

Laoag-Vintar government irrigation system, Laoag City and Vintar municipality, Ilocos Norte, Philippines

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1 Part I: Static Analysis - Collective action

The Laoag-Vintar Irrigation System (LVIS) is built, operated and maintained by the government. The system serves the areas of Laoag City and the municipality of Vintar in Ilocos Norte, the Philippines. The LVIS is bordered on the south of Vintar-Bacarra River, on the west of some hills, on the north of Laoag River and on the east of the China Sea. The irrigation system serves about 2,400 hectares of farming land during the rainy season and about 1,200 hectares during the dry season. The resource appropriated in this case is water, especially in dry months. 3500 farmers served by the LVIS system belong to a farmers' association named Ilocos Norte United Farmers Association Inc. (INUFA). Officials of INUFA help organize irrigators to work with officials in regard to water delivery.

1.1 The Commons Dilemma

During the dry month after the monsoon season, the Laoag-Vintar Irrigation System (LVIS) pumps and drains water from the rivers to irrigate the farming paddies on the slope. The water supply during the dry months is insufficient for the evapotranspiration requirement of the crop, or the losses through seepage and percolation, making farmers grow alternative crops than rice. The irrigation system serves about 2,400 hectares of farming land during the rainy season and about 1,200 hectares during the dry season. The LVIS system is of low diversion type, and it is impossible to deliver the limited water supply to the southernmost part of the region during the dry season. The brush dam or some channels of LVIS are often damaged by typhoons, and the members of the association need to repair the system.

1.2 Biophysical Context (IAD)

- **Natural infrastructure:** The mountain ranges run approximately north to south throughout the archipelago of the Philippines. The mountain ranges raise the prevailing northeast and southwest monsoons and trades to 4 types of climate. The original climate type map and corresponding rainfall distribution figure was missing in the original study. Based on the fee pattern farmers pay for their use of the system, the location is of 2 pronounced seasons: A dry season from November to April and a

rainy season from June to October. Rice paddies in this region are usually enclosed in dikes or levees 10-30 centimeters in height. The region is experiencing percolation loss and seepage loss. The degree of losses depends on the type of soil, the depth of the water table, whether the rice paddy is adjacent to a drainage channel, and whether the system is properly managed. The main crop is rice; sandy paddies that are of high percolation loss and seepage loss need to be planted with alternative crops. The system serves an area that is bounded by Vintar-Bacarra River on the north, Laoage River on the south, hills on the east and the China Sea on the west. The system serves about 2,400 hectares of farming land during the rainy season and about 1,200 hectares during the dry season.

- **Hard human-made infrastructure:** Farmers use a dam to raise the water level in Vintar River, from where the Laoag-Vintar Irrigation System draws water. The original concrete dam was built in 1926, but it collapsed before it was used. The current dam is built with rubble masonry. It is built about 2.7 km upstream the old dam and is frequently destroyed by flood. The system draws the raised water flow using a bench flume to at the foot of a hill, and a network of canals to deliver the water to different areas. The main canal is more than 65 km long, and it is branching to several laterals, sub-laterals and farm ditches.

1.3 Attributes of the Community (IAD)

- **Social Infrastructure** 3500 farmers served by the LVIS system belong to a farmers' association named Ilocos Norte United Farmers Association Inc. (INUFA). The association was officially formed by the approval from the Securities Exchange Commission in 1948, but it has existed since 1936. The INUFA is consistent with a president, 2 vice presidents for the 2 zones, treasurer, the secretary and the auditor. There are 28 cabecillas, 14 in each zone; panglakayenes that are appointed by the gunglos or groups of farmers. Each cabecilla is leading 3-5 panglakayenes, and each paglakayene is leading 1 gunglo that is formed of 20-30 farmers. There are also LVIS irrigation engineers, 1 supervising water master, water masters in each zone, and ditch tenders under them. The 2 sets of leading boards meet 3-4 times a season to discuss the problems and responding remedies. Representatives from the Bureau of Plant Industry (BPI), Agricultural Productivity Commission (APC), Presidential Assistance on Community Development (PACD), and the Agriculturist of Laoag City are invited when necessary. The engineers guarantee money from the office and provide wine for farmers who work for the system reparations. Major problems such as where to plant in the coming dry season are settled between the irrigation office and the association, and the minor problems such as distribution of the water are settled by the panglakayenes and ditch tenders.
- **Human Infrastructure** Farmers in Laoag City and the Vintar municipality need to pay for their use of the irrigation system. Farmers pay 25 Philippine Peso (PHP) per hectare for rice crop and 10 PHP/ha for other crops during May to October; and they pay 35 PHP/ha for rice and 20 PHP/ha for other crops during November to April. Farmers sometimes plant a third crop and they do not pay for the third crop. Fee collection scheme is launched by the National Irrigation Administration (NIA), and supervised by local officers. Water masters, ditch tenders, and some fee

collectors hired by the office collect the fee together. Water master who tops the collection receives a bonus of more than half of his annual salary. They also prepare the water bills and distribute them to landowners before harvest season. The cabecilla and panglakayenes should monitor the equality of water distribution; failure to do so results in a fine of 0.5-5 PJP. Cabecillas should also monitor the constructions of farm ditches; otherwise they will be fined 10 PHP. The panglakayenes also should monitor the efficiency or water delivery, or an additional fine of 10 PHP will be applied beside the penalty from the irrigation office. Farmers need permits from ditch tenders or panglakayenes to draw water from the irrigation system, especially during the dry season. Violation of the rule results in a fine of 0.5-5 PHP, the cost of damage, and penalty from the irrigation office. Each farmer has his own duty to watch his land and the water delivery. Once the water is sufficient the farmer has to turn off the turnout. Otherwise a fine of 0.5-5 PHP and compensation to the destroyed crop will be applied.

1.4 Rules in Use (IAD)

1. Position Rules:

- The president, vice president, treasurer, secretary and the auditor are selected every 2 years based on the leadership, willingness to serve, education and status in the community by secret ballots. The association uses the ballot boxes of Laoag City.
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2. Boundary Rules:

- 3500 farmers served by the LVIS system belong to a farmers' association named Ilocos Norte United Farmers Association Inc. (INUFA).
- Farmers who use the irrigation system have to pay. Farmers pay 25 Philippine Peso (PHP) per hectare for rice crop and 10 PHP/ha for other crops during May to October; and they pay 35 PHP/ha for rice and 20 PHP/ha for other crops during November to April. Farmers do not pay for the third crop.
- Farmers need permissions from ditch tenders or panglakayenes to draw water from the irrigation system, especially during the dry season. Violation of the rule results in a fine of 0.5-5 PHP, the cost of damage, and penalty from the irrigation office.
- Farmers need to allow the construction of canals and ditches on their farming land; otherwise they lose the lands, an additional fine of 0.5-5 PHP and compensation of the destroyed crops will be applied.
- Farmers are required to plant crops that are suitable to the area and season. Fail to plant accordingly will be fined with 0.5-5 PHP
- Putting fish traps, fishing or catching frogs are prohibited in the canals and the farm ditches. Violators will be fined 0.5-5 PHP.

- Stealing crops or productions from others are prohibited. The caught ones will be fined.
- Those who cause the damage of infrastructures will be fined 5-10 PHP and penalized by the irrigation office.
- Victims of incidence or damage should report immediately to the panglakayen then other levels of officers. The one who fails to respond will be considered as the perpetrator, and will be fined with 5-10 PHP. If necessary he will be brought to the court.
- Failure to pay the fines or other obligations on the designated date will compel to the association to take the farmer's livestock. The property will be returned once the violator settles the obligations.

3. Choice Rules:

- Farmers are with limited education but they understand that without serving to repair the irrigation system they cannot cultivate their crops. This is also the main reason to establish the Ilocos Norte United Farmers Association.
- The association is willing to support the LVIS irrigation system through the work of members. The work to repair the system is immediately available under the supervision of the irrigation office.

4. Aggregation Rules:

- Farmers need permits from ditch tenders or panglakayenes to draw water from the irrigation system, especially during the dry season. Violation of the rule results in a fine of 0.5-5 PHP, the cost of damage, and penalty from the irrigation office

5. Scope rules:

- The water delivery through the system is determined not by demand but by the availability of supply from the source and the needs of the crop of water.
- The farmers value the water as their key resource since 50 years ago.
- Farmers and association personnel monitor the delivery of water to make the delivery efficient.

6. Information Rules:

- Farmers are with limited education. Yet in the original study whether the information is made open to public or held as private.

7. Payoff Rules:

- Farmers need permissions from ditch tenders or panglakayenes to draw water from the irrigation system, especially during the dry season. Violation of the rule results in a fine of 0.5-5 PHP, the cost of damage, and penalty from the irrigation office.
- Farmers need to allow the construction of canals and ditches on their farming land; otherwise they lose the lands, an additional fine of 0.5-5 PHP and compensation of the destroyed crops will be applied.

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1.5 Summary

The Laoag-Vintar Irrigation System (LVIS) is a communal irrigation system that is operated and maintained by the National Irrigation Administration and the local association, which is officially named Ilocos Norte United Farmers Association, Inc.(INUFA). The LVIS system serves mainly for rice paddies. The annual rainfall distributes unevenly, making a rainy season from June to October, and a dry season from November to April. The system faces inadequate water supply in dry months. The local farmers' association supports the LVIS system through the work of its members. The association and NIA also establish rules precluding the rules and obligations to manage the irrigation system. Violation of the rules and obligations will be fined and penalized by the irrigation office. The irrigation office and farmers' association cooperate to increase the efficiency of water delivery.

2 Part II. Dynamic Analysis - Robustness

Given the original document, there is insufficient data to make any assessment on the temporal dynamics of this system.

3 Part III. Case Contributors

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