

# Pinagbayanan Farmers' Collective Irrigation System

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## 1 Part I: Static Analysis - Collective action

The Pinagbayanan irrigation system is in the north central region of the Philippines, in Barrio Pinagbayanan, Laguna. The original case, published in 1975, catalogues an action situation in which nineteen farmers, with the help of a technician from the Social Laboratory, form a farmer's association in order to finance the installation of water irrigation pumps. The key resource (natural infrastructure) in the system is water. The key shared resource relevant to the commons dilemma faced by the community is the natural gravity irrigation system, and later the water pumps they install.

This common pool resource governance was a success upon installation of the irrigation pumps. Through well defined rules and high social capital in the form of trust the Pinagbayanan Farmer's Association is able to share their limited supply of water without depleting it.

### 1.1 The Commons Dilemma

- **Potential over-appropriation / poor coordination of appropriation:** The commons dilemma arises as 2/3 of farmers with rice paddies on the natural gravity irrigation line find they do not have enough water reaching them to maintain their crops. 33 farmers with a total cultivation area of 45 hectares are not able to fully utilize their arable land for growing rice due to the lack of water. This is especially apparent during the dry season. A small number of farmers toward the end of the irrigation system grow on land that is at higher elevation, presenting another challenge for the natural gravity irrigation canals

### 1.2 Biophysical Context (IAD)

- **Natural infrastructure:** Barrio Pinagbayanan is located on the south coast of the Laguna de Bay, in north central Philippines. This area, primarily used for rice cultivation, has two grow seasons each calendar year. There is a wet season and dry seasons, and farmers grow during both. Families in the community farm a total of 67 hectares of land. Of that, the water pumps are intended to irrigate 22 hectares of riceland that do not currently get enough water naturally.
- **Human-made infrastructure:** Two 5-inch water pumps, two pump houses, canals with embankments and dikes. Plans to line canals with concrete. All of these are

public human-made infrastructure. Farmer's use collectively owned gasoline to run the pumps when it is their turn to take water. There is no mention in the original case document of privately owned human-made infrastructure.

### 1.3 Attributes of the Community (IAD)

- **Social Infrastructure:** The Pinagbayan Farmers' Association is made up of 19 farmers (all of whom either reside in the Pinagbayan barrio or whose farms are in the Pinagbayan barrio) who meet once every month to discuss association business. The association is governed by a number of documents written by the farmers, with the help of the Social Laboratory technician, including articles of incorporation, bylaws, objectives and how the association plans to meet them, and a non-stock co-operation agreement. When writing these documents all members of the association actively participated in the discussion while the technician wrote the formal document. Members elect to the position of president, vice president, treasurer, secretary, and board of directors. Officers hold their office for one year. After the pumps were installed a water schedule was made up to determine when each farmer was allowed to pump water. Violators were to be heavily fined.

This cooperative association was necessary because the individual farmers did not have enough collateral to borrow from the rural bank, and were scared to borrow money on their own. Before installing the water pumps or making other changes, the association had to present their proposal to the relevant landlords and the administrator for the National Irrigation Administration for approval.

- **Human Infrastructure:** The creation of the association and help from the Social Laboratory technician helped increase human infrastructure among the Pinagbayan farmers. Before the association was formed only a small number of farmers were utilizing recommended agricultural practices such as high-yielding rice varieties, straight-row planting, fertilizer, pesticides, and weed control. Approximately a year after the association was formed almost every farmer in the association was utilizing such practices, and more. Farmer knowledge on how to apply for loans, manage finances, and bank policies increased when the rural bank owner attended an association meeting to help alleviate farmers' fears of borrowing money.

### 1.4 Rules in Use (IAD)

#### 1. Position Rules:

- Association members were responsible for installing the water pumps and continued maintenance to minimize water loss. Each member is responsible for hauling their own fuel to the pump house when it is their turn for water.
- The treasurer is responsible for collecting in-kind payments of rough rice, and working with the president to find outlets for selling it. The treasurer also holds on to a small amount of petty cash.

- The president is responsible for helping the treasurer maintain financial records of members who have paid their portion of fees and loan repayments. It is implied that the president is responsible for organizing the board and officers to confront delinquent members.
- The landlords must approve proposals for changes the association wishes to make to the land.
- The Social Laboratory technician is responsible for assisting the association with official documents, and is a co-signer on loans from the rural bank.

## **2. Boundary Rules:**

- Farmers' association members are restricted to farmers. All farmers served by the pumps either reside in or cultivate farmland in the Pinagbayanan barrio.

## **3. Choice Rules:**

- Farmers are responsible for paying irrigation fees, and cash loan repayments during the dry season and in-kind loan repayments during the wet season. Some farmers have not yet paid their full irrigation fee.
- The bank can choose to loan money to the Farmers' association (inferred).
- Members of the farmers' association choose to give their in-kind payment of unmilled rice to the association president and treasurer to pay off the loan from the bank.
- The association's president and treasurer choose where to sell the bulk unmilled rice, and at what price.

## **4. Aggregation Rules:**

- Farmers may only pump water to their field when the distribution schedule dictates it is their turn.

## **5. Payoffs Rules:**

- Association members pay an irrigation fee of 10(%) of their net harvest. This fee goes toward maintaining the irrigation pumps and associated hard infrastructure.

## **6. Scope Rules:**

- The farmers' association must get approval from the National Irrigation Association before they make changes to the Pinagbayanan irrigation system.

## **7. Information Rules:**

- The original case document does not provide information on information rules.

# **1.5 Summary**

The Pinagbayanan barrio natural gravity irrigation system did not effectively allocate water to all agricultural land, leaving many farmers unable to utilize their full field. With the help of a visiting Social Laboratory technician, nineteen farmers formed the Pinagbayanan

Farmers' Association to take out a collateral-free loan from the local rural bank in order to finance the installation of two water irrigation pumps. Social infrastructure is high within the community as members show high levels of trust in the association officers and board of directors. In addition to better irrigation, the farmers' association members learned about financing with the rural bank and agricultural techniques to increase their yield. After the installation of the water pumps rice yield increased significantly.

## **2 Part II. Dynamic Analysis - Robustness**

Given the source document, there is insufficient data to make any assessment on the temporal dynamics (resource and social conditions, etc.) of this particular common-pool resource. The contributors thus far have been unable to locate any specific updates for this case study.

## **3 Part III. Case Contributors**

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