

Navajo Irrigation

[Editor's Note: The Navajo Indian Reservation is located in the states of Arizona and New Mexico, in the southwest United States. Irrigated agriculture has been practiced for many centuries in this arid region, by various Indian cultures. The following paper compares Navajo irrigation management with that of the nearby Pueblo Indians (along the Rio Grande river in New Mexico), and with systems constructed by the Bureau of Reclamation in the same area, which are managed by non-Indian farmers.]

The performance of Navajo irrigation systems lags far behind the performance of non-Indian systems in the Western United States. The aggregate cropping intensity on Bureau of Reclamation projects is over 85%, compared to 33% on Navajo projects. Over the past fifty years the Navajo systems have been trapped in a cycle of rehabilitation, deterioration, abandonment and rehabilitation.

Many reasons have been proposed to explain this situation, including:

- small economically non-viable farm size,
- lack of maintenance,
- lack of funding,
- lack of extension or technology,
- lack of credit,
- lack of education,
- cultural constraints to irrigated agriculture.

This article suggests that in spite of the generally poor reputation of Navajo irrigation, there are cases where Navajo farmers have found irrigated agriculture to be viable. The greatest constraint to more productive agriculture is a lack of physical and organizational control over their water resources.

BACKGROUND

The traditional Navajo economy was based on a mixed strategy of nomadic enterprises (herding, hunting) and sedentary agriculture. They lived near their farms and moved their sheep according to the season. In areas with assured water supplies, Navajos intercepted water at the mouths of ravines, diked flat areas to catch spring floods, and built small dams to divert river water onto their fields.

In 1939 there were 67 irrigation systems recorded on the reservation, serving a total area of 22,000 acres (8,900 ha) of which 13,800 (5,260 ha) were actually irrigated. By 1948 the acreage had increased to 17,000 acres (6,880 ha) actually irrigated, but this decreased to 10,000 acres (4,050 ha) by 1960. The shift in acreage corresponded to a dramatic shift in the Navajo economy. In the 1940s agriculture contributed about 60% of all Navajo income; by 1958 the figure was only 10%, and by 1988 about 3%. Agriculture could not compete with the coal mines, where earnings were up to twelve times greater than farming.

THE NAVAJO FARMING SYSTEM

The major irrigated crops are maize, vegetables, and forage crops (e.g., alfalfa). The percentage of irrigated area devoted to maize is fairly constant in the systems studied. Alfalfa is the most popular crop, as it requires little labor, and is easy to store and sell.

The Fruitland irrigation system is a relatively successful example of the Navajo pattern. Of the 3,718 acre (1,493 ha) command area, 2,174 acres

(873 ha) were actually irrigated (1986 figures). The irrigated cropping area was devoted to forage crops (53%), maize (12%), vegetables (4%) and small grains (2%).

While the overall cropping intensity of the Fruitland system was a very respectable 71%, cropping intensities at the farm level varied considerably. Of the 279 farms surveyed, about one-fourth of the farms have a cropping intensity above 90%, and roughly the same number have a cropping intensity below 30%. Another way of describing the variability is that roughly one third of the farms are responsible for two thirds of the irrigated agriculture.

The bulk of the production is consumed by family members or relatives who may not have access to irrigated fields. In return for this produce, the farmer may receive meat or wood. Surpluses are sold at local festivals or through roadside markets. Only a small fraction of the production ends up outside the reservation area.

From a classic economic perspective, the Navajo farms are not economically viable. According to a 1981 study by Robert Lansford, a part-time 20 acre (8 hectare) farm produces about US\$ 330 in total net operating profits. When interest charges are included on operating capital and equipment, the total farm return is a US\$ 59 loss. Many farms are subsidized by off-reservation income.

The farming system has similarities with the livestock grazing system. Because of small herds, low reproduction rates, and poor range conditions, raising livestock is also not economically profitable. Rather, it represents a highly valued way of life and is a subsidized source of income for family members who would have little else to live on.

Of equal importance is the value of reciprocal social exchanges in traditional Navajo culture. Although less important today than in the past, exchanging produce is a sign of respect and friendship. Hauling a truck load of melons to a local market may result in an economic loss, but a social gain, as it is an opportunity to visit with neighbors and relatives.

Programs designed to increase off-reservation sales, or to establish corporate farms, need to take into account the additional costs of disrupting the internal and almost invisible social economy. Irrigation development may be one of the best ways of stimulating the internal reservation economy.

IRRIGATION MANAGEMENT

Navajo farmers are institutionally disenfranchised on their own systems. Field level O&M is in the hands of a "canal patrolman" who is employed by the Navajo Tribal Council, and not by the farmers. The revenues collected by the Irrigation Office end up in a revolving fund administered by the Navajo Tribe. The only formal link between farmers and the irrigation bureaucracy is the Farm Board. However, according to a recent survey, only 20% of the farmers in the Fruitland irrigation system feel that they received services from the Board.

When the Navajo systems are compared with Pueblo Indian systems in the same area, or with non-reservation systems, the differences in organizational strength are remarkable. For example, in both the Isleta Pueblo system on the Rio Grande river, and the Farmers' Mutual Ditch Company on the San Juan river, farmers are far more involved in system operations and maintenance. The more intensive management participation by farmers

is reflected in higher cropping intensities in the systems: 89% and 90% respectively.

In the Navajo systems, there is no functioning irrigation organization below the main system, which is controlled by the canal patrolman. The organizational vacuum has resulted in water anarchy. Past water user organizations were little more than appendages of the central bureaucracy designed to collect revenues.

Water anarchy is not a culturally predetermined condition. On the Navajo systems it is the result of fifty years of institutional mismanagement that has created irrigation systems that are currently unmanageable.

Investing development resources in agricultural education, extension, or new crops will have little impact if basic water control is lacking. Increasing farm performance on these systems requires increasing farmers' physical and organizational control over the systems' water resources.

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[Editor's note: This article has been adapted from a paper by the author entitled, "The Impact of Water Control on Navajo Irrigation Projects." For a copy of the full paper, please contact Shaul Manor at IIMI.]

NOTE:

- In the coming issues the central topics will be:

- * Indigenous organizational and technical capacities.
- * Performance measures for FMIS.

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- See page 2 for our new address in Colombo as of 1 September 1989.