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# Performance Determinants of Irrigators Associations in National Irrigation Systems in Bicol, the Philippines: An Analysis

# Performance Determinants of Irrigators Associations in National Irrigation Systems in Bicol, the Philippines: An Analysis

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*Cover photograph by* the National Irrigation Administration, the Philippines: Irrigators associations maintaining canals through group action.

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# Acronyms

| | | |
|---|---|---|
| AAPP | — | Accelerated Agricultural Production Program |
| AMIS | — | Agency-Managed Irrigation System |
| BRBDP | — | Bicol River Basin Irrigation Development Project |
| DA | — | Department of Agriculture |
| FIOP | — | Farmer Irrigator Organizers Program |
| FMIS | — | Farmer-Managed Irrigation System |
| IA | — | Irrigators Association |
| IIMI | — | International Irrigation Management Institute |
| ISO | — | Irrigation Systems Office |
| MNOHRIS | — | Mahaba-Nasisi-Ogsong-Hibiga River Irrigation System |
| NIA | — | National Irrigation Administration |
| NIS | — | National Irrigation System (local term for an agency-managed system) |
| O&M | — | Operation and Maintenance |
| PIO | — | Provincial Irrigation Office |
| RIS | — | River Irrigation System |
| TSA | — | Turnout Service Area |
| USAID | — | United States Agency for International Development |

# Foreword

THE INVOLVEMENT OF farmer-beneficiaries in all facets of irrigation development has been an integral component of the management approach of the National Irrigation Administration (NIA) in the Philippines. The involvement of the irrigators associations (IAs) in the management of irrigation systems started in the 1970s when the NIA was confronted with the problem of inadequate funding to support and sustain efficient operation and maintenance (O&M) of irrigation systems.

In response to this challenge, the NIA launched in the late 1970s its Institutional Development Program (or the participatory approach) which was aimed at the formation, development and sustenance of functional, cohesive and viable irrigators associations capable of managing either partially or fully the O&M of irrigation systems.

Under NIA's Communal Irrigation Development Program, the agency constructs irrigation systems with the active participation of the farmer-beneficiaries and upon completion of this phase, the systems are turned over to IAs: subject to a cost recovery arrangement. With the successful experience in the communal (small) systems, the NIA applied the participatory management strategy in large-scale national irrigation systems as well.

With NIA's efforts toward institutional development and turnover of irrigation systems, donor-assisted irrigation projects in the recent past have included the development of irrigators associations and irrigation management transfer as major components in project implementation.

The Accelerated Agricultural Production Program (AAPP) in the Philippines was formulated in 1987 by the United States Agency for International Development (USAID), the Department of Agriculture (DA) of the Philippines and the National Irrigation Administration, the major purpose of which was to increase the profitability and productivity of agricultural production.

Under the AAPP, the NIA was tasked to implement the Irrigation component of the program. This component was started by the agency in January 1987 to support the national government's mission on agricultural development. The grant-in-aid project funded by the United States Agency for International Development, covered 30 national irrigation systems with a total service area of 92,952 hectares (ha), and 473 communal irrigation systems with a total service area of 54,756 ha. Only three regions in the country were covered by the project. These are: Region V (Bicol), Region VI (Western Visayas) and Region X (Central Mindanao).

Under research, a cooperative agreement between the National Irrigation Administration, the International Irrigation Management Institute (IIMI) and the United States Agency for International Development was reached. The agreement required IIMI to provide principal technical assistance to the NIA for special studies and the research element of the irrigation component of the AAPP. It also aimed to strengthen NIA's capacity to *conduct and manage research* carried out through sub-contracts with research institutions, and to *interpret and use* research results.

Specifically, the research component of the AAPP was designed to:

1. Evaluate, refine and improve NIA's present package of *management innovations*.

2. Identify, develop, field test and evaluate new management innovations to strengthen (a) IAs, (b) NIA's ability to work with IAs, and (c) NIA's ability to improve and sustain the performance of irrigation systems cost effectively.

3. Support the first two and assist the NIA to strengthen its capacity to conduct and manage applied research and special studies.

The agreement between the agencies facilitated a diagnostic research during 1989–1991. This was conducted in collaboration with nine universities in the three AAPP regions with adequate exposure on irrigation management research. These are: in Region V—Bicol University (BU), Ateneo de Naga University, Camarines Sur State Agricultural College (CSSAC); in Region VI—University of the Philippines in the Visayas (UPV), West Visayas State University (WVSU), Central Philippine University (CPU), Panay State Polytechnic College (PSPC); and in Region X—Central Mindanao University (CMU) and Xavier University (XU).

The themes of the researches conducted were as follows:

1. Performance of irrigation systems with special reference to IAs.

2. Management of Provincial Irrigation Offices (PIOs).

3. Impact of training conducted by the NIA.

4. Design-management interactions of farmer-managed irrigation.

5. Farmer Irrigator Organizers Program (FIOP).

6. Irrigation service fee collection.

The studies conducted were regarded as the Phase I of the research activities of the concerned agencies under the Accelerated Agricultural Production Project. The present study—"Performance Determinants of Irrigators Associations in National Irrigation Systems in Bicol, the Philippines: An Analysis"—came under Theme I. Based on the findings of this study, the IIMI-NIA-Bicol University team designed and implemented a Participatory Action Research Project in the Barit River Irrigation System in Bicol (1991–1994).

The project was aimed at strengthening the management capability of irrigators associations. Specifically, the objective was to increase IA participation in irrigation-related activities; to enhance NIA's responsiveness to institutional requirements; and to improve IA's managerial and water management skills through training of farmers by farmers and by a continuous process of self monitoring and evaluation. The present paper, however, is confined to the study during the initial diagnostic phase. The study was conducted by the Bicol University in Region V and funded by the United States Agency for International Development. The USAID-IIMI managed the study and provided technical assistance. The NIA was an active collaborator throughout the diagnostic and intervention phases of the research program.

**C.M. Wijayaratna**
*Head, IIMI Sri Lanka Country Program*
*Head, IIMI Philippines Program*

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*Study Leader*

# Executive Summary

A MAJOR PROBLEM perennially faced by an agricultural economy like the Philippines is low agricultural productivity. With the scarcity of agricultural land that can be additionally cultivated, the country's primary thrust therefore is towards maximizing productivity in this sector to adequately feed the fast rising population and provide the necessary inputs for the growing industrial sector.

In this respect, the role of irrigation in agricultural development cannot be overemphasized. However, given the rapidly diminishing availability of potential areas that can be tapped and the fact that the national economy is in a tight financial squeeze to support the tremendous investment outlay required, the National Irrigation Administration (NIA) in the Philippines, a government agency created primarily to spearhead irrigation development in the countryside, is faced with another challenge of subsidizing the cost of operation and maintenance (O&M) of agency-managed systems locally referred to as National Irrigation Systems (NISs). These systems were viewed to have poor performance in terms of their capacity to deliver more water to the farmlands and ability to attain targeted collection efficiency. This was primarily the reason why in 1982, the NIA started to transform the agency-managed systems or NISs into jointly farmer-NIA-managed systems with the ultimate aim of completely transferring O&M responsibilities to the farmer irrigators associations (IAs). If one pictures the increasing role of IAs in irrigation service delivery with the passage of time, it can be contended that higher-performing IAs may positively contribute to an efficient and effective irrigation system. Considering the major responsibilities lodged at the IAs under the NIA-IA contractual arrangements, one can surmise that, to some extent, the national irrigation systems' viability as well as efficiency in water delivery are anchored on how well these associations execute their designated functions. A fundamental issue therefore is how the IAs can be strengthened and sustained to ensure that they will attain the expected performance level.

It is in this context that in November 1989, the Bicol University was contracted to undertake a research project primarily to determine the management system that best influences the performance of irrigators' associations in Bicol. The output of this research project was intended to assist the NIA and the IAs develop mechanisms to enhance their performance and ultimately improve farm productivity. The study, funded by the United States Agency for International Development (USAID) through the International Irrigation Management Institute (IIMI), was the initial diagnostic phase of an action research program (1989–1994) and lasted for one year (November 1989–November 1990) and covered four gravity type national irrigation systems in Bicol, namely, Buhi-Lalo and Inarihan in Camarines Sur; Daet-Talisay in Camarines Norte; and MNOH in Albay; with a total service area of 12,557 ha.

Presented below are the salient findings of the study.

## Respondents' Profile

In general, an average IA member can be described as male, 52 years old, and full-time farmer who has had some elementary education and is a tenant cultivating an average farm size of 1.4 ha.

## IA Profile

Most of the IAs had been operating for five years or more with an average number of members of 307. The average size of area covered was 332 ha, 90 percent of which was actually irrigated as of 31 December 1989.

## Organizational Climate

Organizational climate refers to the quality of the internal environment of the organization. In this study, 10 dimensions of organizational climate were assessed, namely: (a) effectiveness of size of organizational and task structure; (b) effectiveness of size of membership in attaining unity and cohesiveness among members; (c) degree of commitment of members; (d) extent of autonomy and flexibility; (e) clarity of goals, objectives and policies; (f) extent of trust and openness; (g) degree of warmth and support; (h) extent of fairness and recognition of good work; (i) degree of public discussion of problems; and (j) extent of IA's contribution to the realization of members' personal goals and aspirations.

Based on these above-examined dimensions, one got the impression that the IAs in the four systems under study were still at the infant stage of development as distinct organizations. Although the organizational structures were in place, the IA members did not seem to exhibit a sense of cohesiveness which could be due to the following:

First, most IAs had a relatively large membership base. Second, individual members lacked awareness of the organizations' goals, were not conscious of their individual tasks and the extent of participation in the affairs of the organization resulting in the members' half-hearted commitment. For instance, the greatest number of respondents believe that the IAs were organized to improve the collection of irrigation service fees for the NIA and thus the farmers tend to limit their responsibility as members to paying their monthly dues. Third, the organizational structure exhibited weakness in allowing mass participation and mobilization of members in the attainment of organizational goals. Fourth, as a result of individual members' lack of awareness of the goals of the organization, the IAs did not have a developed sense of mission as a distinct organization. Their mission had been developed by an outside entity, i.e., the NIA.

## IA Performance

IA performance was assessed using the following indicators: collection rate, type of development, regularity and amount of amortization, extent of IA participation in IA activities, resolutions implemented, extent of satisfaction of members with water adequacy and application efficiency. Across all systems, an average performing IA could be pictured as having the following characteristics: (i) a collection rate of 79 percent which in fact is overstated since back accounts collected were incorporated with actual current accounts while the collection target was based on current accounts only; (2) a Type I level of development which is operationally defined as IAs without an existing O&M contract with the NIA; (3) a 44 percent rate of resolutions implemented for a period of one year; (4) a 50 percent regularity and amount of amortization/remittance; (5) a 54 percent extent of satisfaction of members with water adequacy; and (6) a 23 percent application efficiency and a 95 percent extent of participation of IA members in irrigation-related activities (measured in terms of actual versus target length of canals maintained and participation of IA members as perceived by IA leaders).

## Systems Profile

The total area serviced by the four systems in 1990 was 12,557 ha. The total area cropped was reported at 9,254 ha while the irrigated area was 10,895 ha. The NIA income was highest in the Buhi-Lalo System amounting to P (Peso) 899,102.65 as of September 1990.[1] All national systems covered by the study had kept their expenditure level well within their income for the same period except for Daet-Talisay.

In terms of the respective roles of the irrigation systems offices (ISOs) and the IAs in planning irrigation-related activities—specifically cropping calendar, repair and maintenance of irrigation facilities and water distribution—it seemed that there was no uniform practice across the systems studied. In some systems, the majority of the irrigation-related decisions are made by the ISO while in others, there is greater participation coming from the IAs. However, there was least NIA participation in IAs under the Stage III level of development.

Regarding educational qualifications of systems personnel, all the Irrigation Superintendents in the four systems were Civil Engineers and had more than 10 years experience relative to their present job.

Across the four systems, the average rating based on ocular inspection given by agricultural engineers on the physical state and usefulness of irrigation structures was 84 percent with 100 percent denoting irrigation facilities in excellent condition. Daet-Talisay had the highest rating of 90 percent, while MNOH, being the oldest, had the lowest at 80 percent.

## Systems Performance

The ability of the four systems to carry out their functions was assessed in terms of cropping intensity, viability index, collection efficiency, distribution efficiency and IA members' satisfaction with NIA services.

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1 US$1.00 = P24.31 in 1990 (approximately).

On the whole, the systems studied had an average viability index of 1.1 indicating—a higher income generated compared to expenses incurred, a collection rate of 72 percent, a cropping intensity of 78 percent, a distribution efficiency of 12 percent, and a rating of 53 percent given by IA members based on their satisfaction with NIA services.

## Production Ratio

Defined as the ratio of actual average yield per hectare to the highest yield attained within the system, average production efficiency in the four systems was recorded at 50.6 percent. This very low figure could be attributed to the various calamities experienced which were considered by respondents to have deleterious effects on farm production.

## Organizational Climate as a Determinant of IA Performance

1. *Degree of freedom to discuss irrigation-related problems with officers*

   This was found to be negatively related to IA performance. The most commonly discussed problems between members and officers were payment of irrigation service fee (ISF) and insufficiency of water. The findings showed that the degree of freedom as a variable was significantly though negatively related to collection rate which was given a higher weight in determining IA performance, but showed a significant and positive relation to water adequacy. In translating the said finding to a management strategy, in case the problem in the IA concerned that of water distribution and irrigation systems maintenance, smooth interpersonal relations would bring about favorable results. If on the one hand the problem was related to payment of dues, application of pressure from a person of authority might prove to be more effective.

2. *Degree of warmth and support*

This variable was found to be positively related to IA performance. It could be deduced that the higher the degree of sympathy given by the officers to non-IA related problems of members, the more friendliness there was among members; and the higher the respect extended to officers and fellow members, the higher was IA performance.

3. *Degree of public discussion of problems*

The said variable was again negatively related to IA performance. The degree of public discussion of problems refers to the extent of freedom members had in disagreeing with leaders without fear of repercussions. Taking this in the context of the Filipino cultural milieu, this finding was understandable. As practiced, most objections brought out in meetings of the organization were assumed to be an affront on the personal capability of those concerned and not taken constructively to improve performance.

## Relationship of NIS Performance Efficiency to IA Performance, NIS Planning Process, Qualifications of Systems Personnel and Conditions of NIS Irrigation Facilities

1. IA performance was positively related to NIS performance efficiency which reflected the composite score based on the systems performance indicators used.

2. NIS performance efficiency was inversely related to the NIS planning process or the degree of ISO participation in planning and decision making activities relative to the IAs. This implies that higher involvement of IAs in the planning process would result in a higher NIS performance efficiency.

3. Qualification of systems personnel had the closest fit with NIS performance efficiency in the positive sense, i.e., better training and higher educational attainment of NIA personnel would result in higher systems performance.

4. Conditions of NIS facilities were inversely related to NIS performance efficiency. At first glance, this finding seemed unexpected and illogical. However, if one probes at the parameters of systems performance, it could be seen that the inverse relationship established was mainly attributed to the negative correlation existing between the viability index and the conditions of NIS facilities. This further suggests that a higher viability in the systems was achieved at the expense of facilities maintenance. The heavy reliance placed by the NIA on this parameter as a measure of systems performance needs some policy review since there is a tendency for systems to underspend in order to realize a higher viability figure. Needless to say, the viability index should not be taken singly as a performance measurement but should be assessed together with maintenance cost efficiency.

## Relationship of Systems Performance Efficiency and Production Ratio

There was a very strong relationship between the two variables, although it should be emphasized that the finding is not conclusive due to the very limited number of cases observed.

Based on the foregoing, the following conclusions and recommendations are forwarded:

1. The regression model herein developed revealed that organizational climate in general significantly affects IA performance which in turn significantly and directly affects systems performance. Therefore, if one seeks to attain a desired level of systems performance, an organizational climate must first be created characterized by a high level of warmth and support among members and officers. Members should then identify with the organizational goals of the IA and truly perceive the organization as a body that would reflect their personal

aspirations. Since members perceive the IA goals as having been set by the NIA, there is a need to conduct membership campaigns and value-clarification trainings to validate whether the organizational goals and objectives of the IAs are the actual goals and objectives that the farmers want.

2. The organizational climate can be further strengthened through the adoption of a more functional organizationah structure which would bring about an atmosphere of warmth and support among members. The present setup is composed of two tiers, the first comprising the central board while the second includes turnout service areas (TSAs) with an average of 50 members. Considering the large membership size at the lower level, it is recommended that another layer below the TSAs be established with 5 to 10 members, based on water and task distribution. This would provide more opportunities for membership interaction and participation in planning and decision making. Supervision and monitoring by leaders will also be facilitated.

3. There is a need to internalize the concept of co-existence between the NIA and IA, specifically among the O&M personnel of the NIA. This group perceives the progress of IA as a threat to their tenure and thus they do not have an all-out support strategy for the development of the IAs as an organization. Educating the O&M personnel and equipping them with skills needed to deal effectively with an indigenous organization would greatly help in establishing a closer IA-NIA bond. But first the NIA should express, along with its policy context on participatory management, the agency's long-term plans for its personnel, explore alternatives or take on new functions to avert wide personnel displacement, which is the crux of the negative perspectives of NIA's field staff on the participatory program.

4. Irrigation conflicts other than ISF payments can be better managed through smooth face-to-face interpersonal relationships. Disputes on ISF payments however could be best resolved through the application of varying degrees of pressure, e.g., judicial authorities.

5. IA performance significantly contributes to systems performance efficiency. Both are anchored on the rate of collection, and in systems where operation and maintenance have been fully turned

over to the IAs, O&M expenses are now shared by the farmers, not only through ISF payments but through voluntary work as well. These systems therefore have less O&M expenses to reckon with. Systems performance can therefore be enhanced by strengthening IAs' capability for irrigation management and maximizing their involvement in the systems' planning process.

6. The viability index presently used by the NIA in assessing systems performance is not a good indicator of the agency's ability to sustain its operations. As practiced in the field, there is a strong tendency among NIA's system offices to underspend on their O&M expenditures to obtain a higher viability index which might result in the impairment of systems efficiency and deterioration of physical facilities. The performance of the system therefore should be judged not by the viability index alone, but this parameter should be used simultaneously with the ability of the system to maintain its facilities relative to a cost standard, say a set cost of maintenance on a per hectare basis. A high-performing system must therefore have a high viability index and a maintenance cost approximately that of the standard.

7. Lastly, the IA performance indicators were externally imposed and thus were weak in capturing the interplay of variables unique to the organization. It is therefore suggested that the evaluation criteria be recast to take into account existing performance measurement practices of the IAs.

CHAPTER 1

# Introduction

THE PHILIPPINES, LIKE other agricultural countries in Asia, relies upon agriculture to feed its millions and to push it towards industrialization. About one-third of the economy's total goods and services is generated by the agricultural sector. More than half the total labor force is engaged in agricultural activities. Thus agriculture plays a crucial role especially since the government spends huge amounts for credit in the countryside, research for improved crop varieties and suitable technologies, strengthening infrastructure support, and encouraging farmers to build self-help organizations (Mosher 1976).

Irrigation development has a logical and special role in this scheme of growth. Irrigation means water in plenty, which is as essential as the ingredients of labor, seed, sunlight, and air in food production. In the Philippines, irrigation systems are of two types: the national irrigation systems (NISs) or the agency-managed systems, and the communal irrigation systems (CISs) or farmer-owned and -managed systems. The National Irrigation Administration (NIA) began its participatory program in the communal systems in 1976, and encouraged by its positive results, started to transform the agency-managed systems or NIS into jointly farmer-NIA-managed systems with the ultimate aim of completely transferring operation and maintenance (O&M) responsibilities to the farmer irrigators associations (IAs). Literature shows that the involvement of farmers in the management of agency-operated systems brought about improvements in the overall systems performance. The government and farmers, as partners in managing agency-operated systems, possess immense potential for achieving effective systems performance (Jopillo and de los Reyes 1988).

Towards this end, the irrigation component of the Accelerated Agricultural Production Program (AAPP) implemented in 1987 aimed to build a core of sustainable and stable national irrigation systems in the three pilot regions, namely Regions V, VI and X. Strategies employed to achieve the program's objective were geared towards strengthening farmer irrigators associations and enhancing the ability of NIA as the lead implementing agency of the program's irrigation component, to work with farmer IAs. One such strategy is the adoption of the concept of the Farmer Irrigator Organizers Program (FIOP) implemented in 1983 whereby local farmers who were familiar with the irrigation system and understood the O&M problems were utilized as an indigenous force in IA organization and sustenance.

The Bicol Region or Region V, situated in the southeastern tip of the Luzon Island, comprises the six provinces of Albay, Camarines Norte, Camarines Sur, Catanduanes, Masbate and Sorsogon. It has an area of 1,763,258 hectares (ha), roughly six percent of the country's area. As of March 1989, the developed area with irrigation structures and facilities was a little over one half (52%) of the potential irrigable area of 212,833 ha, leaving the remaining area of 102,642 ha open for full development (Table 1).

As of March 1989, there were 14 national irrigation systems in Bicol, 13 of the gravity type and the remaining one a pump system, all of which have a total service area of 16,074 ha. These systems have been grouped into nine responsibility centers, namely: Daet-Talisay and Matogdon in Camarines Norte; Inarihan, Cagaycay, Barit, Buhi-Lalo and Libmanan/Cabusao in Camarines Sur; MNOH (Mahaba-Nasisi-Ogsong-Hibiga River Irrigation System) in Albay; and Bulan-San Francisco in Sorsogon. In addition, as of December 1988, there were 193 communal irrigation systems (CISs) constructed in the region by the NIA for a spread of 24,600 ha. Figure 1 shows the provincial and national irrigation systems' offices in Region V.

In September 1989, the project called the Bickl River Basin Irrigation Development Project (BRBDP) was completed. Funded by the Asian Development Bank (ADB), this project was expected to irrigate an additional 11,896 ha in the Naga-Calabanga and Rinconada areas in Camarines Sur.

Along with the endeavor of expanding the utilization of irrigation potential are efforts to optimize the use of available irrigation water which ultimately will redound to improving the level of service to the greatest number of farmers within the systems.

A basic problem of the systems though, is the difficulty in improving the system's capacity to deliver more irrigation water to the farmlands and enabling the irrigation system offices (ISOs) to raise the level of collection efficiency (NIA Project Paper, AAPP-FIOP). In 1987, for example, the average collection efficiency in the three pilot regions was a little over 50 percent with Region V lagging behind at 38 percent. As a consequence, while

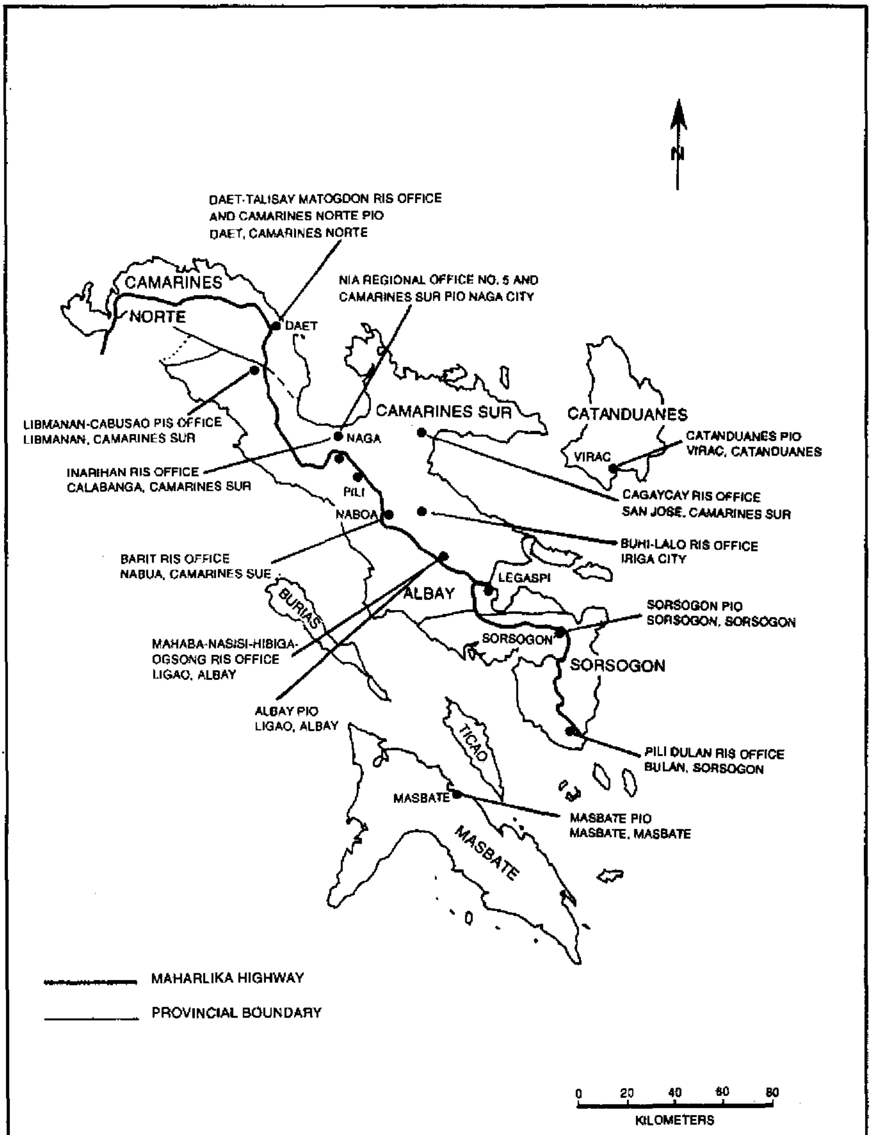
*Table 1. Status of irrigation development, 1989.*

| Province | Total land area (ha) | Total arable area (ha) | Potential irrigable area (ha) | Developed area | | | | | Percentage level of irrigation development | Remaining area for development |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | NIA assisted | | Other government agency | Private | Total | | |
| | | | | National | Communal | | | | | |
| 1. Albay | 255,260 | 158,570 | 50,049 | 1,947 | 7,463 | 1,436 | 12,631 | 23,477 | 47 | 26,572 |
| 2. Camarines Norte | 211,250 | 159,465 | 16,869 | 2,751 | 1,679 | 65 | 119 | 4,614 | 27 | 12,255 |
| 3. Camarines Sur | 526,680 | 326,125 | 106,171 | 16,799 | 31,360 | 5,228 | 14,012 | 67,399 | 63 | 38,772 |
| 4. Catanduanes | 151,150 | 36,745 | 4,189 | 0 | 1,327 | 328 | 0 | 1,655 | 40 | 2,534 |
| 5. Masbate | 404,770 | 281,382 | 19,419 | 0 | 3,104 | 0 | 202 | 3,306 | 17 | 16,113 |
| 6. Sorsogon | 214,140 | 160,356 | 16,136 | 1,200 | 4,517 | 775 | 3,248 | 9,740 | 60 | 6,396 |
| Total for Region V | 1,763,250 | 1,122,643 | 212,833 | 22,697 | 49,450 | 7,832 | 30,212 | 110,191 | 254 | 102,642 |

*Source:* NIA, Region V, Naga City.

*Note:* NIA = National Irrigation Administration.

*Figure 1. The provincial and national irrigation systems offices in Region V (Bicol).*



most national systems were viable at that time, Bicol had a viability index (ratio of income to O&M expenses) of only 0.62.

To deal with these problems, the NIA, as early as 1982, organized farmer irrigators associations in national systems. These groups assumed some operation and maintenance responsibilities under a contractual agreement with the NIA. An IA within the national system, for instance, can collect irrigation fees from farmers benefitted by the system and/or maintain irrigation facilities and implement minor repairs.

Considering the major responsibilities lodged at the IAs under these contractual arrangements, one can surmise that, to some extent, the national systems' viability as well as efficiency in irrigation water delivery is dependent on how well these associations fulfill their designated functions. A fundamental issue therefore is how the IAs can be strengthened and sustained to ensure that they will perform as desired. What then, makes the IAs behave as they do? Why do some groups succeed while others fail?

Chung and Megginson (1981) wrote that groups or associations exercise a profound impact on peoples' lives. Groups exist to satisfy most of their members' needs, especially those related to existence. Individuals, because of their limited capacity for self-sufficiency, must rely on other people to help them meet their needs and requirements. This interdependence provides the impetus and rationale for the formation of groups.

Groups, in general, go through three phases of development: formation, establishment of structure, and maturity. People are motivated to group themselves for many reasons, in most cases, social and economic. Once groups are formed, the members develop a pattern of relationships and interactions that guide and direct their behavior through group norms and individual roles. Some groups grow, mature and expand; others remain where they have started and fail to develop. Mature groups are characterized by their high level of trust, open communication, mutual influence, and commitment among the members so that concerted efforts bring forth the desired goal.

These attributes, including those that are included in this paper, form part of the organizational climate which presages the project's objectives. The term "climate" is used to designate the quality of the internal environment, the conditions of which affect, in turn, the quality of cooperation, the development of individual, the extent of members' dedication and commitment to organizational purpose, as well as the efficiency with which that purpose becomes translated into results. Climate is the atmosphere in which individuals help, judge, reward, constrain, and find out about each other. It influences the morale—the attitudes of the individual towards his work and his environment (Anthony and Dearden 1980). Taking the aforesaid into account, to what extent does organizational climate affect IA performance? In turn, how does it contribute to the performance efficiency of the NIS? Is there a significant relationship between NIS performance efficiency and production efficiency, considering that the latter is the ultimate goal of an agriculture-based economy like Bicol.

These concerns, when analyzed through responses of farmer-members and document perusal, are expected to assist the NIA and IAs develop policies and procedures that would enhance their performance and eventually achieve the desired farm production level. With this in view, this project attempted to answer the aforementioned questions while it endeavored to establish links between organizational climate, IA performance, and NIS performance efficiency.

## CHAPTER 2

# Objectives

IN GENERAL, THE objective of this research was to determine the management system that best relates to IAs' performance, thereby assisting NIA staff in devising procedures and arrangements to better manage a national system in which irrigators associations assume important systems management responsibilities. Specifically, the objectives were as follows:

1. To obtain the socioeconomic profile of the IA members and the profiles of IAs and the systems under study;

2. To describe the organizational climate of the IAs in the Bicol Region;

3. To find out the performance of IAs in terms of: collection rate, type of development, extent of IA participation in irrigation-related activities, member satisfaction with water adequacy, number of resolutions implemented, regularity and amount of amortization/remittance, and application efficiency;

4. To determine the NIS planning process, the qualifications of systems personnel and the condition of NIS physical facilities;

5. To find out the performance efficiency at the systems (NIS) level along the following indicators: viability index, cropping intensity, overall irrigation systems efficiency, water distribution efficiency, and satisfaction of IA members on NIA services;

6. To establish and analyze the relationship between organizational climate and IA performance;

7. To establish and analyze the relationship between IA performance, NIS planning process, qualifications of systems personnel and conditions of NIS performance efficiency; and

8. To relate systems performance efficiency to production efficiency.

To give a better perspective of the project, these objectives are reflected in the conceptual paradigm on page 18 (Figure 2).

CHAPTER 3

# Methodology

THIS PROJECT EMPLOYED both quantitative and qualitative methods of research. A survey of 375 farmer-respondents, 22 IA presidents, and four Irrigation Superintendents was conducted. The actual field observations were also undertaken for the water measurement component of the project. Moreover, case studies of two IAs, the selection of which was based on the IAs with the lowest and the highest performance as of 31 December 1989 were done. Secondary data were also gathered from the offices of the IAs, NISs, and the NIA Region V.

The survey covered a period of 10 months (November 1989 to August 1990); the case studies, two months (August 1990 to October 1990); and the water measurements component, five months (July 1990 to November 1990).

## INSTRUMENTS

Three sets of questionnaires were constructed, one each for the farmer-respondents, IA presidents, and irrigation superintendents. Pre-testing, validation, and translation of the research instruments from English to Bicol were done prior to their actual administration. Ten enumerators were fielded to administer the questionnaires. Callbacks were made with respondents who were not available during the first visit.

# SAMPLING DESIGN AND RESPONDENTS

## Systems Level

Administratively, the 14 national irrigation systems in Bicol are grouped into nine responsibility centers. In the selection of the sample NIS, one system per responsibility center was randomly chosen. Since there were eight gravity type systems and one pump system, only the gravity types were considered as the target population to ensure homogeneity. The inclusion of the pump system may also result in a lopsided analysis if comparisons between the two types were to be made. Fifty percent or four systems were selected using simple random sampling. These were: (1) MNOH in Albay, (2) Buhi-Lalo in Camarines Sur, (3) Daet-Talisay in Camarines Norte, and (4) Calabanga-Inarihan in Camarines Sur.

## IA Level

A total enumeration of IAs was done in the four systems sampled above. The number of IAs per system and the size of their respective memberships are shown in Table 2. The sample size of members was determined by using the Pagoso Formula:

$$n = \frac{N}{1 + N e^2}$$

where:

n = sample size
N = population
e = sampling error (.05)

This number was then proportionately allocated among the four systems. The sample size arrived at per system is likewise shown in Table 2. The distribution of sample size was in turn allocated proportionately at the IA level based on the size of IA membership in order to determine the final sample size per IA. These are presented in Table 3. The systematic random sampling method was used to determine the name of the farmer-respondents from the list of IA members as of 1989.

*Table 2. Distribution of IAs, size of membership and sample size per NIS.*

| Name of system | Number of IAs | Number of members (as of December 1988) | Sample size |
|---|---|---|---|
| MNOH | 6 | 1,414 | 85 |
| Buhi-Lalo | 9 | 3,285 | 202 |
| Daet-Talisay | 5 | 504 | 29 |
| Calabanga-Inarihan | 2 | 940 | 59 |
| Total | | 6,143 | 375 |

*Notes:* IAs = Irrigators associations.
NIS = National Irrigation System.

*Table 3. Distribution of sample respondents per IA/system.*

| Name of system under study | Name of IA | Sample size per IA |
|---|---|---|
| *Buhi-Lalo* | Bulriscofia | 96 |
| | Sajufia | 10 |
| | Sanbafia | 15 |
| | Ramcfia | 15 |
| | Lakfia | 14 |
| | Laymans | 15 |
| | Jemmavifia | 10 |
| | Pamasalovifia | 16 |
| | Vibuscruzfia | 11 |
| *Daet-Talisay* | DTRIS (Lateral B) | 11 |
| | Itomang | 3 |
| | DTRIS WMPA | 9 |
| | Pamorangon | 3 |
| | Cosan | 3 |
| *Calabanga-Inarihan* | Division A | 31 |
| | Division B | 28 |
| *MNOH* | Hibiga | 22 |
| | Mahaba | 18 |
| | Ogsong | 7 |
| | Taps | 11 |
| | Oas South Main | 9 |
| | Bahamas | 18 |

*Note:* IA = Irrigators association.

## STATISTICAL TREATMENT OF DATA

To describe the organizational climate in the IA systems under study, the NIS planning process, qualification of systems personnel, and the condition of NIS physical facilities, descriptive statistics such as frequency counts, percentages, rankings, means, weighted arithmetic means and rating scales were used. These tools were also applied in assessing IA and NIS performance. Meanwhile, in determining the degree of relationship of organizational climate to IA performance, the step-wise Multiple Regression from the MICROSTAT software package was used. The variables included in the model are presented below:

The Multiple Regression Model:

$$Y = B_0 + B_2 X_2 + B_3 X_3 + B_4 X_4 \ldots + B_{13} X_{13} + E_1$$

where:

$Y$ = weighted index of IA performance

$B_0$ = Y intercept

$B_1 \ldots B_{13}$ = Regression Coefficients of $X_1 \ldots X_{13}$, respectively

$X_2$ = effectiveness of organizational structure

$X_3$ = effectiveness of size membership

$X_4$ = degree of commitment

$X_5$ = extent of autonomy and flexibility

$X_6$ = clarity of goals

$X_{7a}$ = degree of trust in officers

$X_{7b}$ = degree of trust in fellow members

$X_{7c}$ = freedom to discuss irrigation-related problems with officers

$X_{7d}$ = freedom to discuss irrigation-related problems with members

$X_{7e}$ = extent to which views are heard

$X_8$ = degree of warmth and support

$X_9$ = fairness and recognition

$X_{10}$ = degree of public discussion of problems

$X_{11}$ = extent of IAs' contribution to personal aspiration

$X_{12}$ = extent of satisfaction with training

$X_{13}$ = actual size of membership

$E$ = error term

The data for the dependent variable were derived from the weighted sum of the values of performance indicators such as collection rate, years of operation, regularity and amount of amortization, number of resolutions formulated and implemented, extent of participation of members in irrigation-related activities, application efficiency, and the extent of satisfaction of members with water adequacy. Meanwhile, data for the independent variables were of the interval scale type except for $X_{13}$ where the actual number of members was used.

The hypothesis tested in the null was that organizational climate does not significantly affect IA performance:

The procedure in constructing the hypothesis was:

$$Ho: B_{7c} = B_8 = B_{10} = 0$$
$$Ha: B_{7c} = B_8 = B_{10} \neq 0$$

The F computed value was tested against the F tabular value at 10 percent level of significance and with 3, 13 degrees of freedom.

## CASE STUDIES

To substantiate and validate data gathered during the survey, case studies focusing on high-performing and low-performing IAs were conducted. Specifically, the researchers:

1. Identified/located the social setting of the IAs which were identified on the basis of their performance indices;

2. Gained entry into the social setting by going to the locus and establishing rapport with informants (IA officers, members and NIA personnel);

3. Conducted a "grand tour" of the setting/community to see and describe its characteristics in terms of resources, infrastructure, economic/social/cultural/educational activities, population, among others;

4. Conducted participant observations by staying in the social setting, observing and participating in the various activities of the informants, and conducting structured and unstructured interviews with informants in order to gain information on the life history of the IA, meaning of the irrigation systems and the IA of the informants, benefits and problems in the use of the system and social relations existing among the officers, members and NIA personnel;

5. Recorded in their field notes ethnographic data such as their experiences, observations, and responses to their interviews; and

6. Analyzed thematically the data gathered to see patterns in their activities such as participation in the IA; and

7. Wrote the final ethnographic report.

## SCOPE AND LIMITATION

The study only covered four non-FIOP gravity systems, but a complete enumeration of IAs in the selected systems was done. The FIOP areas were excluded considering that, at the time of the conducting of the study, IAs in the said areas did not have any past performance data.

A survey was conducted to determine the organizational climate of the IAs. Organizational climate data were obtained based on IA members' perception and quantified using a five-point Likert scale. Although the survey findings were validated by two case studies focusing on the highest and the lowest performing IAs, participant observation was not done in the other IAs.

This could have further substantiated results and thereby elicited a more reliable picture of organizational climate. The same observational technique could have been applied in assessing the NIS planning process. Meanwhile, the indicators of IA and NIS performance were largely based on secondary data.

The regression technique was used to relate the organizational climate with IA performance but the number of cases were limited to only twenty-two. In establishing relationship among variables at the systems level, correlation analysis was employed even if there were only four observations available. Relationship established at the systems level therefore has to be considered with caution since results may not be conclusive due to the very limited number of observations.

CHAPTER 4

# Conceptual Framework

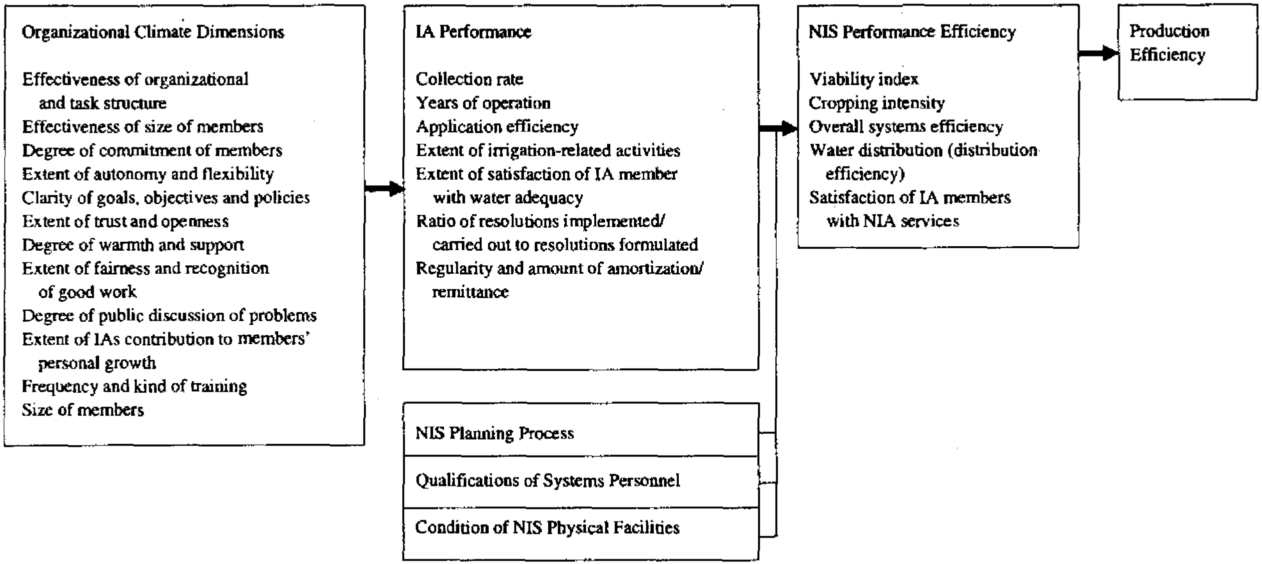
THIS STUDY WAS anchored on the premise that farm productivity depends, to a large extent, on the performance of the NIS in delivering and distributing water reliably, adequately, and equitably as reflected in its performance. Systems performance is influenced by a number of factors, such as IA performance, the NIS planning process, the educational qualifications of systems personnel, and the condition of NIS facilities. It was further hypothesized that IA performance is heavily influenced by the prevailing organizational climate, with a favorable organizational climate leading to increased participation and cooperation of farmer users in water management, which will ultimately result in a more efficient and effective utilization of irrigation water.

The schematic flow of data analysis is presented in Figure 2.

Organizational climate, in this context, refers to the values, attitudes, and underlying assumptions which determine how work gets done (Randall 1990). Specifically, it is the psychological characteristics of the IA measured through the members' perceptions, often group dimensions, namely: (1) effectiveness of organizational structure, (2) effectiveness of present size of membership, (3) degree of commitment of its members, (4) extent of autonomy and flexibility, (5) clarity of goals and objectives, (6) degree of trust and openness, (7) degree of warmth and support among its members, (8) fairness and recognition of good work, (9) degree of public discussion of problems, and (10) extent of IA's contribution to personal aspirations of its members. The actual size of membership and extent of satisfaction with training, although not part of the organizational climate, were considered as a variable which may influence the level of IA performance.

The performance of IAs was determined through a number of indicators such as, collection rate, years of operation, application efficiency, and extent of irrigation-related activities. Each indicator was given a weight depending on its relative importance in strengthening IAs as perceived by the IA presidents.

*Figure 2. Paradigm of the conceptual framework.*



The NIS planning process relates to the extent of participation of NIA vis-a-vis that of the IA in planning the cropping calendar as well as repair and maintenance activities.

The qualifications of systems personnel are defined by the educational attainments and years of experience of the Irrigation Superintendents (ISs) and the Water Masters.

The condition of NIS facilities refers to the physical state of irrigation structures which was assessed through ocular inspections.

As in the IA level, NIS performance efficiency was measured by a number of indicators such as: (1) the viability index, (2) cropping intensity, (3) overall systems efficiency, (4) distribution efficiency, and (5) extent of IA members' satisfaction with NIA services. Each indicator was assigned a weight based on the perception of the Irrigation Superintendent (IS) on its level of contribution to systems performance.

Finally, the production ratio refers to the ratio of the average yield per hectare to the highest possible yield across the systems. Production data gathered from the survey were validated using the crop-cut technique.

## QUANTIFICATION OF VARIABLES

In order to have a measurable basis to relate them, the variables previously mentioned were quantified as follows:

1. Organizational climate—This was based on the responses of farmer-respondents quantified by using a five-point Likert scale described as follows:

   1 — not or none at all
   2 — a little
   3 — somewhat
   4 — much
   5 — very much

Individual responses per question falling under each dimension were averaged to come up with one rating per category.

2. Size of membership—This was based on the actual number of IA members registered in 1989.

3. IA performance—Refers to the weighted sum of the values of IA performance indicators from January to September 1990. These values were determined by the following formulae and weights:

a) collection rate

$$= \frac{\text{actual collection}}{\text{target collection}}$$

b) type of development

$$= \frac{\text{type of IA development}}{3}$$

c) regularity and amount of amortization/remittance

$$= \frac{\text{number of times of actual payment of amortization/remittance to NIA}}{\text{number of times IA is supposed to pay}} \times .50 + \frac{\text{actual amortization of amortization/remittance}}{\text{target amortization of amortization/remittance}} \times .50$$

d) resolutions implemented/carried out to resolutions formulated

$$= \frac{\text{actual number of resolutions implemented}}{\text{highest number of resolutions implemented in 1989}} \times .50 + \frac{\text{actual number of resolutions implemented by the 22 IAs in 1989}}{\text{number of resolutions formulated}}$$

e) extent of IA participation in irrigation-related activities

$$= \frac{\text{actual length of canals maintained and improved}}{\text{target}} \times .70 + \frac{\text{perception of IA presidents as to extent of participation of IA members}}{\text{highest response possible}} \times .30$$

f) application efficiency $= \dfrac{W_u}{W_a}$

where: $W_a$ = water that reaches the place of use
$W_u$ = water that is actually utilized

g) satisfaction of IA members with water adequacy $= \dfrac{\text{perception of IA members on water adequacy}}{\text{highest response possible}}$

4. NIS planning process—The perception of Irrigation Superintendents as to the extent of participation of the NIS office vis-a-vis that of the IA in planning the cropping calendar and repair and maintenance activities measured in percentages. The degree of farmers' participation was measured by subtracting this value from 100 percent.

5. Qualification of systems personal $= \dfrac{\text{actual number of years in college}}{4} \times .4$

$$+ \frac{\text{number of years of experience in work related to present work}}{\text{highest number of years reported by respondents}} \times .6$$

6. Condition of NIS facilities—Based on the perceptions of researchers as to the present state of physical structures expressed in percentage where 100 percent represented a structure of excellent condition.

7. NIS performance—Refers to the weighted sum of NIS performance indicators. Values were arrived at using the formulae below:

a) cropping intensity $= \dfrac{\text{total area cropped}}{\text{total service area}}$

b) viability index $= \dfrac{\text{total income}}{\text{operation and maintenance expenditure}}$

c) collection efficiency $= \dfrac{\text{actual collection}}{\text{expected collection}}$

d) distribution efficiency = 1 – (dt/n)/A x 100

where: dt = summation of absolute deviations of amount received in a section from the average amount of water received by the system

A = average amount of water received by the system as a whole

n = number of sections

e) overall systems efficiency = Ec x Ea

where: $E_c$ = conveyance efficiency

Ea = application efficiency

f) satisfaction of IA members with NIA services = based on members' perception computed as follows:

$$\frac{\text{actual response}}{\text{highest possible response}}$$

g) Production efficiency $= \frac{Y}{Y_p}$

where: $Y$ = average yield/ha

$Y_p$ = highest possible yield/ha.

CHAPTER 5

# Presentation of Findings, Analysis, and Interpretation of Data

## RESPONDENTS' PROFILE

PRESENTED HEREIN IS the profile of the 375 respondents across the four systems covered by the study (refer Tables 4.1, 4.2, 4.3 and 4.4).

### Gender and Civil Status

The membership of the IAs was predominantly male (87%) and married (85%).

The IAs in Bicol could perhaps explore the possibility of encouraging women to take a more active part in their undertakings. Considering that performance of IAs depends heavily on collection efficiency, inviting the wives of the farmers to participate in the organization may have a considerable impact on the collection rate inasmuch as the women hold the purse strings and budget the family income. Although, in general, the household head becomes the registered member since membership to the IA is granted based on land ownership or right to till the land, women's contribution may still be tapped by encouraging their participation in other IA activities which are not exclusive to registered members. For instance, a study on the role of women in irrigation (Illo 1982) disclosed that the all-male board of communal systems in the Philippines considered it natural to send their wives to meetings as proxies, because they adhere to the belief that women are as concerned about farming matters as their spouses. Along this line, women, particularly the wives of turnout service area leaders can also be organized into auxiliary groups to carry out support activities like ISF collection campaign activities.

## Age

Almost half or 48 percent of the respondents belonged to the age group of 55 years and above, and more then a quarter or 29 percent belonged to the age group of 45 to 54 years. The average age of the respondents was 52 years. Comparing the four systems, Inarihan registered the lowest average age of 49 years followed by Daet-Talisay, 51 years. Respondents from both the Buhi-Lalo System and MNOH have reported an average age of 53 years. Considering that family life in the rural areas starts at a relatively early age, members of the IAs may be considered very old which could be one factor for the low farm productivity and below-average IA performance. The advanced age of the IA members might provide an insight into their level of receptiveness to change or their acceptance of new technologies. These should be taken into account in designing training programs for them.

## Educational Attainment

Almost half of the total number interviewed (49%) had only some elementary education. A few (15%) had some secondary education while about the same number finished the elementary grades. About 11 percent and 4 percent finished the secondary and college levels, respectively, while only 3 percent had some college education. About the same number had no formal education at all. This educational attainment profile of the respondents is the same in all the systems under study, except for Buhi-Lalo where a great majority of the respondents (61%) had only some elementary education. This fact should guide those who will conduct training programs for IA members in future: that such programs should be designed and delivered in a manner understood by those who have reached only the elementary grade level. Table 4.1 shows the respondents profile in terms of sex, civil status, age and educational attainment.

*Table 4.1. Respondents' profile by system showing sex, civil status, age and educational attainment.*

| Respondents' profile | | Buhi-Lalo | | Daet-Talisay | | Inarihan | | MNOH RIS | | Grand total | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | f | Percentage | f | Percentage | f | Percentage | f | Percentage | f | Percentage |
| ***Sex:*** | Male | 179 | 88.61 | 24 | 82.76 | 54 | 91.52 | 68 | 80.00 | 325 | 86.67 |
| | Female | 23 | 11.39 | 5 | 17.24 | 5 | 8.48 | 17 | 20.00 | 50 | 13.33 |
| ***Civil status:*** | Single | 3 | 1.48 | 3 | 10.34 | 4 | 6.78 | 6 | 7.06 | 16 | 4.27 |
| | Married | 174 | 86.14 | 25 | 86.21 | 53 | 89.83 | 68 | 80.00 | 320 | 85.33 |
| | Widow/Widower | 25 | 12.38 | 1 | 3.45 | 2 | 3.39 | 11 | 12.94 | 39 | 10.40 |
| ***Age:*** | 25–29 | — | — | 1 | 3.44 | 4 | 6.79 | 1 | 1.18 | 6 | 1.60 |
| | 30–34 | 5 | 2.46 | | | 5 | 8.47 | 4 | 4.71 | 14 | 3.73 |
| | 35–39 | 16 | 7.88 | 4 | 13.79 | 3 | 5.08 | 2 | 2.35 | 24 | 6.40 |
| | 40–44 | 24 | 11.82 | 2 | 6.90 | 9 | 15.25 | 8 | 9.41 | 43 | 11.47 |
| | 45–49 | 23 | 11.33 | 7 | 24.14 | 8 | 13.56 | 15 | 17.65 | 53 | 14.13 |
| | 50–54 | 37 | 18.23 | 2 | 6.90 | 6 | 10.17 | 9 | 10.58 | 54 | 14.40 |
| | 55–Over | 98 | 48.28 | 13 | 44.83 | 24 | 40.68 | 46 | 54.12 | 181 | 48.27 |
| | Average age | | 52.56 | | 50.76 | | 48.9 | | 52.92 | | 51.83 |
| ***Educational attainment:*** | | | | | | | | | | | |
| College graduate and above | | 3 | 1.48 | 1 | 3.45 | 2 | 3.39 | 10 | 11.76 | 16 | 4.27 |
| Some college education | | 3 | 1.48 | 3 | 10.34 | 3 | 5.08 | 1 | 1.16 | 10 | 2.67 |
| Secondary school graduate | | 17 | 8.42 | 1 | 3.45 | 11 | 18.64 | 12 | 14.12 | 41 | 10.92 |
| Some secondary education | | 31 | 15.35 | 3 | 10.34 | 12 | 20.34 | 11 | 12.94 | 57 | 15.20 |
| Elementary school graduate | | 20 | 9.90 | 8 | 27.59 | 9 | 15.26 | 18 | 21.18 | 55 | 14.67 |
| Some elementary school education | | 123 | 60.89 | 12 | 41.38 | 20 | 33.90 | 28 | 32.94 | 183 | 48.80 |
| No formal education | | 5 | 2.48 | 1 | 3.45 | 2 | 3.39 | 2 | 2.35 | 10 | 2.67 |
| No response | | | | | | | | 3 | 3.53 | 3 | 0.80 |
| Total | | 202 | 100.00 | 29 | 100.00 | 59 | 100.00 | 85 | 100.00 | 375 | 100.00 |

*Note:* f = Number of farmers.

## Tenurial Status

Two out of every five respondents (44%) were tenants while more then one third (38%) were owner-operators (refer Table 4.2). As mentioned earlier, membership in the IA is granted based on land ownership or right to till the land. In the latter case, the IA membership is transferred to the tenant as part of the contract with the land owner.

## Off-Farm Occupation

Two-thirds of the respondents were full-time farmers while one-third pursued part-time jobs to supplement their farm income. The latter includes agricultural workers (9%), vendors/entrepreneurs (7%), laborers (4%), and fishermen (3%) (see Table 4.2).

## Size of Household

A majority of the respondents (57%) belonged to medium-sized households of 5–8 members each. Those who belonged to the household size of one to four members came next at 27 percent, followed by those who belonged to large households of 9–12 members (13%). Less than 1 percent of the respondents belonged to the highest household size of 13–16 members. The average family size across the four systems was six, except in Daet-Talisay which registered a smaller average household size of five members (see Table 4.2).

## Total Farm Area

A great majority (72%) cultivated a farm area of less than 2 ha. Half of this number, however, owned less than a hectare of farm land. The rest of the respondents were distributed, according to size of landholding, as follows: 13 percent with 2 to 2.9 ha; 8 percent with 3 to 3.9 ha; 2 percent with 4 to 4.9 ha; and 0.5 percent with 5 ha and above. The average farm size was 1.5 ha, which closely approximated the actual farm holding of members based on IA records. Buhi-Lalo had the smallest average farmland of 1.25 ha while

MNOH had the biggest at 1.79 ha. Almost all of these lands were used for rice production (see Table 4.2).

## Experience of Major Calamity

Almost all of the respondents (94.7%) had experienced the effects of at least one major calamity for the past three years, mostly a combination of typhoon and pest infestation (49.3%). A quarter considered pest infestation alone as the more serious calamity they had reckoned with so far while about one-fifth considered the typhoon as the more serious one. The rest reported having experienced floods or a combination of the three aforementioned calamities. The extent of the damage to the farm was considered to be serious to very serious by the great majority of the respondents (see Table 4.3).

## Expenditure Patterns

On the average, the respondents reported that 61.1 percent of their income went to household expenses, food in particular; 18.1 percent to education, and 8.6 percent to medical expenses. Production and other expenses ate up only about 7.5 percent and savings was 4.7 percent. The same trend was exhibited across the four systems (see Table 4.4).

# IA PROFILE

The following discussion dwells on the profile of the 22 irrigators associations across the four systems covered by the study. Data on the IA profile were gathered from interviews with IA and NIS officials and from records of IAs and the NIS Office.

*Table 4.2. Respondents' profile by system showing tenurial status, off-farm occupation, size of household and total farm area.*

| | Buhi-Lalo | | Daet-Talisay | | Inarihan | | MNOH RIS | | Grand total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | f | Percentage | f | Percentage | f | Percentage | f | Percentage | f | Percentage |
| ***Tenurial status:*** | | | | | | | | | | |
| Tenant | 82 | 40.59 | 13 | 44.83 | 37 | 62.71 | 33 | 38.82 | 165 | 44 |
| Lease holder | 16 | 7.92 | 5 | 17.24 | 2 | 3.39 | 14 | 16.47 | 37 | 9.87 |
| Amortization owner | 6 | 2.97 | 2 | 6.90 | 4 | 6.78 | 7 | 8.24 | 19 | 5.06 |
| Owner-operator combination | 93 | 46.04 | 9 | 31.03 | 14 | 23.72 | 28 | 32.94 | 144 | 38.40 |
| a) 1/4 tenant | 3 | 1.48 | | | | | | | | |
| owner/operator | | | | | | | 3 | 3.53 | | 1.60 |
| b) 1/3 tenant | | | | | 1 | 1.70 | | | 1 | 0.27 |
| amortization/owner | | | | | | | | | | |
| c) 3/4 amortization | 1 | 0.50 | | | 1 | 1.70 | | | 2 | 0.53 |
| owner/owner operator | | | | | | | | | 1 | 0.27 |
| No response | 1 | 0.50 | | | | | | | | |
| ***Off-farm occupation:*** | | | | | | | | | | |
| Vendor/entrepreneur | 11 | 5.45 | 3 | 10.34 | 4 | 6.78 | 8 | 9.41 | 26 | 6.94 |
| Fishermen | 2 | 0.99 | 1 | 6.90 | 6 | 10.17 | 1 | 1.18 | 11 | 2.93 |
| Government employee | 5 | 2.48 | | | 2 | 3.39 | 2 | 2.35 | 9 | 2.40 |
| Laborer | 3 | 1.49 | | | 5 | 8.48 | 6 | 7.06 | 14 | 3.73 |
| Hired agricultural worker | 26 | 12.86 | | | 3 | 5.08 | 2 | 2.35 | 31 | 8.27 |
| Others | 10 | 4.95 | 6 | 20.69 | 8 | 13.56 | 12 | 14.12 | 36 | 9.60 |
| No response or none | 145 | 71.78 | 18 | 62.07 | 31 | 52.54 | 54 | 63.53 | 248 | 66.13 |

*(Continued on page 31.)*

(Table 4.2 continued.)

| | Buhi-Lalo | | Daet-Talisay | | Inarihan | | MNOH RIS | | Grand total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | f | Percentage | f | Percentage | f | Percentage | f | Percentage | f | Percentage |
| ***Size of household:*** | | | | | | | | | | |
| 1–4 | 60 | 29.70 | 9 | 31.03 | 10 | 16.95 | 23 | 27.06 | 102 | 27.20 |
| 5–8 | 107 | 52.97 | 18 | 62.07 | 40 | 67.80 | 49 | 57.65 | 214 | 57.07 |
| 9–12 | 30 | 14.85 | 2 | 6.90 | 9 | 15.25 | 9 | 10.59 | 50 | 13.33 |
| 13–16 | 1 | 0.50 | | | | | 2 | 2.35 | 3 | 0.80 |
| No response | 4 | 1.98 | | | | | 2 | 2.35 | 6 | 1.60 |
| ***Average household number*** | 6 (or 5.60) | | 5 (or 5.41) | | 6 (or 6.40) | | 6 (or 6.12) | | 6 (or 5.83) | |
| ***Total farm area (ha)*** | | | | | | | | | | |
| Below–0.9 | 92 | 45.54 | 6 | 20.69 | 16 | 27.12 | 23 | 27.06 | 137 | 36.53 |
| 1.0–1.9 | 63 | 31.19 | 13 | 44.83 | 25 | 42.37 | 33 | 38.82 | 134 | 35.73 |
| 2.0–2.9 | 23 | 11.39 | 8 | 27.58 | 6 | 10.17 | 10 | 11.76 | 47 | 12.53 |
| 3.0–3.9 | 14 | 6.93 | 1 | 3.45 | 7 | 11.86 | 9 | 10.59 | 31 | 8.27 |
| 4.0–4.9 | 4 | 1.98 | 1 | 3.45 | | | 4 | 4.71 | 9 | 2.40 |
| 5.0–above | 4 | 1.98 | | | 5 | 8.48 | 6 | 7.06 | 15 | 4 |
| No response | 2 | 0.99 | | | | | | | 2 | 0.53 |
| ***Total farm area (average)*** | | 1.26 | | 1.68 | | 1.75 | | 1.79 | | 1.49 |

*Note:* f = Number of farmers.

*Table 4.3. Respondents' profile by system showing experience and nature of major calamity and extent of damage.*

| | Buhi-Lalo | | Daet-Talisay | | Inarihan | | MNOH RIS | | Grand total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | f | Percentage | f | Percentage | f | Percentage | f | Percentage | f | Percentage |
| ***Experience of major calamity:*** | | | | | | | | | | |
| Yes | 192 | 95.05 | 28 | 96.55 | 57 | 96.61 | 78 | 91.76 | 355 | 94.67 |
| No | 8 | 3.96 | 1 | 3.45 | 2 | 3.39 | 7 | 8.24 | 18 | 4.80 |
| No response | 2 | 0.99 | | | | | | | 2 | 0.53 |
| ***Nature of major calamity:*** | | | | | | | | | | |
| Typhoon | 39 | 20.31 | | | 24 | 42.10 | 14 | 17.95 | 77 | 21.69 |
| Pest | 46 | 23.96 | 13 | 46.43 | 13 | 22.81 | 26 | 33.33 | 99 | 27.61 |
| Flood | 1 | 0.52 | | | | | | | 1 | 0.28 |
| Typhoon/pest | 103 | 53.65 | 14 | 50.00 | 20 | 35.09 | 32 | 41.04 | 169 | 47.61 |
| Typhoon/flood | | | 1 | 3.57 | | | 2 | 2.56 | 3 | 0.84 |
| Pest/flood | 1 | 0.52 | | | | | 2 | 2.56 | 3 | 0.84 |
| Typhoon/pest/flood | | | | | | | 2 | 2.56 | 2 | 0.56 |
| No response | 2 | 1.04 | | | | | | | 2 | 0.56 |
| Total | 192 | 100.00 | 28 | 100.00 | 57 | 100.00 | 78 | 100.00 | 356 | 100.00 |
| ***Extent of damage:*** | | | | | | | | | | |
| Very serious | 42 | 21.88 | 13 | 46.43 | 21 | 36.84 | 26 | 33.33 | 102 | 28.73 |
| Serious | 85 | 44.27 | 11 | 39.29 | 23 | 40.35 | 23 | 29.49 | 142 | 40.00 |
| A little serious | 57 | 29.69 | 4 | 14.28 | 13 | 22.81 | 23 | 29.49 | 97 | 27.33 |
| Not serious | 7 | 3.64 | | | | | 6 | 7.69 | 13 | 3.66 |
| No response | 1 | 0.52 | | | | | | | 1 | 0.28 |

*Note:* f = Number of farmers.

*Table 4.4. Expenditure patterns of respondents by system.*

| IA / System | Average percentage distribution of annual expenditure by system | | | | | |
|---|---|---|---|---|---|---|
| | Savings | Household expenses | Educational | Medical | Others | Total |
| Lakfia | 3.43 | 55.57 | 25.43 | 4.64 | 10.93 | 100.00 |
| Laymansfia | 1.33 | 68.20 | 18.53 | 3.20 | 8.74 | 100.00 |
| Vibuscruzfia | 1.64 | 71.26 | 14.71 | 6.21 | 6.18 | 100.00 |
| Ramcfia | 2.13 | 66.68 | 17.74 | 2.62 | 10.63 | 100.00 |
| Sanbafia | 3.67 | 56.00 | 17.20 | 2.67 | 20.46 | 100.00 |
| Sajufia | 1.00 | 72.50 | 24.50 | 2.00 | 0.00 | 100.00 |
| Bulriscofia | 3.02 | 55.81 | 21.75 | 14.09 | 5.33 | 100.00 |
| Jemmavifia | 2.11 | 80.28 | 8.44 | 4.90 | 4.27 | 100.00 |
| Pamasalovifia | 1.25 | 53.31 | 29.38 | 13.12 | 2.94 | 100.00 |
| Buhi-Lalo RIS | 2.18 | 64.42 | 19.74 | 5.94 | 7.72 | 100.00 |
| DTRIS | 0.00 | 52.50 | 18.00 | 19.00 | 10.50 | 100.00 |
| Itomang | 0.00 | 75.00 | 25.00 | 0.00 | 0.00 | 100.00 |
| DTRIS WMPA | 5.70 | 56.98 | 27.22 | 8.30 | 1.80 | 100.00 |
| Pamoyangon | 0.00 | 39.33 | 38.33 | 15.00 | 7.34 | 100.00 |
| Cosan | 2.50 | 56.20 | 18.21 | 0.75 | 22.30 | 100.00 |
| Daet-Talisay RIS | 1.64 | 56.00 | 25.36 | 8.61 | 8.39 | 100.00 |
| Calabanga Division A | 8.17 | 59.11 | 10.53 | 12.92 | 9.27 | 100.00 |
| Calabanga Division B | 7.19 | 62.08 | 13.49 | 10.22 | 7.02 | 100.00 |
| Inarihan RIS | 7.68 | 60.60 | 12.01 | 11.57 | 8.14 | 100.00 |
| Hibiga | 11.05 | 56.36 | 20.24 | 7.90 | 4.45 | 100.00 |
| Mahaba | 7.03 | 67.93 | 14.74 | 4.23 | 6.07 | 100.00 |
| Ogsong | 5.00 | 63.86 | 14.43 | 7.57 | 9.14 | 100.00 |
| Taps | 10.71 | 66.43 | 7.40 | 11.04 | 4.42 | 100.00 |
| Oas South | 6.88 | 60.83 | 15.62 | 11.39 | 5.28 | 100.00 |
| Bahamas | 3.74 | 64.32 | 19.05 | 7.26 | 5.63 | 100.00 |
| MNOH RIS | 7.40 | 63.29 | 15.25 | 8.23 | 5.83 | 100.00 |
| General average | 4.72 | 61.08 | 18.09 | 8.59 | 7.52 | 100.00 |

## Period of IA Organization

Of the 22 IAs covered by the study, 15 were organized during the period 1980–1984, 5 were formed between 1985 and 1989 and the rest were organized before 1980. The newest IA, reportedly created in 1988, was merely a reactivation of an inoperative water user organization. In terms of the number of years in operation, almost all IAs (82%) have already been operating for five years or more. If likened to a business cycle, a firm which has been in existence for at least five years can already be considered successful. However, most of these IAs, as results later would show, are still in their infant stage. On the part of NIA, a Type III contract wherein an IA can fully own the irrigation system is granted to those associations that have manifested considerable success in terms of collection efficiency (of at least 75%). Although this is a very limited criterion by which to judge an IA's level of development, it is the one presently used by the NIA in the absence of other alternative parameters. At present, 6 IAs have Stage or Type II contracts whereby IAs assume the collection function and/or undertake maintenance and minor repairs, while 10 have no existing O&M contract with the NIA at the time of the survey. Only six IAs, all in the MNOH System, being classified as Type III, have completely assumed management of the system. Details are presented in Table 5.

## Size of Membership

The IAs in the four systems had an average of 175 registered members in 1987. This number dramatically grew to 307 in 1989—an increase of 75 percent over a three-year period (1987–1989). As of 1989, almost all of the potential members have been registered. This implies that more and more farmers have been enjoined to become members of IAs. This growth in the general membership is viewed positively since this directly indicates the increasing importance of the IA among farmers. However, such a growth in membership necessitates that the IA's organizational structure as well as its policies be of such a nature in order to enable the IA to effectively respond to the needs of a growing number of members, elicit a higher level of participation among them, and efficiently attain organizational goals and objectives (see Table 5).

## Area Covered and Irrigated

The average area covered by the IAs is 332 ha, of which about 90 percent had been irrigated as of December 1989. The potential area for irrigation, therefore, has yet to be serviced. Considering the average size of 307 members per IA, each member tills an average of about 1.08 ha of irrigated farmland, which nearly approximates the average farm size of 1.4 ha, as determined by the survey (see Table 5).

## Objectives/Goals/Mission of IAs

The IA presidents were asked to describe the objectives, goals, as well as the mission of the association over which they preside. In order to make sure that the respondents understood what they were being asked, these terms were operationally defined as follows:

Objectives—those which the IA would want to achieve within a year.

Goals—those which the IA would like to attain in the long-run (in the next five years).

Mission—the purpose/reason for which the IA was established.

The majority of the presidents responded that the IA objectives are to provide an adequate water supply to its members through canal construction and repair, and to improve fee collection. Although the attainment of higher collection efficiency appears to be more favorable to the NIA, the IAs also have something to gain considering that under the Type II or Stage II IA-NIA contract, the association stands to collect a bigger percentage share when a higher collection efficiency is attained. Under the full turnover or Type III/Stage III contract, the ISF collection becomes the IA income and payment to the NIA becomes a fixed amount referred to as an amortization fee. Of the 22 IAs whose presidents were interviewed, 10 have no existing operation and maintenance contracts with the NIA although they are already involved in the planning of the cropping calendar as well as in water distribution.

In the next five years, all the IAs plan to further enhance their performance either by lining canals, tapping other funding agencies, achieving a 100 percent collection rate, expanding irrigated areas, instilling more discipline among members, and diversifying IA functions to include the procurement of agricultural inputs and centralized marketing of members' produce.

*Table 5. Irrigators association profile by system.*

| Profile/System | Buhi-Lalo | Daet-Talisay | Inarihan | MNOH RIS | Grand total/ Average |
|---|---|---|---|---|---|
| ***Organized date:*** | | | | | |
| Before 1980 | — | 1 | — | 1 | 2 |
| 1980–1984 | 7 | 3 | 1 | 4 | 15 |
| 1985–1989 | 2 | 1 | 1 | 1 | 5 |
| ***Average size of membership:*** | | | | | |
| 1987 | 194 | — | 375 | 164 | 175 |
| 1988 | 218 | 99 | 400 | 150 | 187 |
| 1989 | 402 | 120 | 400 | 254 | 307 |
| Average service area (ha) | 301.93 | 188.51 | 950 | 289.33 | 331.63 |
| Percentage irrigated | 93 | 85 | 78 | 98 | 90 |
| ***Type of development:*** | | | | | |
| No O&M contract | 3 | 5 | 2 | — | 10 |
| Type/Stage II | 6 | — | — | — | 6 |
| Type/Stage III | — | — | — | 6 | 6 |

When asked about the IA mission, most of the presidents claimed that the primordial reason for organizing IAs was to uplift the quality of life of members through farmer unity.

## ORGANIZATIONAL CLIMATE OF IRRIGATORS ASSOCIATIONS

As earlier defined, organizational climate refers to the values, attitudes, and underlying assumptions which determine how the work gets done. The farmer as a member of an irrigators association moves within the organizational milieu that creates the conditions that would determine his patterns of behavior. Whether that behavior will contribute to the effectiveness of the organization or not is largely determined by his perceptions of his work environment.

The study looked into 10 dimensions of the organizational climate of irrigators associations as measured by the perceptions of farmer-members. The following discussion presents how the 375 farmer-respondents saw their organizational environment, specifically in terms of the effectiveness of the organizational and task structures; effectiveness of size of membership in attaining unity and cohesiveness; degree of commitment among members; clarity of goals, objectives and policies; extent of trust and openness among members; degree of warmth and support among members; extent of fairness and recognition of good work; degree of public discussion of problems and the extent of IAs' contribution to members' personal growth. The frequency distribution of respondents for each dimension of organizational climate is presented in Table 6 while the average response of the 375 farmer-respondents in the different dimensions of the organizational climate as well as the composite rating per IA are shown in Figures 3 and 4. Figure 3 shows that almost all of the IAs fall within the rank of 3 described as moderately strong IAs. Only one was categorized as having a very strong organizational climate, while another was pictured as weak. Looking at the average response per organizational climate dimension (Figure 4), one would note that clarity of goals, training, effectiveness of organizational task structure, degree of autonomy and flexibility and effectiveness of size of membership were among the lowest-rated aspects.

Although the organizational structures were in place, IA members perceived them as ineffective. The IA members did not seem to exhibit a sense of cohesiveness since most IAs had relatively large membership bases. These members also lacked awareness of the organizational goals and were not conscious of their individual tasks as well as extent of participation in the affairs of the organization. This has resulted in the members' half-hearted commitment. Some of the significant findings on the various dimensions of the organizational climate of IAs are highlighted below:

## Effectiveness of Organizational and Task Structure

The farmer-respondents were asked whether their present organizational structure is effective in accomplishing the goals and objectives of the IA; achieving smooth and speedy flow of information; defining authority, duties,

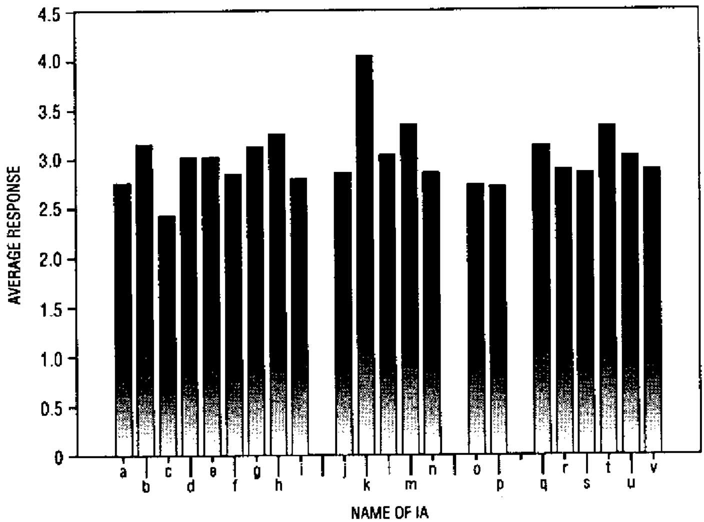
*Table 6. Summary table of organizational climate of IAs as perceived by members.*

| Response category | Organizational climate | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | X2 | X3 | X4 | X5 | X6 | X7a | X7b | X7c | X7d | X7e | X8 | X9 | X10 | X11 |
| 0—No response | 17.07 | 9.87 | 0.27 | 11.47 | 12.27 | 0.80 | 0.80 | 3.08 | 0.80 | 4.80 | 14.67 | 1.60 | 1.60 | 0.53 |
| 1—Not at all | 6.93 | 5.60 | 8.80 | 8.27 | 9.90 | 1.36 | 1.86 | 1.86 | 1.86 | 4.53 | 3.20 | 14.67 | 14.67 | 4.27 |
| 2—A little | 16.00 | 16.00 | 26.40 | 16.53 | 17.37 | 15.47 | 18.93 | 8.26 | 6.93 | 192.00 | 10.67 | 16.80 | 16.80 | 12.53 |
| 3—Somewhat | 39.47 | 49.06 | 39.73 | 43.73 | 41.33 | 54.13 | 52.80 | 52.80 | 53.33 | 41.06 | 35.37 | 44.00 | 44.00 | 45.34 |
| 4—Much | 15.20 | 14.67 | 17.07 | 12.27 | 14.40 | 21.33 | 19.20 | 25.60 | 27.20 | 12.26 | 21.33 | 15.47 | 15.47 | 26.93 |
| 5—Very much | 5.33 | 4.80 | 7.73 | 7.73 | 4.53 | 7.20 | 6.40 | 10.66 | 9.86 | 18.13 | 14.66 | 7.46 | 7.46 | 10.40 |
| | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Average response | 2.45 | 2.70 | 2.88 | 2.60 | 2.50 | 3.16 | 3.07 | 3.32 | 3.34 | 3.06 | 2.90 | 2.80 | 3.11 | 3.25 |

*Legend:* $X_2$ Effectiveness of organizational structure.
$X_3$ Effectiveness of size membership.
$X_4$ Degree of commitment.
$X_5$ Extent of autonomy and flexibility.
$X_6$ Clarity of goals.
$X_{7a}$ Degree of trust in officers.
$X_{7b}$ Degree of trust in fellow members.
$X_{7c}$ Freedom to discuss irrigation-related problems with officers.
$X_{7d}$ Freedom to discuss irrigation-related problems with members.
$X_{7e}$ Extent to which views are heard.
$X_8$ Degree of warmth and support.
$X_9$ Fairness and recognition.
$X_{10}$ Degree of public discussion of problems.
$X_{11}$ Extent of IAs' contribution to personal aspirations.

*Note:* IAs = Irrigators associations.

*Figure 3. Organizational climate of irrigators associations.*




*Legend I:* Name of System:

Buhi-Lalo

a. Bulriscofia
b. Sajufia
c. Sanbafia
d. Ramcfia
e. Lakfia
f. Laymans
g. Jemmavifia
h. Pamasalovifia
i. Vivuscruzfia

Daet-Talisay

j. DTRIS
k. Itomang
l. DTRIS WMPA
m. Pamorangon
n. Cosan

Inarihan

o. Division A
p. Division B

MNOH

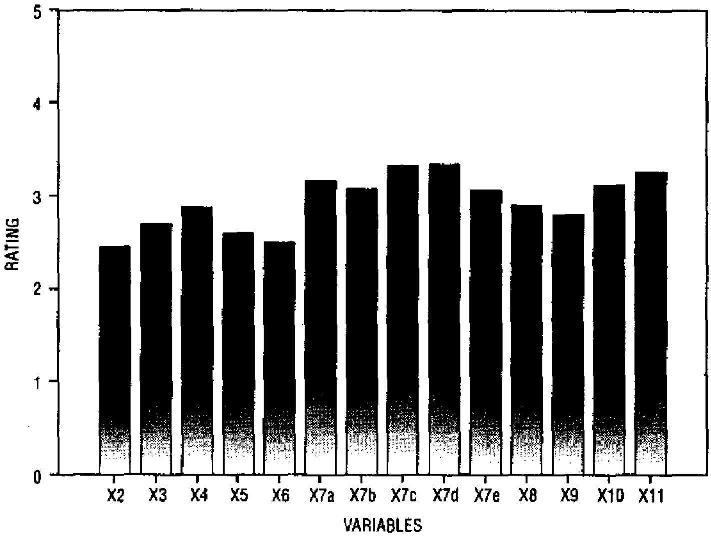
q. Hibiga
r. Mahaba
s. Ogsong
t. Taps
u. Oas South Main
v. Bahamas

*Legend II:* Description of Scale:

1. Very weak.
2. Weak.
3. Moderately strong.
4. Strong.
5. Very strong.

*Note:* IA = Irrigators association.

*Figure 4. Dimensions of organizational climate (based on average response of respondents).*




| | | |
|---|---|---|
| *Legend I:* | 1. | Not at all. |
| | 2. | A little. |
| | 3. | Somewhat. |
| | 4. | Much. |
| | 5. | Very much. |
| *Legend II:* | $X_2$ | Effectiveness of organizational structure. |
| | $X_3$ | Effectiveness of size membership. |
| | $X_4$ | Degree of commitment. |
| | $X_5$ | Extent of autonomy and flexibility. |
| | $X_6$ | Clarity of goals. |
| | $X_{7a}$ | Degree of trust and openness of respondents and IA officials. |
| | $X_{7b}$ | Degree of trust in fellow members. |
| | $X_{7c}$ | Freedom to discuss irrigation-related problems with officers. |
| | $X_{7d}$ | Freedom to discuss irrigation-related problems with members. |
| | $X_{7e}$ | Extent to which views are heard. |
| | $X_8$ | Degree of warmth and support. |
| | $X_9$ | Fairness and recognition. |
| | $X_{10}$ | Risk-taking behavior. |
| | $X_{11}$ | Extent of IAs' contribution to personal aspirations. |

and responsibilities among and between members; stating clearly duties and work to be performed by members; providing members information needed to perform their task; allowing members to relate their task to that of others; and fitting ability and skills to their task. Table 6 shows that the average response obtained for this dimension was 2.45, which means that, on the average, member-respondents viewed their organizational and task structures as being a little effective. Answers categorized under no responses came from member-respondents who did not have any idea at all about their IA's organizational and task structure. This number represents almost one-fifth of those interviewed, suggesting the need to educate IA members about their organization. The farmers felt that their only "task" was to pay the Irrigation Service Fee and that work related to the maintenance of the canals such as weeding should be paid for as the IA has a budget for such activities. Likewise, the farmers felt that maintaining the irrigation structure is not their prime responsibility but that of the committee on irrigation and maintenance. At present, neither the IA nor the NIA has officially articulated what the ISF payment covers. Unless the IA could account for what services are taken care of by this fee, the organization would continue to find difficulty in defining the expected task from members. This dilemma then has a direct bearing on the IAs' effort in increasing membership participation in maintenance work, meetings and the like.

## Effectiveness of the Size of Membership in Attaining Unity and Cohesiveness among Members

Among the 22 IAs covered by the study, Bulriscofia in Buhi-Lalo had, as of April 1990, the biggest membership (1,599 farmers) while Cosan in Daet-Talisay had the smallest (39 members). Average membership size was 307.

A great majority of the farmer-respondents (68.9%) saw their present size of membership as effective in establishing unity and cohesiveness. The participant observation phase, however, showed some indicators of the extent of interaction among members of the organization. Familiarity among members did not go beyond family names and faces. One turnout service area leader is responsible for from 50 to more than 100 farmer-members whose farms and residences are so widely dispersed. A TSA leader reported that it takes him 3 to 4 days to call on the residences of members to inform them of a scheduled activity. It is interesting to note that both Bulriscofia, which had the biggest membership and Cosan the smallest, were among those who claimed that their present size of membership was not effective.

## Degree of Commitment of Members

This study also tried to focus on the farmer-respondents' extent of involvement in irrigation-related activities of their respective IAs and their willingness to go beyond the required compliant behavior in order to contribute to the realization of the organization's goal. Specifically, the respondents were asked to rate their perceptions of the extent of the members' willingness to perform organizational activities even without pay, the strength of their sense of cooperation, and the degree of utilization of personal resources to improve and maintain the irrigation system.

Perhaps the farmers' perception of their role and obligation as IA members could be summarized in this comment of a farmer-member:

> "As long as I am paying my monthly dues every cropping season, I do not think there is reason for the Board of Directors to require me to participate in all IA activities."

In the farmer's mind, his role and obligation as a member is confined to paying the Irrigation Service Fee. Thus, for him, assuming the responsibility of paying (but not necessarily paying on time) the required dues already manifests his full commitment to the organization. Such a situation reflects the level of knowledge the farmer-member has on the duties and responsibilities of a registered IA member as stipulated in the organization's Constitution and By-Laws which might be clear only to the officers and the Board of Directors. In addition to paying the ISF, the officers still expect members to voluntarily participate in irrigation-related activities such as canal maintenance and improvement. What is expected of the farmers by the officers is therefore greater than what the farmers can give, primarily because their perceptions of members' duties and responsibilities are not congruent with those of the former.

## Extent of Autonomy and Flexibility

The farmer-respondents were asked to rate the extent to which the organization allows flexibility in choosing one's own work pace and co-worker, the degree to which the organization encourages use of one's own judgement and initiative as well as the extent to which the members exercise freedom to use one's own time in performing irrigation-related tasks. On the average, farmer-members perceived that there is autonomy and flexibility in the organization, but only to some extent.

Such responses might be due to the practice among IAs of centralizing the planning of irrigation activities, such as the formulation of the cropping calendar, irrigation canal cleaning and maintenance, etc., where only the Board of Directors and officers plan such activities with the NIA. Very little or no consultation at all with individual farmer-members is done. The farmer is told what to do only after the activities have been firmed up at the central level. The general assembly meeting, which is the farmers' opportunity to have their views heard, is called only once a year.

## Clarity of Goals, Objectives and Policies

The extent to which individual members identify with organizational goals, objectives and policies influences the value they place on being a member, and consequently determines their desire to remain a member of the organization. The clarity of the group's goals and objectives as well as its policies, therefore, is an essential prerequisite to ensure membership commitment.

Results indicate that a great majority (60%) claims to have a clear understanding of their organization's goals, objectives and policies. However, when asked to state what the organizational goals of their IAs are, one third (33%) of the respondents did not know their IA goal. The others had five varied responses with 31 percent stating that the IAs were organized to improve the collection of irrigation fees for NIA, which implies that this group of farmers perceived the organization as being more beneficial to NIA rather than to themselves. Because of this perception, farmers tend to limit their responsibility as members to paying their monthly dues. It might be mentioned however, that although farmers claimed that they could afford to pay the ISF, records showed that the collection rate of IAs was below the national average. Such a scenario may be interpreted in two ways: either the farmers wanted to make a good impression with the interviewers or that they did not appreciate the importance of paying the ISF on time because they did not see the organization as a means of helping the farmers but only the NIA. Only one fifth (19.47%) said that the IA's goal was to help the farmers improve their way of life, while a few (6.67%) stated that the IAs were organized to strengthen the system of irrigation. The other responses were: to achieve unity and cooperation (5.6%) and to give a better water supply (4.0%). These varied responses as shown in Table 7 are understandable considering that the goals were not set by the members themselves.

*Table 7. Goals of IAs in NIS in Bicol, as perceived by members.*

| Goals | f | Percentage |
|---|---|---|
| 1. To organize the farmers in order to improve collection of irrigation fee for NIA | 116 | 30.93 |
| 2. To help farmers increase their production and improve their way of life | 73 | 19.47 |
| 3. To strengthen the system of irrigation | 25 | 6.67 |
| 4. To organize the farmers in order to have better cooperation and unity | 21 | 5.60 |
| 5. To give a better water supply | 15 | 4.00 |
| 6. Do not know | 125 | 33.33 |
| Total | 375 | 100.00 |

*Notes:* f = Number of farmers.
IAs = Irrigators associations.
NIS = National Irrigation System.
NIA = National Irrigation Administration.

Almost half (46%) of the respondents claimed that it was the NIA officials, both at the regional and the national levels, who set the goals of the IA. Only three out of 10 respondents (30%) said that the IA goals were set by their officials alone or by their members. Table 8 and Figure 5 bear this out. A visit to one of the system offices confirmed that the visions and goals of the IAs indeed came from the NIA. Nandy, in one of his articles (PDI 1991), put forward the view that a developed organization has a developed sense of mission. It has been observed that the maturity of IAs in the National Irrigation System in terms of a developed sense of mission or even in terms of performance appears stunted compared to their counterparts in the communal systems. Perhaps the process of systems turnover is partly responsible for this disparity. National Irrigation System facilities and structures are constructed by the NIA prior to the organization of the IA. After construction, the irrigation system is initially managed singlehandedly by the said agency. Hence, the farmers do not participate in planning the irrigation system. The systems are already in place before the organization of water users is undertaken. Even then, systems management is given to the farmers on a piecemeal basis. For instance, Type I contracts give the IA power to clean and maintain the turnout from the main farm ditches. Under the Type II contracts the IAs assume the systems operations and ISF collection, while under the Type III contracts there is a full turnover of the whole system to the farmers. Thus, a sense of ownership of the system is direly lacking in IAs under the national system or if such is present, it has taken quite some time to develop. In contrast, water users in communal systems are first organized and are consulted prior to the construction of irrigation structures and facilities. Full turnover by the IAs takes place soon after completion.

Given the present perspective of farmers regarding what their IA's objectives and policies are (and given the fact that these are the NIA-stated goals), it is suggested that membership campaigns be conducted in order to validate whether these are the real organizational goals that the farmers want.

*Table 8. Distribution of respondents based on perceptions as to who sets goals of IAs.*

| Category | f | Percentage |
|---|---|---|
| 1. NIA regional/national officials | 174 | 46.40 |
| 2. Officials of IAs only | 63 | 16.80 |
| 3. Officials and members of IA | 51 | 13.60 |
| 4. NIA officials and IA | 44 | 11.73 |
| 5. Others | 5 | 1.34 |
| 6. No response | 38 | 10.13 |
| Total | 375 | 100.00 |

*Notes:* f = Number of farmers.
NIA = National Irrigation Administration.
IAs = Irrigators associations.

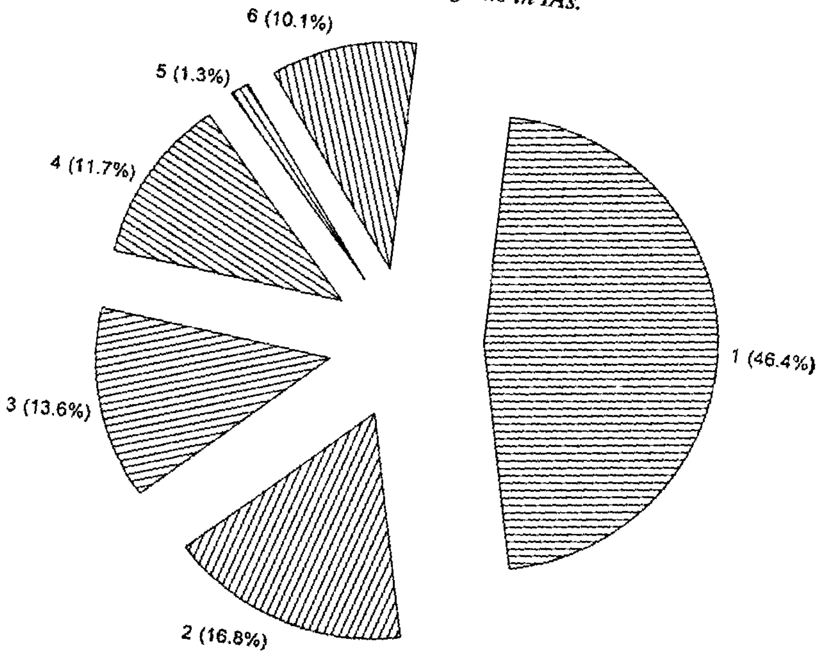
There is actually a need to educate the farmer-members on the goals of the IAs considering the rapid increase in the membership of the IAs, and the very limited amount of institutional building undertaken by the NIA Community Organizers. In addition to the membership campaigns recommended, it is strongly suggested that training be given to members, focusing on goal setting and on the reconciliation of personal and organizational goals. This type of training aims to enhance attachment to the organization which hopefully will result in increased membership participation.

## Extent of Trust and Openness

This dimension of organizational climate is composed of the extent of trust between members and the officers of the IAs, the degree of freedom to discuss irrigation-related problems with their officers, the degree of freedom to discuss irrigation-related problems with members, and the extent to which their views are heard during meetings. These different components of trust and openness will be described separately in order that a better understanding of why they have a varied impact on the performance of the IA is facilitated.

Results showed that over 80 percent had at least some trust in their officers. About the same number also said that they had at least some trust in their fellow members. Close to 90 percent claimed that they could discuss irrigation-related problems with their officers as well as with their fellow members, while about 70 percent believe that their views are heard and considered by the organization. The most commonly discussed problems by members with their officers were payment of the ISF and water inadequacy. These problems were usually discussed during formal meetings, although members regret the fact that meetings were organized only if there was a problem. The associations' by-laws require that each turnout service area leader should call for a meeting of all members at least once a month. However, a quorum could hardly be met and thus, the frequency of meeting had been reduced to practically one per cropping season. Lack of membership participation in irrigation-related activities like meetings is still interrelated to the problem of lack of attachment to the organization which is compounded by the fact that the membership size at the turnout service area levels is relatively large. One turnout service area leader has responsibility for over 50 to more than 100 farmer-members whose farms and residences are geographically dispersed, making communication very difficult.

*Figure 5. Perceptions as to who sets goals in IAs.*




*Legend:*

1. NIA regional/national officials.
2. Officials of IAs only.
3. Officials and members of IAs.
4. NIA officials and IA.
5. Others.
6. No response

*Notes:* IAs = Irrigators associations.
NIA = National Irrigation Administration.

## Degree of Warmth and Support

This aspect focused on the degree of empathy of the officers for the members' problems in general, as well as those among the members themselves, the extent of respect for each other, the degree of friendliness and support among officers and members, and the effectiveness of strategies employed by the officers in resolving conflicts in the organization. A great majority felt that warmth and support were present among members of the association. A closer scrutiny, however, showed that, at most, familiarity among members did not go beyond family names and faces. As previously cited, membership was relatively large, aggravated by the geographical dispersion of farms and residences of the members.

## Degree of Public Discussion of Problems

This variable was measured on the basis of the members' perception of how free they were to disagree with leaders without fear of repercussions and the extent to which they can introduce something new without fear of failure. Most (77%) of the respondents believed that they could freely discuss issues with their leaders and, in the process, suggest new ideas.

## Extent of IA Contribution towards the Realization of Personal Goals and Aspirations of Farmer-Members

Almost all (83%) of the farmer-respondents said that the organization helped to improve their living conditions. However, closer interaction with the farmers during the case study phase indicated that they want more service from the IA other than water delivery alone. Personally, they aspire to send their children to school, undertake house repair, purchase agricultural land, and save some money. They can only do this if the price of *palay* (their main product) is good, production inputs like fertilizer and pesticide are cheap, and there is accessible credit facilities for production loans. For the farmer, the organization is important but it would have greater contribution to his existence as a farmer if it ventures into activities beyond water services. These bigger benefits would boost the motivation of farmers to participate in IA activities. In Bicol, a few irrigators associations in communal systems are already going into marketing functions and the results showed greater participation among members, higher farm productivity, and increased collection efficiency. At the time the study was conducted, all the IAs were undertaking the singular function of water delivery and only one was contemphating going into non-water services in the future.

## IA PERFORMANCE

Given the foregoing organizational climate, what was the performance of IAs in this study? Assessment of organizational performance in general involves observation and measurement of progress towards a desired state which is specified in its goals (Christensen et al. 1982). Hence, standards are set to determine where the organization is presently, compared to where it ought to be.

In this study, IA performance covering the period from 1 January to 31 December 1990 was assessed through a number of indicators among which were collection rate, years of operation, regularity and amount of amortization, satisfaction of members with water adequacy, resolutions carried out, and application efficiency. It is worth noting that although some of these indicators are externally imposed by the NIA (e.g., collection rate, regularity and amount of amortization, remittance, etc.), they are also in consonance with the goals of the IAs as opined by the associations' presidents. A closer look at the irrigation service fee sharing system of IAs under the Stage II contract indicates that the higher the collection rate, the higher will be the percentage share that shall accrue to the IAs. Hence, efforts to attain high collection efficiency would consequently increase their capital build-up or funds required for maintenance and repairs. Further, considering the long-term goal of IAs to ultimately own and take full control of the irrigation system in the future, one can contemplate that the IAs would seriously focus on attaining higher collection efficiency as this is one of the most crucial bases for system turnover.

As previously mentioned, the said indicators were assigned corresponding weights based on the perceptions of the presidents on the degree of importance each indicator had in strengthening IAs and in assessing IA performance. The weighted ratings of indicators were then summed up to arrive at the rating for each IA. Table 9 shows the corresponding weights placed by the IA presidents on the indicators used. For IAs classified under the Type I level of development, regularity and amount of amortization were excluded in the computation since these IAs did not yet carry amortizing and collecting functions. It could be noted that among the seven performance indicators considered, the extent of participation was given the heaviest weight, implying the importance of eliciting involvement and cooperation among members in performing irrigation-related activities. Meanwhile, the number of resolutions carried out was perceived as the least important indicator of performance. An inspection of the formulae used in the determination of the performance parameter ratings would expectedly reveal values ranging from 0.0 to 1.0 since they were expressed as ratios of actual to target. However, two of the performance indicators, namely collection rate and extent of participation, yielded results greater than one implying that actual performance exceeded targets insofar as these parameters are concerned. In terms of collection rates, for instance, actual collection rates were observed to be higher than their targets in some IAs because of collections arising from back accounts which were not reckoned with in establishing collection targets. In the same manner, the actual length of canals maintained exceeded targets in other IAs, accounting for a higher than one score in the extent of participation. Because of the relatively heavier weights placed by the IA presidents on these two parameters, the IAs whose actual ratings exceeded targets indicated a higher composite performance score, as in the case of Sanbafia and Ramcfia. To determine the extent to which the weight factors affected the overall performance score, equal weights were alternatively placed on each indicator. The last column in Table 9 shows that the disturbance caused by the alteration of the weights is minimal, i.e., three of the IAs in the top five highest-performing IA category in the original ranking remained among the top five IAs, assuming equal weights. Almost the same observation would be seen for the lowest-performing IAs. This suggests the relative insensitivity of the IA performance rating to variations in the assignment of weights.

In the selection of the indicators for performance assessment, only those which were thought to be fully influenced by the organization were chosen. Being endogenous, their values could be varied at the will of the IAs. Production, on one hand, was excluded since its level is a function of a number of factors, most of which are beyond the control of the IAs given their singular function of water management. It is therefore probable that despite efficiency in water distribution, for example, the average yield at the IA level may still be very low, owing to the interplay of exogenous variables mentioned. For this reason, it is rather unfair to penalize an IA with below par production yields since the organization could only directly influence one of the large number of production determinants, which is adequacy of irrigation water.

The performance rating of the twenty-two IAs in the four systems under study is likewise shown in Table 9.

As observed, collection rate was highest in Sanbafia at 153 percent, and lowest in Vibuscruzfia at 21 percent. A case study of the latter revealed that the low level of collection rate was a manifestation of problems occurring within the organization like inactiveness or nonparticipation of some BOD officials and almost half the registered members. These might be traced to the weak organizational climate existing in the organization as well as to the poor management of irrigation water in the area.

Insofar as regularity and amount of amortization/remittance paid to the NIA were concerned, Ramcfia had the highest rating while Vivuscruzfia had the lowest. This result is quite logical since the latter also had the lowest collection rate.

In Lateral B of Daet-Talisay, participation of the IA in irrigation-related activities was seen to be the highest, while Bahamas in MNOH RIS had the lowest level of IA participation.

Meanwhile, it appeared that members of Itomang and Pamorangon in Daet-Talisay RIS were most satisfied with their association in terms of water adequacy. The least satisfied were members of Sanbafia. In terms of application efficiency, which reflects the extent of utilization of irrigation water in the farm, Ramcfia registered the highest value, implying that there was minimal waste of irrigation water in this IA compared to the other IAs under study. The resulting values given for this parameter were amazingly low, down to 0.04 in some cases, meaning that 25 times as much water was supplied to the crop than what was actually needed. There is truth in the results because there were observation points with continuous water flows as they served as feeders of waters to adjacent boxes.

The formula of the water application efficiency may have its limitations or inadequacies in that it took into account only the water that went in and out of the kbservation point and that which was consumed (used up, evaporated, etc.). In this case, while a low application efficiency may be computed for the specific water adequacy observation point, it may have been different had the water supply in the main canal and laterals been considered.

To achieve a more efficient use of water at farm levels, it is henceforth suggested that for each turnout service area, supplementary farm ditches should be so located as to be able to effect a system of control when the desired level of water has been met. Among the IAs with the lowest application efficiency were Lateral B, DTRIS WMPA, Pamorangon and Cosan, all in the Daet-Talisay System.

Taken as a whole, Ramcfia garnered the highest performance rating of 85 percent which could be largely attributed to high levels of remittances paid, members' satisfaction with water adequacy, resolutions carried out, and application efficiency. Sanbafia and DTRIS-Lateral B got the second highest

*Table 9. IA performance, January to December 1990.*

| IA performance indicators | Collection rate | | Type of development | | Regularity and amount of amortization | | Number of resolutions implemented | | Extent of participation | | Extent of satisfaction | | Application efficiency | | Rating | Overall ranking | Assuming equal weight | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | Weighted | Actual | Weighted | Actual | Weighted | Actual | Weighted | Actual | Weighted | Actual | Weighted | Actual | Weighted | | | Rating | Rank |
| A. Bahi-Lale | | | | | | | | | | | | | | | | | | |
| 1. Bulriscofia | 0.79 | 0.11 | 0.67 | 0.07 | 0.71 | 0.05 | 0.84 | 0.04 | 0.84 | 0.21 | 0.58 | 0.10 | 0.08 | 0.02 | 0.60 | 18.00 | 0.65 | 8 |
| 2. Sajufia | 0.36 | 0.05 | 0.67 | 0.07 | 0.29 | 0.02 | 0.60 | 0.03 | 0.84 | 0.21 | 0.58 | 0.10 | 0.30 | 0.06 | 0.54 | 21.00 | 0.52 | 17 |
| 3. Sanbafia | 1.53 | 0.29 | 0.33 | 0.09 | – | – | 0.57 | 0.04 | 0.82 | 0.27 | 0.29 | 0.08 | – | – | 0.77 | 2.50 | 0.71 | 3 |
| 4. Ranefia | 1.43 | 0.20 | 0.67 | 0.07 | 1.00 | 0.07 | 0.80 | 0.04 | 1.00 | 0.25 | 0.58 | 0.10 | 0.60 | 0.13 | 0.86 | 1.00 | 0.87 | 1 |
| 5. Lakfia | 0.50 | 0.07 | 0.67 | 0.07 | 0.43 | 0.03 | 0.60 | 0.03 | 1.00 | 0.25 | 0.58 | 0.10 | 0.24 | 0.05 | 0.60 | 16.50 | 0.57 | 13 |
| 6. Laymans | 0.74 | 0.14 | 0.09 | 0.33– | – | 0.57 | 0.04 | 0.88 | 0.29 | 0.37 | 0.10 | – | – | 0.66 | 11.00 | 0.58 | 12 | |
| 7. Jemnavifia | 0.63 | 0.12 | 0.33 | 0.09 | – | – | 0.00 | 0.00 | 0.88 | 0.29 | 0.30 | 0.08 | – | – | 0.58 | 19.00 | 0.43 | – |
| 8. Pamasalovifia | 0.71 | 0.10 | 0.67 | 0.07 | 0.57 | 0.04 | 0.60 | 0.03 | 0.92 | 0.23 | 0.82 | 0.14 | 0.35 | 0.07 | 0.68 | 9.00 | 0.66 | 6 |
| 9. Vivuscrazfia | 0.21 | 0.03 | 0.67 | 0.07 | 0.14 | 0.01 | 0.60 | 0.03 | 1.04 | 0.26 | 0.58 | 0.10 | 0.53 | 0.11 | 0.61 | 13.00 | 0.54 | 15 |
| B. Daet-Talisay | | | | | | | | | | | | | | | | | | |
| 1. DTRIS-Lateral B | 0.71 | 0.10 | 0.33 | 0.04 | – | – | 0.20 | 0.01 | 1.89 | 0.53 | 0.42 | 0.08 | 0.04 | 0.01 | 0.77 | 2.50 | 0.60 | 10 |
| 2. Itomang | 0.71 | 0.10 | 0.33 | 0.04 | – | – | 0.00 | 0.00 | 1.29 | 0.36 | 0.10 | 0.19 | 0.08 | 0.02 | 0.71 | 6.00 | 0.42 | 22 |
| 3. DTRIS WMPA | 0.71 | 0.10 | 0.33 | 0.04 | – | – | 0.80 | 0.04 | 1.11 | 0.31 | 0.58 | 0.11 | 0.04 | 0.01 | 0.61 | 14.00 | 0.60 | 11 |
| 4. Pamorangon | 0.79 | 0.11 | 0.33 | 0.04 | – | – | 0.00 | 0.00 | 1.11 | 0.31 | 0.58 | 0.11 | 0.04 | 0.01 | 0.61 | 16.50 | 0.48 | 20 |
| 5. Coman | 0.79 | 0.11 | 0.33 | 0.04 | – | – | 0.60 | 0.03 | 0.89 | 0.25 | 0.53 | 0.11 | 0.04 | 0.01 | 0.55 | 20.00 | 0.53 | 16 |
| C. InarRian | | | | | | | | | | | | | | | | | | |
| 1. Calabanga Div. A | 0.79 | 0.11 | 0.33 | 0.04 | – | – | 0.00 | 0.00 | 0.89 | 0.25 | 0.58 | 0.11 | 0.47 | 0.11 | 0.61 | 12.00 | 0.51 | 19 |
| 2. Calabanga Div. B | 1.14 | 0.16 | 0.33 | 0.04 | – | – | 0.00 | 0.00 | 0.89 | 0.25 | 0.42 | 0.08 | 0.30 | 0.07 | 0.60 | 15.00 | 0.51 | 18 |
| D. MNOH | | | | | | | | | | | | | | | | | | |
| 1. Hibiga | 1.21 | 0.17 | 1.00 | 0.11 | 0.43 | 0.03 | 0.80 | 0.04 | 0.96 | 0.24 | 0.58 | 0.10 | 0.05 | 0.01 | 0.70 | 7.50 | 0.72 | 2 |
| 2. Mababa | 1.07 | 0.15 | 1.00 | 0.11 | 0.57 | 0.04 | 0.60 | 0.03 | 1.00 | 0.25 | 0.58 | 0.10 | 0.10 | 0.02 | 0.70 | 7.50 | 0.70 | 4 |
| 3. Ogsong | 0.79 | 0.11 | 1.00 | 0.11 | 0.43 | 0.03 | 0.40 | 0.02 | 1.44 | 0.36 | 0.58 | 0.10 | 0.05 | 0.01 | 0.74 | 4.00 | 0.67 | 5 |
| 4. Taps | 0.63 | 0.12 | 1.00 | 0.11 | 0.60 | 0.06 | 0.00 | 0.00 | 0.93 | 0.26 | 0.58 | 0.14 | – | – | 0.72 | 5.00 | 0.62 | 9 |
| 5. Oas South Main | 0.63 | 0.12 | 1.00 | 0.11 | 0.60 | 0.06 | 0.40 | 0.02 | 0.86 | 0.24 | 0.42 | 0.10 | – | – | 0.68 | 10.00 | 0.65 | 7 |
| 6. Bahamas | 0.57 | 0.08 | 1.00 | 0.11 | 0.29 | 0.02 | 0.80 | 0.04 | 0.60 | 0.15 | 0.58 | 0.10 | 0.10 | 0.02 | 0.52 | 22.00 | 0.56 | 14 |

*Note:* IA = Irrigators association.

performance scores. On the other hand, Bahamas registered the lowest performance with the rating of 52 percent, due to its poor membership participation in irrigation-related activities as well as its low collection rate. The inter-IA performance variation is shown in Figure 6.

The above results are deemed important to the IAs in the sense that one could pinpoint areas for improvement. For instance, the management of Sanbafia might be interested to determine the reasons for the low satisfaction of members with water adequacy. Other IAs might also want to know the strategies employed by the IAs with a high level of collection rates and find out if such strategies might also work in their organizations.

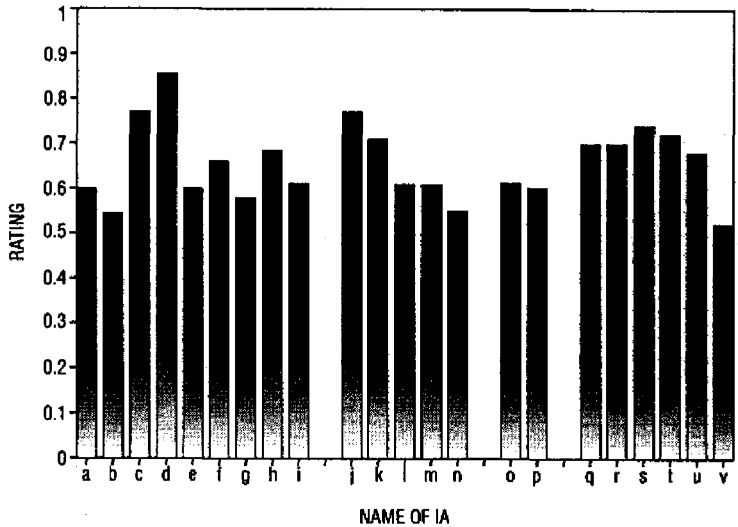
## SYSTEMS PROFILE

The study covered four systems in Bicol, namely: Buhi-Lalo, Daet-Talisay, Inarihan and MNOH. These systems practice two cropping seasons per year. The wet season starts in May and ends in October, while the dry season starts in November and lasts until April of the succeeding year with the exception of Daet-Talisay whose seasons happen in the exact opposite time frames as those experienced by the other systems, i.e., the wet season starts in November and continues till April, while the dry season commences in May and lasts till October. Discussed below are the salient features of these four (4) systems which had a bearing on the present study (refer Tables 10.1 to 10.3).

### Total Area Serviced

The total area serviced in 1990 by the four systems totalled 13,229 ha. Inarihan and the MNOH RIS had consistently serviced the same number of hectares, 2,768 and 1,947 ha, respectively, for the past four years. The MNOH service area, however, is based on a per cropping basis while the rest of the systems report a cumulative service area per year. Buhi-Lalo, which continuously serviced 2,541.56 ha from 1987 to 1989, increased its area of coverage to 2,604 ha in 1990. On the other hand, Daet-Talisay's service area, the biggest among the four systems was 6,102 ha in 1987 and 1988, but decreased to 5,238 ha in 1989. The same area was serviced by the said system in 1990.

*Figure 6. IA performance rating.*




*Legend:* Name of IA/System:

**Buhi-Lalo**

a. Bulriscofia
b. Sajufia
c. Sanbafia
d. Ramcfia
e. Lakfia
f. Laymans
g. Jemmafia
h. Pamasalovifia
i. Vivuscruzfia

**Daet-Talisay**

j. DTRIS (Lateral B)
k. Itomang
l. DTRIS WMPA
m. Pamorangon
n. Cosan

**Inarihan**

o. Division A
p. Division B

**MNOH**

q. Hibiga
r. Mahaba
s. Ogsong
t. Taps
u. Oas South Main
v. Bahamas

*Note:* IA = Irrigators association.

## Total Area Cropped

As of September 1990, a total area of 9,264 ha was reportedly cropped within the four systems covered by the study. Again, Daet-Talisay reported the highest area with 4,320 ha. Buhi-Lalo came second with 2,615 ha while MNOH and Inarihan reported 1,714 and 615 ha, respectively. The MNOH and Inarihan service areas are based on dry season cropping only.

## Total Area Irrigated

The combined irrigated area as of the same period (1990) was 9,487.29 ha. Three systems, namely Buhi-Lalo, Daet-Talisay and Inarihan, assumed that the entire irrigated area was totally cropped by the farmers. Only MNOH reported that their total service area had been fully irrigated.

## Total Income

Looking at NIA's income from each system, Buhi-Lalo registered the highest income of P899,102.65 as of September 1990. It outdid all the other systems in 1988 in terms of growth in income, having reported a 242.18 percent increase from the 1987 level. It also reported the highest collection of irrigation fees, comprising 90.8 percent of its 1990 income. For the past three years, almost all its income has been from collection fees.

Meanwhile, MNOH reported that it surpassed its 1989 income level by 11.18 percent. However, only 67.14 percent of its 1990 income came from collection fees, the lowest ratio from among the four systems under study. It is interesting to note that Inarihan's reported income for 1990 was only P692,486 as of the end of the third quarter but it already posted a 218.55 percent increase over the previous year's collection level, with the bulk of collection coming from back account remittances. Inarihan attributed this substantial increment in income to the improvement of its collection system.

## Total Expenditure

Looking at the 1990 expenditure levels, only two systems were able to keep their expenditures almost within the level of their collection fees. These were Buhi-Lalo and MNOH. This indicates that even without any other source of income, the collection fees alone could be sufficient to keep these systems viable. This stems from the fact that all of the IAs under these two systems are either in the IInd or IIIrd O&M contract stages which stipulate that maintenance and minor repairs as well as ISF collection are already the responsibilities of the IAs. Inasmuch as most operation and maintenance responsibilities had been devolved to the farmers, the two NISs only maintain a core staff with O&M expenses confined to major repair works. Inarihan and Daet-Talisay have to sustain, if not further improve their collection efforts, in order to reach the target collection level which, if attained, will be more than sufficient to cover their funding requirements. Unlike the first two systems, the IAs under Inarihan and Daet-Talisay have no existing O&M contract with the NIA. Thus the entire responsibility of collecting ISF, monitoring, and repairing structures lie on these systems, making their expenditure levels relatively high. All systems kept their expenditure levels well within their income for the third quarter of 1990 except for Daet-Talisay.

Table 10.1 shows the particulars of this first four areas (service area, total income, income collection fees and total expenditures) of the systems profile.

## Planning Process

This aspect of the study looked into the degree of involvement of the NIA in relation to the IAs in planning three activities, namely: the cropping calendar, repair and maintenance of irrigation facilities, and water distribution. Considering the thrust of the NIA in soliciting as much farmer participation as possible in planning and implementing such activities, the ideal response is a low percentage score on the NIA which would partly reflect active participation from the IAs. Based on the statements of the Irrigation Superintendents, there seemed to be no uniform practice that could be established relative to NIA's participation in the planning of the three activities mentioned. MNOH reported the least degree of involvement in planning the cropping calendar, with the farmers doing 75 percent of the planning activities. On the other hand, Buhi-Lalo claimed to have exercised the biggest share

*Table 10.1. Systems profile (total area serviced, cropped and irrigated; total income; income collection fees and total expenditures).*

| Areas under study | Buhi-Lalo | Daet-Talisay | Inarihan | MNOH RIS |
|---|---|---|---|---|
| ***Total area serviced (ha)*** | | | | |
| 1987 | 2,541.56 | 6,102.00 | 2,768.00 | 1,947.00 |
| 1988 | 2,541.56 | 6,102.00 | 2,768.00 | 1,947.00 |
| 1989 | 2,541.56 | 5,238.00 | 2,768.00 | 1,947.00 |
| 1990 | 2,604.00 | 5,238.00 | 1,384.00 | 1,947.00 |
| ***Total area cropped (ha)*** | | | | |
| 1987 | 2,168.89 | 4,359.00 | 1,500.00 | 1,638.00<br>1,590.00 |
| 1988 | 2,315.15 | 4,519.00 | 1,303.59 | 1,712.00<br>1,748.00 |
| 1989 | 949.61 | 4,420.00 | 1,080.22 | 1,712.00<br>1,748.00 |
| 1990 | 2,615.32 | 4,320.00 | 614.97 | 1,714.00 |
| ***Total area irrigated (ha)*** | | | | |
| 1987 | 2,288.46 | 4,483.00 | 2,000.00 | 1,947.00 |
| 1988 | 2,340.54 | 4,690.00 | 1,958.44 | 1,947.00 |
| 1989 | 967.15 | 4,446.00 | 1,517.94 | 1,947.00 |
| 1990 | 2,615.32 | 4,310.00 | 614.97 | 1,947.00 |
| ***Total income (P)*** | | | | |
| 1987 | 274,769.55 | 1,126,800.00 | 315,572.13 | 127,467.29 |
| 1988 | 940,056.57 | 1,038,000.00 | 341,725.70 | 207,121.28 |
| 1989 | 926,496.77 | 1,055,268.60 | 316,855.92 | 310,652.18 |
| 1990 | 899,102.65 | 780,008.34 | 692,486.31 | 345,379.20 |
| ***Income collection fees only (P)*** | | | | |
| 1987 | 272,769.55 | 1,063,800.00 | 56,451.40 | 108,729.62 |
| 1988 | 940,056.77 | 975,000.00 | 139,847.17 | 141,698.69 |
| 1989 | 926,496.77 | 997,309.00 | 142,655.20 | 231,885.38 |
| 1990 | 816,412.86 | 732,678.40 | 457,994.71 | No data |
| ***Total expenditures (P)*** | | | | |
| 1987 | 403,662.40 | 1,178,430.00 | 611,798.11 | 229,065.49 |
| 1988 | 709,522.40 | 1,215,000.00 | 625,785.75 | 272,533.28 |
| 1989 | 843,950.86 | 1,078,335.00 | 637,132.06 | 239,089.56 |
| 1990 | 809,605.93 | 986,398.99 | 652,944.44 | 231,037.27 |

*Note:* US$1.00 = P24.31 in 1990.

in planning the cropping calendar by doing 90 percent of the work involved. This is due to the fact that although six of the nine IAs in this system have already taken over most of the O&M responsibilities, many of the associations have internal weaknesses as reflected in their IA performance scores and are therefore not fully capable of delivering what is expected of them. Hence, the system's office is forced to play a major role in the planning and decision making process. Daet-Talisay approximated Buhi-Lalo's practice, doing 80 percent of the planning activities. Most of its IAs have just been organized and do not have contracts yet. On the other hand, Inarihan seemed to have struck a balanced sharing, doing 50 percent of the planning work with the other half being performed by the IA and other parties. Based on the existing contracts of various IAs under each of the four systems, there is logic to the actual response of the IA. For one, it is true that MNOH had the least involvement in the planning of irrigation-related activities since there is already a complete turnover of the system. The function of this system therefore is largely coordination and monitoring, while the major activities are basically initiated and implemented by the IAs.

In planning for the repair and maintenance of Irrigation facilities, Daet-Talisay and Inarihan followed the same practice as in planning the cropping calendar. MNOH adhered to the stipulations in the contract (Type III) of IAs in exercising the planning functions where the NIA wholly undertook the planning and actual implementation of major repairs, while the IA took responsibility for planning and undertaking of minor repairs. Buhi-Lalo, which is predominantly Type II, reported a 70–30 percent sharing in planning work, the bulk of which was undertaken by the NIA.

With respect to the water distribution plan, MNOH wholly delegated to the IAs the planning of the water distribution. As in the two activities previously discussed, Inarihan gave its IA much liberty in planning the water distribution with 50 percent of the work being performed by the NIA, although the IA in this system had no O&M contracts with the NIA. On the other hand, Daet-Talisay, whose IAs had no contracts also reported that it solely undertook the planning of the water distribution. Buhi-Lalo RIS with IAs under the Type II level of development, accounted for 90 percent of the work in planning the water distribution, with the IAs performing the rest of the work. Table 10.2 shows data on the planning process in the systems studied.

## Qualifications of Systems Personnel

All the Irrigation Superintendents (ISs) in the four IAs are civil engineers and have had more than 10 years experience relevant to their present job. The ISs in Buhi-Lalo and Daet-Talisay claimed the longest work experience of 16 years. The Assistant Water Management Technologist in MNOH and Daet-Talisay met the minimum educational requirements for the position with at least 2 years college education. Those in Inarihan and Buhi-Lalo were more than qualified and had college degrees related to their present work. The years of experience related to the present work ranged from 15 (MNOH) to 4 years (Daet-Talisay). Numerical data with regard to this are shown in Table 10.3

## Condition of Irrigation Structures

By ocular inspection, the irrigation structures of the four systems were assessed on their present physical state and usefulness with 100 percent reflecting a system in excellent condition.

As evaluated by a group of agricultural engineers, the Daet-Talisay Irrigation System had the best in terms of physical structures with a rating of 90 percent followed by Inarihan with a rating of 82 percent. MNOH came last at 80 percent. This confirms the observation that among the four systems, MNOH had the oldest and, therefore, the most dilapidated structures. This explains why the said system had the lowest overall systems efficiency rating and was placed only third in terms of distribution efficiency.

As previously mentioned, the IAs in Daet-Talisay got the lowest rating in application efficiency although the system had the best irrigation structures. This implies that good irrigation structures do not necessarily result in effective water utilization at the farm level. As contended earlier, application efficiency was more a function of the IA's water management capability. The assistance, therefore, of NIA in terms of water management training to strengthen IAs is in order.

*Table 10.2. Systems profile (planning process).*

| Areas under study | Systems | | | |
|---|---|---|---|---|
| | Buhi-Lalo | Daet-Talisay | Inarihan | MNOH RIS |
| ***Planning process*** | | | | |
| Degree of involvement in designing the cropping calendar | | | | |
| NIA | 90% | 80% | 50% | 25% |
| IA | 10% | 20% | 40% | 75% |
| Others | — | — | 10% | — |
| Degree of involvement in planning repairs/maintenance and improvement of irrigation facilities | | | | |
| NIA | 70% | 80% | 50% | 100% major |
| IA | 30% | 20% | 40% | 100% minor |
| Others | — | — | 10% | — |
| Who are involved in the water distribution plan? | | | | |
| NIA | 90% | 100% | 50% | — |
| IA | 10% | — | 50% | 100%, |
| How farmers are informed of water distribution | Through regular meetings | BOD meeting | Through IA meetings | Through IA President |

*Notes:* IA = Irrigators association.
NIA = National Irrigation Administration.

*Table 10.3. Systems profile (qualifications of personnel, as of December 1990).*

| Areas under study | Systems | | | |
|---|---|---|---|---|
| | Buhi-Lalo | Daet-Talisay | Inarihan | MNOH RIS |
| ***Qualifications of systems personnel*** | | | | |
| *Superintendent* | | | | |
| – Average educational attainment | BSCE | BSCE | BSCE | BSCE |
| – Average years of work experience related to position for past years | 16 | 16 | 11 | 10 |
| – Average number of trainings related to position for past three years | 4 | 3 | 7 | 2 |
| *Asst. Water Management Technologist* | | | | |
| – Average educational attainment | BSCA agronomy | 2nd year college | BSCE | 2nd year college |
| – Average years of work related to position | 10 | 4 | 4 | 15 |
| – Average number of trainings related to position for past three years | 3 | 2 | 3 | 3 |

*Notes:* BSCE = B.Sc. Engineering.
BSCA = B.Sc. Agronomy/Agriculture.

## Extent of Satisfaction of Members with NIA Services

The respondents were asked about their level of satisfaction with NIA services categorized into four areas, namely: timeliness of cropping calendar, adequacy of irrigation structures, incentives provided for early payments, types of training, and timely resolution of NIA-IA-related problems. The scale used ranged from 1 to 5 with the former indicating lack of satisfaction and the latter indicating the highest level of satisfaction.

On the whole, the rating showed that the farmers were only somewhat satisfied with the NIA services. Of the five services, incentives for early payment got the highest score implying that the water users are more or less contented with the present incentive scheme (Table 11). It is a practice that farmers who pay ISF on time are given a 10 percent discount. However, it should be mentioned that at present, no incentives are given to IAs who remit ISF collections on time, but penalties do occur. The NIA got the lowest rating on timely resolution of NIA-IA-related problems. The respondents claimed that the NIS offices were quite slow in acting on complaints or on requests such as verification of payments and repair of structures like steel gates and division boxes which must be functional if the cropping calendar is to be strictly followed. Interviews with some ISs about the farmers' feedback revealed that although some of their demands are reasonable, the system is constrained from acting on those simply because of limited funding. On the part of the agency, the IAs are being urged to improve on their collection efficiency and remittance to the NIA so that it could have the financial resources to respond to farmers' demands. Training conducted by the NIA for IAs were given a rating of 2.46 or "a little satisfied." Feedback from members on training revealed that content could not be appreciated since the language used was English and the level of delivery was way beyond the member-participants' level. It could be recalled that the profile of the members indicated that most of them were relatively old and had only reached an elementary level of schooling. Moreover, echo training was presented as summary reports, thus losing much of the valuable inputs received during the original training. Such might be because the IA leaders who conducted the training were not really trained for the job of trainer.

*Table 11. Extent of satisfaction of members on NIA services.*

| NIA services | Average response |
|---|---|
| A. Timeliness of cropping calendar | 2.80 |
| B. Adequacy of structures | 2.63 |
| C. Incentives for early payments | 2.85 |
| D. Type of training | 2.46 |
| E. Timely resolution of NIA-IA-related problems | 2.39 |

*Notes:* NIA = National Irrigation Administration.
IA = Irrigators association

One reason why the participatory program of the NIA in national irrigation systems seems not to flourish as expected is the fear of the NIA O&M personnel that they will be displaced as a result of the turnover of the irrigation management function to farmers. Although participatory management is fully articulated at the management level (NIA Central Office), its full implementation at the field level faces difficulty because of this insecurity among field personnel who are the NIA's direct link to the IAs. It is therefore necessary that the NIA expresses its long-term plans to its personnel, explores alternatives in case of personnel displacement. As recommended by Korten (1981), the NIA should undergo the needed changes, otherwise the policy context (participatory management) might crumble as practical observers note the discrepancy between policy and reality.

When the farmer-respondents were asked whether the IA can still perform functions and discharge responsibilities if the NIA withdraws its assistance, 47 percent said that the IA can independently carry out its functions while 53 percent said that the IA cannot exist without the NIA. This result could be traced to the type of irrigation management contracts IAs had with the NIA at the time of the study. A closer look at Table 12 shows that the highest negative response came from Buhi-Lalo and MNOH systems whose IAs have been given partial or full control over irrigation management, while the highest affirmative response came from Daet-Talisay and Inarihan systems whose IAs are only responsible for clearing the main and supplementary farm ditches while the NIA plays the dominant role in systems operation and maintenance. It could be that the farmers in IAs which have no existing contracts were eager to test the water, so to speak, while those farmers in IAs with partial or full turnover have seen the difficulty of venturing on their own and experienced the difference in irrigation services with or without the NIA, and thus are now in a position to appreciate the importance of the agency's assistance to them.

*Table 12. Perception as to whether IA can still perform functions and discharge responsibilities if NIA withdraws assistance.*

| Can the IA still perform functions and discharge responsibilities if NIA withdraws assistance? | Buhi-Lalo | | Daet-Talisay | | Inarihan | | MNOH RIS | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | f | Percentage | f | Percentage | f | Percentage | f | Percentage | f | Percentage |
| Yes | 83 | 41.09 | 15 | 51.72 | 39 | 66.10 | 40 | 47.06 | 177 | 47.20 |
| No | 119 | 58.91 | 14 | 48.28 | 20 | 33.90 | 45 | 52.94 | 198 | 52.80 |
| Total | 202 | 100.00 | 29 | 100.00 | 59 | 100.00 | 85 | 100.00 | 375 | 100.00 |

*Notes:* f = Number of farmers.
IA = Irrigators association.
NIA = National Irrigation Administration.

## SYSTEMS PERFORMANCE EFFICIENCY

The ability of the four systems to carry out their functions were assessed in terms of viability index, collection efficiency, cropping intensity, IA members' satisfaction with NIA services, distribution efficiency and, overall systems efficiency. The weights given to these factors were based on the perceptions of Irrigations Superintendents (ISs) in the four systems covered on the degree of importance of each indicator in enhancing systems performance. It should be noted that these parameters are likewise used by the NIA in assessing the performance of the ISs in their respective territories. In a similar fashion, the focus on the viability index as the most important performance parameter in this study is consistent with the emphasis that the NIA places on this variable in assessing systems performance nationwide. One however, should not be led to think that systems must necessarily underspend on their O&M to obtain a higher viability index which might result in the impairment of systems efficiency and deterioration of physical facilities. In the case of the MNOH, for instance, the O&M of the system was fully turned over to IAs, hence the farmers now share a bigger burden of O&M expenses. This accounts for the low figures of O&M expenditures on the part of the NIA. Systems whose O&M are only partially turned over to IAs are therefore expected to incur higher O&M expenses and thereby realize lower viability figures given a constant mean. Indeed, cognizant of the important involvement of farmers in operating and maintaining the system, the NIA is presently preoccupied in strengthening the IAs' capability to completely manage the system (Table 13).

To test the sensitivity of the weight factors on systems performance, the performance rating per system was alternatively determined on the premise that equal weights for each parameter were in place. Results showed that the ranking of the four NISs remained the same, implying the relative insensitivity of performance results to variations in weights. In the selection of systems performance parameters, production at systems level was not considered, primarily because this variable is not within the absolute control of the system as non-water factors likewise play a crucial rôle in its determination. At best, one can only postulate a link between systems performance and production efficiency. The weighted rating for each category and the composite score for systems performance are shown in Tables 13 and 14. Buhi-Lalo was ranked first (0.84) while MNOH RIS came close as second (0.832). Inarihan and Daet-Talisay were placed third and fourth with a rating of 0.74 and 0.673, respectively. It could be gleaned from the said table that

*Table 13. NIS performance efficiency.*

| Systems performance indicators | Weight | Buhi-Lalo | | Daet-Talisay | | Inarihan | | MNOH RIS | |
|---|---|---|---|---|---|---|---|---|---|
| | | Actual | Weighted rating | Actual | Weighted rating | Actual | Weighted rating | Actual | Weighted rating |
| a. Viability index | 0.29 | 1.11 | 0.32 | 0.79 | 0.23 | 1.06 | 0.31 | 1.49 | 0.43 |
| Rank | | | 2 | | 4 | | 3 | | 1 |
| b. Collection efficiency | 0.24 | 0.75 | 0.18 | 0.78 | 0.19 | 0.91 | 0.22 | 0.43 | 0.1 |
| Rank | | | 3 | | 2 | | 1 | | 4 |
| c. Cropping intensity | 0.19 | 1 | 0.19 | 0.82 | 0.16 | 0.44 | 0.08 | 0.88 | 0.17 |
| Rank | | | 1 | | 3 | | 4 | | 2 |
| d. Satisfaction of IA members with NIA services | 0.14 | 0.52 | 0.07 | 0.6 | 0.08 | 0.44 | 0.06 | 0.56 | 0.08 |
| Rank | | | 3 | | 1.5 | | 4 | | 1.5 |
| e. Distribution efficiency | 0.09 | 0.79 | 0.07 | 0.12 | 0.01 | 0.71 | 0.06 | 0.61 | 0.05 |
| Rank | | | 1.5 | | 3 | | 1.5 | | 4 |
| f. Overall systems efficiency | 0.05 | 0.18 | 0.01 | 0.058 | 0 | 0.18 | 0.01 | 0.05 | 0 |
| Rank | | | 1.5 | | 3 | | 1.5 | | 4 |
| Performance rating | 100 | | 0.840 | | 0.673 | | 0.740 | | 0.832 |
| Rank | | | 1 | | 4 | | 3 | | 2 |

*Notes:* NIS = National Irrigation System.
IA = Irrigators association.
NIA = National Irrigation Administration.

viability index and collection efficiency together accounted for 53 percent of the total performance of the system. In these aspects, MNOH RIS emerged with the highest ranking for viability index but the lowest in collection efficiency. To hypothesize a more successful scenario, overall performance of this system could have reached 92 percent had it approximated 0.91, the rating of Inarihan in collection efficiency. The same would happen to Buhi-Lalo were we to apply a similar assumption. One can, therefore, argue that increasing efforts towards improvement of NIS collection efficiency may consequently reflect an upsurge in its viability index and ultimately, higher performance efficiency.

With this end in view, one could deduce the significant contribution of the irrigators associations. NIS's performance is also anchored on collection rate as well as on the extent of members' participation in irrigation-related activities, like repairs and maintenance. The latter has a major influence in curbing the O&M expenditure at the NIS level which ultimately affects its viability. The NIA, therefore, cannot afford to weaken the IA chain in the irrigation management partnership.

## PRODUCTION RATIO

As previously mentioned, production ratio refers to the ratio of the actual average yield per hectare (yield/ha) to the highest yield attained across the systems. The latter was derived by getting the average of the maximum yield/ha realized per system as follows: Buhi-Lalo, 119 cavans; Daet-Talisay, 175 cavans; Inarihan, 112 cavans; and MNOH, 125 cavans. It can be noted that Buhi-Lalo had the highest production efficiency while Inarihan got the lowest at 48.3 percent. This suggests that actual production on the average was a little less than one half of the maximum possible yield. It should be emphasized that differences in the production efficiency could be attributed to a number of factors such as variation in soil types, wind velocity, type of technology used, and efficiency of irrigation service, among others (Table 15).

*Table 14. NIS performance efficiency and its indicators in Bicol, for the period covering January to 31 September 1990.*

| Category | Rating | | | |
|---|---|---|---|---|
| | Buhi-Lalo | Daet-Talisay | Inarihan | MNOH RIS |
| Systems performance efficiency | 0.84 | 0.673 | 0.74 | 0.832 |
| Rank | 1 | 4 | 3 | 2 |
| Production efficiency | 0.531 | 0.487 | 0.488 | 0.577 |
| Rank | 2 | 3 | 4 | 1 |
| Average IA performance | 0.656 | 0.648 | 0.608 | 0.678 |
| Rank | 2 | 3 | 4 | 1 |
| NIS planning process (extent of NIA involvement) | 0.94 | 0.95 | 0.61 | 0.11 |
| Rank | 2 | 1 | 3 | 4 |
| Qualification of systems personnel | 0.90 | 0.68 | 0.72 | 0.79 |
| Rank | 1 | 4 | 3 | 2 |
| Conditions of NIS facilities | 0.81 | 0.90 | 0.85 | 0.80 |
| Rank | 3 | 1 | 2 | 4 |

*Notes:* IA = Irrigators association.
NIA = National Irrigation Administration.
NIS = National Irrigation System.

*Table 15. Production efficiency at systems level.*

| System | Actual average yield (in cavans) | Production efficiency* | Rank |
|---|---|---|---|
| Buhi-Lalo | 70.44 | .531 | 1 |
| Daet-Talisay | 64.60 | .487 | 3 |
| Inarihan | 64.54 | .483 | 4 |
| MNOH | 69.91 | .523 | 2 |

* *Average highest attainable yield = 132.75 cavans.*

In general, it can be observed that the actual production results generated across all systems were very low (67 cavans on the average), if the ideal number of cavans set by the Masagana 99 Program of 99 cavans per hectare is to be followed.

# RELATIONSHIP OF ORGANIZATIONAL CLIMATE TO IA PERFORMANCE

The stepwise regression procedure was used to select which among the twelve independent variables (indicators of organizational climate) most explained the variation in IA performance (Y). The results are shown in the Appendix. From among the thirteen dimensions of organizational climate, only three were found to be significantly related to IA performance. These were: freedom to discuss with officers irrigation-related problems (X 7C), degree of warmth and support (X 8), and degree of public discussion of problems (X 10). Taken together, these variables explained 76.2 percent of the variation in IA performance (Y).

## Degree of Freedom to Discuss Irrigation-Related Problems with Officers (X 7C)

It could be noted that this variable was negatively related to IA performance, implying that as the degree of freedom to discuss irrigation-related problems increases, the level of IA performance deteriorates. This relationship may seem illogical unless we look deeply at the irrigation-related problems most commonly discussed by members with their officers which are, payment of ISF and insufficiency of water. On one hand, a greater weight was given to collection rate than water adequacy in assessing IA performance. Therefore, one may conclude that the freedom to discuss irrigation-related problems related negatively to collection rate. The present practice shows that the more impersonal the officers of IA are to their members, the higher the collection rate. One case was that of the IA of MAZOIA in MNOH which attained its target collection level when an outsider was hired—a lawyer to pressurize members to pay their dues on time. If we interpret this in the context of the Filipino value of *pakikisama* where a higher value is placed on smooth interpersonal relations rather than on performance, more pakikisama might prove to be detrimental to IA performance, a large component of which is the collection rate. To validate this thesis further, freedom to discuss as a variable was further regressed against collection rate and water adequacy. Findings showed that the freedom to discuss problems and collection rate were negatively but significantly related while the freedom to discuss and water adequacy were found to have been significantly and positively related to each other. If this were translated to a management strategy, in case a problem in the IA concerns that of water distribution and irrigation system maintenance, smooth interpersonal relations would bring about favorable results. If, on one hand, the problem relates to payment of dues, application of pressure from a person of authority might prove to be more effective. The same approach was tried by the association officials of the Harani, Malinao and Tugmad (HMT) systems which collected payments of irrigation service fees not through the strict enforcement of association rules but through the application of varying degrees of pressure. Pressure was applied through the authority of the association, local government, police, and judicial authorities, and through the economic power of the association leaders (de los Reyes 1982). Based on the members' claim that they could afford to pay the ISF, one would expect that the IAs could attain high collection rates. However, IA records showed that the collection rate was below average. IAs whose collection rates were poor may, therefore, choose to adopt this strategy in addition to educating the members on the importance of the timely payment of irrigation dues in attaining the IA goals.

## Degree of Warmth and Support (X 8)

This variable was found to be positively related to IA performance. It was quantified in this study through the members' perception of the extent of empathy given by the officers to non-IA related problems of members, the degree of friendliness among members, and the extent of respect given to officers and fellow members. It can be deduced that if there were more warmth and support among members, and if respect were fostered among members and officers, higher IA performance might be attained. The survey showed that there was only a minimal degree of warmth and support among members and officers which may partly explain the below-average performance of the IAs. As previously mentioned, one reason for the minimal level of warmth and support among members and officers was the wide area of coverage of an IA which includes about four municipalities on the average. Even at the TSA level, familiarity among members did not go beyond the level of family names and faces. To aggravate the situation, general membership meetings are held only once a year. Only officers met monthly, so members felt alienated from organizational activities. If the structures of the IA could be modified in such a way that would promote more interaction among members, specifically through smaller group activities than the TSA level, higher warmth and support among members and officers can be achieved, which ultimately will lead to higher performance. However, it is suggested that the collection activities be done by the officers at the central level as the collection function requires a more formal approach and less of a friendly stance which is what should exist at the lower level grouping. It is further suggested that warmth and support among members be enhanced through training on values, clarification and team building.

## Degree of Public Discussion of Problems (X 10)

This variable was again negatively related to IA performance. As previously described, this variable was measured on the basis of members' perception of how free they were to disagree with leaders without fear of repercussions and the extent to which they can introduce something new without fear of failure. Taking these in the context of the Filipino cultural milieu, the result of the regression is understandable. As practiced, most objections brought out in meetings of the organization are assumed to be affronts on the personal capability of those concerned instead of being taken constructively to improve performance. Hence, "Gripe Sessions" or formal meetings are not an effective means of resolving conflicts since those require direct group confrontation, resulting in hurting the members' *amor propio.* Instead of enhancing group unity, verbal tussles may lead to a breakdown of harmonious relations, thereby adversely affecting the performance of IAs. de los Reyes also noted a similar approach in the HMT System in Camarines Sur, the Philippines, where light enforcement of rules, avoidance of head-on confrontation or open conflict, and the use of social pressure rather than formal sanctions were the means of imposing discipline. Lynch and Coward also noted that smooth face-to-face relations and the avoidance of open conflict are norms in the Philippine society (Lynch and Coward in de los Reyes 1982).

To provide leaders with a tool for dealing with officers and members of divergent views, training in communications style is hereby recommended. For instance, a leading specialist in Filipino communication recommends visiting known vocal "devil-advocates" prior to a set date of meeting and discussing issues with them in advance in order to convince them of the idea. This approach should minimize unproductive arguments during the actual meeting and avoid possible rifts among the members.

Table 16 presents the degree of influence exerted by each of the twelve variables as well as the response of IA performance to a one-unit change in the individual organizational climate variable. Ranking the degree of influence of each, it could be gleaned that fairness and recognition, training, warmth and support, risk-taking behavior, and freedom to discuss irrigation-related problems with officers were among the top five variables. For example, the highest ranking variable of warmth and support explains 30 percent of the change in IA performance. This confirms that the upper five parameters are the only ones for which any significant impact on performance could be claimed.

*Table 16. Ranking of organizational climate variables based on order of correlation magnitude with IA performance.*

| Variable | Regression Coefficient | Standard Error | T(DF=6) | Prob. | Partial | $r^2$ |
|---|---|---|---|---|---|---|
| x9 | 0.180 | 0.112 | 1.612 | 0.15816 | x9 | 0.3021 |
| x12 | –0.092 | 0.070 | 1.325 | 0.23334 | x12 | 0.2264 |
| x8 | 0.124 | 0.110 | 1.130 | 0.30167 | x8 | 0.1754 |
| x10 | –0.070 | 0.075 | –0.933 | 0.38682 | x10 | 0.1267 |
| x7c | –0.093 | 0.113 | –0.829 | 0.43864 | x7c | 0.1028 |
| x7e | 0.046 | 0.069 | 0.673 | 0.52608 | x7e | 0.0702 |
| x4 | –0.123 | 0.232 | 0.533 | 0.61317 | x4 | 0.0452 |
| x7b | 0.051 | 0.098 | 0.524 | 0.61933 | x7b | 0.0437 |
| x7 | 0.051 | 0.100 | 0.510 | 0.62830 | x7 | 0.0415 |
| x2 | 0.030 | 0.070 | –0.421 | 0.68821 | x2 | 0.0287 |
| x7d | 0.066 | 0.180 | –0.369 | 0.72450 | x7d | 0.0222 |
| x5 | 0.029 | 0.095 | 0.299 | 0.77523 | x5 | 0.0147 |
| x11 | 0.017 | 0.070 | –0.240 | 0.81825 | x11 | 0.0095 |
| x6 | –0.017 | 0.082 | –0.213 | 0.83830 | x6 | 0.0075 |
| x3 | 0.012 | 0.063 | 0.188 | 0.85727 | x3 | 0.0058 |

*Notes:* IA = Irrigators association.
Prob. = Probability.
T = T ratio.
DF = Degree of freedom.

It seems unexpected that organizational structure, clarity of goals, trust in officers, commitment of members and realization of personal goals and size of membership should all turn out to be so weakly related to performance since these are the likely characteristics of a successful organization. Perhaps, this situation could be explained by the fact that almost all of the IAs surveyed were, as previously mentioned, in their infant stage. Hence, members of these organizations have yet to assimilate the importance of their organizational structure, match IA goals with personal goals and thus be motivated to give their commitment to actively participate as members. Moreover, the performance measures were not developed by the members themselves.

Since warmth and support emerged as a major determinant of performance and considering that such a scenario could be valid with smaller groups, the size of membership as a variable was further subjected to testing to determine the optimal size for IAs to be most effective. Based from the logarithms of the departure from the geometric mean, findings showed that the geometric mean is 201 members and correlation of performance is –0.293, i.e., the larger the departure (up and down) the less the performance. Average membership size at present is 307.

## RELATIONSHIP OF NIS PERFORMANCE EFFICIENCY TO IA PERFORMANCE, NIS PLANNING PROCESS, QUALIFICATIONS OF SYSTEMS PERSONNEL AND CONDITIONS OF NIS IRRIGATION FACILITIES

Considering that there were only four cases studied, at the systems level, the mathematical analysis used in the succeeding discussions may yield results which are not conclusive. Despite this limitation, any relationship which could be established in the model would prove to be noteworthy, especially for policy and decision makers of the NIA (Table 17).

*Table 17. Correlation results of parameters at systems level performance efficiency.*

| | $r^2$ | b |
|---|---|---|
| Average IA performance | 0.69 | 1.42 |
| NIS planning process | –0.36 | –0.05 |
| Qualification of systems personnel | 0.90 | 0.56 |
| Conditions of NIS facilities | –0.92 | –1.22 |
| Production efficiency | 0.99 | 0.40 |

*Notes:* IA = Irrigators association.
NIS = National Irrigation System.

IA performance revealed a positive relationship to NIS performance efficiency. Specifically, 69 percent of the variation in systems performance could be accounted for by IA performance. Further, a gradient of 1.4 implies that a 10 percent improvement in IA performance could yield 14 percent enhancement in systems performance. For this reason, investments made by the NIA towards IA development could be recouped in terms of the IA's contribution to systems performance. It was mentioned earlier that 53 percent of the weight for assessing NIS performance efficiency pertains to collection efficiency and viability index. IA performance on the other hand, is also anchored on collection rate and extent of participation in irrigation-related activities like repairs and maintenance. The latter has a major influence in curbing the O&M expenditure at the NIS level, which in turn affects the viability of the NIS. The NIA therefore cannot afford to weaken the IA link in the irrigation management partnership.

NIS performance efficiency seemed to be inversely related to the NIS planning process. Inasmuch as the planning process was expressed in terms of the extent of participation of NIS, findings imply that higher involvement of NIS personnel relative to the IA participation in the planning process would result in lower systems performance efficiency. Therefore, in order to increase systems performance efficiency, IAs' involvement in the planning activity should be maximized.

Of the four variables analyzed, qualification of systems personnel had the closest fit with NIS performance efficiency in the positive sense ($r = 0.90$). The better qualified the systems personnel were, in terms of education and years of experience related to the present work, the higher the performance efficiency. Specifically, a 10 percent improvement in qualification of systems personnel would result in a 6 percent improvement in systems performance. Hence, training and educational advancement opportunities should be made available to qualified staff. Moreover, considering that IAs are crucial to systems performance efficiency, there is a need to re-orient the NIS O&M personnel on the role of the IAs in the irrigation partnership, specially since the said personnel are the most visible representatives of the NIA to the IA. It was noted that the NIS O&M personnel viewed the progress of the IAs as a threat to their job tenure. They, therefore, did not provide all-out support for the development of the IA as an organization.

Conditions of NIS facilities correlated negatively and significantly with systems performance suggesting that the worse the condition of NIS facilities are, the higher will be the performance of the system. At first glance, this finding seemed unexpected and illogical. However, if one probes at the parameters of systems performance, it could be seen that the inverse relationship established can mainly be attributed to the negative correlation existing between the viability index and conditions of NIS facilities. This further suggests that a higher viability in the systems was achieved at the expense of facilities maintenance. The heavy reliance placed by NIA on this parameter as a measure of systems performance needs to be reviewed since there is a tendency for systems to underspend in order to realize a higher viability figure. Needless to say, the viability index should not be taken singly as a performance measurement but should be assessed together with maintenance cost efficiency.

## RELATIONSHIP OF SYSTEMS PERFORMANCE EFFICIENCY AND PRODUCTION EFFICIENCY

A very strong positive correlation was found between systems performance efficiency and production efficiency ($r = 0.99$). Specifically, 99 percent of the variation in production levels could be accounted for by systems performance. It can be further deduced that given a 10 percent improvement in systems performance, a 4 percent increase in the production level would likely be observed. As a whole, these results would justify the need to exert more serious efforts in attaining a higher systems performance because such would have a significant bearing on farm production and income. Following the cyclical process, any increase in farm income would likely result in higher collection efficiency, a higher viability index and, hence, a higher systems performance level.

# CHAPTER 6

# Conclusions and Recommendations

ORGANIZATIONAL CLIMATE IN general significantly affects IA performance. The low performance of IAs in National Irrigation Systems (NISs) or agency-managed systems in Bicol could be greatly improved if there is a created organizational climate characterized by a high level of warmth and support among members and officers. Such an environment can be realized if members identify with the organizational goals of the IA and truly perceive the organization as reflective of their personal aspirations. Farmer-members would have greater motivation to participate in IA activities if the association would provide additional services other than water, like credit or marketing of its members' agricultural produce. It also appears that the approach of first constructing irrigation systems prior to the organization of IAs, as in the case of all the associations surveyed, did not seem to produce the desired result of establishing cohesive and strong IAs primarily because of the perceived notion of members that its formation was done to assist the NIA in its collection efforts, hence limiting membership participation to payment of the ISF. There is therefore wisdom in the approach applied to communal (or farmer-managed) systems where farmers' associations are organized prior to construction and allowed to participate in planning, designing and constructing of the improvements on their irrigation system. Experience in the communal systems showed that the IAs have a greater sense of ownership, and a developed sense of mission resulting in a better irrigation management performance.

Given the existing organizational climate of IAs in NISs, some farmers have no clear idea of what their association is for and their commitment is limited to ISF payment. Such farmers have no sense of system ownership; it is suggested that massive membership campaigns and value-clarification training be conducted to validate whether the NIA-set organizational goals and objectives are the real goals and objectives that farmers want if long-term IA sustainability is desired.

It is further recommended that IAs' organizational climate be strengthened through the adoption of a more functional organizational structure that would create an atmosphere of warmth and support among members. Specifically, smaller-sized groupings should be formed within the TSA level. This will provide more opportunities for membership interaction and participation in planning and decision making. It should be emphasized that present organizational structures need not be radically changed but it is recommended that additional features be adopted, such as the aforementioned smaller groupings together with a decentralized and participatory management style responsive to the Filipino temperament and attitude. The need for a more appropriate form of organizational structure that would meet the unique requirements of the locale (e.g., geographically dispersed members) was similarly verbalized in existing literature (de los Reyes 1982) which recommends the formation of mini-unit organizations especially in developing countries where often, there are poor transportation and communication facilities which make coordinating among dispersed membership difficult. The same study further recommends that functions need to be delegated into geographically small areas where people can easily meet, talk and work together. At present, the lowest leadership tier (turnout service area level) in the IAs surveyed have an average membership size of 50 farmers whose farms and residences are widely dispersed. This figure is several times bigger than the average number of members per leader in a participatory system, which is nine members. Formation of smaller groups below the turnout service area level based on water and task distribution may result in a more efficient, better-managed system.

Meanwhile, there is a need to internalize and institutionalize the concept of co-existence between the NIA and IA, specifically among O&M personnel of the NIA. This group perceives the progress of IA as a threat to their tenure and therefore does not provide all-out support for the development of the IAs as an organization. Educating the O&M personnel and equipping them with skills needed to deal effectively with an indigenous organization would greatly help in establishing a closer IA-NIA bond. But first, the NIA should express, along with a policy of participatory management, the agency's long-term plans for its personnel, explore alternatives or take new functions to avert widespread personnel displacement which is the crux of the negative attitude of its personnel towards the participatory program.

Irrigation conflicts other than ISF payments can be better managed through smooth face-to-face interpersonal relationships. Disputes on ISF payments, however, could be best resolved through the application of varying degrees of pressure, e.g., the use of judicial authorities for collection purposes.

IA performance significantly contributes to systems performance efficiency. Both are anchored on collection rate, and in systems where operation and maintenance have been fully turned over to the IAs, O&M expenses are now shared by the farmers, not only through ISF payments but by voluntary work. These systems therefore have lesser O&M expenses to contend with. Systems performance can therefore be enhanced by strengthening IAs' capability for irrigation management and maximizing their involvement in the system's planning process.

The viability index presently used by the NIA in assessing systems performance is not a good indicator of the agency's ability to sustain its operations. As practiced in the field, there is a strong tendency among NIA's system offices to underspend on their O&M expenditures to obtain a higher viability index. This results in the impairment of systems efficiency and the deterioration of physical facilities. The performance of the system therefore should be judged not by the viability index alone. This parameter should be used simultaneously with the ability of the system to maintain its facilities relative to a cost standard, say a set cost of maintenance on a per hectare basis. A high-performing system must therefore have a high viability index and a maintenance cost approximating the standard.

Lastly, the IA performance indicators were externally imposed and thus were weak in capturing the interplay of variables unique to the organization. It is therefore suggested that the evaluation criteria be recast and internahly developed by the members themselves. Future researches should take into account existing performance measurement practices of IAs.

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# Appendix

## Results of Stepwise Regression

| Variable | Regression Coefficient | Standard Error | F (1, 13) | Prob. Partial $r^2$ |
|---|---|---|---|---|
| x7c | –.1435 | .0566 | 6.431 | .02485 |
| x8 | .2501 | .0603 | 17.197 | .00115 |
| x10 | –.0658 | .0353 | 3.474 | .08507 |
| Constant | .5822 | | | |

| | | | |
|---|---|---|---|
| Standard Error of estimate | | = | .0638 |
| Adjusted | $r^2$ | = | .4842 |
| | $r^2$ | = | .5809 |
| Multiple | r | = | .7622 |

## Analysis of Variance Table

| Source | Sum of squares | DF | Mean square | F ratio |
|---|---|---|---|---|
| Regression | .0734 | 3 | .02545 | 6.007 |
| Residual | .0530 | 13 | .0041 | 8.496E-03 |
| Total | .1264 | 16 | | |

*Note:* DF = Degrees of freedom.

The multiple r value of .7622 implies that 76.22 percent of the variation in Y is explained by X7C, X8, and X10 taken together. The remaining 23.78 percent of the variation is explained by other factors not considered in the model.

The final Regression model is:

Y = .5822 – .1435 x 7c = .2501 x 8 – .0658 x 10

To verify whether or not this Regression relation is significant, the Regression Coefficients must not be equal to zero. Hence, the following tests:

Ho: B7C = B8 = B10 = 0
H1: not all B = 0 i = 7C, 8; 10

Test statistics: $FC = \frac{MSR}{MSE}$

$$FC = \frac{.0734}{.0530} = 6.007$$

Rejection region: FC > F = 2.49

05 (3,13)

Conclusion: Since F of 6.007 is greater than F tabular of 2.49, the Ha (Alternate Hypothesis) which held that not all Regression Coefficients are equal to zero was accepted.

Conceptually, this means that if the Regression Coefficients are not zero, then the Regression relation is significant.