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The Zanjeras of Ilocos in the Northern Philippines: A Legacy of Sustainable Resource Management

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ABSTRACT

Zanjeras are farmer-managed irrigation systems that have endured for centuries in the Ilocos region of northern Luzon in the Philippines. These cooperative irrigation societies emerged during the Spanish regime when Augustinians were deployed to congregate indigenous populations into *pueblos*, convert them to Christianity, and raise tributes for the Crown. Zanjeras evolved from a blending of two traditions: the Iberian model of irrigation and indigenized practices of water-for-land exchanges with landowners and *atar*-holdings to distribute shares among the members. Like other community-based irrigation systems in Southeast Asia and globally, zanjeras are self-governed, long-enduring, and serve as exemplary models of sustainable resource management. This essay presents a brief history of zanjeras and includes a comparison with the acequias of southern Colorado and New Mexico in the southwestern United States. A photo gallery of zanjera landscapes appears at the end.

I went to the Philippines in the year 2000 to compare their community irrigation systems, called *zanjeras*, with the acequias of the Río Grande. At first, I wondered why there were acequias in a green, tropical place, and then I realized how parched the country's annual dry season was. I was curious to find out if they were similar or different from the acequias of New Mexico and southern Colorado. It appeared to me that they were close cousins. Based on my fieldwork and a review of their operating procedures, my hypothesis turned out to be accurate.

The zanjera farmers (*zanjeros*) I met, graciously took time to educate me about their irrigation practices during my research in Ilocos Norte and Ilocos Sur. Some I encountered in their homes and others in rice fields as they monitored the canals and irrigation underway. In all cases, they patiently addressed the many questions that I raised about their internal governance, operating procedures, and irrigation practices. I trust that I captured at least the core principles that they espoused while I was in their company. Our encounter validated what I had read about their admirable qualities as being a hardworking, industrious, and enterprising people who possess a reverence for the land and their ancestors. In zanjera irrigation, peasant and tenant farmers without land mobilized their labor to exchange water for land, and in one generation they transformed into a corporate community with ownership of irrigation works that have endured for

centuries. In today's global water crisis, the *zanjera* legacy offers important lessons about collective action, water sharing, and resource sustainability.

I conducted interviews with the *zanjeros*, collected their rules and regulations, and took photographs to document of *zanjera* landscapes. I inquired about the governance of *zanjeras*, operating procedures, cropping patterns and other related irrigation practices. After completing each interview, my last activity was to observe *zanjera* operations in the field, most of which were irrigating rice, tobacco, corn, garlic, and other crops.

I also inquired about diversions of water from the river and how water from the canals is distributed to the members. Similar to practices in the Río Grande acequias, I was informed that *zanjeras* share water in times of shortages and especially during the six months of the dry season. The titles of their officers are in the native Ilocano language but also in Spanish similar to those used in New Mexico, *maestro* for the *mayordomo* equivalent, a *secretario*, *tesorero*, *papelista*, *mandador* and others. Their governance structure includes a *Junta Directiva* (Board of Directors) and a *Junta General* (General assembly), direct parallels to the acequias of Valencia and Murcia in southeastern Spain. Some of the names given to the *zanjeras* derive from Catholic saints, for example, the *Zanjeras* San Juan, San Marcelino, San Antonio, San Pedro, San Isidro, San José, San Lorenzo, Santa Rosa, Santa María, Santa Ana, Santo Rosario, and many others.

How is it that I became interested in the *zanjeras*? Walt Coward, a senior director at the Ford Foundation, wrote a key article that piqued my curiosity about the *zanjeras* at a time when I had barely started my own research about the acequias of the upper Río Grande in the southwestern United States. The parallels were striking, and I amended my research agenda in order to compare irrigation cooperatives in locales where they have thrived for centuries: the *huertas* along the Mediterranean coast of Spain, the *acequias* diffused from Iberia to the Americas, and the *zanjeras* of Ilocos in the Philippines. In due time, I met Professor Coward at a conference in New Mexico just after my book on *Acequia Culture* had been published and told him of my plans to conduct comparative field work in southern Spain and northern Luzon in the Philippines. Subsequently, he and the Ford Foundation supported my research.

Coward also put me in touch with several key colleagues he had mentored at Cornell University: Ruth Yabes from Arizona State University, and Robert Siy of Asian Development Bank in Manila. Siy welcomed me in Manila and highlighted the many important features of *zanjeras* and the policy implications globally of why they should be studied as models of community resource management. Other Filipino collaborators included Bengy Bagadion, faculty member at the Asian Institute of Management in Manila, and his father, Benjamin U. Bagadion, who had worked at the National Irrigation Administration (NIA) in Quezon City. Bengy Bagadion arranged for a talk at the Institute of Philippine Culture (Ateneo de Manila University) where I compared the acequia irrigation systems of the upper Río Grande, the *huertas* of southern Spain and the *zanjeras* of the Ilocos provinces.

Benjamin Bagadion Senior put me in contact with other key people, including Pilipina Bermudez at the NIA regional office in Urdaneta and Lelito Valdez at the Ilocos Norte Provincial Irrigation Office in San Nicolás, Laoag City. There Alberto Cabanos, Senior

Water Resources Facilities Technician, took me to dozens of field sites across most of Ilocos Norte. He introduced and tutored me on the many zanjas evident throughout the region. It took me twenty years to finally publish my story in a book released in 2020 by the Ateneo de Manila University Press. Here is a summary of the important lessons we can all learn from about sustainable resource management in a far corner of the Philippine archipelago.

Geography and Environment

The Philippines in Southeast Asia, an archipelago of more than 7,000 islands, normally does not come to mind as a region that needs irrigation to enhance production in agriculture. Most of us associate the Philippine Islands as a wet tropical zone and do not expect to find canal irrigated landscapes. Unlike the verdant rice terraces of the Mountain Province in north central Luzon, agriculture in the Ilocos provinces to the northwest requires irrigation during a prolonged dry season that extends from late October to May. Similarly, irrigation helps farmers during the wet season due to the erratic start and end dates of the monsoons with interruptions caused by inadequate rainfall. Much of this region is located between the highlands of the Cordillera Central on the east and a coastal area north and west toward the South China Sea. The land base of this stretch of northwest Luzon encompasses the provinces of Ilocos Norte, Ilocos Sur, and La Union, together with sections of the Abra River Valley in Abra Province. Most of the agricultural lands of Ilocos are irrigated by zanjas that are community-based. And like those of the Río Grande acequias, they too operate outside of government as commons property held by the irrigators themselves, the zanjeros.

The narrow strips of arable land along the coastal plains accommodate only small landholdings, usually less than one hectare under cultivation. From this restricted land base, two types of irrigation societies evolved. Those who owned lands often pooled their resources to build a common canal, provided the necessary materials, and assumed ownership of all the water rights once the irrigation system was completed. Other Ilocanos were not as fortunate, especially those without landholdings. True to the ingenuity characteristic of the people from Ilocos, peasant and tenant farmers fashioned a bold experiment where they bartered water for land. In brief, peasant and tenant farmers negotiated contracts with wealthy landlords in the community and developed water-for-land exchanges where the landowners partnered with the irrigators to share the land. In return, the irrigators built the diversions on the river, dug out the canals, and promised to deliver water to blocks of land retained by the landowners and to their own designated parcels known as *atar*-holdings. Each willing *propietario* or landowner too would benefit from the water in the system to irrigate blocks of farmland he would retain for his own production. To structure this unique arrangement, the zanjeros formalized an agreement or *convenio* along with a land-division map indicating more or less equal shares of land to each farmer, and large blocks of land to be retained by the landowner.

The water for land exchanges with landowners stipulated that operations, maintenance and repairs are the responsibility of the zanjera members. During the monsoon season, the traditional dams made from bamboo stakes, brush, sandbags, and rocks wash out and have to be rebuilt and sometimes relocated when river channels move.

On these occasions, the zanjera depends on a special official not found in the Río Grande acequias: a *cocinero* or cook. Repairs to the dam often take days to get them back into service. Once the *gunglos* (work crews) are assembled, they have to be fed meals prepared by the *cocinero* who slaughters a pig or calf on site daily until the repairs are finished. During my visit to the brush and rock dam built by the Bacarra-Vintar Federation of Zanjas, I was informed that the last time the structure was replaced, following a typhoon, it took three hundred members to accomplish the task. For materials, each member was assigned to bring five bamboo pole and five sandbags. The dam spans the entire Bacarra-Vintar River, and its intake diverts water into a main canal that serves nine zanjas affiliated with the Federation. No outside financial assistance was required since the members provided the labor as well as the construction materials at no cost to the Federation.

Origins of Zanjas

Most historians date zanjas to around 1730, with additional ones developed by the late 1890s and into the turn of the century. The dates of construction and when they flourished coincide with the Spanish regime that began in the middle sixteenth century and ended in 1898. One of my main points of comparison was to determine the extent to which the zanjas adopted the Iberian model of irrigation. The work of Thomas F. Glick was my guide on Spanish irrigation. After examining organizational records coupled with field observations, I concluded that operating procedures and water distribution rules in the zanjas closely resemble the Iberian tradition transplanted to the Americas. As with land shares, water shares in the zanja are proportionately distributed, and in times of scarcity a system of rotating turns per day can be implemented, called *barsák* in Ilocano, or a share of time allocated for the use of canal water, a concept dating back to the Ilocano ancestors. The rules for allocating water in times of scarcity can vary depending on which schedule is determined at a zanja meeting that covers duration and the location of water distribution activities with much flexibility for these arrangements per canal or laterals. When rainfall becomes abundant again, the rotation schedule is undone.

The first Spanish zanjas in the coastal towns of Ilocos were constructed under the guidance of Augustinian missionaries who encouraged farmers to grow cash crops like sugar cane, indigo and tobacco so that the Philippines could participate in the global economy and at the same time pay tributes imposed by the Spanish Crown in Manila. Once built, I believe that local parish priests introduced the "*Sociedad*," a guild-like administrative structure with an executive board, formalized charters based on self-governance, written rules and regulations, and collective responsibility for upkeep and maintenance of the irrigation system. For governance, zanja societies follow the procedures in the Iberian model described by Glick: the irrigators elect their own executive officers, determine internal rules and regulations of water management; establish days for canal cleaning and repairs; guard and monitor their systems; impose *multas* (fines) for infractions or when irrigators fail to contribute their share of labor; and resolve conflicts internally without intervention by outside authorities.

In the end, I concluded that the totality of Spanish influence in northern Luzon left appreciable imprints on irrigation landscapes characterized today as the Ilocano zanjas.

The Augustinians organized local projects to construct the irrigation works and from there, however, the farmers themselves negotiated water-for-land contracts with the wealthier landowners in the area. Zanjas emerged from a blending of two traditions: the Iberian model of irrigation and zanjera practices that involved water-for-land exchanges with landowners and atar-holdings for equitable sharing among the members. In response to a limited land area suitable for cultivation, the ancestors bartered with propietarios to share the land in exchange for water delivery from a common canal. Without access to economic resources, peasant and tenant farmers set out to pool their labor, build the irrigation systems, and exchange water for land, initially in contracts with landlords in the vicinity, and from this experience, they attracted other landowners in need of water after the canals were built. These indigenized arrangements for atar-based zanjas were developed outside of any Spanish influence, are unique to Ilocos, and have no cultural precedent elsewhere in other regions of world agriculture. The irrigation agreements in each case were modified to fit local conditions or opportunities, including the exchange of water across zanjera associations when a shared main canal became necessary or would deliver water more efficiently. As the zanjera records make clear, the decision authority to pursue and negotiate cooperative agreements rested internally within the governance structure of each zanjera.

Zanjera and Acequia Traditions

The autonomy of decision-making in zanjera governance caused me to reflect on other commonalities with the Río Grande acequias. In parallel with the ephemeral dams found in the early Ilocano zanjas, the traditional acequia diversions in New Mexico and southern Colorado were also built from available local materials such as boulders, tree branches and brush and can be repaired or replaced if they are washed out during thunderstorms in late summer. Many diversions in the region have been modernized and are now built as concrete dams, but some brush and rock can still be found. Like the Ilocano canals, most of the Río Grande acequias are earthen, *zanjas de tierra*, and have not been lined with concrete or other materials, a feature that recharges local aquifers while also providing habitat for a variety of plant and animal species. The Río Grande acequias require annual maintenance and cooperative labor for cleaning in the early spring, rituals that reaffirm community solidarity at the beginning of the irrigation calendar. Zanjas likewise band together to conduct maintenance and repairs. As with the Ilocano zanjeros, the farmer-irrigators of New Mexico and southern Colorado continue to own and maintain the common property of irrigation works that their ancestors created. They both invoke the ancestors when addressing their reverence for and attachment to the land as well as the life-giving properties of water. Water is sacred. Analogous to the zanjas, the acequia irrigators view water as inextricably linked to the land, rituals, and food traditions. This belief is widely held throughout the irrigation communities along the upper Río Grande as expressed in the slogan, "*El Agua es Vida*," Water is Life.

Zanjera farms represent a fraction of total agricultural enterprises in the Philippines, but their unique features and scarcity are what make them valuable to Philippine society and its agrarian history. The zanjas and the rice terraces of the Central Cordillera predate the 1976 Water Code of the Philippines and are among the few irrigation

institutions that are still managed according to customary water laws and practices. Despite the many obstacles working against them, the zanjera legacy lives on. The corporate property, made by the ancestors, is shared among the heirs and successors who continue to maintain and sustain each of the local zanjeras. Like many other farmer-managed irrigation systems in Southeast Asia and globally, the zanjera societies are self-governed, long enduring and serve as exemplary models of sustainable resource management.

Sources

José A. Rivera. 2020. *The Zanjeras of Ilocos: Cooperative Irrigation Societies in the Philippines*. Ateneo de Manila University Press: Quezon City, Manila.

José A. Rivera. 2023. The Zanjeras: Community Irrigation in the Philippines. Chapter 22 in Enrique R. Lamadrid and José A. Rivera eds., *Water for the People-The Acequia Heritage of New Mexico in a Global Context*. University of New Mexico Press: Albuquerque NM.

A Photo Gallery of Zanjera Landscapes Appears in Pages that Follow



Ilocos Norte Capitol at Laoag City February 2000



Zanja Camungao and Crops February 2000



Lateral of Zanjera Camungao in Rice Field



Zanjera Surgui Lateral



Zanjera Santo Rosario Lateral



Santo Rosario Rice Field with Flood Irrigation Practices of the Zanjera Farmers



Zanjera Deniega: One of the Oldest Canals in Ilocos Norte



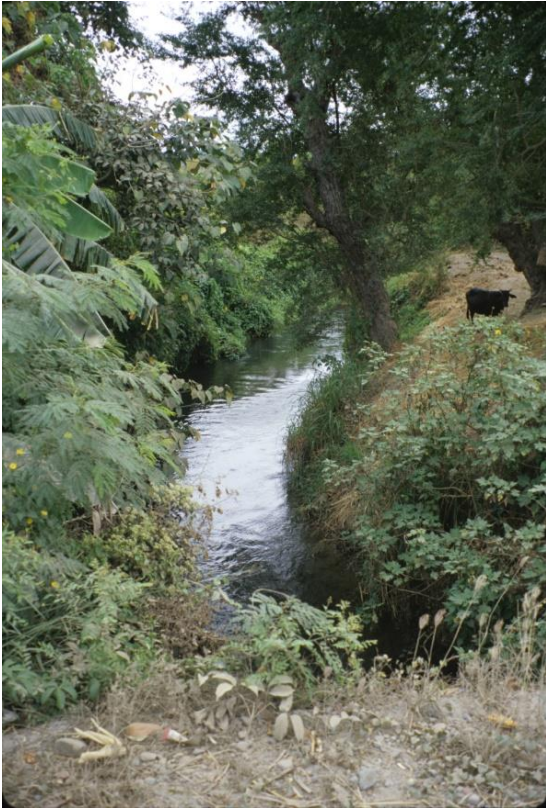
Zanjera Sales: Another Early Canal



Zanjera Santa Ana Terraces and Corn Field



Zanjera Santa Ana Rice Mill



Zanjera Paratong



Zanjera Paratong Rice Field



Bacarra-Vintar Federation Brush Dam



Fish Traps on Bacarra-Vintar Federation Brush Dam



Cathedral Bell Tower at Laoag City



Paoay Church and Bell Tower: World Heritage Site at Ilocos Norte



Church at Batac in Ilocos Norte



Cathedral at Vigan in Ilocos Sur



Alberto Cabanos with Zanjera Farmer Benjamin Nagal



José Rivera with Zanjera Farmer Benjamin Nagal



Zanjera San Marcelino Main Canal



Zanjera San Marcelino Padila Tablon



Zanjera San Marcelino Padila Detail



Zanjera San Marcelino Gates to Gunglo Laterals



Tadao Mountains: Source of a Spring-fed Irrigation System



Zanjera Tadao Farmers at Mountain Camp Site During Rehab Project at Springs



Zanjera Tadao Canal Rehab Project at Springs



Zanjera Tadao: Kamarin in Fields Downstream of Mountain



Kamarin at Zanjera Camungao: President Patrocinio Castillo and Alberto Cabanos



Kamarin at Zanjera Surgui: A Place to Meet and Plan Operations



My host Eligio Guerrero and Water Master at Zanjera Silag-Butir in Ilocos Sur



Silag-Butir Creek at Foot Bridge with Kids Looking on as I Snap the Photo



Kids at Play: Silag-Butir Creek Dam



Zanjera Silag-Butir Subcanal in Dry Season February 2000



Zanjera Silag-Butir Tobacco Field



Zanjera Silag-Butir Corn Field on Road Back to Santa María Ilocos Sur



Ilocos Sur Rural Landscape



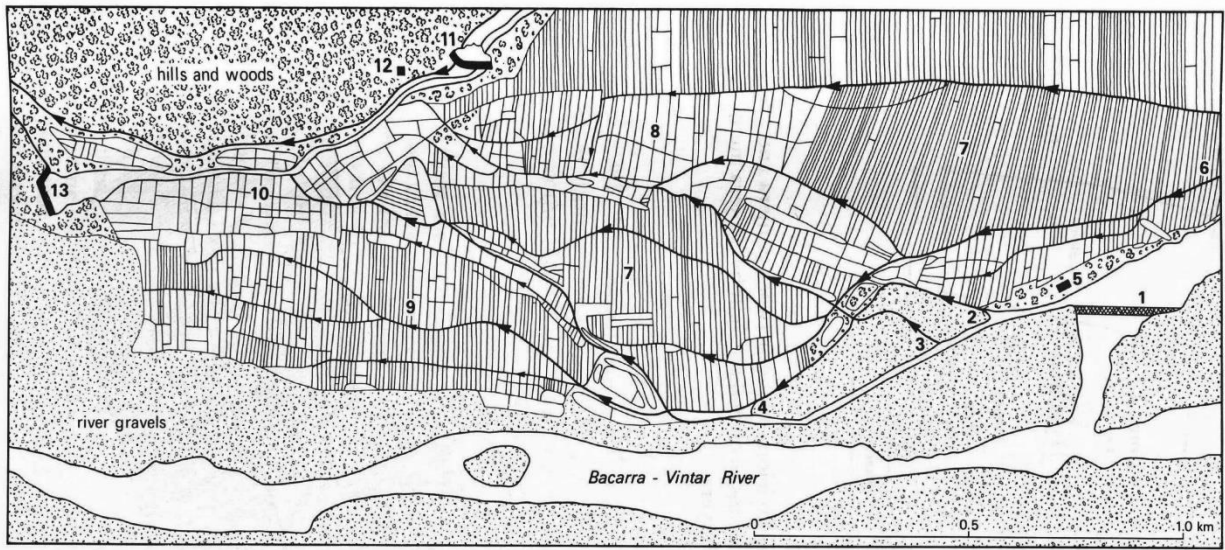
Shadoof Near Sinait Ilocos Sur



Santa María Church World Heritage Site



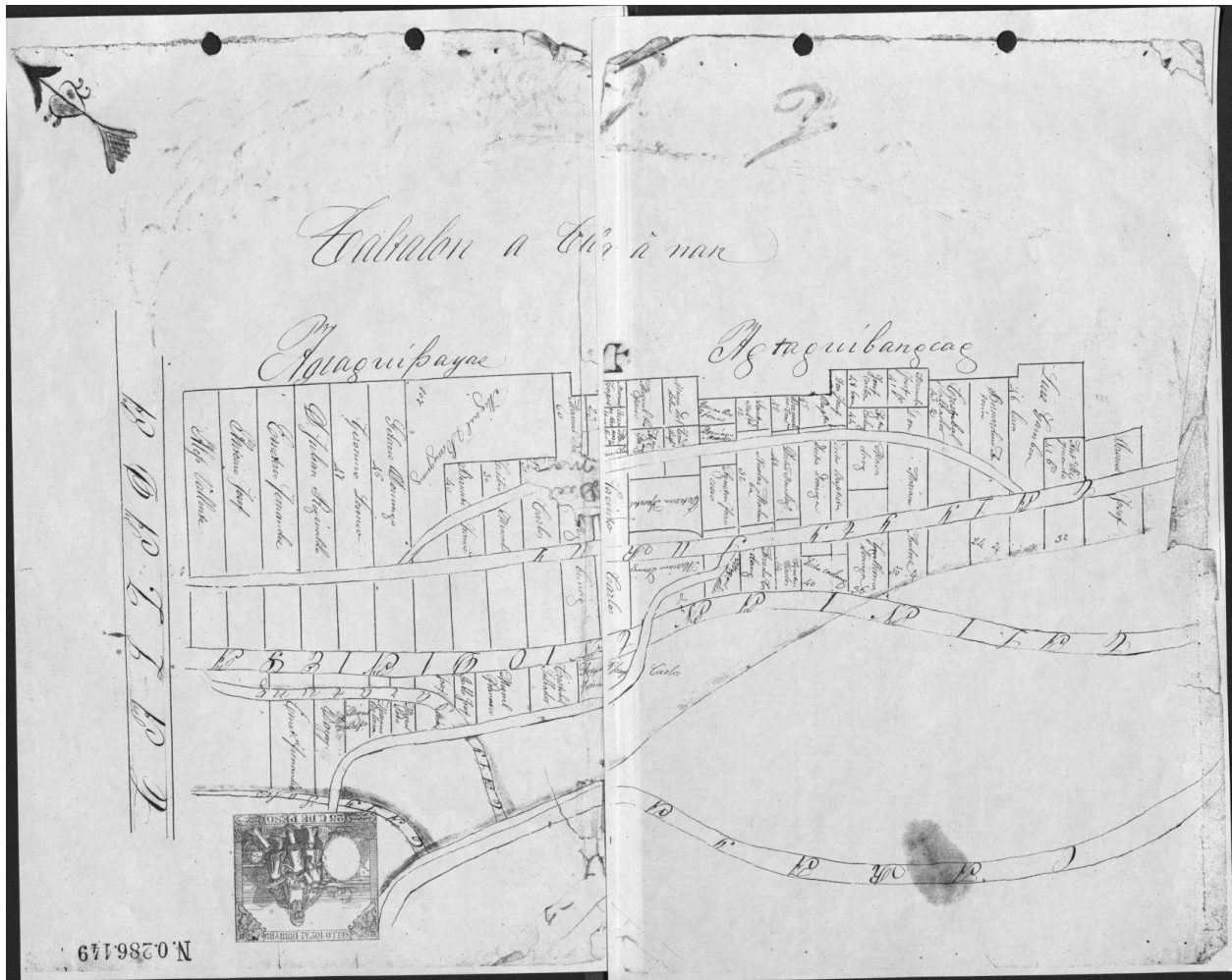
Santa María Church Side View



- | | |
|--|--|
| <ul style="list-style-type: none"> 1 Brush and rock weir (<i>padul</i>) in main river channel 2 Intake (<i>wawa ti kali</i>) and main canal (<i>kali</i>) for Zanjera A 3 Intake and main canal for Zanjera B 4 Intake and main canal for Zanjera C 5 Temporary shelter used by zanjeras when working nearby dam or main canals 6 Main canal from upstream system of Zanjera D 7 Communally owned (<i>atar</i>) lands of Zanjera D showing individual members' fields or shares (<i>bingay</i>) 8 Privately owned, non-member lands belonging to original landowners (<i>biang ti daga</i>) of Zanjera D | <ul style="list-style-type: none"> 9 Individual member-owned lands (<i>inkalian</i>) of Zanjera A's members 10 Lands owned by "water buyers" (<i>inkapulo</i>) who pay Zanjera A 10% for each irrigated crop 11 Concrete dam (<i>puttat</i>) and reservoir (<i>libtong</i>) which provides supplementary water source for and feeds into main canal of Zanjera B 12 Meeting house (<i>kamarine</i> or <i>balay ti zanjera</i>) of Zanjera B 13 Concrete dam and reservoir which provides supplementary water for Zanjera C, located on same stream as that of Zanjera B's supplementary dam |
|--|--|

Four Zanjeras and Elongated Strips at Bacarra Ilocos Norte

Courtesy of Henry Lewis, *Ilocano Irrigation: The Corporate Resolution*. Asian Studies at Hawaii No. 37: University of Hawaii Press, 1991.



Zanja Surgui Land Divisions Map 1888-1889

