow its “*Reglas y regulaciones para el gobierno y manejo de la acequia de comunidad*” (Rules and Regulations for the Governance and Management of the Community Ditch) to include a system for the assignment of daily labor responsibilities called “*días de fatigas*” during the annual cleaning of the acequia with a special provision that exempts “*las personas que estén incapacitadas o mujeres solas viudas*” (handicapped persons or women who are widowed, *Reglas para el año 1942*). In terms of agricultural heritage, the acequia farmers continue to produce crops of diverse origins from both the Old and New Worlds: Pueblo Indian and native land races for a wide range of field crops, as well as orchard fruits, vegetables, and some grains from Mediterranean Europe (see Peña 1998 and Santistevan 2003 for examples of crops).

In contemporary times, the acequia associations organize educational programs, cultural events, and religious activities at the watershed and regional levels: newsletters, technical assistance workshops, and an annual meeting of the *Congreso de las Acequias* convened by the New Mexico Acequia Association. In Colorado the acequias affiliated into the Sangre de Cristo Acequia Association with the aim of protecting water rights and the unique governance structures of acequias. Local acequias organize community celebrations such as the ritual blessing of the *ojito* (spring) at San Antonio de Padua near Albuquerque that includes a mass and *matachines* procession from the parish church to the site of the spring well. On the feast day of San Isidro, one of the Taos acequias celebrates the patron saint of farming by holding a *novena* and evening mass at their chapel followed by a procession along the parish roads and into the irrigated fields to bless the sacred landscape of springs, ditches, corrals, homes, the chapel and other religious shrines. As documented by Sylvia Rodríguez (2006), this route symbolically

encircles both the lower Río Grande del Rancho watershed and the boundaries of the parish of San Francisco de Asís.

Cofradías de Penitentes **Penitent Brotherhoods**

For many generations the acequias coexisted with other forms of *mutualismo* (reciprocal mutual aid) that permeated village life and the social structure of the *hispano* community: the religious *cofradías de penitentes* during the colonial and Mexican periods, followed by the *sociedades mutualistas* that proliferated at the turn of the twentieth century, 1880-1930s. The precursors to the *sociedades mutualistas* were the *cofradías* of northern New Mexico and southern Colorado known as *La Fraternidad Piadosa de Nuestro Padre Jesús Nazareno*. Due in part to the lack of sufficient Catholic priests, the *penitentes* associated for religious purposes through prayer and bodily penance and, importantly, for mutual help within the local villages where they were organized. The members of these societies were rural Catholic men who conducted penitent rituals, including self-flagellation and simulated crucifixions during Lenten season and Holy Week, and other religious practices throughout the year.

The penitent brotherhoods were organized in the Río Arriba during the late 1790s to commemorate the passion and death of Christ outside of the supervision of the Catholic Church hierarchy headquartered in the Archdiocese of Durango hundreds of miles from Santa Fe, the capital city of the province. In remote *Nuevo México*, these societies were modeled after the *cofradías* brought by the Spaniards into Mexico City and later to the province of *Nueva Vizcaya* (now Durango and Chihuahua) where some of the *mutualidades* (brotherhoods) controlled water, farmlands, orchards, vineyards, and livestock while ensuring both the material and spiritual welfare of the agrarian communities (Lamadrid 2008; Martínez Saldaña and Rivera 2008). By the middle 1850s the *penitentes* of New Mexico had extended into the villages of the San Luis Valley as *hispano* settlement patterns dispersed outward from the Taos Basin, each time further away from the Franciscan priests who tended primarily to the Indians in the missions (Steele and Rivera 1985). Various terms were used in the written constitutions of local *penitente* societies with names such as *La Sociedad Benévola del Condado de Taos*, and their documents utilized a number of interchangeable descriptors: *cofradía*, *unión católica*, *fraternidad piadosa*, *hermandad*, *hermanos penitentes*, and *sociedad* (Woodward, 1935). For internal governance each *morada* (local chapter) and later the district consolidations, adopted formal constitutions, a set of rules and regulations, and “*artículos de mutua protección*” or articles of mutual protection (Steele and Rivera 1985).

The village *penitentes* held their meetings in a chapel called *La Morada*, and the officials who directed the society’s activities were usually elected by popular vote. In addition to the *Hermano Mayor*, who held the highest local authority, other organizational officers included: a *Secretario* as the clerk custodian of the confraternity records and rule book; a *Mandatorio* or treasurer and collector of dues; a *Celador* who

acted as a sergeant-at-arms; an *Enfermero* who cared for the sick and performed charitable works; a *Rezador* who read prayers at important ceremonies; a *Maestro de Novicios* who instructed and supervised the novices petitioning for admission; a *Sangrador* who inflicted whip lashes on the backs of novices; a *Pitero* who played a flute as musical accompaniment during services, and other officials who performed specified religious duties during penitential observances (Weigle 1970).

Throughout the phases of development, the benevolent activities performed by the *cofradías* remained consistent village to village, expressing their core belief in *caridad*: ministering to the sick and elderly, providing food and emergency assistance, arranging funeral and burial ceremonies for members and for others in need, assisting widows and orphaned children, helping with agricultural chores, punishing members who violated village norms, and occasionally settling village disputes (Knowlton 1969). To care for the sick, the *hermanos* appointed a Nurse (*Enfermero*) from amongst the membership. This representative was charged with visiting the ill, performing works of mercy, reporting back on specific family needs, and mobilizing both spiritual and material assistance to be provided by the local brotherhood. If cash were needed for medical bills or other family expenses, the *Enfermero* requested the *Hermano Mayor* to draw from the common fund of the society or solicit donations from the members (see “Rules for the Nurse,” Chama, New Mexico, in Steele and Rivera 1985). If certain *hermanos* were not able to contribute cash, they often provided in-kind help or other goods and services such as firewood for home use, a team of horses and a wagon to help with farm chores, or staple foods grown on the local farms such as wheat, potatoes, beans, peas, or grains (*Morada de los Pinos* Journal in Archuleta 2003).

In the event of death, the Brothers as a group prepared the deceased, conducted a *velorio* (funeral wake), organized *rosarios* (rosary prayer sessions), dug the grave, led a procession to the *campo santo* (community cemetery) after the funeral mass at the church, sang *alabados* (religious hymns) and performed the burial ceremonies (Kutsche and Gallegos 1979). Should cash assistance be needed by the surviving widow, the *hermanos* would organize a collection or make an outright donation from a common fund. Alternately, families in needs would be provided with direct food assistance and clothing taken from the *morada* storehouse of grain, flour, potatoes, shoes and other articles of clothing (Barker 1924). After the introduction of the cash economy into the villages, some councils of the *penitentes* formalized the burial assistance program by way of a modest insurance policy administered by a finance committee, a bonded treasurer, and a system of lump sum benefit payments, classic functions duplicated by the *sociedades mutualistas* in the region at the turn of the twentieth century.

In the post-World War II era, accelerated social and economic change reduced the isolation of the *penitente* villages. Membership rolls declined in subsequent decades as the elders passed away, and the younger generations moved to urban employment centers and joined other organizations more in line with modern American society. The many acts of charity provided by the *hermanos* in earlier times gradually became supplanted by other forms of *mutualismo* and by government welfare programs. Some

penitent brotherhoods, however, have survived into the twenty-first century, maintaining their *moradas* and practicing their religious beliefs in dozens of villages located principally within the Río Arriba region of northern New Mexico and also in adjacent counties of southern Colorado. Some have successfully obtained historic preservation funds to repair and restore their *moradas* for use by future generations, such as *La Morada de San Francisco* in the San Luis Valley along with the *moradas* at Fort Garland and García. In New Mexico the *moradas* at Arroyo Seco, Talpa, Abiquiú, Tierra Amarilla, and other communities continue to function and have been utilized and maintained continuously, as have the *moradas* of San Luis, San Antonio, and Trinidad, Colorado (See Archuleta 2007 for a list of seventy-three *moradas* that are still active and his photo documentation of processions, structures, religious artifacts, and *devisas*).

Sociedades Mutualistas **Mutual Aid Societies**

In common with the local acequia associations and the *cofradías de penitentes*, the *sociedades mutualistas* of the late 19th century valued the customs of *repartimiento*, *auxilio*, and *caridad*, forms of sharing that survived among the people for centuries in a frontier isolated from the larger cities and distant government centers. For many generations, these *vecinos* (neighbors) banded together and replicated traditional forms of cooperation familiar to them in order to solve problems and mobilize resources for the common welfare. When necessary, the village people created new forms of mutual help, adopted rules for self-government, elected their own leaders, and pooled their resources to finance local aid to families in need. During the period of industrialization and rapid social change, 1880-1930, membership within the *acequias*, *cofradías de penitentes* and the *mutualistas* often overlapped, as the *parciantes* (acequia irrigators) and *hermanos* (society brothers) were of the same village and culture.

The *sociedades mutualistas* in the Río Arriba were established almost a century after the inception of the *cofradías de penitentes*, but they adopted similar rituals and maintained the charitable works: recited Catholic prayers at meetings, conducted funeral and burial services for deceased members, performed acts of charity at the village level, and promulgated rules of *ayuda mutua*. Most of the early *sociedades mutualistas* originated as burial funds at a time when commercial life insurance was not available in the isolated rural communities, and soon other functions were added such as sponsoring literary and debate societies for the enlightenment and educational advancement of members, and providing economic assistance during times of illness or when confronted with other misfortunes of life. Some were more strictly lay religious brotherhoods under the auspices and supervision of the Archdiocese of Santa Fe, such as *La Unión Católica de San José y San Andrés* near Springer, New Mexico, founded in 1883. Many others were organized as prototypical *sociedad mutualistas* founded on principles of “*unión y fraternidad*” offering a range of social, educational, recreational and economic security benefits such as the *Sociedad Unión y Fraternidad Mexicana* in the barrio of Chihuahuita (Roswell, NM) organized in 1902, and the *Unión Protectora* in Santa Fe in 1916.

In the agricultural districts *mutualista* organizations were formed in the defense of land and water rights following the introduction of the railroad to the Río Arriba around 1880 when land speculators, cattle companies, mining interests and other investors from “*los estados*” to the east entered the region seeking to exploit its mineral, natural and labor resources. The rise in Anglo population during this period of rapid modernization, coupled with the imposition of a new legal-administrative system of land ownership, set the stage for episodic social and economic cleavages between the native *hispanos* and the newcomers. Some land grants were privatized by legal shenanigans; others were stolen or federalized into the public domain. In the traditional land grant communities, *hispanos* lost access to their communal lands in the forests and the open rangelands for pasturing of their sheep and goats. Soon, many *hispanos* were transformed from self-sufficient farmers to wage laborers employed in mining, railroad construction, timbering, and commercialized agriculture where they took the brunt of exploitation and wage discrimination (Rivera 2010).

To resist encroachment and protect their natural resources, *hispanos* organized mutual benefit and protective associations. In 1888 the acequia farmers of Cerro in Taos County formed *La Asociación de Mutua Protección y Mutuo Beneficio de la Plaza de Cerro de Guadalupe* (Association for the Mutual Protection and Mutual Benefit of the Town of Cerro de Guadalupe) to assert and defend their rights to the waters of the *Ritos del Latir* and access to the mountains and grazing ranges within the boundaries of their traditional land grant (*Constitución y Artículos de Incorporación 1888*). A decade later, the settlers of Costilla north of Cerro similarly organized their own *Asociación Defensiva de los Pobladores de los Terrenos del Río de Costilla* (Association for the Defense of Settlers in the Lands of the Rio de Costilla) in order to affirm their rights as landowners and irrigators “*cultivando las tierras, construyendo presas y acequias de regadío, edificando casas... de este modo ocupando dicho terreno con sus montes, pasteos, sus fuentes de agua en beneficio común*” (cultivating the lands, constructing dams and irrigation ditches, building houses... in this way occupying said land with its forests, pastures, with its water sources for their common benefit) all against foreign companies claiming the land (*Constitución de la Asociación Defensiva 1902*).

In the San Luis Valley of Colorado, *hispanos* established *La Sociedad Protección Mutua de Trabajadores Unidos* (Society for the Mutual Protection of United Workers) in 1900 to help workers during times of unemployment, illness, or met the needs of widows and orphans, and also to combat wage and racial discrimination in the railroad and mining industries emerging at the time. Many of the members were also traditional farmers, and like their acequia neighbors in nearby Costilla and Cerro, they united “*para protegerse contra las injusticias de los tiranos y de los déspotas, de los usurpadores de la ley y de la justicia, de los ladrones de vidas, honras y propiedades...*” (to protect each other against the injustices of tyrants and despots, the usurpers of law and justice, and those who steal our lives, honor and property, *Preámbulo, Constitución y Reglamento de la SPMDTU 1922*). As an organization of *trabajadores unidos*, the SPMDTU turned its attention to services not available from

employers or government: cash-subsidy benefits to members when they were unable to work due to illness or injuries; short-term loans in times of family crises or medical emergencies; and funeral benefits paid to widows, orphans, and survivors at the time of a member's death. By the late 1930s, in the midst of the Great Depression, *La Sociedad de Protección Mutua* had already commissioned fifty-four local councils, with thirty-one in Colorado and twenty-three in New Mexico (Rivera 2010).

From among hundreds of *mutualistas*, only a few have survived into the twenty-first century, and like the acequia associations, they continue to govern their own affairs and maintain the culture. The *Sociedad de Protección Mutua de Trabajadores Unidos*, for example, continues to sponsor local societies in northern New Mexico, the San Luis Valley of southern Colorado, and an urban affiliate in Denver. These “*concilios locales*” follow a common *Código Ritualístico de Régimen Interior* (Code of Rituals, Revised 1980) for the conduct of their meetings and in the performance of rituals during burial ceremonies for deceased *hermanos*. Participation in burial services continues as has been the tradition since the founding of the society and is viewed as an obligation and a ritual of profound honor and respect. Much as before, officers of the local councils conduct their meetings in the order prescribed in the rules: *ceremonia de apertura, oración oficial, lectura de los procedimientos de la previa reunión, comunicaciones y reclamos, reportes de comisiones, ceremonia de admisión de nuevos miembros, negocios sobre la mesa del Presidente, debates para el bien de la Sociedad, reporte de colectaciones, y de embolsos y delincuencias de miembros, ceremonia de clausura*.

For governance, the SPMDTU General Constitution (Revised 1980) remains in effect as does the executive authority of the Superior Council. The parent organization convenes a biannual convention conducted in the Spanish language and maintains a *sala superior* as the headquarters building in Antonito, Colorado, a structure listed on the National Register of Historic Places and the Colorado State Register of Historic Properties. Local councils include *Concilio No. 18* at Ranchos de Taos, and at one time *Concilio No. 20* for the spouses and other women of Ranchos from 1984-1987. Other active councils are currently located at Nambé No. 57, Placitas No. 15, Antonito No. 1, Alamosa No. 19, along with Denver No. 7. Plans are underway to restore and remodel the headquarters and meeting hall at Antonito as a cultural center that will display SPMDTU memorabilia and showcase the organization's history with videos, photos, and exhibits and to serve as a multi-purpose community facility for the San Luis Valley (Rivera 2010).

Cultural Endurance and Resilience

How is resilience defined and how can it be measured in a system? Are there factors of community mutualism that contribute to resilience, and the contrary, are there potential disturbances and tipping points that can undermine social cohesion and resilience? And, importantly, what is the role of design in producing resilience? In this paper, we attempted to understand the motives for collective action in the historic Río Arriba bioregion with regard to common needs and problems whether in the case of water allocation, the expression of religious values, or material relief in times economic

hardships. In the Río Arriba, the people have lived off the homeland for centuries and have endured countless threats, challenges, and turbulence in the environment. Ernest Atencio (2004) said it best, and eloquently, when he wrote:

In the mountains and mesas of northern New Mexico and southern Colorado, a land-based Indo-Hispano village culture persists against all odds. For over four centuries, these isolated ranching and farming communities have survived the rigors of frontier life in the farthest corner of the Spanish kingdom, generations of raiding by nomadic tribes, rebellions, wars and conquest, the vagaries of weather, dispossession of community lands, and desperate poverty. But they have done more than simply survive. A distinctive culture has developed in the region that remains a dynamic and defining presence today. And after centuries of continuity and adaptation, rural villagers have acquired a powerful sense of belonging, a rooted knowledge and reverence for their homeland that has become rare in the modern world.

In the case examples presented here, *acequias de común*, *cofradías de penitentes*, and *sociedades mutualistas*, each one is a distinct type of mutual aid collective, but nonetheless they share a number of key characteristics: local governance, adaptation, and solidarity of the group. All three forms have survived for one, two and up to more than four centuries to include periods of rapid social change, transformations in the legal-political environment, and a barrage of pressures brought forth by the forces of modernity in a post industrial society. The successes of one form helped to create others as new problems surfaced in the throes of change and the need for self preservation of community and cultural identity in the land of the ancestors, “*nuestro pueblo*.” Absent governmental intervention, social relief depended on the mobilization of resources from within the agrarian villages based in large part on the traditions of *mutualismo* embedded in a culture of self-help, *la cultura de ayuda mutua*. The people fended for themselves and successfully established land and water protective associations, literary and debate societies, mutual aid organizations, acequia associations and other autonomous institutions for cultural resistance, preservation and economic survival.

The *cofradías de penitentes*, for example, surfaced at a time when spiritual administration was too distant from the locus of village life in the Río Arriba. Out of necessity these *hermanos* developed autonomous societies outside the hierarchy of the Catholic Church as they undertook religious practices of their own native design and established local constitutional rules of self-government. They also built private chapels, *moradas* that also served as meeting halls to conduct business affairs and develop various programs of charity to villagers in need. Later, a lay version of the *cofradías* emerged as *sociedades mutualistas* to take on the more extensive need for mutual help, not only in the religious sphere, but in material aid in times of economic hardships, illness, and racial discrimination of wage workers in the railroad, mining and other resource extractive industries. A key principle for each type of mutual union was the idea of pooling resources to help protect members from poverty, unemployment,

health care emergencies, and to lessen the burdens of funeral expenses when members passed away. At the core was a belief that help should come from the people in the community, “*de nuestro pueblo*,” all for the good of the society and advancement of the common welfare. Like the penitent brotherhoods, the *mutualistas* too built their local meeting halls in the vernacular architecture: rectangular or linear floor plans, flat or pitched roofs, and the use of adobes, vigas, rocks and other local materials for construction. For the provision of social services, they designed local projects of assistance, *obras de caridad*; recorded their rules and minutes in journals; displayed their membership ribbons or *devisas* at public ceremonies and conventions; and at the end of life, they held vigil over the deceased *hermanos*, dug their graves, paid their respects, and then provided financial help to the widows, orphans and other survivors.

Community Mutualism + Shared Risks

Irrigation is man's response to drought; by this means he reduces radically the uncertainty that nature presents to human settlement in an inhospitable environment. To succeed for any length of time, to capture and distribute available water, and to control the amount of land placed under irrigation, farmers must develop self-discipline and a high level of community organization. (Arthur Maass, . . . and the Desert Shall Rejoice, 1978)

Acequias of the upper Río Grande evolved from the traditions of cooperation and the pooling of resources for the pursuit of community objectives, in this case the need to establish agricultural colonies in the northern frontiers of New Spain. Irrigation, controlled by the local acequia, makes water available to an otherwise dry landscape. In the Río Arriba bioregion, acequias have survived in part due to their dependence on communal labor and the continuity of their democratic self-government where they design, adopt and monitor compliance with rules and other agreements for mutual benefit to share a vital but scarce natural resource: water. Customary practices for water distribution are based on values of mutualism for the good of the corporate body and not for individual gain. Conditions of aridity necessitated a regimen of local plans for water sharing and the ability to adapt to climate variability especially in cycles of drought. As gravity flow systems, acequias take water out of the streams only when surface water is available, whether in times of abundance or scarcity, each time adapting to environmental conditions. The practice of *repartimiento* (water schedules) insures that all farmers share shortages when needed based on a system of rotation that is flexible and equitable. These customs and traditions, coupled with decision-making at the local level, have been among the major factors that account for the resilience of acequias.

How are the community-based acequias organized, and do they evidence the requisite features of sustainability posited by Maass (1978) in terms of self-discipline and a high level of community organization? Do the acequias operate under rules of popular participation, local control, and the principles of justice, equity and internal conflict resolution? Will the acequia culture of the Río Arriba bioregion endure?

For governance, the *parciantes* in each acequia elect three commissioners and a *mayordomo* (ditch manager) who have decision authority and local control of water management within the service area of their acequia system, a key factor in their ability to adapt to seasonal and climatic changes especially during times of low flows in the stream or reductions of snow pack conditions in the headwaters source. This adaptive capacity of the acequia is largely a social component, part of the institutional robustness of the system (Cox 2010). In most watersheds, the acequias are the first diversions in the system, and therefore, the officers can respond and adapt quickly to seasonal changes in streamflow. During times of water scarcity or years of prolonged drought, for example, the system of turns for water delivery can be modified according to customs and traditions of *repartimiento*, *auxilio* (emergency water), and allocation of *sobrantes* (surplus waters). Agreements on how to divide the water within and across acequias may be reviewed and altered to fit existing conditions in the stream season to season. Decisions of this kind are made at open meetings of the *parciantes* to insure transparency and compliance with any new or modified rules of water distribution. When violations occur, the acequias impose fines, curtail water, or take other appropriate measures to enforce and uphold the rules on an impartial basis. In all of these respects, the acequia landowners of the Río Arriba control their own destinies by acting collectively, the dominant characteristic found in case studies of successful irrigation communities operating in other world desert environments (Maass 1978).

The ability of the acequia community to recover from natural systems changes and other stressors in the environment is an indicator of system resilience. Their discretionary authority to alter the operating procedures by tightening the rotation of turns and allocating water according to pro-rata shares allows the officers to respond to ecosystem disturbances as they arise. Like other traditional agro-ecosystems around the world, the acequias of the Río Arriba are well adapted to their environments and would have disappeared long ago were they not. By now, they have survived as “water democracies” (Rivera 1998) under three sovereigns and their laws pertaining to water administration: colonial Spain, the Republic of Mexico, and the United States. In this regard, the acequias measure up in all respects to the widely accepted design principles of “long enduring, self-organized irrigation institutions” (Ostrom 1992). They also exemplify what Mabry (1996) describes as self-governing, collective choice institutions that manage commonly held water resources under conditions of relative resource scarcity. Canals and communities of this type “are held together by shared ecological risks, mutual economic interests, and collective investments in the means of production.” To Mabry these small-scale organizations are sustainable due to a number of characteristics: compliance with rules that spread risk, level inequities, and resolve conflicts. In terms of boundaries, they “are exclusive in membership, territorial in defense of resources, resistant to outside interventions, and resilient in the face of change” (Mabry 1996).

In his many decades of studying the cultural meaning of ancient hydraulic landscapes worldwide, Glick (2006) advocates for the preservation of *huertas*, oases, polders, and *chinampas* as significant human artifacts that have been stable, long term providers of

food. Following Glick's analysis, traditional agricultural systems are knowledge intensive, and the complete system is carried collectively in the local knowledge of the irrigators, particularly with regard to the distinctive micro region of their community: soils, climatic conditions, crops, and water requirements for every niche suitable for agriculture. The social cohesion of the irrigators derives from the values encoded in the operational rules of water sharing, namely, equity, justice, and local control. As is the case with other common property regimes, the *acequia parciantes* of the Río Arriba will continue their participation so long as their collective actions assure that their benefits and rights to irrigation water will remain intact into future years. In practical terms this means access to water at the point of delivery, meaning the *compuertas* (headgates) that take water into their individual parcels. In the prototypical *acequia*, the diversion on the stream along with the *parciante* headgates are the key physical structures, but equally or more important is the fact that *compuertas* tie each landowner irrigator to the social arrangements for water management of the hydrological system as a whole.

Conclusions

Many factors have contributed to system resiliency, but the concept of *mutualismo*, reciprocal mutual aid, has to be included among one of the essential foundations of community cohesion evidenced in the three forms of societies examined here. In times of hardship or other needs, voluntary associations mobilized local resources and bonded the *vecinos* into a collective imaginary deeply rooted in the land, a place, region and homeland they called "*Nuestro Pueblo*." Rituals, democratic participation in governance, and continuity of culture have maintained solidarity and retained the identity of the land-based people of the Río Arriba, the essence of "*querencia*" described to perfection by Juan Estevan Arellano (1997) when he wrote: "*El que pierde su tierra, pierde su memoria*" (He who loses his land, loses his memory). *Querencia* is what anchors people to the land and this attachment in turn informs and inspires mutualism across neighbors and kin who live in the same place. *Vecinos* take care of other *vecinos*, and together they fend for themselves and do not rely on outside institutions. After a lifetime of learning about wisdom of the land and knowledge of the water from his elders and mentors, Arellano, the former mayordomo of the *Acequia Junta y Ciénaga* on the Río Embudo, concludes that healthy bioregions and strong rural economies depend on safeguarding land, water, and people as a common interest and not as the private property of individuals (Arellano 1997, 2014).

Will the *acequias de común* survive the multitude of stressors working against small-scale agriculture not only in the Río Arriba section of the Río Grande but in the global economy as well? Are there "tipping points" (hydrologic, economic, social) that are beyond the capacity of the *acequias* to resolve, and can these threats be averted? Solidarity, community cohesion, and mutualism are important elements of system renewal to counter threats that may surface periodically. We conclude with a set of propositions that characterize system resiliency of *acequia* governance and may hold the key to adaptation when new challenges emerge in future scenarios of unexpected change. These conclusions stem from multidisciplinary research in progress (Fernald et

al 2012) studying the connectivity of coupled hydrologic and human systems as the basis of resilience in traditional irrigation communities of the upper Río Grande watershed:

- (a) The acequia culture is based on a reciprocal relationship between irrigation and community that creates a sense of place, attachment to the land, and a shared cultural identity based on membership in the corporate group;
- (b) Mutual networks and social density result in cooperation over water sharing when acequias are confronted with drought or other stressors from outside the community;
- (c) Customary practices combine hydrologic and sociocultural strategies encoded in the acequia culture to respond collectively to snow melt releases in the spring and variable precipitation during the summer months;
- (d) Autonomy of the decision making structure in acequia governance permits rapid adjustments in the operational rules and practices of each acequia when warranted by changing environmental conditions of wet or dry seasons;
- (e) Traditional knowledge of local ecology and customary practices are vital components of social capital for transmission to the next generation, a process essential to the continuity of acequia agriculture and culture.

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Acknowledgments

The early work that led to the development of this paper came from a presentation at the "4th Annual *Celebrando las Acequias: Water + Resilience*," sponsored by the Arid Lands Institute of Woodbury University, and hosted by Juan Estevan Arellano, Embudo Mission, Dixon, New Mexico, June 10-12, 2011. Additional work was conducted from 2008-2015 supported by research grants made by the National Science Foundation to New Mexico EPSCoR, award #0814449 and to New Mexico State University, award #101516 with a subaward to the Center for Regional Studies at the University of New Mexico. Other collaborators in the NSF research included the New Mexico Institute of Mining and Technology, Sandia National Laboratories and the New Mexico Acequia Association.