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Technical and Institutional Evaluation of Selected National and Communal Irrigation Systems and Characterization of Irrigation Sector Governance Structure

Arlene B. Inocencio et al.

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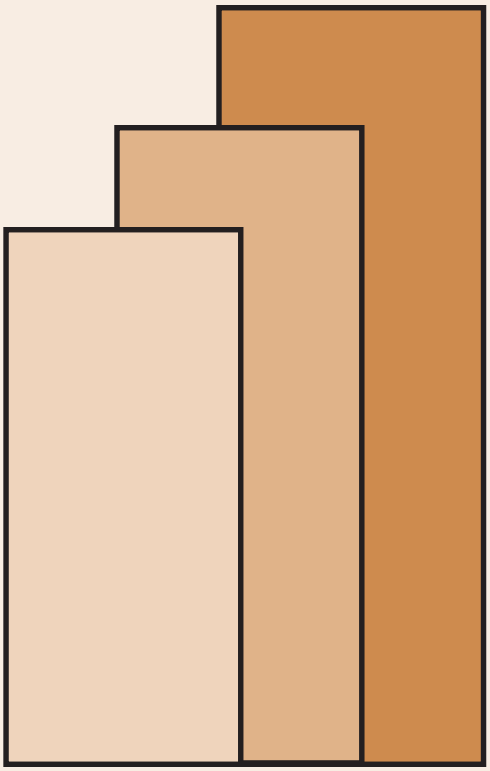

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Technical and Institutional Evaluation of Selected National and Communal Irrigation Systems and Characterization of Irrigation Sector Governance Structure: Integrative Chapter

Final Report

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With inputs from NIS & CIS Technical Studies Proponents -- Roberto Clemente for NIS component and Roger Luyun and Dulce Elazegui for CIS component

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Abstract

This discussion paper presents an analysis of the performance of national (NIS) and communal irrigation systems (CIS) by region, complemented by technical and institutional assessments of 30 sample NIS and 66 sample CIS in Luzon. It shows that there is value in looking at subnational trends. Using secondary data from the central and regional offices of the National Irrigation Administration and the systems, complemented by key informant interviews and ocular inspections, this study establishes key institutional and technical constraints to improving performance of NIS and CIS systems.

In addition to the selected key performance indicators, some ratios are used to characterize the capacities of the systems in terms of manpower, level of functionality, financial structure, and productivity of the systems. This study examines the NIS cases by *province*, *size* (large, medium, small), *technology* (gravity type vs pump type), *location* (upstream, midstream, downstream), *vintage* (pre-NIA, 1965–1980, 1981–2013), and by some measures of "*success*" and presents a number of instructive results.

Keywords: irrigation performance, management and development of irrigation systems, irrigators' association, Luzon

EXECUTIVE SUMMARY

This paper presents findings and some preliminary recommendations on irrigation related to technical/physical and institutional aspects of irrigation management and development for both national and communal systems.

Key Findings

There is value in looking at sub-national trends given insights which cannot be inferred from national trends. Using secondary data from the Central and regional offices of NIA and the systems, complemented by key informant interviews and ocular inspections, this study establishes key institutional and technical constraints to improving performance of both national and communal irrigation systems.

Specifically, for national irrigation systems, we found the following:

- National and regional trends in NIS

  Service area growth has slowed down in the last decade and growth has been concentrated in just four regions. Firmed up service area difference with service area indicate on average a land conversion rate or declared permanently non-restorable area of about 10%. Most NIS systems are diversion systems and the few operational pump systems available are in five regions (Regions 1, 2, 3, 5 and 13).

  Cropping intensity only slightly increased over the years. In fact wet season irrigation intensity appears to have largely slowed down. In Luzon, some increases in dry season irrigation intensities can be seen while wet season intensities appear to have stagnated. However, in Mindanao, similar increasing patterns for both wet and dry seasons irrigation intensities are observed.

  Collection efficiency has only noticeably improved in two (the rest of Regions 2 and 4) regions only in Luzon and in MRIIS and slightly in UPRIIS while worst in Region 6. The Mindanao regions appear to have been performing better in terms of this indicator, consistent with the corresponding improvements in cropping intensity. Aside from this, possibly other factors maybe at play given the performance in Regions 2 and 11 and in MRIIS and higher cropping intensities in the rest of Mindanao.

- NIS Cases - Performance and Issues

  Of the 21 NIS cases, six are from Ilocos, five from Cagayan (including 2 MRIIS), seven from Region 3 (including 3 UPRIIS), three from Regions 4a and 4b, and one from Region 5. The sample also included four pump systems.[1] Except for UPRIIS and MRIIS, the rest of the systems are diversion/gravity type.

[1]Part of UPRIIS and MRIIS systems are served by pumps.

The performance of the NIS cases are analyzed in terms of size of IAs (defined as large, medium, small based on their FUSA), technology (diversion/gravity, pump, reservoir), location (upstream, midstream, downstream of the main canals), vintage (before 1965, 1965-80, 1981-2013), and by some measures of "success" which largely capture institutional and financial/economic aspects of irrigation system management by IAs/NIA. "Success" is measured similarly as NIA loosely defines it -- based on functionality ratings and active and functional IA organization, high collection efficiency and payment of ISF to NIA. These typologies capture various technical and institutional aspects of providing irrigation service by national systems. Pump systems will have different challenges from reservoir and diversion systems. Size of IAs based on firmed-up service area will likely be correlated with complexity of design, and operation of physical structures and facilities, and the corresponding type of management. Vintage entails different technical and institutional concerns between relatively old vs. newer systems. "Successful" IAs entail institutional factors at play but also probably technical aspects contributing to such performance.

The analysis according to size indicates that there is disparity between small and large IAs. The small IAs reported the highest incidence of inadequate water during dry seasons, flooding during wet season, high counts of canal problems especially lateral canals, and siltation/solid waste problems. The large systems/IAs indicated adequate water supply, least occurrence of siltation problems, lowest count of irrigation headwork and main canal problems, minimal occurrence of flooding and adequacy of budget. These IAs also have a high percentage of "successful" IAs compared with the small and medium size IAs. This apparent advantage of large IAs may be linked to their degree of influence by virtue of their size and ability to access funds which result in favorable physical states of their systems, which in turn led to their success.

Looking at systems according to technology, reservoir systems show clear advantages over the other types of schemes. And while pumped systems are shown to be doing well, these systems are in fact heavily subsidized. The IA sample irrigated by diversion system (gravity) reported the highest count of inadequacy in water supply especially during the dry season. The IAs which used pump systems have the highest counts of siltation, lateral canals and institutional problems. Despite these concerns, these IAs reported adequacy and dependability of water supply even during dry season, no flooding problem, and higher collection efficiencies compared to the situation of IAs with diversion/gravity system. The IAs in reservoir systems claimed to be most successful of the three groups. This group reported adequate water supply, lowest count of siltation problems, largest percentage of financially strong IAs, very high IA functionality ratings and high collection efficiencies.

As to the location of the IAs relative to main canals, downstream IAs are shown to be heavily disadvantaged over the rest of the IAs. The sample has the following characteristics: highest count of siltation and/or solid waste problems, highest count of lack of water supply, highest occurrence of flooding during wet seasons, highest count of damaged farm-to-market roads, highest percentage of financially weak IAs and lowest ratings of water delivery service in terms of adequacy and timeliness. The upstream IAs on the other hand, reported the least incidence of water supply problems, lowest count of solid waste and/or siltation problems, highest

irrigation structure problems, highest count of lack of machineries and equipment and a high percentage of financially strong IAs. Irrigation canal problems were ranked first in the list of problems, and followed by institutional problems and then by calamities/pest infestation causing production problems.

In terms of vintage, the profile of IAs and irrigation systems also differs. This measure splits the sample into three periods which coincide with the distinct trends in irrigation investment and development. Interestingly, the pre-NIA systems are characterized as those with the least irrigation structure problems, concern for lack of machineries and equipment and inadequacy of water supply. However, the IAs in these systems have the lowest functionality ratings. Systems constructed between 1965 and 1980 have the following attributes: highest count of poor headwork and control structures condition, highest concern of lack of machineries and equipment, highest count of financially weak IAs, highest count of lack of water supply, and highest incidence of damaged FMRs. Yet, these systems have the least siltation/solid waste problems relative to systems from the other periods. Prevalent problems in decreasing order include: inadequate of water during dry seasons, poor conditions of lateral canal and control structures. The IAs with systems built between 1981 and 2013 reported the highest count of main and lateral canal problems. They also have the highest incidence of siltation problems and the largest count of institutional problems. However, this group has the largest number of financially strong IAs, the highest count of "successful" IAs, the least occurrence of flooding, with adequate water supply and least damaged FMRs. This observation seems ironic as it implies that IAs can still be financially strong and "successful" despite technical and institutional problems.

Profiling IAs according to "success" or failure indicates distinct differences between these groups. "Successful" IAs in the sample are characterized as those with adequate water supply, less institutional problems, adequate budget and facilities, machineries and equipment. However, these IAs experience higher incidence of siltation and problems with physical state of main canals, lateral canals and control structures. The hierarchy of problems of successful IAs are as follows in decreasing order: lateral canal condition problems, institutional problems, crop production problems due to calamities/pest infestations and damaged irrigation structures. The "not successful" IAs have the higher count of inadequate water during dry seasons, irrigation headwork problems, lack of facilities, machineries and equipment, with inadequate budget and lower IA functionality ratings, indicating poor management performance. In order of importance, inadequacy of water comes first, followed by institutional problems, and then by the lack of irrigation facilities/infrastructures, machineries and equipment.

Lastly, using an alternative approach to analyzing the sample NIS performance, the results show that irrigation performance has much to improve. This approach establishes an irrigation performance index (IPI) measured in terms of five aspects: financial, economic, institutional, technical and environmental factors. The *financial factors* include: 1) IAs rating of their financial strength – financial capability of the IA is critical in the organization's development; 2) collection efficiency – a higher collection efficiency means higher ISF shares by IAs and better incentive; and 3) collection delinquency – a higher delinquency decreases the

performance index. Financially strong IAs can carry out better O&M and repairs so that irrigation systems can deliver good/sustainable irrigation service.

The *economic factors* include average annual yields and gross profits of IA members which would be indicative of benefits that reach beneficiary farmers. Higher annual yields can lead to higher annual profits. Also, higher incomes can mean farmer members would be better able to pay ISF resulting in IAs financial strength. The *institutional component* includes: 1) effectiveness of policies; 2) flexibility index rating; 3) reliability index rating; and 4) satisfaction rating on farm to market road.

The *technical component* indicators include canal structures ease of operability and canal structure's operability vs. design. Canal structure ease of operability pertains to the ease in operating irrigation structures such as check gates, turnout gates, etc. While canal structure operability vs design compares the original design of the irrigation system vs the actual use of the structure. The *environmental component* indicators include dissolve oxygen content and acidity. Higher DO (i.e. > 6 ppm) and pH content (i.e. >5) mean better quality water. The pH found in most water samples show levels >7 which indicate alkaline conditions and potential sodicity problems if not addressed on time. The results of this analysis show that 58% of the sample IAs rated the irrigation performance as moderate. Only 12% of the sample rated performance as high and the rest, low performance.

For communal irrigation systems, the preliminary evaluation leads to the following findings:

- National and Regional/Provincial Trends
  Service area has been growing but at a relatively very slow pace while firmed up service area has been closely following. Given the relatively stable difference between the SA and FUSA, land conversion or growth in permanently non-restorable area does not appear to be a concern. However, the trends in actual irrigated areas during the wet and dry seasons seem to have faltered in 2012. Wet and dry seasons irrigation intensities never reached the 80% mark and even declined by about 20% in 2012.

  With the rise in equity schemes, the amortization collection decreased and became a less significant source of income. Despite this trend, amortization collection efficiency drastically declined, making this a serious concern.

- Characterizing the sample CIS
  The 66 CIS are saddled with technical issues and problems that affect their performance. The sample CIS in this study have run-of-the-river type dams which are quite old, with exposed rock cores, damaged spillways, and sediments almost at the crest level. The sluice gates and intake gates which were initially made of steel have been replaced with flashboards, sand bags, or stones and in some relatively larger CIS, with defective lifting mechanisms. These problems contributed to the increase in sedimentation. However, most of the sample CIS have concrete-lined main canals and even laterals. The good conditions of these lined and unlined canal networks are said to be due to the IAs O&M efforts and cleanup mechanisms. Where heavy siltation is experienced due to watershed degradation, the solutions are simply beyond the IAs.

The sample CIS are characterized according to size, technology, "success" or "not successful" and by province. On size, three types are defined: small, medium, large. Based on technology, the CIS are classified as gravity or pump systems. To profile CIS according to some measure of success, a "successful" IA is defined in terms of three criteria: (1) NIA's functionality rating of very satisfactory to outstanding; (2) IA's own financial rating of 3 to 4, with 4 as very strong; and (3) IA's ISF collection performance rating of 3 to 4, with 4 as excellent, and a collection rate of 65% and above. "Not successful" or unsuccessful IAs are defined as all other IAs not classified as "successful". These categories capture various technical and institutional factors that influence CIS irrigation service.

The experience in small CIS exemplifies "small is beautiful." Compared to the other classes, the small CIS have the least incidence of inadequate water during dry seasons, siltation and solid waste problems. They also have less problem in irrigation structures and canals compared with the large systems and they reported the highest average cropping intensity and yield. However, they have the lowest collection efficiency and highest count of funding problem. Following the criteria above on "successful" CIS, the small systems have the highest percentage of "successful" IAs compared to the larger systems. The large CIS have the highest incidence of floods during the wet seasons. They also have the highest count of irrigation canal problems and water theft. But, they have the least funding problems.

Contrary to earlier findings, IAs using pump technology in the sample are found to be more successful despite the higher incidence of flooding and funding problems, and low cropping intensities. The disparity is likely due to their adequate water supply even during dry seasons, fewer problems with their irrigation canals and structures, and high collection efficiencies. The pump technology appears to be closely associated with better control of available water and the success of IAs.

The IAs irrigated by gravity have the highest cropping intensity and a low incidence of flooding, but they have more problems with irrigation canals and structures, more severe water shortages, and greater incidence of funding problems and water theft.

As to profile of "successful" IAs, they have adequate and dependable sources of water supply, high cropping intensity, high collection efficiency, and adequate funding. This success profile is obtained despite flooding, siltation, irrigation structures, and water theft problems. Less successful IAs are characterized by inadequate water in the dry season, more problems with irrigation main canal and control structures, low collection efficiencies, and severe funding problems. It is interesting to note that IAs can still be classified as successful despite physical and economic concerns. It seems that water availability is a key factor in high collection efficiency. This finding needs to be validated so NIA can use this result in formulating strategies to improve collection efficiency.

Recommendations

Based on the technical and institutional analyses carried out for national and communal irrigation systems, the following recommendations are in order.

For National Irrigation Systems:

- Given the new insights from sub-national trends which cannot be inferred from national level data, such level of analysis should be scaled up to cover more NIS in Visayas and Mindanao and better understand the situation on the ground and establish some patterns and trends which can be used to formulate relevant policy changes and actions.
- It appears that conversion of irrigated areas is a more serious concern in certain regions. If the rate of land conversion will continue to rise, estimates of design areas should properly take this into account.
- Given the dramatic slowdown in growth or stagnation of wet season irrigation intensity, it is high time that NIA gives attention to the need to invest in drainage and/or collaborate with DPWH to explicitly and more systematically address flooding problems in NIS systems which fall under the turf of the latter and may require bigger technical/engineering solutions.
- As a first step, each NIS should clearly establish size of firmed-up service areas which are flooded during the wet season. For systems where there is a big difference between wet and dry season irrigable area, two FUSA measures should be recognized in order to set more realistic irrigated area targets.
- Collection efficiency improvements appear to correspond to improvements in cropping intensities. If this relationship can be confirmed, the strategy to improve collection efficiency should include improvement in cropping intensities which in turn will require improvement in irrigation service.
- Relative to the medium and large irrigators associations (IAs), the small IAs appear to have the disproportionate share of the problems.Given this disparity, the design of institutional interventions should take into account "size" of IAs according to membership. Special attention should be given to the needs of small IAs and appropriate interventions be designed.
- Irrigators Associations in reservoir systems claimed to be most "successful" based on many indicators when compared with those in diversion and pump systems. In considering types of projects to invest in, government will have to weigh the trade-offs in investing more in reservoir types which will likely mean higher initial capital requirements vs. other type of systems (e.g. pumps). The later type may mean less initial investment but higher O&M after project completion and less likely to be sustainable to operate given volatility in oil prices.
- "Successful" IAs in the sample are characterized as those with adequate water supply, less institutional problems, adequate budget and facilities, machineries and equipment. If we take these factors as indicative of necessary requirements for "successful IAs," then at minimum, NIA's system design and eventually service areas should have better estimates of available water. This finding makes necessary more firm and systematic assessment of adequacy and reliability of water that will be available to farmers when an NIS system operates.
- The issue of equity in the delivery of service remains a major concern given the heavily disadvantaged downstream IAs – with inadequate water during the dry season and more water than they need during the wet season. NIA has to come up with a better strategy of addressing this aspect of equity as part of improving quality of irrigation service.

If use of pumps is to be taken as a way to partly address equity concerns especially during dry seasons, the lack of policy on treatment of use of pumps within NIS systems has to be addressed. The use of discount needs to be evaluated and made an official policy rather than leaving too much discretion on the water masters or institutional development officers in the field.

- Performance of irrigators associations using functionality ratings differ by vintage -- pre-NIA systems, 1965-80 and 1981 to 2013 – indicating that contrary to expectations, functionality of "older" IAs maybe more problematic. If functionality ratings can be validated, there may be a strong case for revisiting the institutionalization program. "Old" IAs appear to need more retraining/reorienting/strengthening so they can keep up and become more effective organizations.
- Again, appropriate institutionalization policy has to be designed according to the specific needs of different types of IAs. Irrigators associations in the early NIA years appear to be mostly financially weak. Given this, the capacity building strategy for IAs should explicitly include ways to improve financial strengths and that intervention for IAs should consider not only size (in terms of membership) but also vintage. IAs with systems built between 1981 and 2013 appear to need in addition, more engineering/technical solutions. These observations should be confirmed by further evaluations given two possible scenarios –more recent systems are not built as strongly or we have simply more intense weather and climate contributing to more rapid deterioration or damage to the systems. If the latter would be the case, this finding will provide a strong support for more deliberate climate change resilient systems in terms of design and structures.
- Using an alternative approach to analyzing the sample NIS, the results show that the composite performance has much to improve. This approach establishes an irrigation performance index in terms of five aspects: financial, economic, institutional, technical and environmental factors.If the results can be confirmed, addressing specific aspects of performance with respect to the five areas can lead to possible marked improvement. Given this potential usefulness of the analysis, this approach should be scaled-up to cover more IAs and national systems to validate the initial observations and at the same time refine the measure to be more useful.

<u>For Communal Irrigation Systems:</u>

- Service area has been growing at a very slow pace and prelimnary investigation shows that a good number of CIS are already in elevations beyond the 3% slope. This initial finding warrants scaling up of the characterization to cover more IMOs to get a better sense of the location and distribution of the over 9000 CIS nationwide.
- An assessment of the potential and economics of considering areas between 3% and 8% slopes for CIS expansion should be pursued. Using the GIS technology and some modeling, a more systematic identification of irrigable CIS areas should be carried out taking into account water availability, associated environmental damage/watershed degradation.
- The wet and dry seasons irrigation intensities which are generally below 80%, should be further investigated and understood by looking at trends in all provinces/IMOs and more systems. As a first step to this assessment, the firmed up service area (FUSA) has to be examined and the field work should be used to understand why the actual irrigated areas have been falling short in both seasons. The evaluation should be able to establish how much is due

to "non-functional" areas (which will therefore need repair/rehabilitation/restoration) vs. flooded during wet or with inadequate water during dry.

- With the rise in equity schemes, the amortization collection decreased and became a less significant source of income. Despite this, the fact that amortization collection efficiency has declined, is a concern which should be addressed.
- Reservoir systems appear to coincide with most successful group of IAs. If this finding can be validated, consideration of this type of system may well justify the possibly higher investment needs compared to other type of systems.
- The technical issues and problems affecting the CIS performance point to the need to revisit adherence to design and construction guidelines for new development and rehabilitation of CIS. Specifically, the assessment of dependable flow, catchment conditions, sediment discharges and potential of groundwater source should be properly carried out. The trade-off between spending more on capital requirement during the development phase versus higher O&M expenditures after turnover should be carefully weighed.
- If results can be validated by scaling up the evaluation to cover more CIS, appropriate government interventions can be designed according to the priority needs of IAs. NIA can use the results for targeting interventions and allocating the corresponding resources. Small IAs need more capacity building and funding while large IAs need more technical solutions.
- Lastly, while IAs can still be considered "successful" despite physical and economic concerns, it appears that water availability is a key factor in high collection efficiency. NIA's strategy to improve collection efficiency has to also include addressing the issue of water availability.

INTRODUCTION

This report is a Phase 2 of the 2013 Rapid Assessment of national irrigation systems (NIS) conducted for the Philippine Institute for Development Studies (PIDS) which largely focused on national level data and analysis with six case studies (Inocencio, et al. 2013). This second phase has three components: (i) assessment of national irrigation systems (NIS) regional trends and 22 systems; (ii) rapid appraisal of communal irrigation systems (CIS) at the IMO or province level and a sample of 66 systems; and (iii) characterization the irrigation sector governance structure. This component is tasked with integrating the first two components.

Irrigation development and management in the country has historically been the single biggest item of public expenditure for agriculture, accounting for about a third of the total since the 1960s. In the 1970s and early 1980s, as well as in recent years when world rice prices rose at unprecedented levels, this ratio was even higher at close to half of total public expenditures for agriculture. In recent years, irrigation has taken up from one third to close to half of the Department of Agriculture budget.

Table 1. Budget appropriation by the Department of Agriculture[2]

	Appropriation for irrigation (P Million)	Share in Department of Agriculture budget (%)
2011	12,790.650	36.8
2012	24,454.052	46.2
2013	27,156.295	42.1
2014	21,182.734	30.9
2015	28,750.441	42.4

Sources: Various General Appropriations Act (GAA).

The National Irrigation Administration (NIA) development program largely focuses on national irrigation systems (NIS) and communal irrigation systems. NIS are irrigation systems supposedly with minimum service areas of 1,000 hectares (ha), the biggest reaching over 120,000 ha. However, a number of NIS fall short of the 1,000 ha threshold size. Management of these NIS systems is by NIA and irrigators associations. There are 231 NIS with a total service area of 813,916 ha. (or 731,186 ha firmed-up service area) as of December 2014. The three largest NIS with massive reservoirs operated in combination with river run off, are gravity irrigation systems which account for about a third of total NIS service area. The remaining two-thirds are mostly run-of-the-river gravity irrigation, except for five medium-sized NIS that pump water from large rivers.

Communal irrigation systems (CIS) are those whose service areas fall below the 1,000-ha threshold. The total service area of CIS continues to be sizeable at about 599,049 ha or a firmed-up service area of 576,859 ha as of December 2014. While many CIS started as private initiatives, most of them have been receiving government support for the cost of rehabilitation and new construction. At least 95% of CIS are gravity systems obtaining water from rivers or streams. However, few have been given funding support for medium sized pumps to also

[2] The 2015 share is computed as ratio of NIA to DA plus NIA budgets to be consistent with other years. The appropriations for irrigation are only those through NIA.

abstract and distribute water from a river. Most CIS are constructed by NIA, but the irrigator associations are responsible for the management and maintenance of the systems.

While the government started to promote the adoption of pump irrigation in the 1950s, recent data indicate that at least 90% of pump irrigation used by rice farmers have been purchased privately, and even more so for pumps used for non-rice cultivation. The Department of Agriculture's Bureau of Soils and Water Management (BSWM), as well as NIA, have occasionally distributed small pumps to rice farmers for free and sometimes on credit, especially during periods of drought when the surface irrigation systems have unusually low actual irrigated areas. In relative terms, government subsidy for the use of small pump or individual irrigation systems has been nominal.

OBJECTIVES

The project aims to evaluate the effectiveness and efficiency of the government's irrigation program. It focuses on technical, physical, and institutional aspects of performance of both national (NIS) and communal irrigation systems (CIS), and selected cases led by other project proponents. Specifically,

Component 1: National Irrigation Systems

This component analyzes trends in NIS secondary data and examines 22 cases to help understand and explain the trends and state of national irrigation service provision from the points of view of providers and beneficiaries. Specifically:

1. Analyze the trends and patterns of performance indicators across different types of systems in terms of ratios of actual irrigated areas to service and firmed-up service area, cropping intensity, collection efficiency, operation and maintenance (O&M), and farm productivity based on system level and aggregated data, and
2. Analyze the factors affecting the trends and patterns of performance across NIS and within selected NIS using secondary data, key informant interviews and focus group discussions, geographic information system (GIS), and other techniques. This analysis requires collection of secondary data at the different levels of NIA – Central Office (CO), Regional Irrigation Office (RIO), Irrigation Management Office (IMO) and selected NIS cases.

Component 2: Communal irrigation systems

This component provides preliminary evaluation of investments in CIS. This component undertakes CIS analyses from secondary data and cases to help understand and explain the trends and state of irrigation service provision from the points of view of providers and beneficiaries. Specifically:

1. Characterize the CIS at national and provincial levels, examine the trends and patterns of performance indicators in terms of ratios of actual irrigated areas to service and firmed-up service areas and cropping intensity, collection efficiency, and farm productivity based on national and provincial level data, and

2. Undertake preliminary analysis of factors affecting the trends and patterns of performance of CIS at the national and provincial levels and within selected CIS in 11 IMOs/provinces (out of 60 total as of July 2015) using secondary data, key informant interviews and focus group discussions, GIS, and other techniques. This analysis requires collection of secondary data at the different levels of NIA particularly the CO and the IMO and site visits to selected CIS cases.

This component is tasked with integrating the findings of both the NIS and CIS technical and institutional assessments of performance. The aim is to establish technical and institutional factors constraining the NIS and CIS systems from performing well and delivering quality service. These factors may relate to inefficiencies in the development and management of the systems, from planning and design, to project evaluation/selection, construction, operation and maintenance, and rehabilitation. A separate study component covers the entire irrigation sector governance aspect.

FRAMEWORK OF ANALYSIS AND METHODOLOGY[3]

The study applies a rapid assessment approach following Burt and Styles (1998) and the MASSCOTE (Mapping Systems and Services for Canal Operation TEchniques) (2007) rapid appraisal procedure (RAP) taking into account availability and access to technical data on the systems and what can be realistically measured during the relatively short visits and ocular inspections.[4]

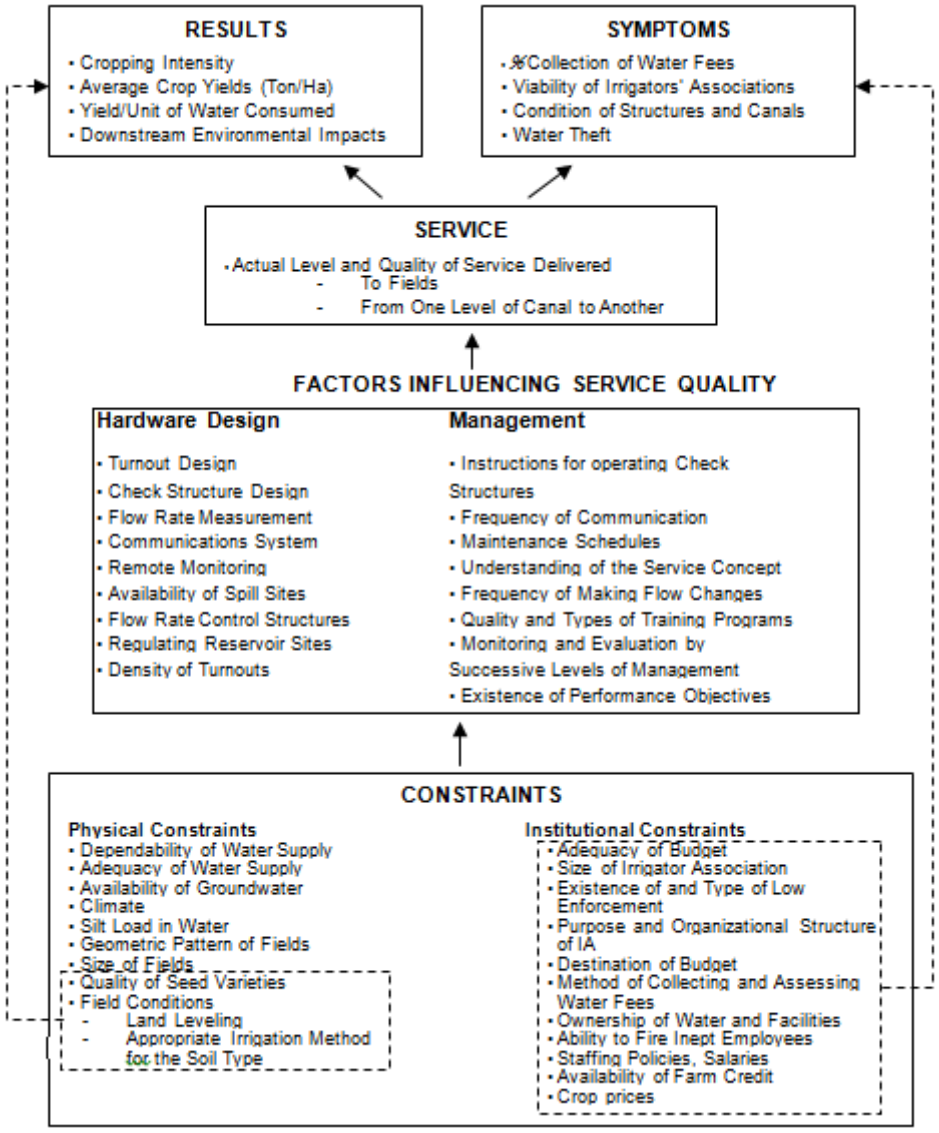
Figure 1 shows some of the major inter-relationships that affect outputs from irrigation projects/systems. It is important to distinguish "results" from "causes" and "symptoms". For instance, strong IAs maybe thought to eliminate most of the problems in irrigation systems/projects. However, this framework takes strong IAs as a *result* and not a *cause*. A scenario for the existence of a weak IA is where the irrigation project authorities expect the IA to collect water fees, distribute water, and maintain a water distribution network. Yet, the IA has little or no say in how the fees are spent and the water arrives at the IA area is inadequate and untimely (i.e. poor water delivery service). In this scenario, the weak IA is a *symptom* and not a *cause* of poor water delivery service.

The framework shows that many factors will impact project/system outputs and that the strength of an IA is dependent on both *institutional* and water delivery service factors. It describes a rapid appraisal process that takes into account the various *hardware design* and *management* factors that affect service. Consequently, the *physical, technical* constraints that include aspects of water supply and sources, and *institutional* constraints that include capacities of parties involved, influence availability and flexibility of irrigation service.

[3]The RAP approach draws heavily from Burt and Styles (1998).

[4] The MASSCOTE framework aims to map the entire services area into manageable cost-effective units to better serve users. The framework maps the service to users by taking into account the perturbations, the opportunities for water management improvement, and the costs. This mapping in turn serves as an input in formulating strategies for water management service delivery, canal operation, and modernization. The NIS and CIS studies only limit themselves to the use of some relevant and applicable parts of the RAP.

Figure 1. The Rapid Appraisal Procedure (RAP)



Sources: Burt and Styles (1998) and MASSCOTE (2007).

The RAP examines external inputs such as water supplies and outputs like water destinations (e.g. evapotranspiration or ET, surface runoff, etc.). It provides a systematic examination of the *hardware* and the *processes* used to convey and distribute water internally to all levels within the project (i.e. from the source to the fields).

The RAP *outputs* include *external* and *internal* indicators. Basically, external indicators examine inputs and outputs of the whole project/system, while *internal* indicators examine processes and hardware within the project/system. The *internal* indicators also identify key factors related to water control throughout a project/system. They define the level of water delivery service provided to users, examine specific hardware, and check up on management techniques and processes used in the control and distribution of water. The *external* indicators include ratios or percentages comparing project inputs and outputs to describe performance,

measures of forms of efficiencies related to budgets, water, yields, etc. However, these indicators do not provide insight in how to improve performance.

The fieldwork asked questions to management in the RIO/IMO offices, systems operators, and IA officers/farmer beneficiaries, and observes or critically examines them. Questions for provincial/IMO/system offices probe on information/readily available data on general project/system conditions, water supply location, ownership of land and water, budgets, operation as described by office staff, and stated water delivery service at various levels in the system. In the field, RAP includes observing the state of the canals and structures from head works to main canals to laterals to field level, discussing operations of cross regulator and inlet, and performing key informant interviews (KIIs) with NIA staff/irrigators association officers/members responsible for system management/co-management and water distribution.

Scope of the Study

For the NIS component, 22 systems in 14 provinces in Luzon are covered: (1) Bonga Pump 2 and (2) Nueva Era RIS in Ilocos Norte; (3) Banaoang Pump Irrigation System (PIS) in Ilocos Sur; (4) Magapit PIS and (5) Solana PIS both in Cagayan; (6) Visitacion RIS also in Cagayan; (7-8) Magat River Integrated Irrigation System (MRIIS) in Isabela; (9-10) Ambayoan-Dipalo RIS in Pangasinan; (11-13) Upper Pampanga River Integrated Irrigation System (UPRIIS) in Nueva Ecija and parts of Tarlac, Pampanga, and Bulacan; (14-16) Tarlac-San Miguel-O'Donnel River Irrigation System (TASMORIS) and selected operational TGIS systems; (17) Pampanga Delta RIS; (18) Angat-Maasim RIS in Bulacan; (19) Balayungan friar land irrigation system (FLIS) in Cavite; (20) Libmanan-Cabusao PIS in Camarines Sur, (21) Caguray IS in Mindoro Occidental, (22) Dumacaa in Quezon. The sampling frame represents Regions 1 to 5 national systems, with a total firmed-up service area (FUSA) of 440,785 ha (as of December 2014). The selected NIS represent about 47% of the Regions 1 to 5 firmed up service area (FUSA) or 28% of overall total NIS FUSA.[5]

For the CIS component, 11 provinces/IMOs in Luzon are covered, with total firmed-up service area of around 180,328 has, representing 31% of the total. The selected IMOs were drawn from the top 20 provinces in terms of total FUSA except for Laguna because it was selected to optimize the overlap with the NIS sample provinces. Specifically, the selected provinces/IMOs include the following: (1) Laguna (part of Laguna-Rizal IMO); (2) Ilocos Norte; (3) Cagayan (part of Cagayan-Batanes IMO); (4) Isabela; (5) Nueva Vizcaya; (6) Benguet (part of Abra-Benguet -Ifugao-Mt. Province IMO); (7) Pangasinan; (8) Nueva Ecija (part of Bulacan, Aurora, Nueva-Ecija IMO); (9) Pampanga (part of Pampanga-Bataan IMO); (10) Camarines Sur; and (11) Occidental Mindoro. Of these provinces, Camarines Sur (with 43,730 has) and Pangasinan (29,783 has) have the largest CIS areas (NIA 2014).[6]

[5] UPRIIS and MRIIS have FUSA of 119,640 ha and 85,176 ha., respectively, as of December 2014. These two largest systems already represent around 28% of the total FUSA for NIS.

[6] NIA has 60 IMOs nationwide each headed by a Division Manager. The IMOs consist of 40 clustered provinces; and the 9 district offices, and two dam and reservoir divisions of UPRIIS and MRIIS. The IMOs are responsible for the construction and rehabilitation of irrigation projects and systems in one or a cluster of provinces. They also implement the operation and maintenance (O&M) plans of irrigation systems in collaboration with the farmer-beneficiaries (http://www.nia.gov.ph).

For each selected province/IMO, six sample CIS systems were drawn using the 2013 NIA Inventory file that serves as the sampling frame. This file contains system size, technology, source of water, and percentage of operational/non-operational FUSA. The CIS sample represents small (i.e. 50 ha and below), medium (i.e. above 50 to 100ha), and large (i.e. above 100 ha) systems. Selection of CIS is also based on the type of technology, whether gravity or pump. In consultation with the NIA Irrigation Development Officers (IDOs) at each IMO, "success" and "failure" cases were included in the sample. Accessibility of the system was also considered.

Data Collection

Primary and secondary data were collected from the central and field offices. Primary data were collected during technical field visits, and qualitative information gathered from key informant interviews (KIIs) for the institutional and governance aspects of irrigation service. Secondary data were collected from the different NIA offices such as NIA-Central, Regional, Irrigation Management Offices (IMOs), and the offices of each selected NIS. Additional secondary data were gathered from other the government agencies. Relevant documents, appraisal, implementation/completion, project performance audit reports, annual/yearend reports, technical studies, policy notes, and river basin master plans were reviewed to characterize the current state and distribution of NIS and CIS and to evaluate trends and patterns of performance indicators.

Specifically, secondary data/reports, whenever available, included the following:

- List of NIS/CIS under the IMOs and available data including functionality survey results;
- Technical data (i.e. physical state, service area, irrigation efficiency, source of water, access to and availability of water, year constructed and start of operations, construction cost, rehabilitation cost, other major investments, yield, cropping calendar, cropping intensity; rainfall and other climatic data;
- Status of IAs (i.e. profile/institutional report of IAs, source of funding, financial status/viability, program of works (POWs) for all available years, and national irrigation system performance (NISPER) and communal irrigation system performance (CISPER); and
- Assistance provided by NIA to CIS/IAs; assistance provided by other agencies to CIS/IAs.

For each selected NIS or CIS case, the proponents met with the IMO Division Managers, NIS Managers, and the system personnel. Where available, technical references including feasibility studies, technical drawings, network maps were obtained. A review and analysis of the maps, including technical specifications, canal layout, location and functions of irrigation structures, and irrigated and built-up areas were conducted.

Key informant interviews (KIIs) of NIS or CIS staff and IAs (e.g. IMO, System managers, IDOs/operations staff, and IA president/officer/member) were conducted. Information on socio-economic characteristics of farmer-members, institutional capacity of IA, problems and constraints in managing the NIS canals/laterals/CIS by the IAs were generated from the KIIs. The status and current conditions of the main canal, selected secondary, and tertiary canals

were initially determined through KIIs and complemented by ocular observations during the walk-throughs.[7]

Walk-throughs and actual measurements were collected for a subset of the sample NIS and CIS to gauge the physical conditions of the systems (i.e. current vs. designed dam/reservoir capacity; length and efficiencies of lined vs. unlined canals; legal and illegal turnouts, including functionality; for pump systems: fully, partially operational, or non-operational pumps; among others). Depending on the size of the IS, one secondary lateral was selected: (a) near the dam or headgate, (b) in the middle, or (c) at the tail end of the system. If the NIS is relatively small, only one lateral near the headgate and one at the tail end had been selected. These structures/facilities are photographed and geo-tagged for proper referencing. Conveyance losses were measured on selected main and lateral canals, and where applicable, compared for lined and unlined canals. For the CIS, at least two systems per IMO/province were selected for the walk-throughs. One lateral each near the headgate and at the tail end were selected for technical evaluation.

Data Analysis

This study carried out trend analysis and use case studies to provide in-depth analysis. To accomplish this goal, technical and institutional evaluations are carried out applying some RAP approaches. Application of the RAP framework allows development of *internal* process indicators and *external* indicators. The generation of ***internal process*** **indicators** requires information listed in the "**Constraints**", "**Factors Influencing Service Quality**", "**Service**", and "**Symptoms**" in Figure 1. The ***external*** **indicators** require some of the information contained under "Physical Constraints" (e.g. water supply, climate) and "Results".

The following measures can be considered as among the *internal* indicators:

- Service area (SA) (proxy for *hardware*)– total area that a completed national or communal system can potentially irrigate;

- Firmed-up service area (FUSA) (proxy for *hardware*) – Service Area less converted areas and permanently non-restorable areas; this is further broken down into operational/functional vs. non-operational/functional; functional service area is the actual area irrigated in the wet season plus the area submerged in the said season but irrigated in the dry season; non-operational/functional service area is the difference between FUSA and operational/functional service area, mainly due to water shortage and dilapidated facilities;

- Programmed service area (dry season, wet season) (proxy for *management*) – FUSA less non-operational area that can be irrigated given "expected/estimated" available water in the dry season and less areas that will potentially be flooded during the wet season;

While the following maybe considered a combination of *internal* and *external indicators*:

- Actual irrigated area (dry season, wet season) – Programmed area which were planted and reported in the verified list of irrigated planted area (LIPA);

[7] Refer to the inception report for the KII and guide questions for NIS staff at different levels and NIS/CIS IAs.

- Benefitted area (dry season, wet season) – irrigated areas which harvested at least 40 cavans/ha.

- Cropping intensity (*result*) – sum of actual irrigated wet and dry seasons divided by FUSA (before 2004, SA is used)

- Irrigation intensity (*result*) – actual irrigated wet (or dry season) divided by FUSA (before 2004, SA is used)

- Collection efficiency (*symptom*) – current collected irrigation service fee (ISF) divided by current collectible;

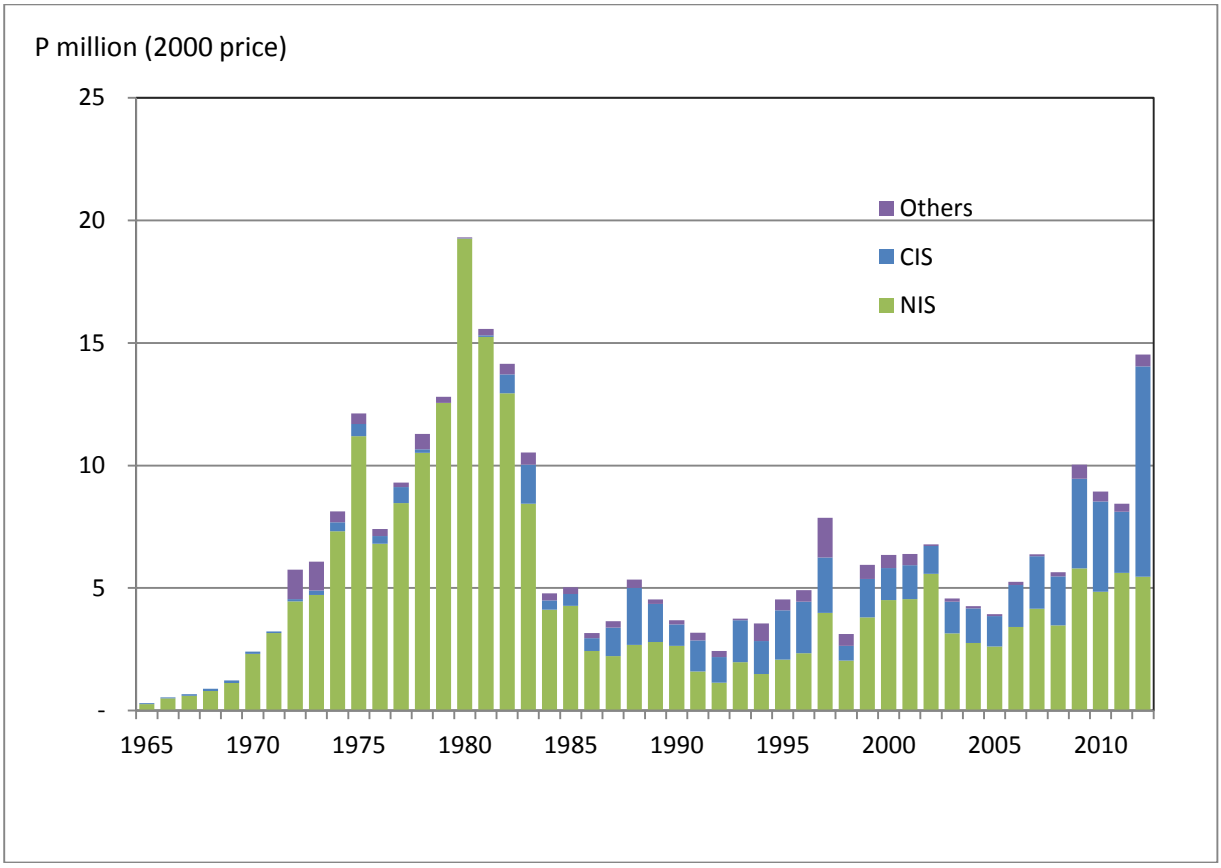
- Viability (*symptom*) – total system income divided by reported total O&M expenses.

In addition to the above performance indicators, some ratios are used to characterize the *institutional constraints* captured by capacities of the systems in terms of manpower, level of operation or functionality, financial structure, and productivity of the systems (*result*).

TRENDS IN NATIONAL IRRIGATION INVESTMENTS AND PERFORMANCE

Irrigation investment remains the most important policy instrument that government uses to increase productivity in agriculture and to achieve its food staples sufficiency objective. Figure 2 presents the trends in total public expenditures for irrigation in 2000 prices. Over the past four decades, irrigation investments have peaked in the 1ate 1970s to early 1980s and rose again in more recent years.

Figure 2. Irrigation investment trends for national and communal irrigation systems, 1965-2012



Sources: NIA Yearend Report, various years.

The increase in world rice prices in the 1970s together with the introduction of modern rice varieties suited to irrigated conditions raised the marginal rates of returns for irrigation investments. As world commodity prices decline, yields of modern rice varieties leveling off, and the cost of irrigation expansion increase, public expenditures declined. Investment shifted from new development to rehabilitation projects, which were reported to give higher returns to investment.

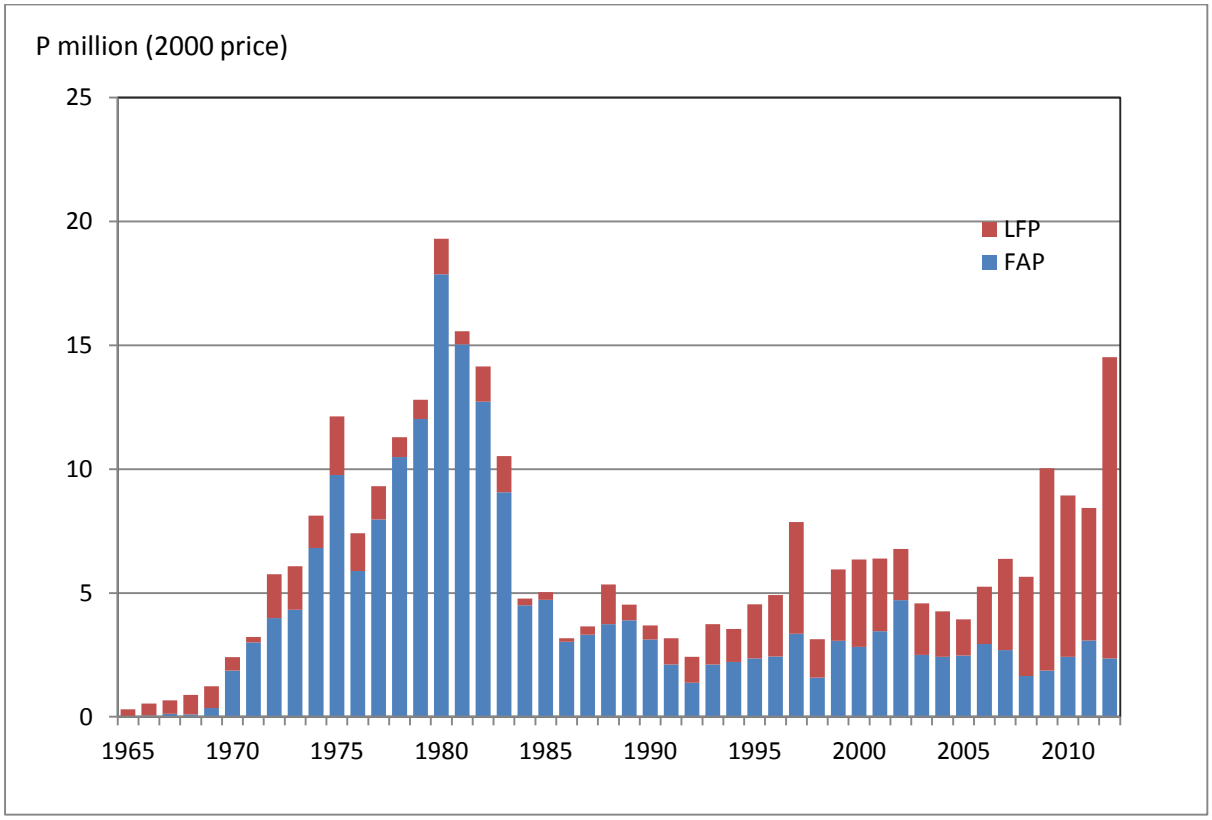
The rise in investments in 2008 was as a response to the increase in world rice prices in 2007. This trend continues with the present administration's food self-sufficiency program. More systematic analyses indicate that levels of public investments respond to short-run changes in

world rice prices as these affect marginal rates of returns to irrigation investments and adoption of rice self-sufficiency instead of consideration of long-term benefits and costs

There are also discernible shifts in investments from largely NIS to more CIS in early 2000 and in more recent years (Inocencio and David 2013). These changes were consistent with the delayed enforcement of the provisions in AFMA (supposedly to begin in 1997) to give more attention to smaller systems and promote participation of LGUs in developing CIS.

The funding source also has shifted from predominantly foreign in the 1970s to the 1980s to local in more recent years (Figure 3). This pattern is reflective of the country's development strategy at that time where foreign funding was a key element. That period was characterized by a debt-driven growth. The poor fiscal position of the country in early 2000 led it to foreign funding for irrigation projects. The recognition of the need to reduce foreign exchange risks, directed borrowings back to local sources. This fiscal policy had implications on the quality of projects and implementation. Foreign funding appeared to have certain implementation rules and standards at the start of the project up to completion. Local funding however, appears to have fewer requirements and less stringent rules and accountability.

Figure 3. Trends in irrigation investments by source of funding, 1965-2012



Sources: NIA Yearend Report, various years.

Looking at investment by purpose (Figure 4), the 1970s and early 1980s were dominated by new projects with some rehabilitation components. Donor evaluation studies in the late 1980s indicated that rehabilitation projects have higher rates of return (Jones 1995). This was also the period in which donors began to invest more in institutional strengthening relative to construction projects.

Figure 4. Trends in irrigation investments by purpose, 1965-2012

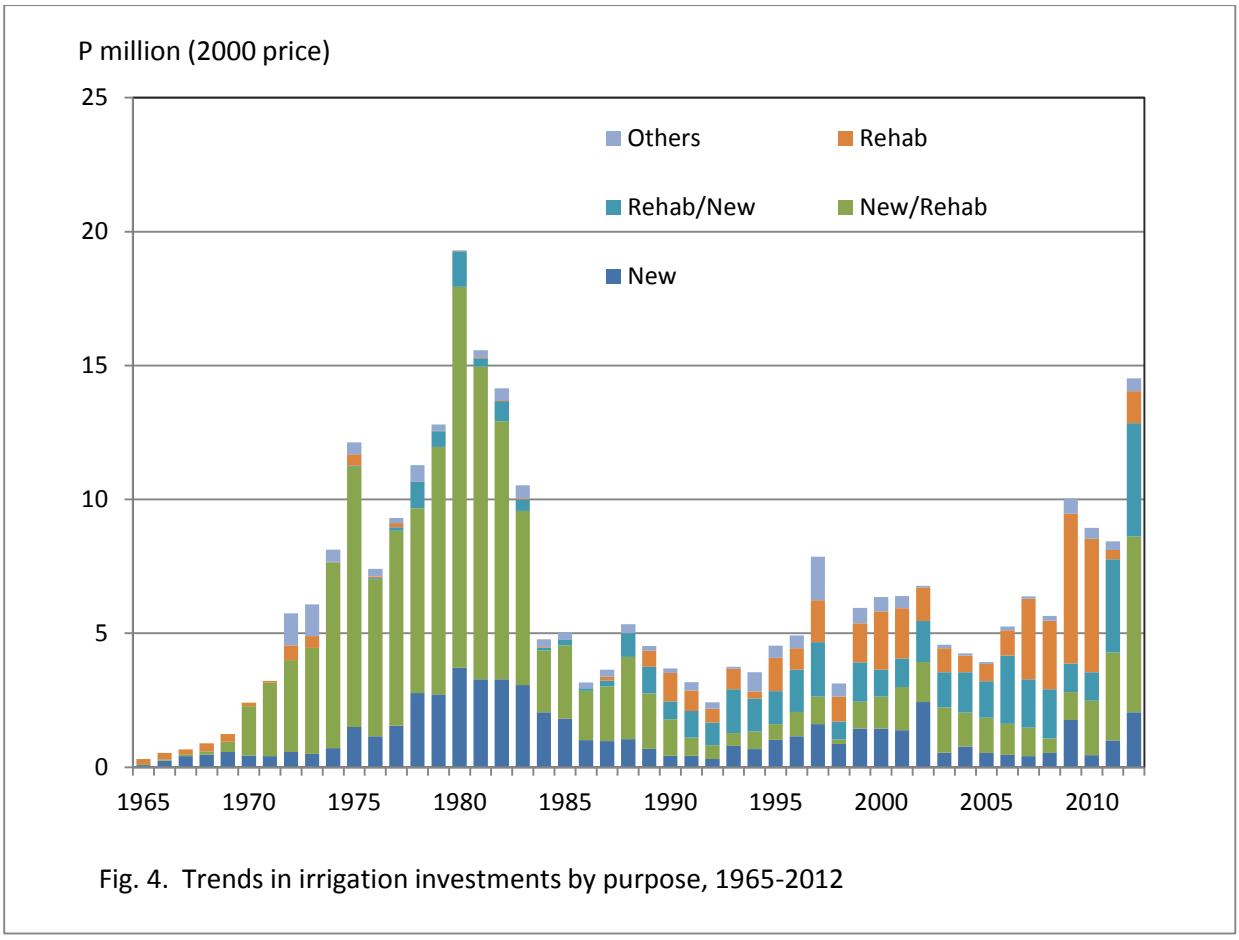
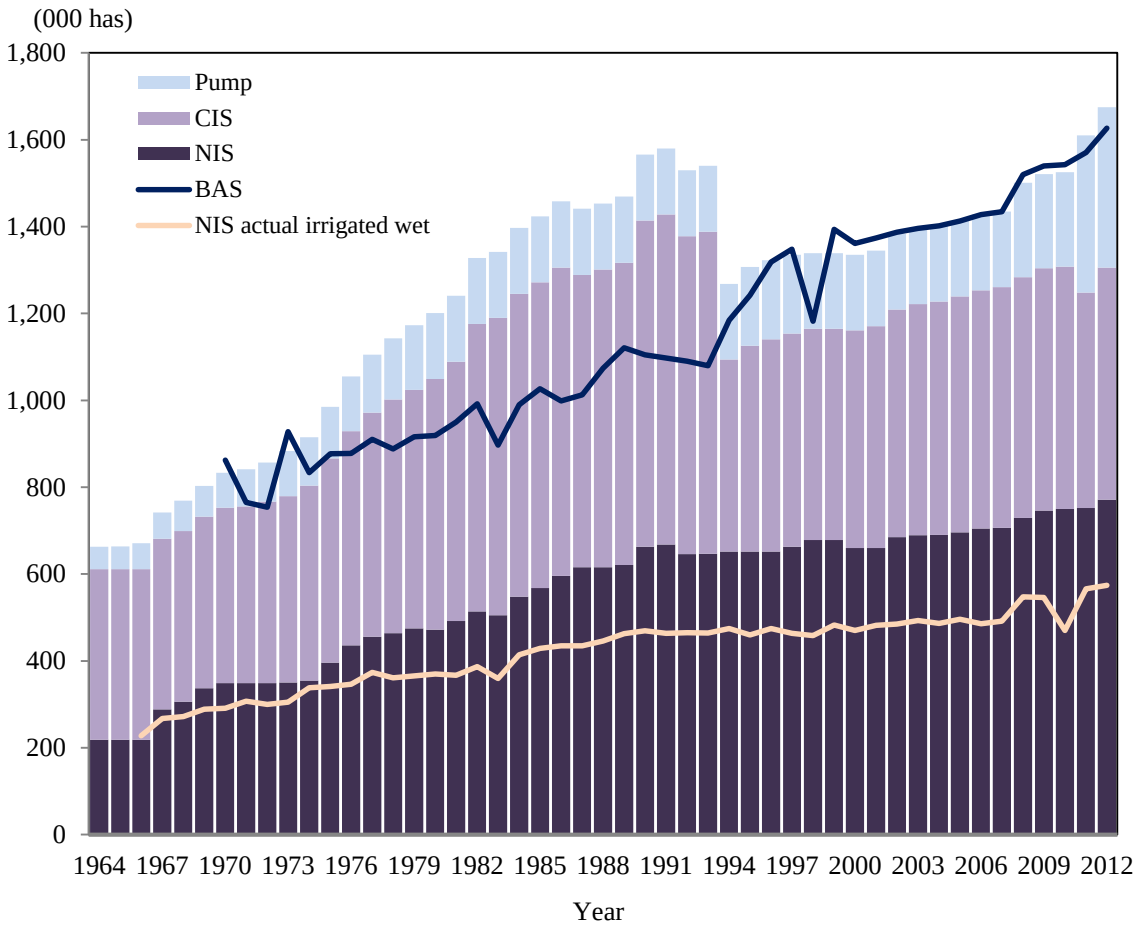


Fig. 4. Trends in irrigation investments by purpose, 1965-2012

Sources: NIA Yearend Report, various years.

Trends in irrigation service areas indicate continuously rising service areas although the rates of increases seem to be slowing down in the last decade (Figure 5). The NIA data would be seemingly consistent with those of BAS if the former's correction of CIS data in 1994 is extended back to the mid-1970s. Noteworthy is the trend in actual NIS irrigated area (wet season) which appears to grow even on much lower rate relative to the NIS service area. Also, interesting to note that private pumps appear to be increasing with discernible growth in early 2000.

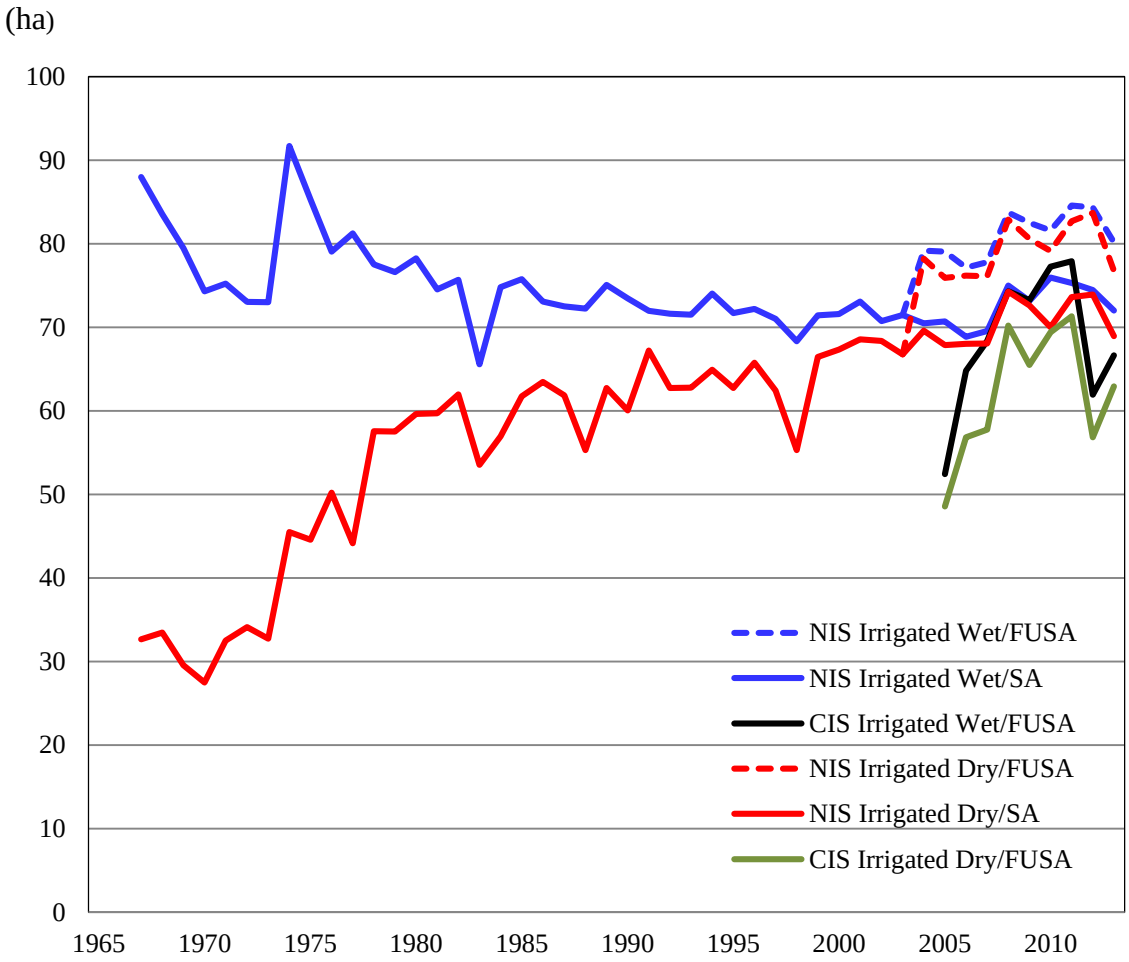
Figure 5. Trends in NIA NIS, CIS & Pump service areas, Actual NIS irrigated area (wet season), and the BAS-PSA estimates of irrigated rice crop area (second semester), 1964-2012 (000 has).



Sources: NIA-SMD NISPER and CISPER data, various years.

Figure 6 shows the trends in irrigation intensities for NIS and CIS, wet and dry seasons. The trends for CIS show the same pattern for wet and dry seasons, with the first generally higher than the latter, Using the irrigated area to FUSA measure, the NIS intensities are much better than those of the CIS. What is striking is that the NIS intensities using the SA are seemingly in contrast with a declining wet season versus a rising dry season trend. Yet, if the FUSA definition is used, the contrast seems to diminish with both wet and dry intensities rising closely to each other. The correction in FUSA with converted lands and permanently non-restorable areas removed from SA, shows improved performance which does not differ much between seasons.

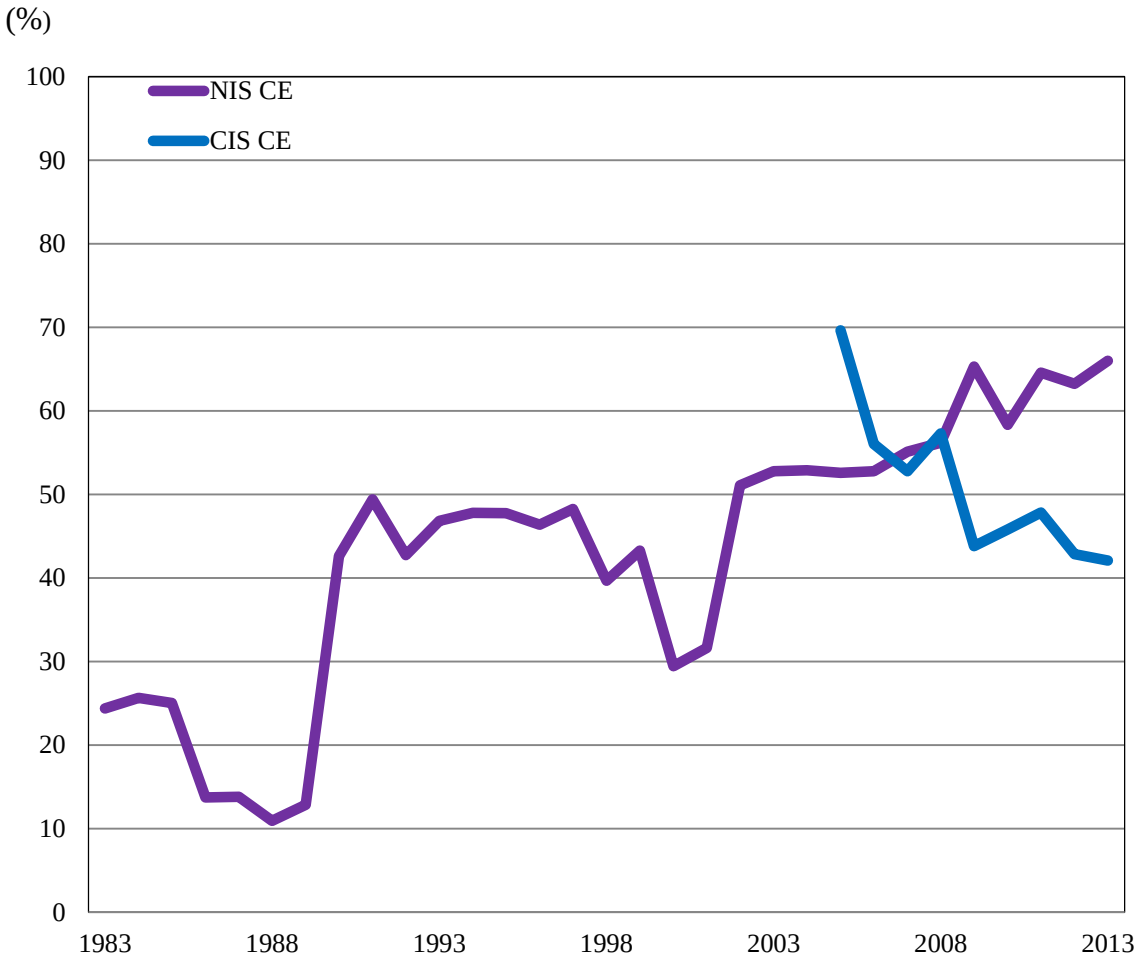
Figure 6. Trends in Irrigation Intensity in NIS and CIS, Philippines, 1965-2013



Sources: NIA-SMD NISPER and CISPER data, various years.

The collection efficiencies (**Figure 7**) defined for NIS as the rate of current ISF collection ratio to current collectible, while for CIS, current amortization payment ratio to current collectible, show opposite trends. The collection efficiency for NIS has been below 50% until the early 2000. It started rising in 2003 to over 60 percent in more recent years. The ISF collection is used for O &M of the systems and to partly cover the operations costs of the IMOs and the RIOs. For the CIS, the amortization collection rate has been declining since 2004 which should be alarming given the declining share to total revenues from CIS. This pattern could mean much reduced effort in collection and/or less effective collection strategy.

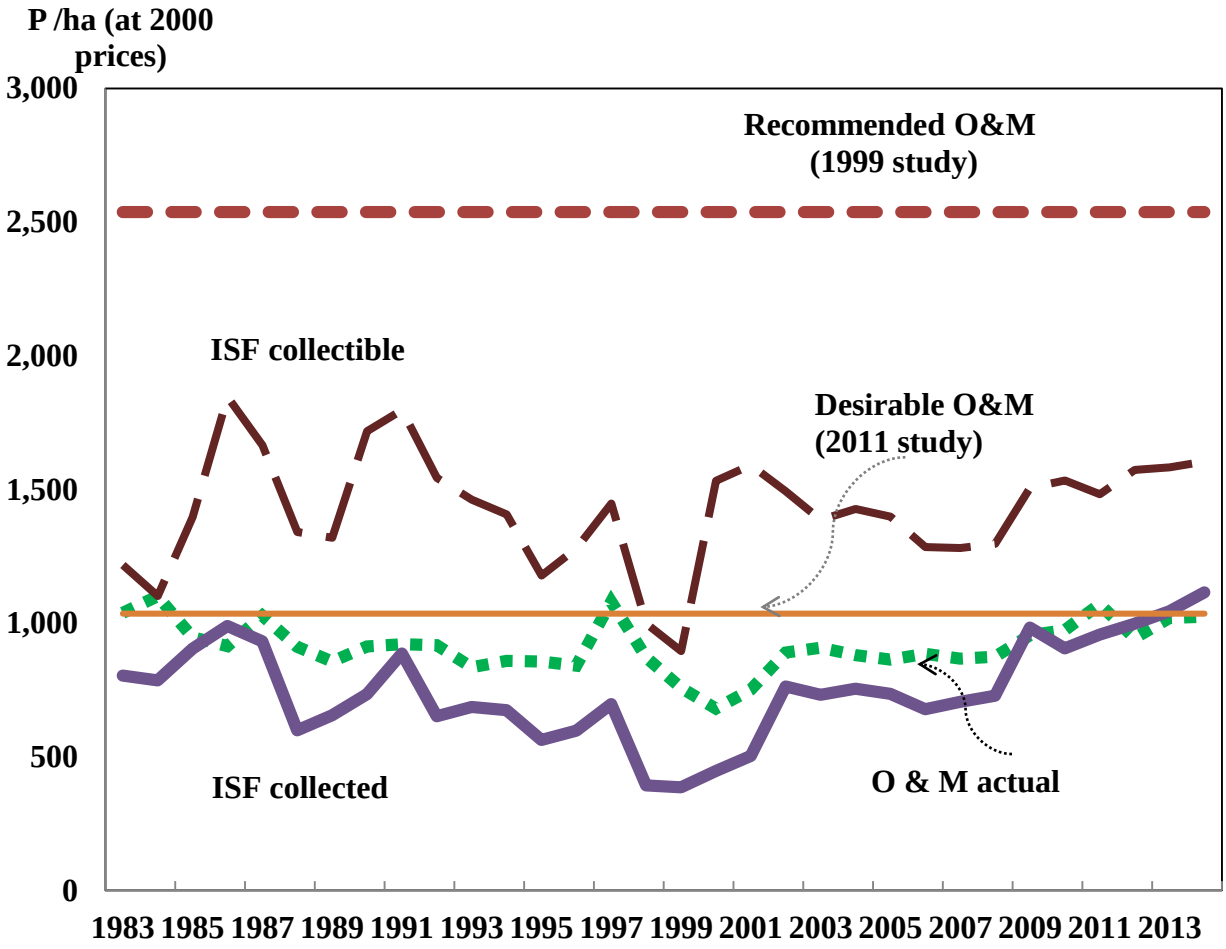
Figure 7. Trends in Collection Efficiency in NIS and CIS, Philippines, 1965-2013



Sources: NIA-SMD NISPER and CISPER data, various years.

Figure 8 shows the trends in actual cost of NIS operation and maintenance (O&M) compared to recommended/desirable levels and to irrigation service fee collectible and collections o at 2000 prices. There are a few key observations: (1) an old recommended O&M is much higher than current collectible ISF implying that even with a 100% collection efficiency, the ISF will not be able to properly cover the O&M; (2) the actual O&M appears to be pegged to the actual ISF collected. These observations may help explain why despite the increasing investments in irrigation development, firmed up service areas, actual irrigated and irrigation intensities hardly improved over time.

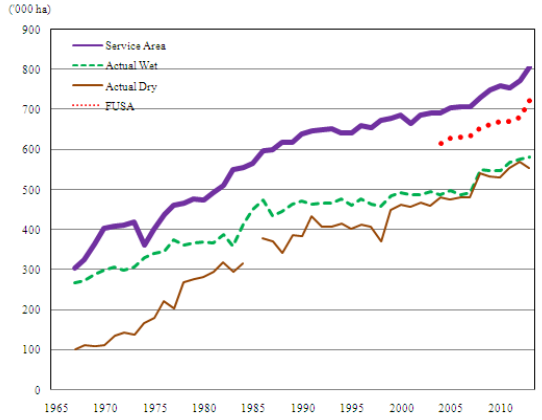
Figure 8. Trends in the actual cost of operation and maintenance (O&M) of service area compared to recommended levels and to irrigation service fee collections of national irrigation systems at 2000 prices.



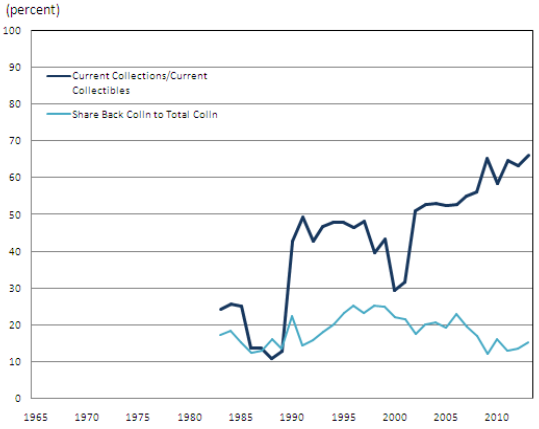
Sources: NIA-SMD NISPER data, various years.

Figure 9 provides a snap shot of all the key performance indicators of the NIS from 1965 to 2013.

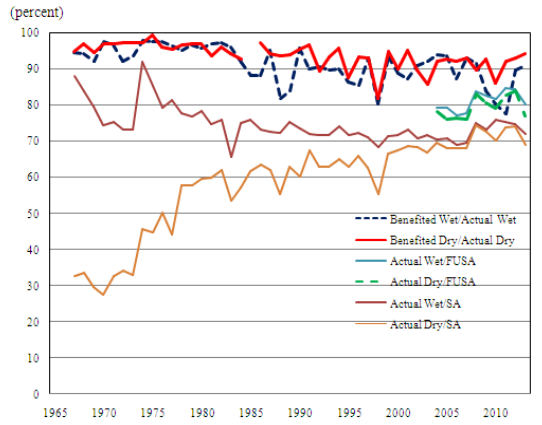
Figure 9. Trends in key performance indicators, Philippines, 1965-2013



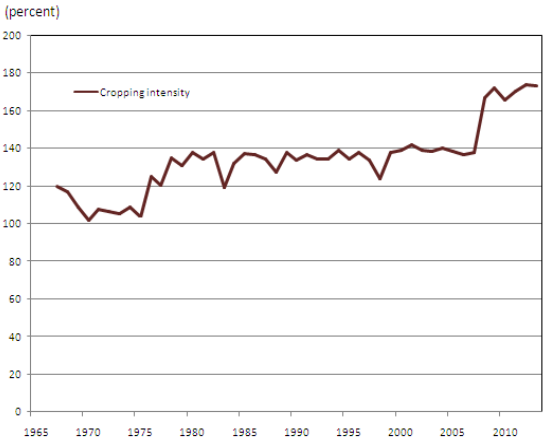
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



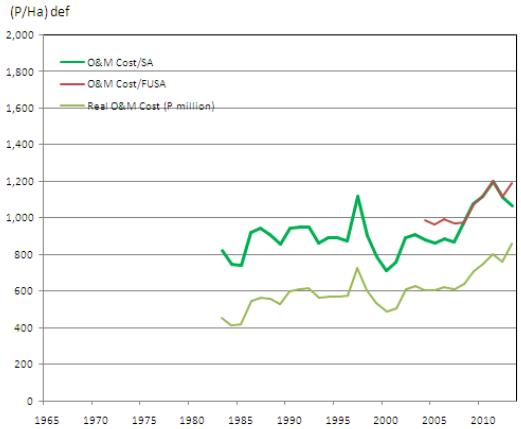
b. Collection efficiency



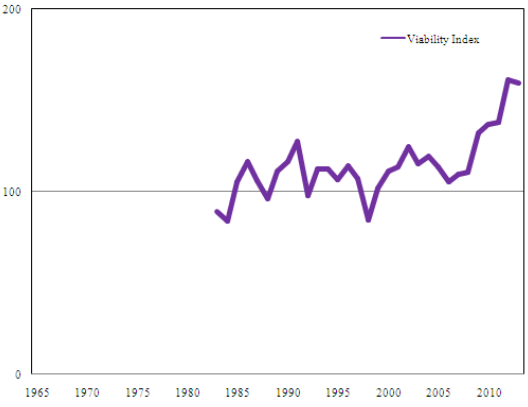
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD NISPER data, various years.

NIS REGIONAL TRENDS AND SYSTEM PERFORMANCE

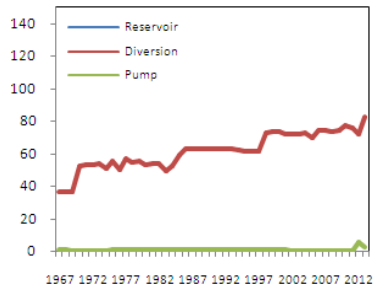
This section presents system level and regional trends put together from NIA-SMD data to broadly explain the national trends. While Figure 9 shows trends in key national performance indicators, Figures 10 to 13 report regional trends in selected performance indicators.

Trends in regional service area (SA) indicate that the national growth has been coming from four regions – Regions 2, 3, 10 and 12 (**Figure 10**). By type of scheme, the growth in Luzon is in reservoir type while that in Mindanao, diversion type.

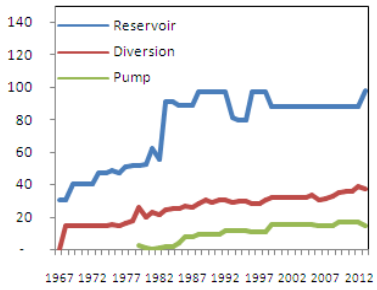
The NIS are classified into three types of schemes: run-of-the-river diversion, storage or reservoir, and pump irrigation. A diversion scheme draws water under controlled conditions directly from the flow of rivers or streams while a storage or reservoir scheme involves the construction of storage dams to impound water and released as needed to be drawn from a diversion dam downstream. According to NIA, the reservoir projects are usually multi-purpose and may serve power generation, flood control, fishery and recreation functions. Pump projects lift water from underground or from rivers and streams. These schemes maybe used in some storage or diversion systems to lift water to irrigate areas in higher elevation or pump groundwater to supplement available surface water supply. As of 2012, reservoir type accounts for 31% while diversion schemes, 63%. The rest of the areas are accounted by pump-systems. The reservoir schemes are largely found in Regions 2 (i.e., MRIIS) and 3 (i.e., UPRIIS) while most of the pump systems are in Regions 2 and 5. Over time, much of the expansion appears to have been in diversion and small reservoir schemes. Diversion schemes will be more vulnerable during dry seasons and also to higher water stress resulting from decreased rainfall and extended dry spells.

Figure 11 shows the regional trends in O&M expenditures and O&M per ha. According to Shepley, et al. (2000), the recommended cost of O&M per hectare that will cover the average direct costs of water scheduling and gate operations, canal cleaning labor, gate repairs/greasing and locks, use of hand held radios and equipment rental is at least double the current level of ISF charged in run of the river diversion and reservoir systems (Inocencio, et al 2014). The actual spending on O&M/ha at the field level is even significantly less than the collectible ISF in the wet and dry seasons, as ISF collection rate on current account has averaged only about 50% in the 1980s and 1990s, and rising to slightly higher than 60% over the past decade. The Shepley, et al. study found that about 40% of the time of ditch tenders is devoted to ISF collection, rather than to O&M. In fact, a more recent study on ISF indicated that the system operations staff spend as high as 80% of their time for ISF collection (Cablayan, et al. 2014). Except for four regions, regional real O&M expenditures have been almost constant (CAR and Region 1, Regions 7and 9) or even declining (Regions 6, 10 & 13, and slightly, Regions 4 and 5 and AMRIS). Real O&M per ha follow the same pattern of decline or hardly changing in the last three decades. Given these trend, the dismal states of many systems and likely poorer performance can only be expected. The poor performance is confirmed by the trends in regional (wet and dry season) irrigation intensities (**Figure 12**).

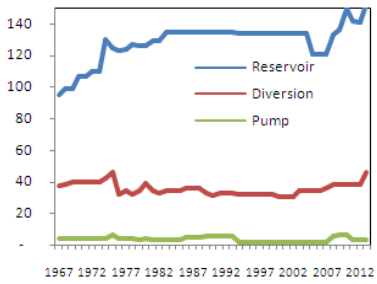
Figure 10. Trends in the service area of NIS by scheme type and by region, 1967-2013 (‘000 ha)



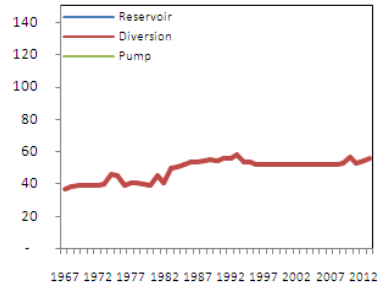
Car & Region 1



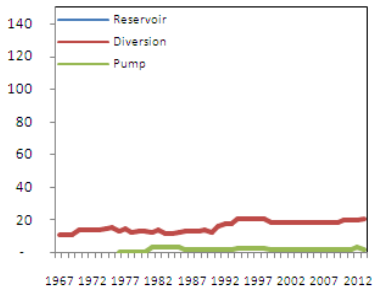
Region 2



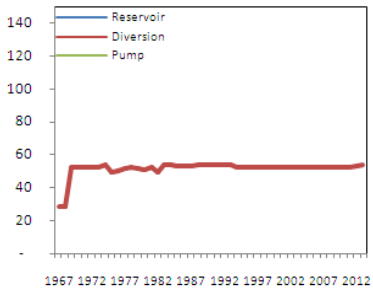
Region 3



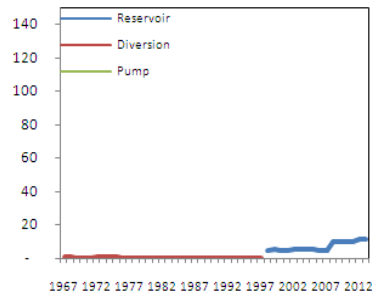
Region 4



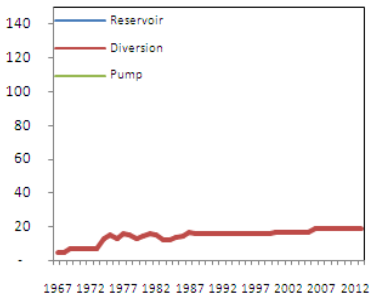
Region 5



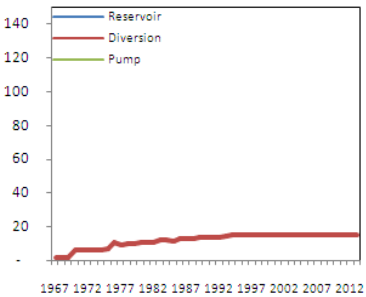
Region 6



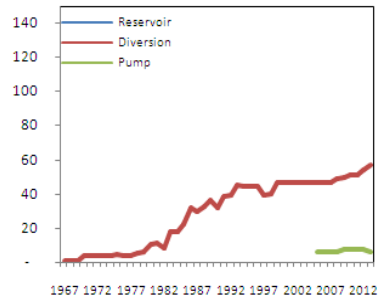
Region 7



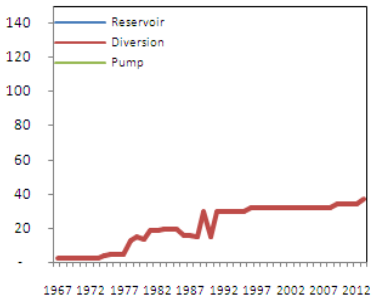
Region 8



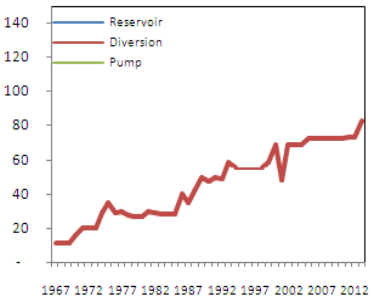
Region 9



Region 10 & Region 13



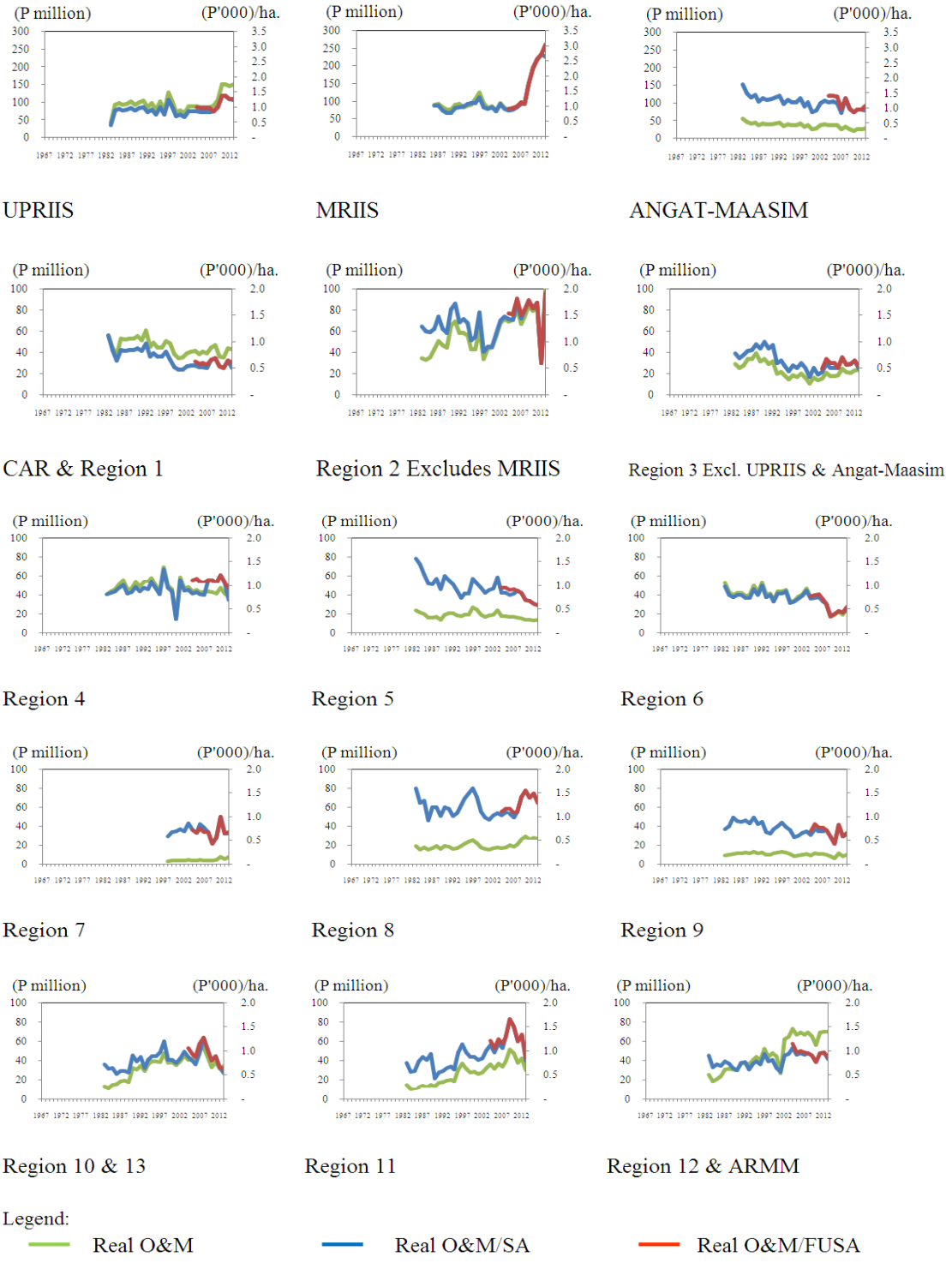
Region 11



Region 12 & ARMM

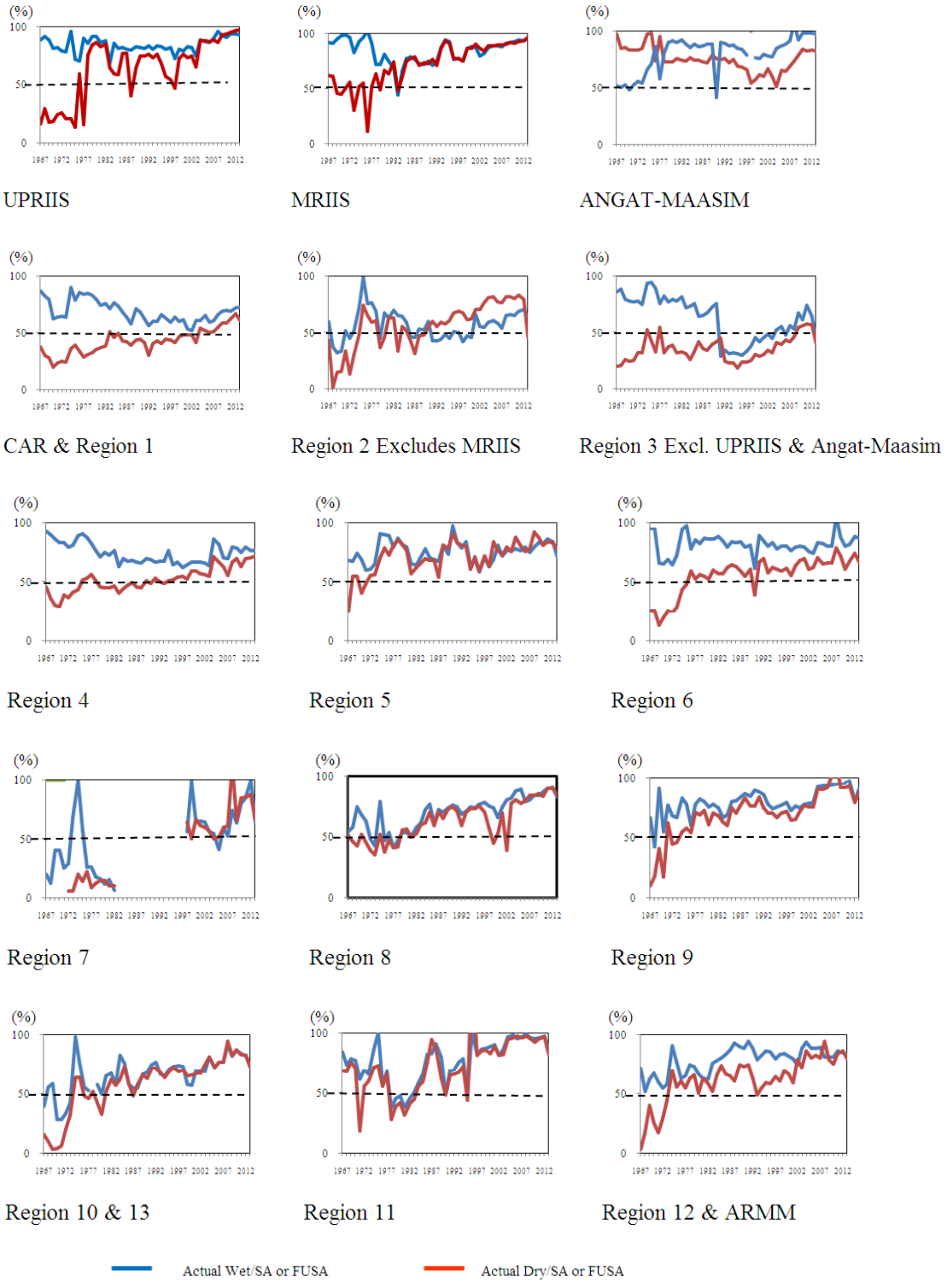
Sources: NISPER, NIA-SMD, various years.

Figure 11.Trends in the real O&M, O&M/SA and O&M/FUSA in national irrigation systems by region, 1985-2013 (at 2000 prices).



Sources: NISPER, NIA-SMD, various years.

Figure 12. Trends in irrigation intensities in national irrigation systems by region, 1967-2013.



Sources: NISPER, NIA-SMD, various years.

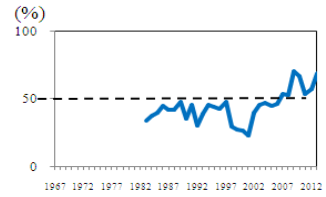
In terms of explaining the national trends, CAR, Regions 1 and 4 appear to be consistent for both wet and dry irrigation intensities. As to the increasing trend in dry season irrigation intensity, almost all regions seem to be consistent with the exception of Regions 5 and 6 which have more flat lines and Region 3 because of the big drop in the early 1990s because of the Mt. Pinatubo eruption impact.

The regional trends in collection efficiency in **Figure 13** show generally poor performance except for Regions 2 and 11. In recent years, however, several regions (Regions 4, 7, 8, 10/13, and 12/ARMM) and MRIIS are starting to show improvements. The consistent poorly performing regions and system (CAR/Region 1, Regions 3, 5, 6 and 9, AMRIS) appear to be also those which suffer from low irrigation intensities.

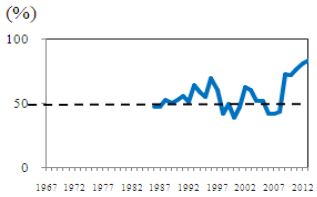
What is notable is the trend in benefitted to actual irrigated area (Figure 9c) indicating increasing exemptions (for areas harvesting below 40 cavans/ha) over time at around 10%. Since 2008, exemptions for wet season irrigated area have been higher, even reaching as high as 20% in 2011.

Table 2 shows additional indicators to help characterize NIS capacity and resources and productivity of systems and these figures serve as the benchmark for the regional trends. With the rationalization and food self-sufficiency agenda, it is interesting to note that at the national level, NIA is still to fill-up about 40% of its approved plantilla under the RatPlan, as of December 2014. . Since 2010, one plantilla staff is on average responsible for an increasing service area, at 424 ha as of December 2014. If the daily staff would be considered, the coverage decreases by 86. It appears that the daily staff is on average covering 17 to 20% of service area in the last five years.

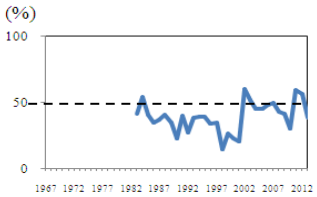
Figure 13.Trends in collection efficiency in national irrigation systems by region, 1967-2013.



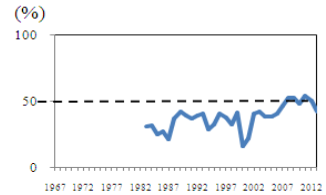
UPRRIS



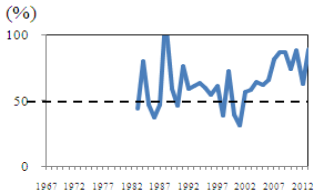
MRIIS



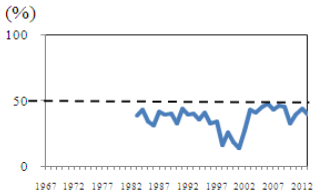
ANGAT-MAASIM



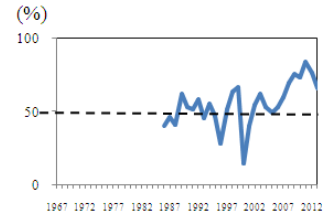
CAR & Region 1



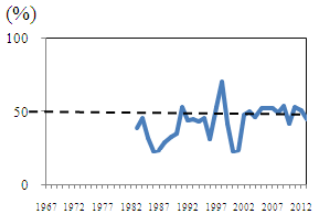
Region 2 Excludes MRIIS



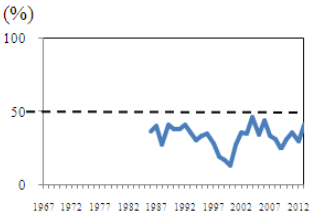
Region 3 Excl. UPRIIS & Angat-Maasim



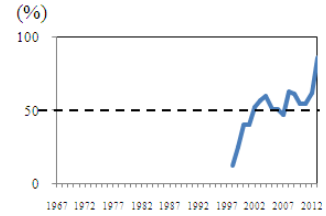
Region 4



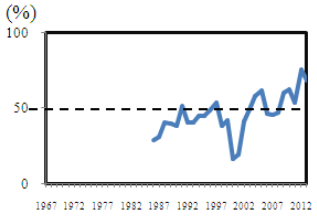
Region 5



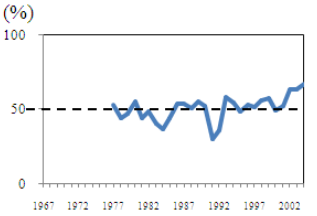
Region 6



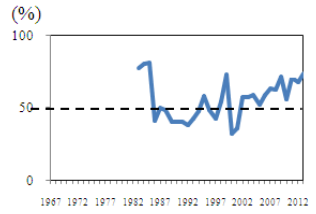
Region 7



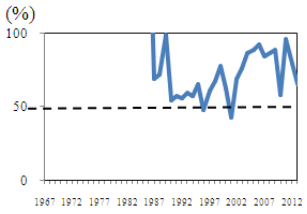
Region 8



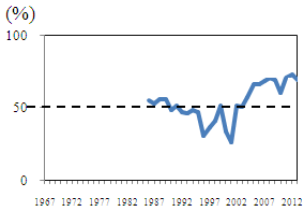
Region 9



Region 10 & 13



Region 11



Region 12 & ARMM

Sources: NISPER, NIA-SMD, various years.

Table 2. Performance Ratios of NIS Philippines, 1965 – 2003

Ratios	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Filled-up/Plantilla (%)																					
FUSA/Filled-up (Ha/staff)																					
FUSA/Filled-up + Daily Staff (Ha/staff)																					
FUSA/SA (%)																					
Ben. Wet/Actual Wet (%)	96	92	93	96	95	82	84	96	90	90	89	90	86	85	93	80	93	89	87	91	92
Ben. Dry/Actual Dry (%)	94	93	95	97	94	93	94	95	97	89	93	96	87	93	93	82	95	90	95	90	86
ISF Current Account/Total Income (%)	26	23	27	24	23	17	18	69	77	73	73	70	62	62	60	53	49	59	59	69	70
ISF Back Account/Total income (%)	5	5	5	3	3	3	3	20	13	14	16	17	19	21	18	18	16	17	16	15	18
Other Income/Total Income (%)								13	12	13	11	13	20	18	22	29	35	25	25	16	12
Total Income (%)	31	28	32	28	26	20	21	103	101	100	100	100	100	100	100	100	100	100	100	100	100
Total ISF/Total Income (%)	31	28	32	28	26	20	21	89	90	87	90	87	80	82	79	71	65	75	75	84	88
Yield Wet (cavan/ha)																					
Yield Dry (cavan/ha)																					

Sources: NIA-SMD NISPER data, various years.

Region 1 – Ilocos

For Ilocos, six systems have been visited (see **Figures 14 to 18**). Three of these systems are small and the rest are medium-sized. One is relatively recent. Except for Ambayoan –Dipalo, performance data for the 4 other systems are patchy (especially Tables 3 to 6). What seems apparent is that firmed-up service area appears to be much lower than service area indicating substantial land conversions and/or large permanently non-restorable areas.

Bonga 2 Pump Irrigation System

Bonga 2 started as a communal irrigation system (CIS) to be fully turned over to the IAs upon full payment of amortization. However, with the failure of the IA to manage the system and fulfil obligations to NIA and electric company, a tri-partite body comprising the local government unit (municipality), NIA and IA was formed to help the system recover. The municipality takes care of collection and management of finances while the IA is responsible for pump operation and maintenance and water distribution. Despite being included in the NIS roster, Bonga 2 is operated like a CIS.

Looking at the performance indicators for Bonga 2, it is difficult to establish any pattern due to insufficient data (**Figure 14**). However, data show that the decline in irrigation intensity, coincides with the decreases in collection efficiency. The irrigation service fee (ISF) is the sole source of income which is supposed to cover O&M expenses and amortization payment to NIA (**Table 3**).

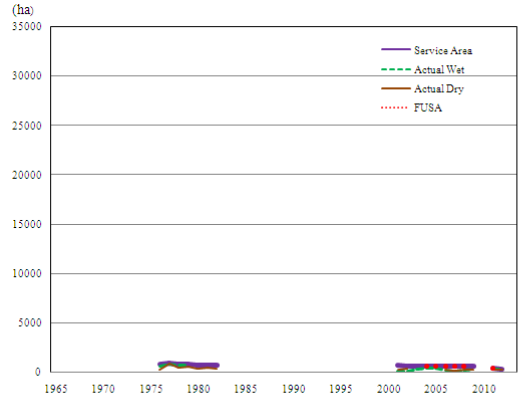
Madongan

Madongan is a medium size system with an initial service area of 3,200 ha in 2001 which decreased to over 1,400 ha in 2012 (**Figure 15**). Both the actual irrigated wet and dry, however, dropped drastically in 2004-2005 and remained constant up to 2012 (Figure 15). The big drop in actual (wet and dry) irrigated areas from 2004 onwards was due to the major damage in head structure caused by typhoon Igme. Specifically, the left side of the system was seriously damaged and became non-operational while in the right-side, the siphon #1 was silted and was partially operational (David, et al. 2012). The damage to overflow dam had been severe, reducing actual irrigated area to about 20% of the design. Yabes (2008) attributes the big drop in service area to typhoons and the lack of NIA funds for repairs (before Igme, there was Feria in 2001).

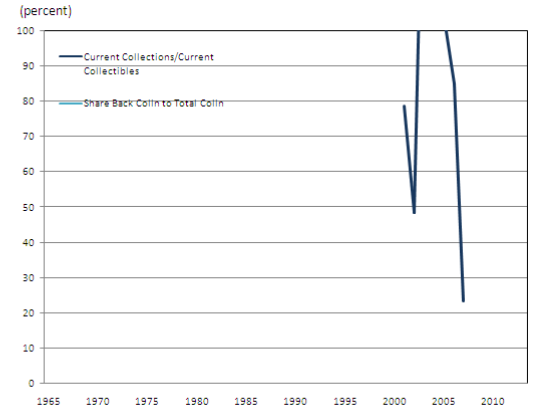
Despite the 100-year flood design, the severe damage to Madongan was attributed by David, et al. to: (a) error in estimating the design flood, (b) shifting hydrographs due to watershed degradation, and (c) poor construction standards. Even before the typhoon, a large discrepancy between design area and irrigated area was noted by David, et al. (2012) and cited a number of technical concerns to explain the discrepancy.

For this system, the irrigation service fee (ISF) is the main source of income which is supposed to cover O&M expenses and amortization payment to NIA (**Table 4**).

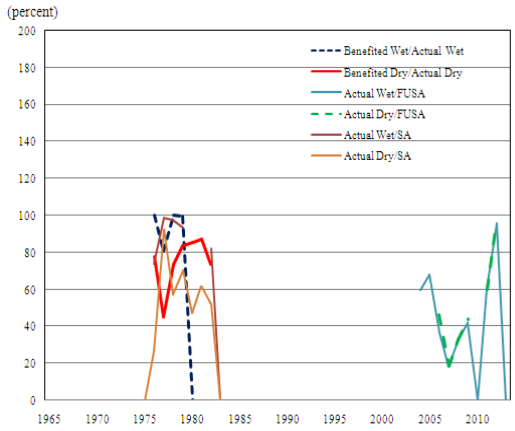
Figure 14. Trends in key performance indicators, Bonga 2, Ilocos Norte Irrigation System, Region 1, 1965-2013



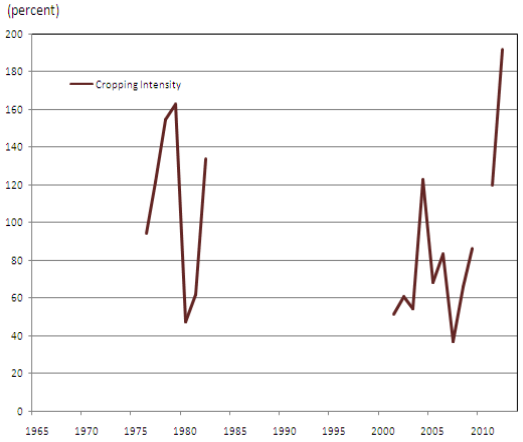
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



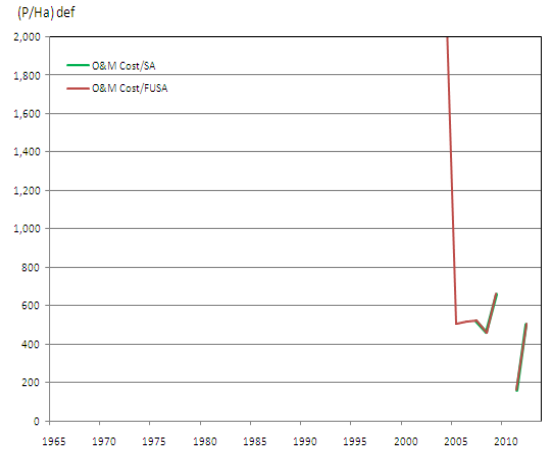
b. Collection efficiency



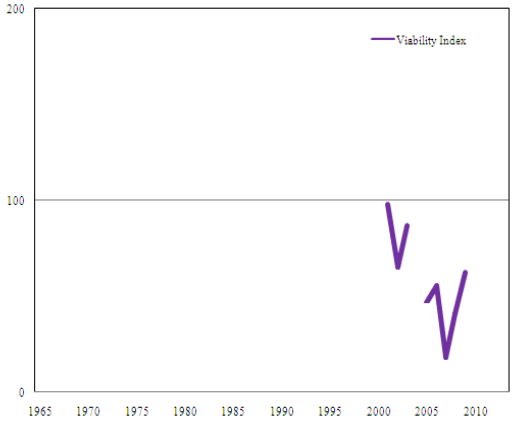
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



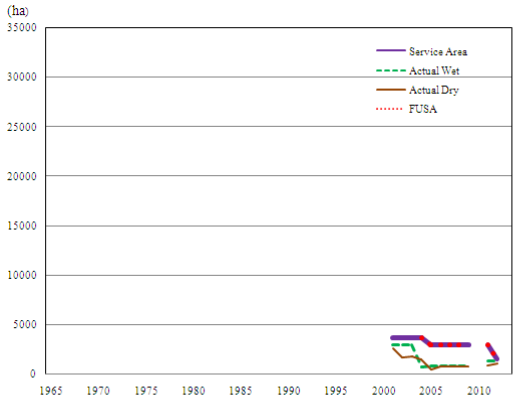
e. O&M per ha



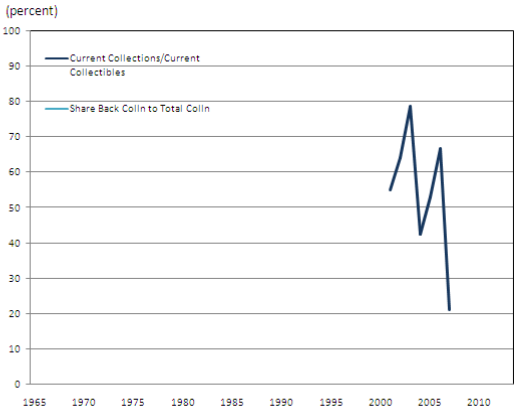
f. Viability index

Sources: NIA-SMD NISPER data, various years.

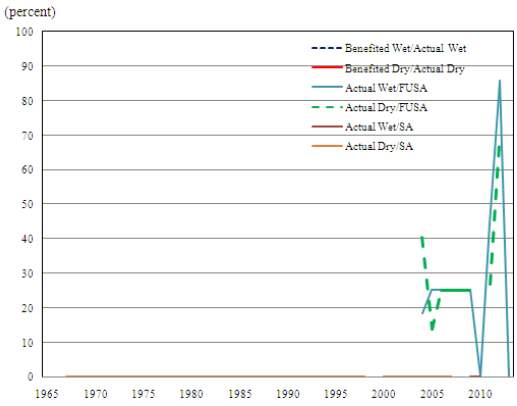
Figure 15. Trends in key performance indicators, Madongan, Ilocos Norte Irrigation System, Region 1, 1965-2013



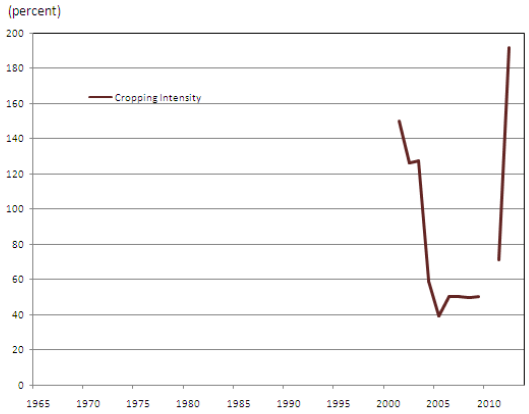
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



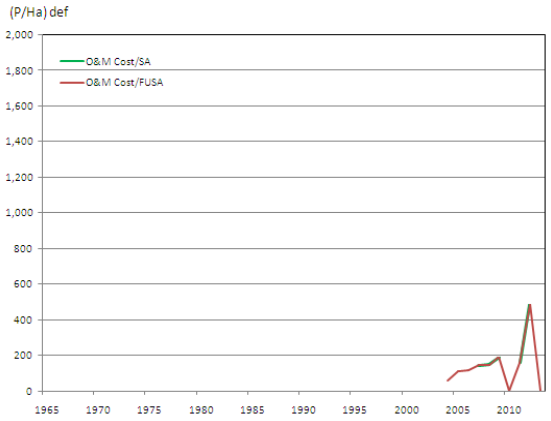
b. Collection efficiency



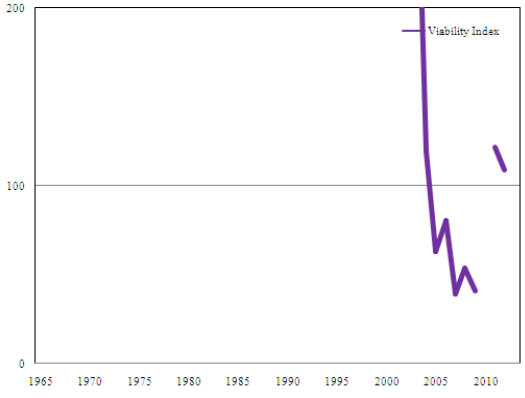
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



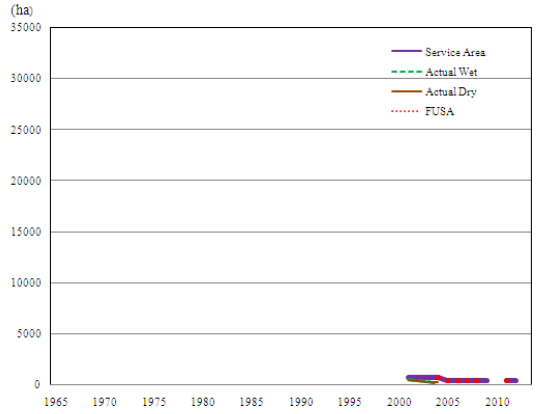
e. O&M per ha



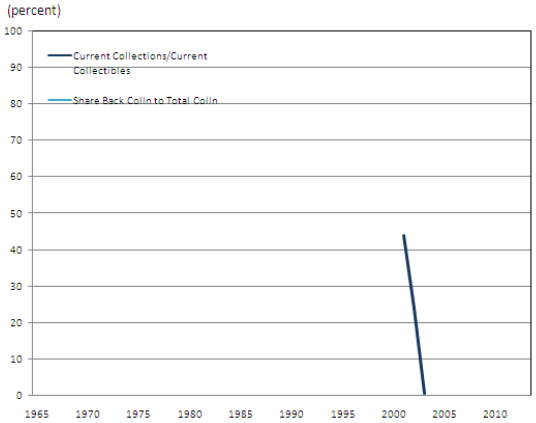
f. Viability index

Sources: NIA-SMD NISPER data, various years.

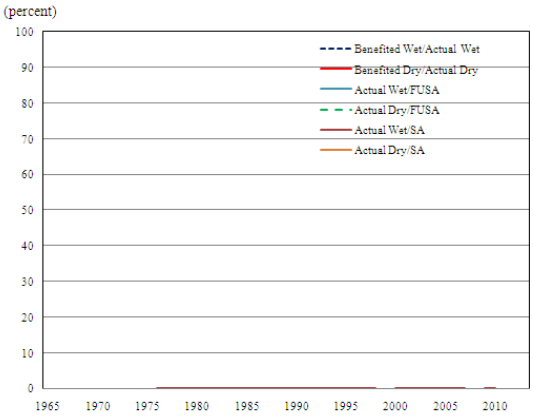
Figure 16. Trends in key performance indicators, Nueva Era, Ilocos Norte Irrigation System, Region 1, 1965-2013



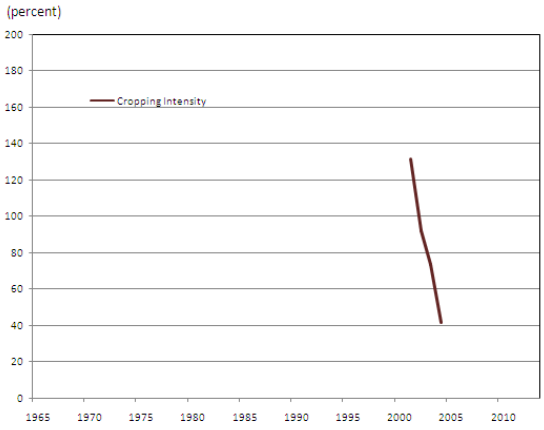
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



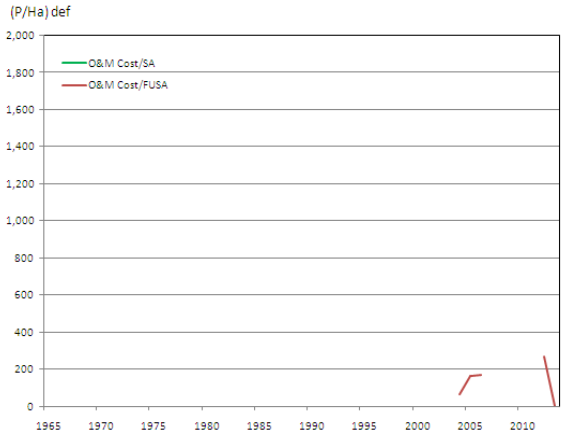
b. Collection efficiency



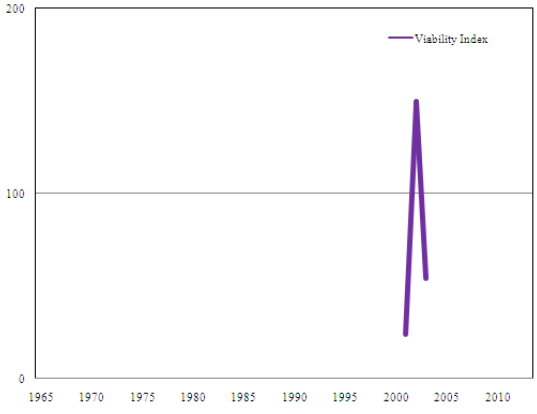
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



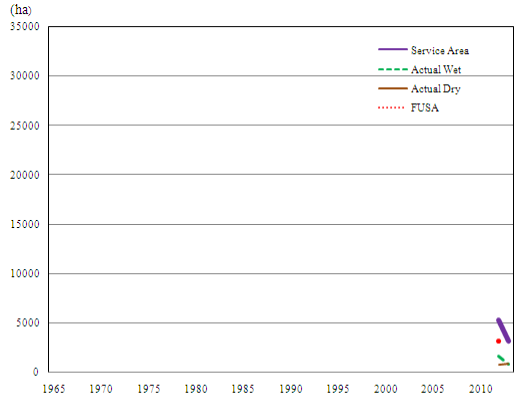
e. O&M per ha



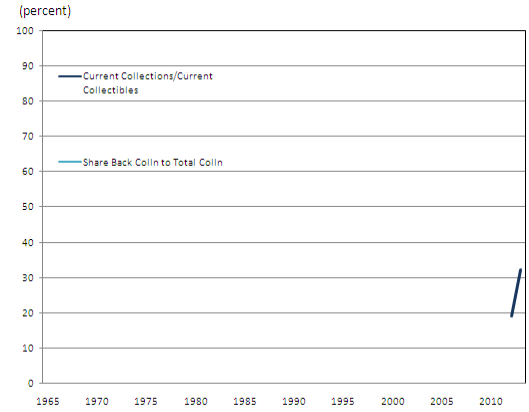
f. Viability index

Sources: NIA-SMD NISPER data, various years.

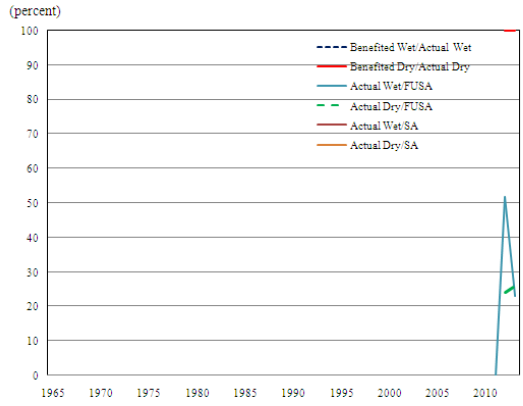
Figure 17. Trends in key performance indicators, Banaoang PIP, Ilocos Sur, Region 1, 1965-2013



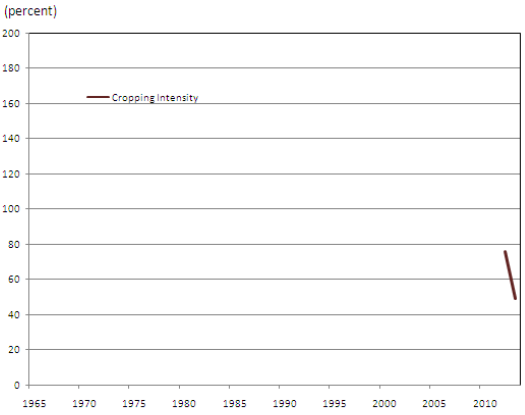
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



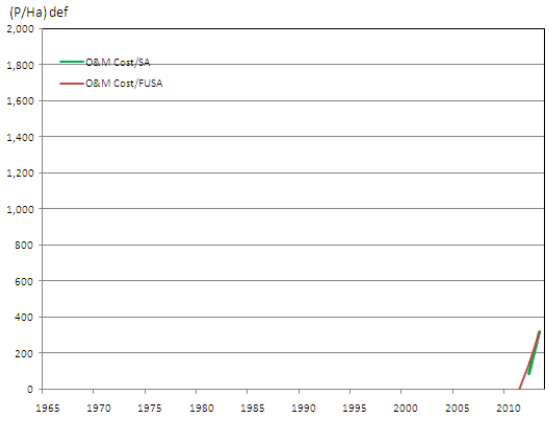
b. Collection efficiency



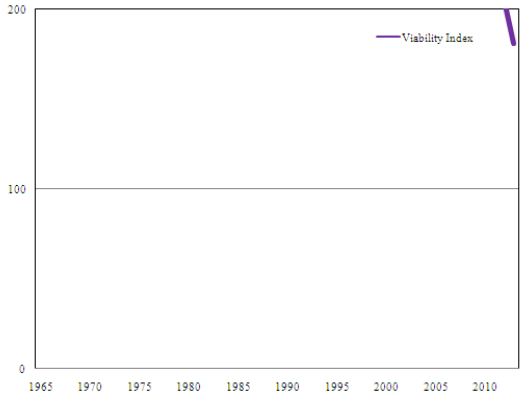
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



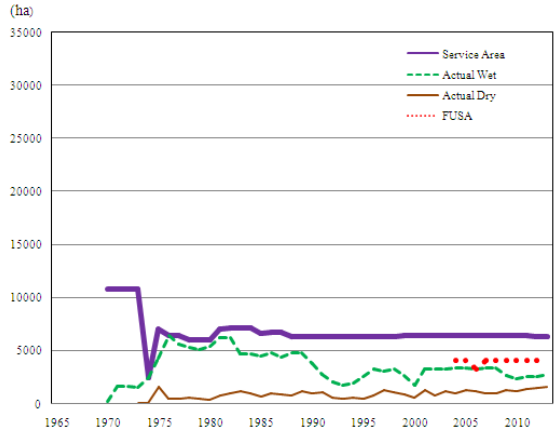
e. O&M per ha



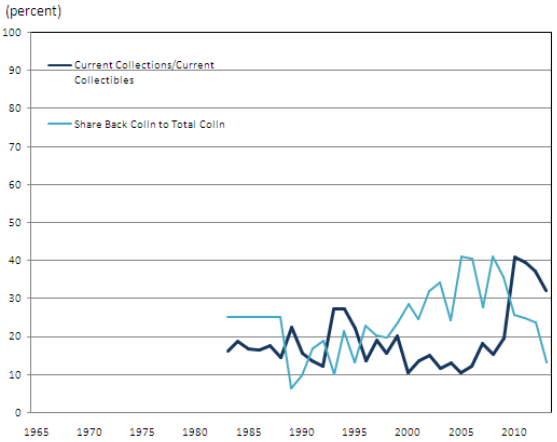
f. Viability index

Sources: NIA-SMD NISPER data, various years.

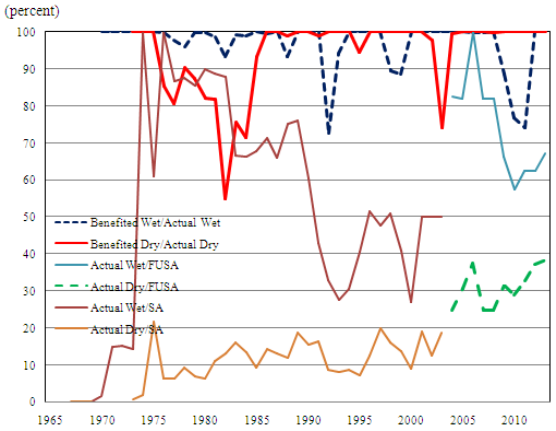
Figure 18. Trends in key performance indicators, Ambayoan-Dipalo RC, Pangasinan, Region 1, 1965-2013



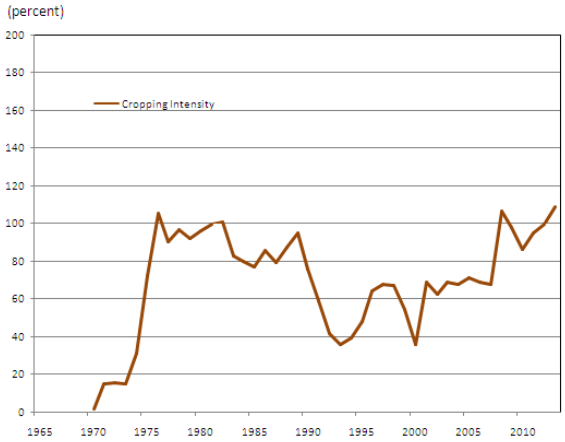
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



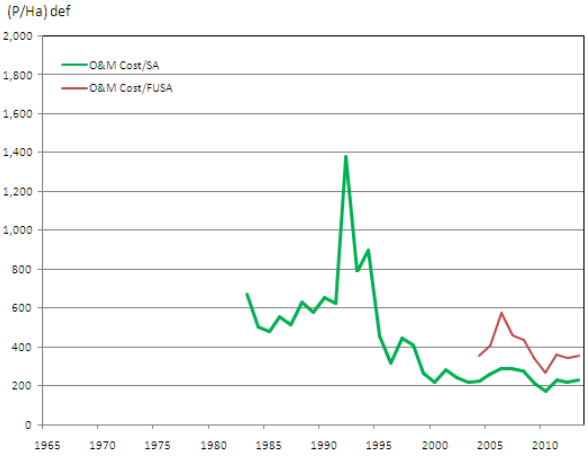
b. Collection efficiency



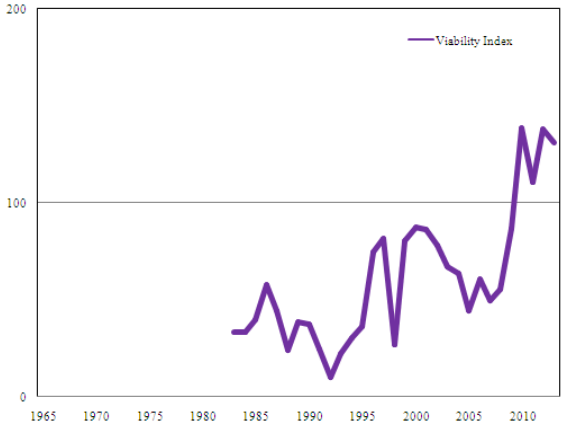
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD NISPER data, various years.

Table 3. Performance Ratios of Bonga 2, 1966 – 2013

Ratios	1976	1977	1978	1979	1980	1981	1982	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)																				
FUSA/Filled-up (Ha/staff)																				
FUSA/Filled-up + Daily Staff (Ha/staff)																				
FUSA/SA (%)								100	100	100	100	100	100	100	100	100		100	100	
Ben. Wet/Actual Wet (%)	100	81	100	99			100												100	
Ben. Dry/Actual Dry (%)	78	45	73	84	85	87	74												100	
ISF Current Account/Total Income (%)																			76	
ISF Back Account/Total income (%)																			9	
Other Income/Total Income (%)																			5	
Total Income (%)																			90	
Total ISF/Total Income (%)								79	91	92		100	93	100	100	100		100		
Yield Wet (cavan/ha)																				
Yield Dry (cavan/ha)																				

Sources: NIA-SMD NISPER data, various years.

Table 4. Performance Ratios of Madongan, 2001 – 2013

Ratios	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)													
FUSA/Filled-up (Ha/staff)													
FUSA/Filled-up + Daily Staff (Ha/staff)													
FUSA/SA (%)	100	100	100	100	100	100	100	100	100		100	100	
Ben. Wet/Actual Wet (%)												100	
Ben. Dry/Actual Dry (%)												100	
ISF Current Account/Total Income (%)												85	
ISF Back Account/Total income (%)												1	
Other Income/Total Income (%)												12	
Total Income (%)												98.23	
Total ISF/Total Income (%)	94	59	90	100	100	89	105	92	100		100		
Yield Wet (cavan/ha)													
Yield Dry (cavan/ha)													

Sources: NIA-SMD NISPER data, various years.

Nueva Era

Again, there is not enough data for Nueva Era to establish any pattern. Like Madongan, the system was also badly damaged by typhoons especially Igme. After typhoon Igme, the system was heavily damaged and silted and was not operational which explains the drastic declines in performance (ratios to current collectibles of current collections and total collections, with irrigation intensity, have downward trends in **Table 5**, **Figure 16**). Total ISF collections as part of total income and collection efficiency correspondingly drastically declined.

Banaoang

Banaoang in Ilocos Sur is a newly completed system, thus data only started in 2010. So far, a declining trend for service area and irrigated wet are reported while the ratios to current collectibles to total current collections and share of current to total collections trend upward. With already small farms, farmers were not willing to give up land for right of way or were not willing to pay for irrigation service. Due to this, the realized service area has been much lower than the designed area.

The same decreasing pattern can be seen for both O&M cost per service area and per FUSA. Lastly, both irrigation intensity and viability index trend downward (**Figure 17**, **Table 6**).

Table 5. Performance Ratios of Nueva Era, 2001 – 2013

Ratios	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)													
FUSA/Filled-up (Ha/staff)													
FUSA/Filled-up + Daily Staff (Ha/staff)													
FUSA/SA (%)	100	100	100	100	100	100	100	100	100		100	100	
Ben. Wet/Actual Wet (%)												100	
Ben. Dry/Actual Dry (%)													
ISF Current Account/Total Income (%)												52	
ISF Back Account/Total income (%)													
Other Income/Total Income (%)												48	
Total Income (%)												100	
Total ISF/Total Income (%)	77	25	1										
Yield Wet (cavan/ha)													
Yield Dry (cavan/ha)													

Sources: NIA-SMD NISPER data, various years.

Table 6. Performance Ratios of Banaoang, 2002 – 2013

Ratios	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)												36
FUSA/Filled-up (Ha/staff)												782
FUSA/Filled-up + Daily Staff (Ha/staff)												782
FUSA/SA (%)											60	100
Ben. Wet/Actual Wet (%)											100	100
Ben. Dry/Actual Dry (%)											100	100
ISF Current Account/Total Income (%)											81	94
ISF Back Account/Total income (%)											17	4
Other Income/Total Income (%)											2	2
Total Income (%)											100	100
Total ISF/Total Income (%)											98	98
Yield Wet (cavan/ha)											105	105
Yield Dry (cavan/ha)											85	95

Sources: NIA-SMD NISPER data, various years.

Ambayoan-Dipalo

Service area of Ambayoan-Dipalo dropped from 10,800 ha. to 2,445 ha. in 1974. It then recovered and settled at 6,300 ha since 1988. Irrigated areas during wet seasons generally showed a downward trend after 1976 while dry seasons fluctuated through the years with a slightly upward trend.

The system has a low collection efficiency never reaching above 50%. While, the collection efficiency as well as the ratio of ISF collections to collections and total income seemed to increase slightly in the later years. Shares of back account collections generally showed an increasing trend from 1989 to 2008. Cropping intensity as ratio of the sum of irrigated wet and dry area to either irrigated wet or dry area showed an upward direction over time reaching up to 157% in 2013. On the other hand, O&M cost per service area followed a downward path after its peak in 1992. Viability index rose from 33% to 131% in 2013 (**Figure 18**).

Table 7 shows additional indicators to profile these two systems. The coverage area per staff spiked to 578 ha per staff in 2013. This relatively big coverage per staff might hinder the staff from providing the necessary services to their assigned areas. The gaps between irrigated area and FUSA during dry season ranged from 62% to 75% are higher compared to wet season which only ranged from 18% to 43%. These gaps are likely caused by lack of water supply and defective facilities. But, despite of these gaps, benefited to irrigated area showed high ratios across the year averaging at 97% during wet seasons and 94% during dry seasons.

Most of the total income comes from current account collections averaging at 57%, followed by the other income like equipment rentals at 23% and then, by back collections at 17%. The system has very low collection efficiency and viability index compared to other systems averaging only at 19% and 62%, respectively.

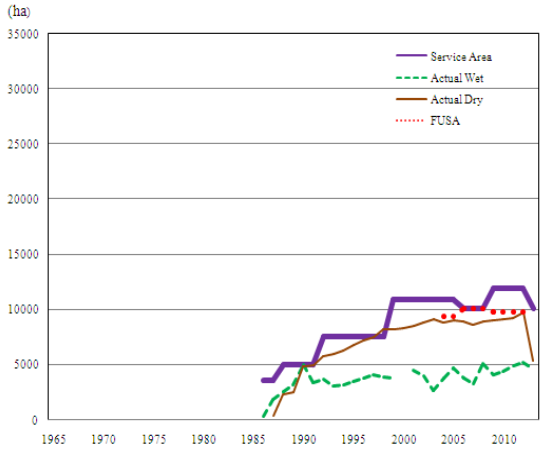
Region 2 Cagayan Valley

Magapit Pump Irrigation System (PIS)

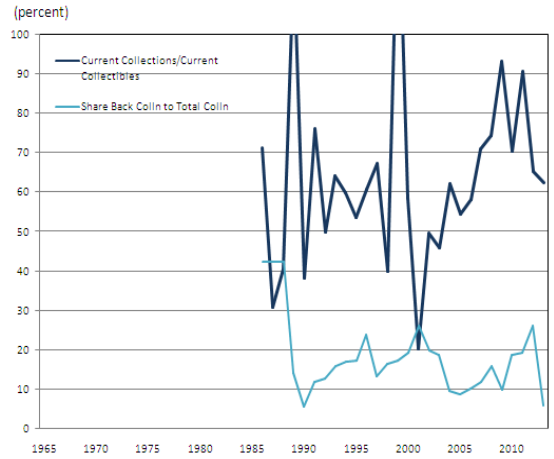
The service area of Magapit PIS has been increasing over time. In 2012, it more than tripled its size from 3,523 has in 1986 to 11,875 ha. Actual irrigated areas during wet and dry seasons also correspondingly increased (**Figure 19**).

Collections and income ratios fluctuated over the years (**Table 8**). Shares of current and back collection to total collection moved symmetrically at opposite trends from each other. Ratios of irrigated area to FUSA during wet season fluctuated towards 50% while during dry seasons it fluctuated towards 100%. The ratio of benefited area to irrigated area during wet season seemed to stabilize in the later years while dry season showed a slightly downward trend. Cropping intensity fluctuated towards 150% from 1993 to 2012. O&M cost per service area also showed steep movement over the years having peaks up to PhP 4,672/ha in 1991 and dips up to 417 in

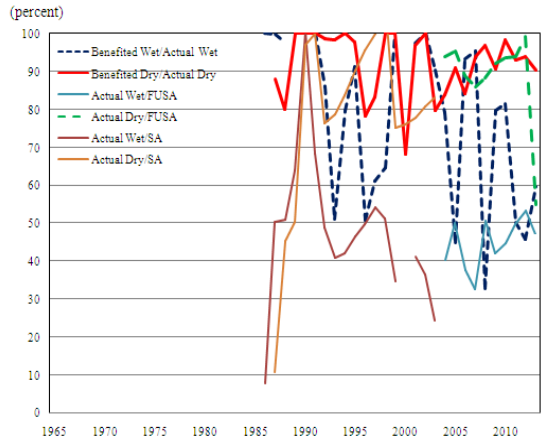
Figure 19. Trends in key performance indicators, Magapit PIS, Cagayan, Region 2, 1965-2013



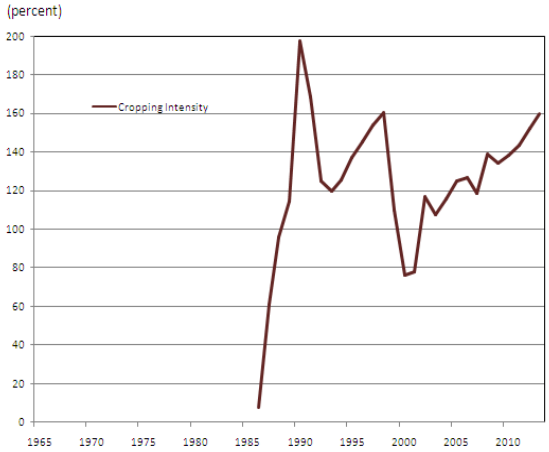
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



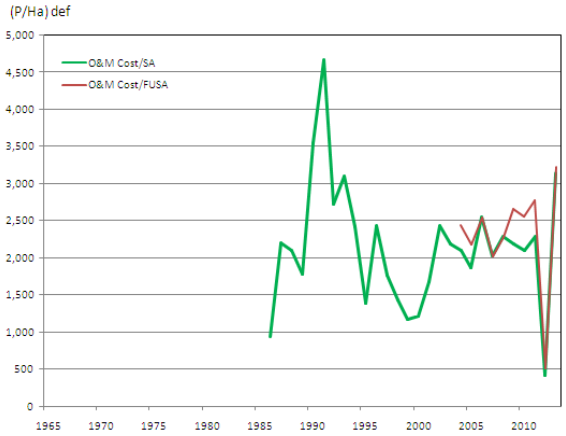
b. Collection efficiency



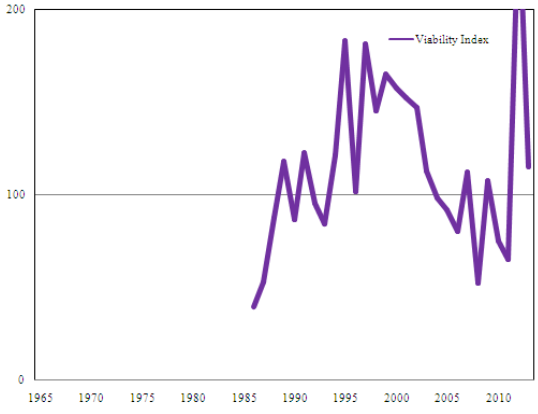
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD NISPER data, various years.

Table 7. Performance Ratios of Ambayoan-Dipalo, 1983 – 2003

Ratios	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Filled-up/Plantilla (%)																					
FUSA/Filled-up (Ha/staff)																					
FUSA/Filled-up + Daily Staff (Ha/staff)																					
FUSA/SA (%)																					
Ben. Wet/Actual Wet (%)	99	99	100	99	100	93	100	100	100	73	94	100	100	100	100	90	89	100	100	100	100
Ben. Dry/Actual Dry (%)	76	71	93	100	100	99	100	100	99	100	100	100	95	100	100	100	100	100	100	98	74
ISF Current Account/Total Income (%)	75	75	75	49	55	74	72	55	63	32	54	36	53	36	36	80	24	20	39	46	46
ISF Back Account/Total income (%)	25	25	25	16	18	25	5	6	13	7	6	10	8	11	9	20	7	8	13	21	24
Other Income/Total Income (%)								40	25	61	40	54	39	53	54	0	69	72	49	32	30
Total Income (%)	100	100	100	65	73	99	77	101	101	100	100	100	100	100	99	100	100	100	101	99	100
Total ISF/Total Income (%)	100	100	100	65	74	99	77	60	75	39	60	46	61	47	46	100	31	28	51	68	70
Yield Wet (cavan/ha)								75	76	75	75	75	76	78	78	78	81	91	100	90	53
Yield Dry (cavan/ha)								76	77	76	77	77	77	78	79	80	83	83	80	85	80

Sources: NIA-SMD NISPER data, various years.

Table 7. Performance Ratios of Ambayoan-Dipalo, 2004 – 2013

Ratios	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					25	38	25	25	25	54
FUSA/Filled-up (Ha/staff)					506	809	506	506	506	578
FUSA/Filled-up + Daily Staff (Ha/staff)					337	674	337	337	337	506
FUSA/SA (%)	63	63	50	63	63	63	63	63	64	64
Ben. Wet/Actual Wet (%)	100	100	100	100	100	88	77	74	100	100
Ben. Dry/Actual Dry (%)	100	100	100	100	100	100	100	100	100	100
ISF Current Account/Total Income (%)	54	59	41	69	55	62	82	77	82	85
ISF Back Account/Total income (%)	17	41	28	26	30	33	15	13	16	13
Other Income/Total Income (%)	29	1	32	4	15	5	3	10	2	2
Total Income (%)	100	101	101	99	100	100	100	100	100	100
Total ISF/Total Income (%)	71	99	68	96	85	95	97	90	98	98
Yield Wet (cavan/ha)	89	79	78	80	90	84			90	90
Yield Dry (cavan/ha)	90	80	75	80	89	80		85	90	79

Sources: NIA-SMD NISPER data, various years.

Table 8. Performance Ratios of Magapit, 1986 – 2003

Ratios	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Filled-up/Plantilla (%)																		
FUSA/Filled-up (Ha/staff)																		
FUSA/Filled-up + Daily Staff (Ha/staff)																		
FUSA/SA (%)																		
Ben. Wet/Actual Wet (%)	100	100	98	0	100	100	86	51	80	91	51	61	65	100		98	100	90
Ben. Dry/Actual Dry (%)		88	80	100	100	100	99	98	100	98	78	83	100	100	68	97	100	80
ISF Current Account/Total Income (%)	58	58	62	86	94	88	82	82	74	79	72	82	83	49	59	31	53	53
ISF Back Account/Total income (%)	42	42	46	14	6	12	12	16	15	16	22	13	16	10	14	11	13	12
Other Income/Total Income (%)							6	2	11	5	6	5	1	40	27	57	33	34
Total Income (%)	100	100	108	100	100	100	100	100	100	100	100	100	100	99	100	99	99	99
Total ISF/Total Income (%)	100	100	108	100	100	100	94	98	89	95	94	95	99	60	73	43	67	66
Yield Wet (cavan/ha)					75	76	77	78	79	79	80	80	81	81		82	74	78
Yield Dry (cavan/ha)					78	79	80	81	81	82	83	84	75	84	85	85	75	83

Sources: NIA-SMD NISPER data, various years.

Table 8. Performance Ratios of Magapit, 2004 – 2013

Ratios	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					40		53	53	53	53
FUSA/Filled-up (Ha/staff)					419	408	306	306	306	306
FUSA/Filled-up + Daily Staff (Ha/staff)					150	408	306	306	306	306
FUSA/SA (%)	86	86	100	100	100	82	82	82	82	97
Ben. Wet/Actual Wet (%)	79	45	93	95	33	80	81	50	46	60
Ben. Dry/Actual Dry (%)	84	91	84	94	97	91	98	93	94	90
ISF Current Account/Total Income (%)	88	89	88	82	83	54	85	88	90	44
ISF Back Account/Total income (%)	9	9	10	11	14	5	15	11	10	3
Other Income/Total Income (%)	3	3	2	7	3	41	0	1	0	53
Total Income (%)	100	101	100	100	100	100	100	100	100	100
Total ISF/Total Income (%)	97	97	98	93	97	59	100	99	100	47
Yield Wet (cavan/ha)	70	76	62	83	60	78				
Yield Dry (cavan/ha)	78	80	85	88	85	80				

Sources: NIA-SMD NISPER data, various years.

2012. Viability index exhibited an increasing trend starting at 39% in 1986 and ending at 115% in 2013.

Filled-up plantilla position was constant at 53% from 2010 to 2013. FUSA to filled-up plus daily staff also had minimal changes, ending at 306 ha. per staff in 2013. The ratios of actual irrigated areas to FUSA are much lower in the wet seasons, averaging 45%, compared to dry seasons which average of 89%. This pattern is likely caused by calamities or floods during the wet season.

Collection efficiencies in terms of ratios of ISF current account and total ISF (current plus back accounts) to total income do not show any clear trend. The ISF collections comprise 73% of total income over the years. Viability index, despite its fluctuations, generally followed an upward trend peaking at 254% in 2012.

Visitacion Irrigation System

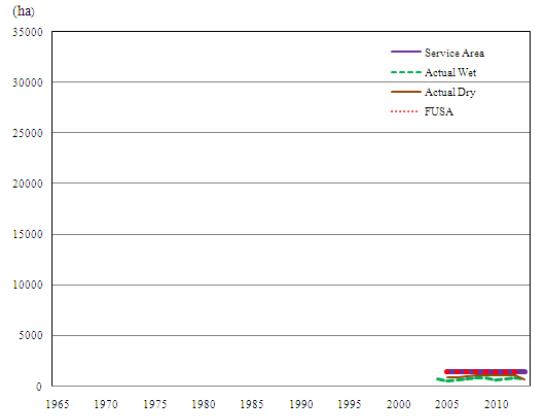
Visitacion in Cagayan is an interesting case because it was a communal system which has been converted to an NIS. Apparently, funding constraints led to the slow pace of development of irrigation facilities of Dagupan CIS. In addition, the inadequate staff of NIA resulted in the poor social condition of water users because of the disorganized IA which led further to the deterioration of irrigation facilities. This condition motivated the IAs, with strong support from the LGU of Sta. Ana to pursue the conversion of Visitacion CIA into an NIS. The thinking was that, with the conversion, the funding problem would be addressed and the system will be restored to its fully operational condition and fully developed.

Collection efficiency tends to fluctuate through the years with no clear trend while the other collections and income ratios appear to be stable (**Figure 20**). The ratios of benefited to irrigated areas do not show any clear trends. Cropping intensity, on the other hand has been increasing and reached 122% in 2013. The same trend is observed with the O&M cost per SA and viability index (**Table 9**).

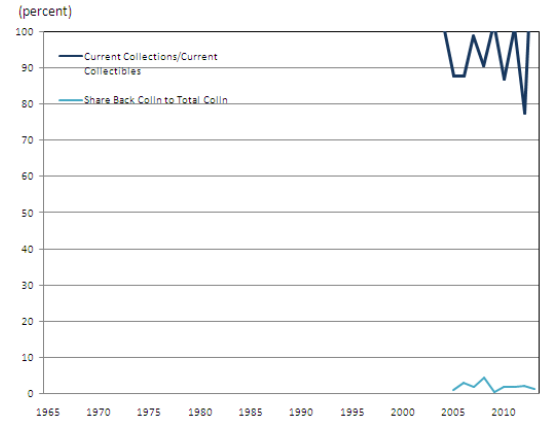
There is no data on filled-up plantilla positions of Visitacion. In the last 5 years, no land conversion has been reported with FUSA equal to SA. But ratios of actual irrigated area to FUSA show relatively low averages of 50% during the wet season and about 30% in the dry season. These low irrigation intensities are essentially due to the poor physical state of the irrigation system, defective facilities and lack of water supply.

The ISF current account collection accounts for the system's income averaging at 99%. The cropping intensity has an increasing trend despite drops in various years. Viability index also exhibits the same upward trend from 103% in 2004 to 193% in 2013.

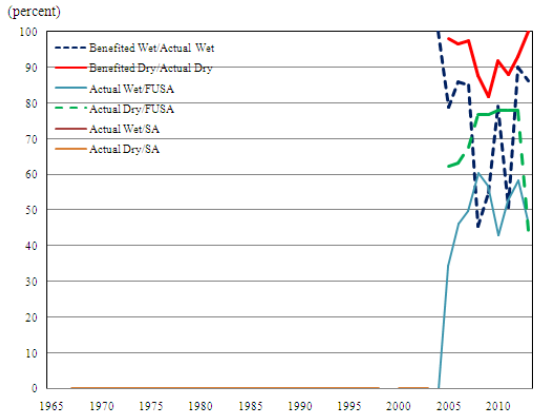
Figure 20. Trends in key performance indicators, Visitacion RIS, Cagayan, Region 2, 1965-2013



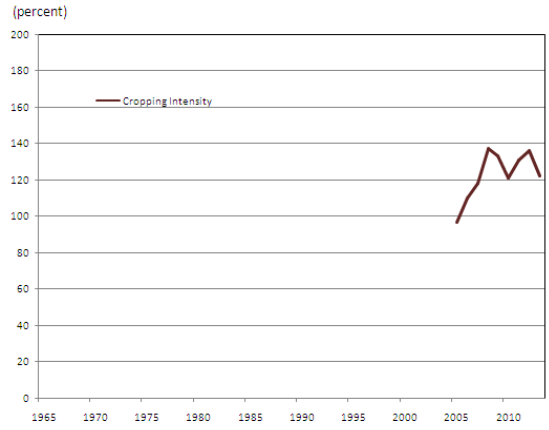
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



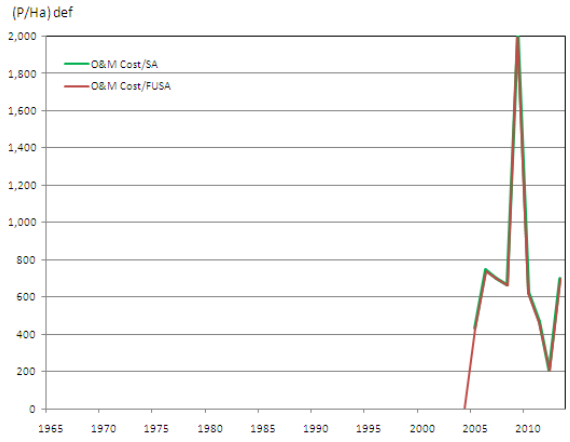
b. Collection efficiency



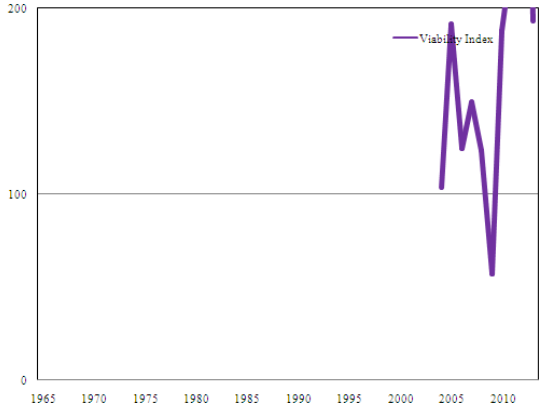
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD NISPER data, various years.

Table 9. Performance Ratios of Visitacion, 2001 – 2013

Ratios	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)													
FUSA/Filled-up (Ha/staff)													
FUSA/Filled-up + Daily Staff (Ha/staff)													
FUSA/SA (%)					100	101	101	101	100	100	100	100	100
Ben. Wet/Actual Wet (%)				100	79	86	85	45	55	79	51	90	86
Ben. Dry/Actual Dry (%)					98	97	97	88	82	92	88	93	100
ISF Current Account/Total Income (%)				99	99	94	97	99	100	100	100	100	99
ISF Back Account/Total income (%)					1	3	2	1					1
Other Income/Total Income (%)				1	0	3	1	0	0	0	0	0	0
Total Income (%)				100	100	100	100	100	100	100	100	100	100
Total ISF/Total Income (%)				99	100	97	99	100	100	100	100	100	100
Yield Wet (cavan/ha)				80	88	85	82	60	82				
Yield Dry (cavan/ha)				80	95	95	100	106	110				

Sources: NIA-SMD NISPER data, various years.

Solana-Tuguegarao Pump Irrigation System

The service area of Solana-Tuguegarao barely increased from 2009 onwards (**Figure 21a**). FUSA remained constant over the years. But with the increase in service area in 2009, the gap between FUSA and SA increased to 12 % indicating land conversions and uncovered permanently non-restorable areas.

Actual irrigated area started increasing around mid 2000s. These changes are consistent with the installation of a new pump house in March 2002 under the Water Resources Development Project (WRDP) Fund. This project was completed in 2003 and became operational during the wet season crop in 2004.

The ratio of actual irrigated area to FUSA in wet season has a higher average over the years compared to dry season. But, in terms of ratios of benefited area to irrigated area, dry season crop did better indicating substantial areas during wet being exempted –either because of damage from calamities or pests and diseases.

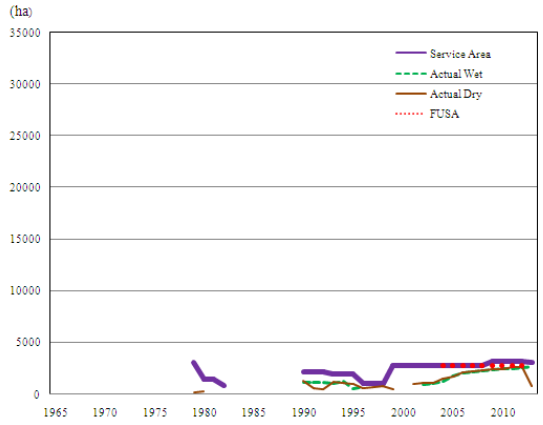
The ISF accounts for much of the system's income averaging 87% over the years although its share to total income dropped in 2009 and 2013 as other incomes like equipment rental increase during these years (**Table 10**). Collection efficiency has sharp fluctuations exhibiting drops below 50% over the years. Starting in 1997, the share of current collection to total collections, on the other hand, seemed to stabilize at 100%. Cropping intensity fluctuated over the years but showed an increasing trend in the later years. O&M expenditure per ha has been increasing over time starting at PhP. 2,611/ha in 1990 and PhP 12,669/ha in 2013. The same is true even for the O&M over FUSA. In terms of viability of system (revenues exceeding O&M expenditures), the system appears to be generally not viable except in 2009 and 2012.

Magat River Integrated Irrigation System (MRIIS) Division 2

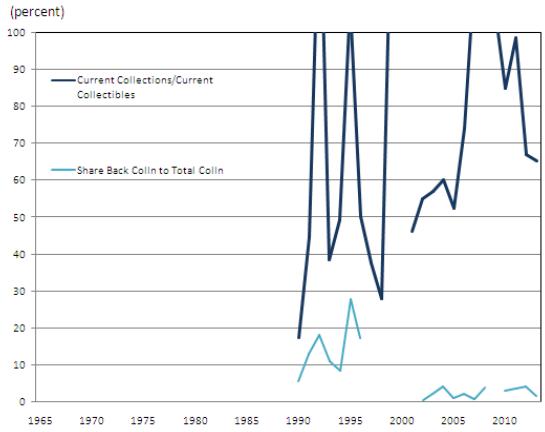
Figures 22a to f show trends in key performance indicators for MRIIS 2. Service area is among the largest of national systems at 23,241 ha until 2013 and when it increased to 25,718 ha. Actual irrigated areas showed modest increases as they already approach the firmed-up service area, indicating the system is almost fully operational. Aside from the share of ISF collection to total income and collection efficiency which showed an upward trend in later years, ratios of collections and income fluctuated towards the same level in earlier years. Cropping intensity as a ratio of irrigated wet plus dry over FUSA generally has an upward trend despite dips in various years. O&M cost per service area and O&M cost per FUSA moved with the same upward trend. Viability index has a downward trend and exhibiting drops below 100%.

Looking at the ratio of filled-up plantilla positions to approved plantilla and firmed-up service area, the coverage area per staff has increased from 225 ha in 2004 and increased to 399 ha in 2013 (**Table 11**). The gaps between actual irrigated areas in both wet and dry seasons and FUSA over the years do not exceed 5%. Inadequate and/or defective facilities account for these gaps. The ratios of benefited areas to irrigated areas across the years averaged 96% during dry season and 91% in the wet season indicating little crop damage by calamities and crop infestations.

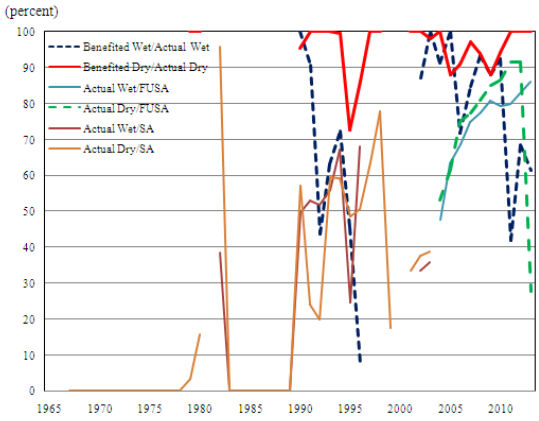
Figure 21. Trends in key performance indicators, Solana-Tuguegarao, Cagayan, Region 2, 1965-2013



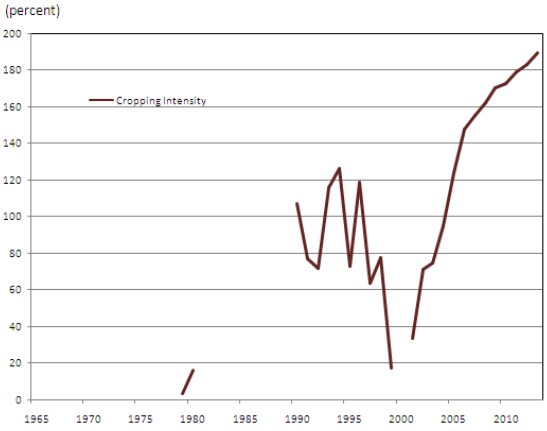
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



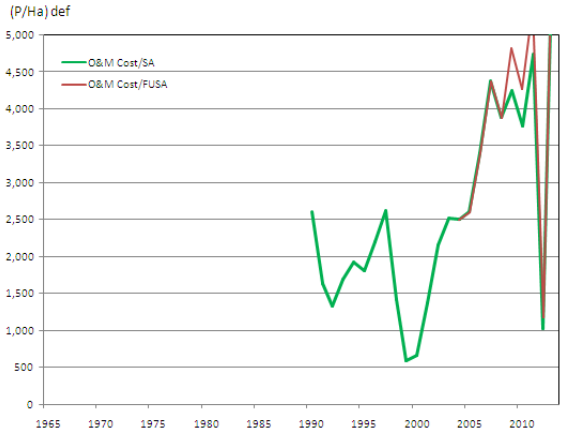
b. Collection efficiency



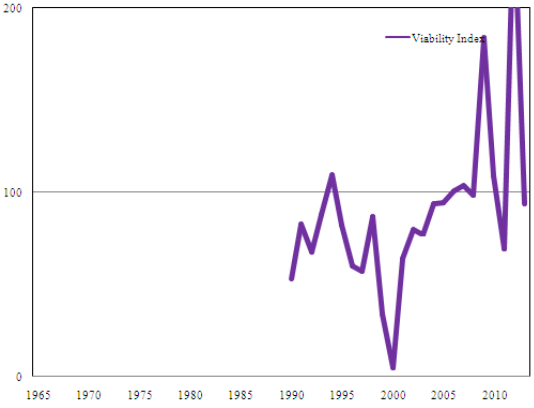
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



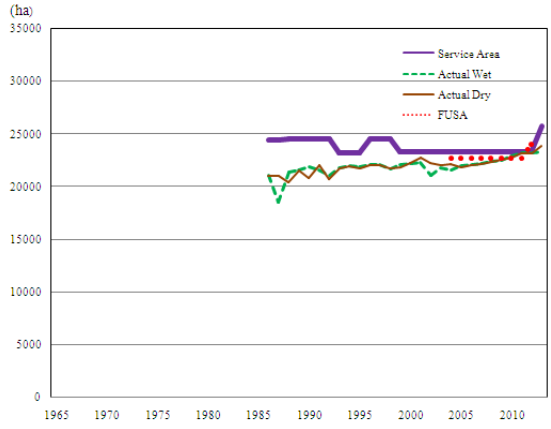
e. O&M per ha



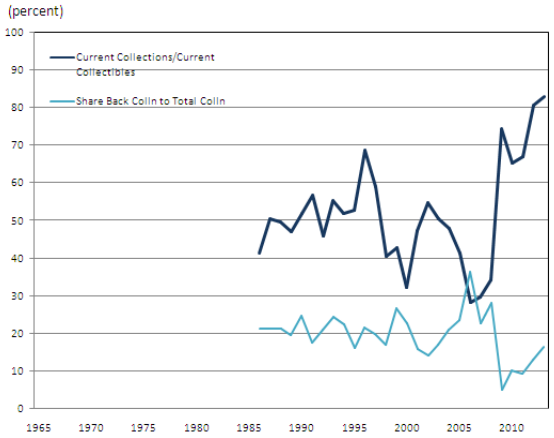
f. Viability index

Sources: NIA-SMD NISPER data, various years.

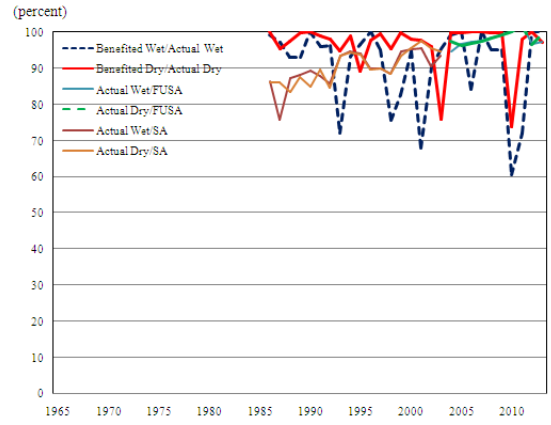
Figure 22. Trends in key performance indicators, MRIIS 2, Isabela, Region 2, 1965-2013



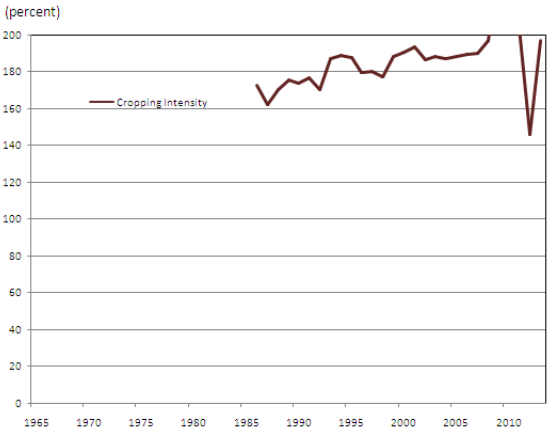
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



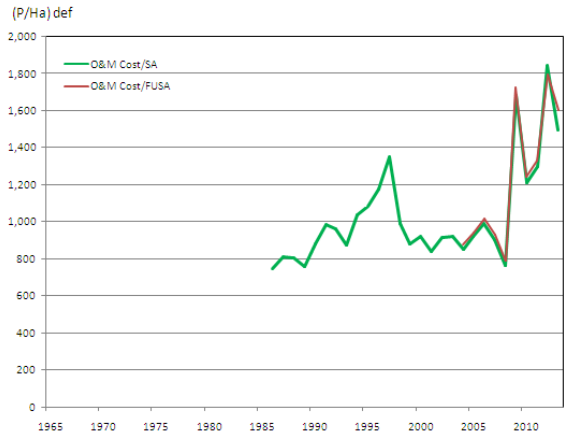
b. Collection efficiency



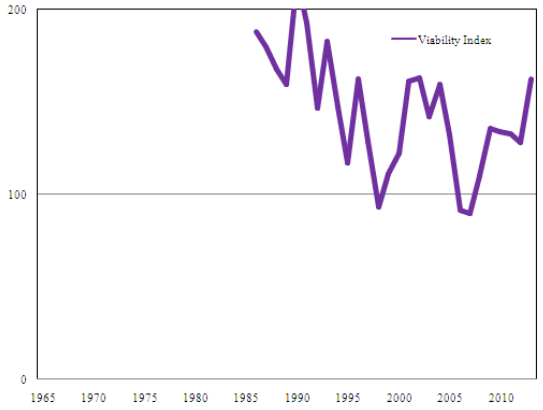
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD NISPER data, various years.

Table 10. Performance Ratios of Solana-Tuguegarao PIS, 1990 – 2003

Ratios	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Filled-up/Plantilla (%)														
FUSA/Filled-up (Ha/staff)														
FUSA/Filled-up + Daily Staff (Ha/staff)														
FUSA/SA (%)														
Ben. Wet/Actual Wet (%)	100	91	44	63	72	46	7						87	100
Ben. Dry/Actual Dry (%)	96	100	100	100	100	72	86	100	100	100		100	100	98
ISF Current Account/Total Income (%)	93	86	81	89	88	68	83	100	100	91		82	93	91
ISF Back Account/Total income (%)	6	13	18	11	8	26	17	0	0	0		0	0	2
Other Income/Total Income (%)	1	2	1	0	4	6	0	0	0	9	100	18	6	7
Total Income (%)	100	101	100	100	100	100	100	100	100	100	100	100	99	100
Total ISF/Total Income (%)	99	98	99	100	96	94	100	100	100	91		82	94	93
Yield Wet (cavan/ha)							80						75	81
Yield Dry (cavan/ha)							82	82	75	82		82	108	84

Sources: NIA-SMD NISPER data, various years.

Table 10. Performance Ratios of Solana-Tuguegarao PIS, 2004 – 2013

Ratios	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					24		29	29	29	29
FUSA/Filled-up (Ha/staff)					347	347	278	278	278	278
FUSA/Filled-up + Daily Staff (Ha/staff)					309	347	278	278	278	278
FUSA/SA (%)	100	100	100	100	100	88	88	88	88	93
Ben. Wet/Actual Wet (%)	91	100	72	85	93	88	92	42	69	61
Ben. Dry/Actual Dry (%)	100	88	91	97	94	88	94	100	100	100
ISF Current Account/Total Income (%)	94	99	98	99	94	44	98	98	98	36
ISF Back Account/Total income (%)	4	1	2	1	6		2	2	2	1
Other Income/Total Income (%)	2	1	0	0	0	56	0	0	0	64
Total Income (%)	100	101	100	100	100	100	100	100	100	101
Total ISF/Total Income (%)	98	99	100	100	100	44	100	100	100	36
Yield Wet (cavan/ha)	86	84	96	84	98	80				
Yield Dry (cavan/ha)	108	90	95	95	87	100				

Sources: NIA-SMD NISPER data, various years.

Table 11. Performance Ratios of MRIIS 2, 1986 – 2003

Ratios	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Filled-up/Plantilla (%)																		
FUSA/Filled-up (Ha/staff)																		
FUSA/Filled-up + Daily Staff (Ha/staff)																		
FUSA/SA (%)																		
Ben. Wet/Actual Wet (%)	99	97	93	93	100	96	96	72	93	97	100	95	76	83	95	68	90	95
Ben. Dry/Actual Dry (%)	100	95	97	100	100	99	98	95	99	89	98	99	95	100	98	98	96	76
ISF Current Account/Total Income (%)	78	78	79	80	72	82	79	75	77	83	78	80	82	72	76	79	84	77
ISF Back Account/Total income (%)	21	21	21	19	24	17	21	24	22	16	21	20	17	26	22	15	14	16
Other Income/Total Income (%)					4	1	0	0	1	1	1	0	1	1	1	6	2	7
Total Income (%)	99	99	100	99	100	100	100	99	100	100	100	100	100	99	99	100	100	100
Total ISF/Total Income (%)	99	99	100	99	96	99	100	100	99	99	99	100	99	99	99	94	98	93
Yield Wet (cavan/ha)					75	75	76	76	77	77	79	81	81	80	98	89	89	89
Yield Dry (cavan/ha)					77	77	78	79	79	80	80	83	75	82	101	101	101	101

Sources: NIA-SMD NISPER data, various years.

Table 11. Performance Ratios of MRIIS 2, 2004 – 2013

Ratios	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					37	72	37	88	37	92
FUSA/Filled-up (Ha/staff)					319	527	319	428	337	435
FUSA/Filled-up + Daily Staff (Ha/staff)					225	287	225	372	237	399
FUSA/SA (%)	98	98	98	98	98	98	98	98	103	93
Ben. Wet/Actual Wet (%)	99	100	84	100	95	95	61	72	100	100
Ben. Dry/Actual Dry (%)	100	100	100	100	100	100	74	98	100	97
ISF Current Account/Total Income (%)	78	76	62	76	82	82	75	81	82	83
ISF Back Account/Total income (%)	21	23	35	22	18	17	24	17	17	16
Other Income/Total Income (%)	1	1	3	2	1	1	1	2	1	1
Total Income (%)	100	100	100	100	101	100	100	100	100	100
Total ISF/Total Income (%)	99	99	97	98	99	99	99	98	99	99
Yield Wet (cavan/ha)	96	103	78	102	87	87				
Yield Dry (cavan/ha)	101	107	94	107	104	95	83			

Sources: NIA-SMD NISPER data, various years.

Magat River Integrated Irrigation System (MRIIS) Division 4

MARIIS 4 service area and firmed-up service area have hardly changed over time until 2013 when service area increased to 24,000 ha (**Figure 23**). Actual irrigated areas generally exhibited an upward trend over the years.

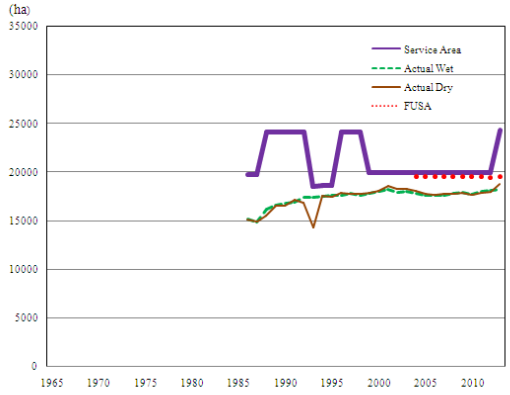
The ratios of ISF current collection to total income moved in an upward trend starting in 2006 (**Table 12**). The same upward pattern is observed of its collection efficiency reaching up to 83% in 2013.

Shares of current and back collection to total income moved across the years in more or less the same level they started. Benefited area during wet season moved through the years with more dips compared to dry season. This might be due to occurrence of calamities like typhoons and flooding during wet seasons. Cropping intensity as a ratio of irrigated wet plus dry to FUSA has an upward trend. O&M cost per service area as well as the O&M cost per FUSA exhibited peaks and dips in various years but generally has an increasing trend. Viability index fluctuated over the years with a slightly decreasing trend exhibiting dips below 1.0 in various years.

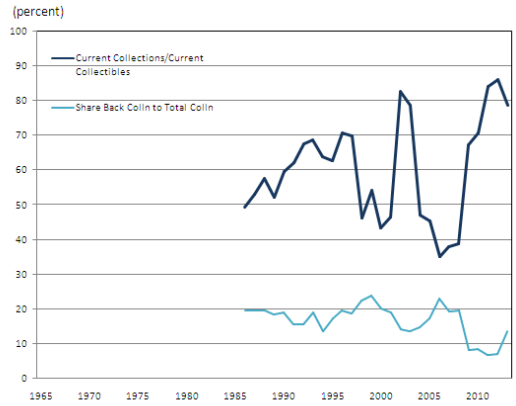
The ratio of filled-up plantilla positions to approved plantilla fluctuated as the plantilla positions varied annually. The coverage area per staff has a slightly increasing trend reaching 342 ha per staff in 2013. The gaps of irrigated areas and FUSA reached 10%. This is likely due to defective or inadequate facilities. Ratios of benefited area to irrigated area during wet season are much lower averaging only at 87% compared to the 96% during dry season. This might be due to occurrence of calamities like typhoons during wet seasons.

Despite the dips in various years, the ratios of ISF collection to total income as well as collection efficiency have been increasing over time. Viability index, on the contrary, fluctuated downward with dips reaching up to 0.74 in 2008.

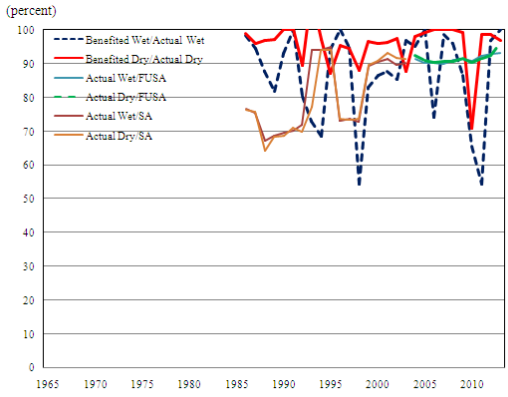
Figure 23. Trends in key performance indicators, MRIIS 4, Isabela, Region 2, 1965-2013



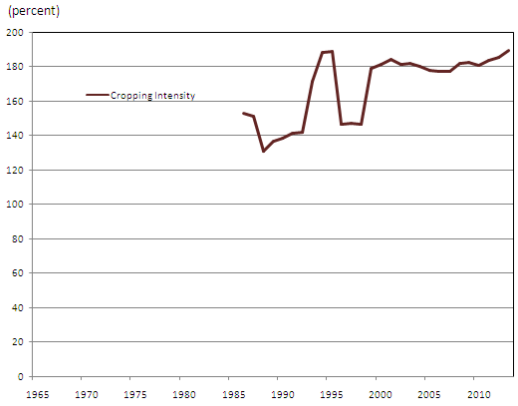
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



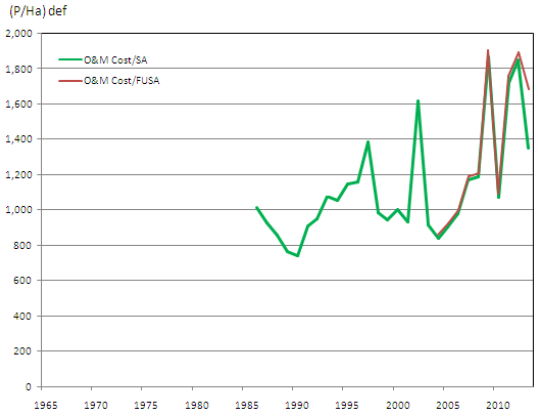
b. Collection efficiency



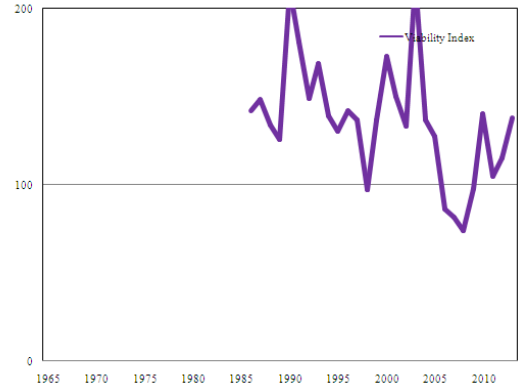
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD NISPER data, various years.

Table 12. Performance Ratios of MRIIS 4, 1986 – 2003

Ratios	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Filled-up/Plantilla (%)																		
FUSA/Filled-up (Ha/staff)																		
FUSA/Filled-up + Daily Staff (Ha/staff)																		
FUSA/SA (%)																		
Ben. Wet/Actual Wet (%)	99	97	93	93	100	96	96	72	93	97	100	95	76	83	95	68	90	95
Ben. Dry/Actual Dry (%)	100	95	97	100	100	99	98	95	99	89	98	99	95	100	98	98	96	76
ISF Current Account/Total Income (%)	78	78	79	80	72	82	79	75	77	83	78	80	82	72	76	79	84	77
ISF Back Account/Total income (%)	21	21	21	19	24	17	21	24	22	16	21	20	17	26	22	15	14	16
Other Income/Total Income (%)					4	0	1	0	0	0	6	15	17	16	25	4	2	3
Total Income (%)	99	99	100	99	100	99	101	99	99	99	105	115	116	114	123	98	100	96
Total ISF/Total Income (%)	99	99	100	99	96	99	100	100	99	99	99	100	99	99	99	94	98	93
Yield Wet (cavan/ha)					75	75	76	76	77	77	79	81	81	80	98	89	89	89
Yield Dry (cavan/ha)					77	77	78	79	79	80	80	83	75	82	101	101	101	101

Sources: NIA-SMD NISPER data, various years.

Table 12. Performance Ratios of MRIIS 4, 2004 – 2013

Ratios	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					37	72	37	88	37	92
FUSA/Filled-up (Ha/staff)					319	527	319	428	337	435
FUSA/Filled-up + Daily Staff (Ha/staff)					225	287	225	372	237	399
FUSA/SA (%)	98	98	98	98	98	98	98	98	103	93
Ben. Wet/Actual Wet (%)	99	100	84	100	95	95	61	72	100	100
Ben. Dry/Actual Dry (%)	100	100	100	100	100	100	74	98	100	97
ISF Current Account/Total Income (%)	78	76	62	76	82	82	75	81	82	83
ISF Back Account/Total income (%)	21	23	35	22	18	17	24	17	17	16
Other Income/Total Income (%)	0	0	6	4	0	0	1	0	1	2
Total Income (%)	99	99	103	102	100	99	100	98	100	101
Total ISF/Total Income (%)	99	99	97	98	99	99	99	98	99	99
Yield Wet (cavan/ha)	96	103	78	102	87	87				
Yield Dry (cavan/ha)	101	107	94	107	104	95	83			

Sources: NIA-SMD NISPER data, various years.

Region 3 Central Luzon

Angat-Maasim River Irrigation System (AMRIS)

Angat-Maasim in Bulacan has an unchanged service area (**Figure 24**). However, it may be important to note the big dips in areas for irrigated dry and wet from highs of almost 30,000 has. to below 15,000 has. in 1990 and 2005 respectively.

No clear trend with the collections and income ratios can be established (**Table 13**). In 1998, shares of back to total collection and total collections to current collectibles peaked at about 90%. On the other hand, shares of current to total collections, total ISF collections to total income, and current collections to current collectibles dipped and recovered slightly after. It seems interesting to note that all measures seem to converge towards 50% in 2013. Cropping intensity as ratio of the sum of irrigated wet and dry area to FUSA does not fall below 150%. O&M cost per service area was declining from about PhP1,700 per hectare in the 1980s to less than PhP1,000 per hectare in 2013. On the contrary, viability index constantly rose to almost 1.5 in 2013.

Filled-up plantilla position was constant at 39% from 2008 to 2013. FUSA to filled-up plus daily staff also had minimal changes, increasing slightly to 203 ha per staff in 2013. Though irrigated areas in the wet season is lower back in 2004 with a 30% gap, it has closed the gap by half with the irrigated dry as it increase to 83% in 2013.

Ratios to total income of ISF current account and total ISF and collection efficiency appear to have a downward tread. On the other contrary, ISF back account ratio to total income and viability index both increased across the years.

Pampanga Delta River Irrigation System (PDRIS)

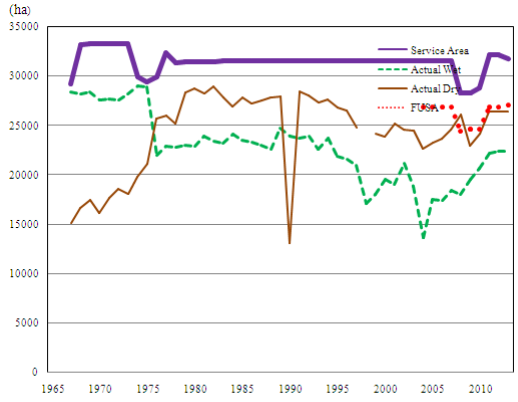
Pampanga Delta's service area has been pegged at 8000 ha over the years with a slight increase in 2013 (**Figure 25**). Actual irrigated area in the dry season has been increasing over the years, reaching over 5,000 ha in 2013. On the other hand, wet season actual irrigated area has been generally low with over 2,000 ha in 2010 and only 433 ha in 2012. There is also no clear trend for the share of total ISF collections to total income, though it started at near 100% with a general downward direction (**Table 14**). Cropping intensity as ratio of the sum of irrigated wet and dry area to FUSA in Pampanga Delta is generally increasing with downward dips in 2010 and 2012. O&M cost per service area was increasing before 2005, however as data for O&M cost per FUSA became available, it followed its downward trend. Viability index dropped greatly in 2003, but it has recovered and has averaged at about 1.0.

FUSA per staff, which includes both filled-up and daily staff, averages at around 262 has. This relatively stable movement is also seen for FUSA per service area averaging at around 72.

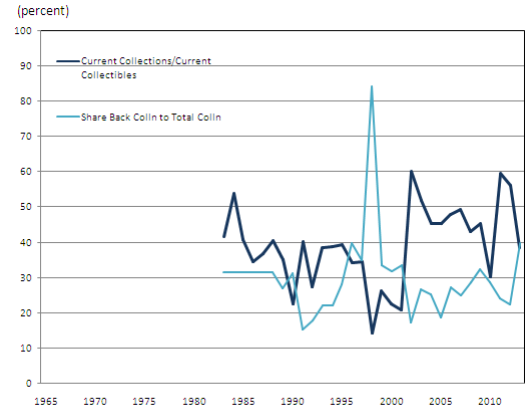
Irrigated wet per FUSA averaged at about 10% with peak at 32% in 2011. On the other hand, actual wet irrigated area over FUSA remained more than double the dry ranging from 34% to 52% in 2013. This gap may be due to defective or inadequate facilities like lack of drainage.

The ratios of ISF current account to total income, total ISF to total income, and collection efficiency follow downward but fluctuating trends from 97%, 97%, and 94% respectively in 2003 to 83%, 87%, and 52% respectively in 2013.

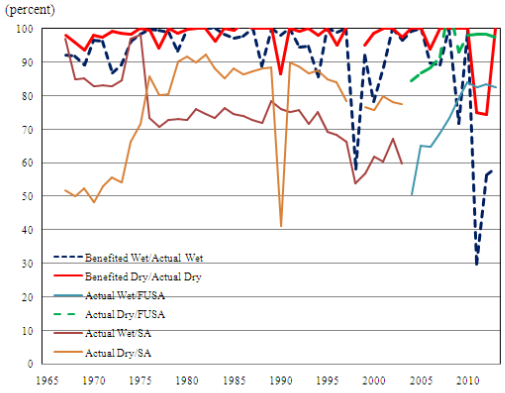
Figure 24. Trends in key performance indicators, Angat-Maasim RC, Bulacan, Region 3, 1965-2013



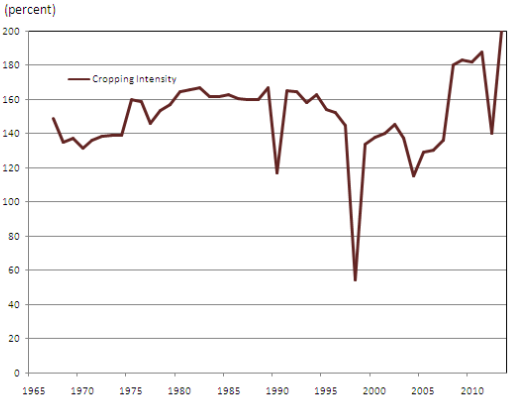
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



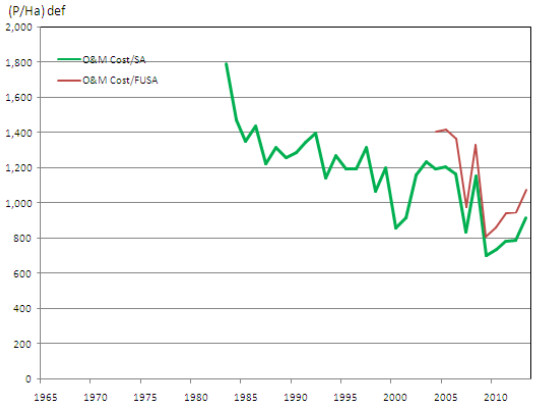
b. Collection efficiency



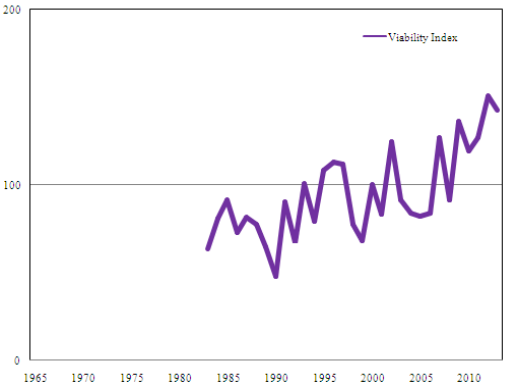
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



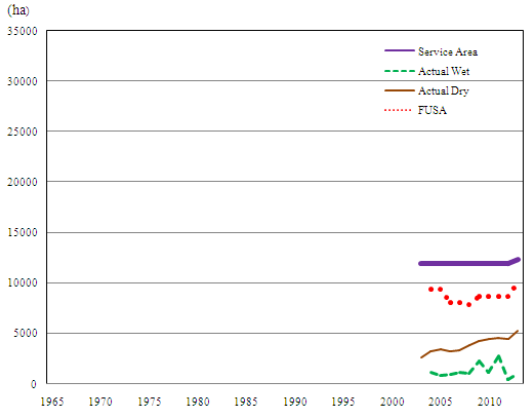
e. O&M per ha



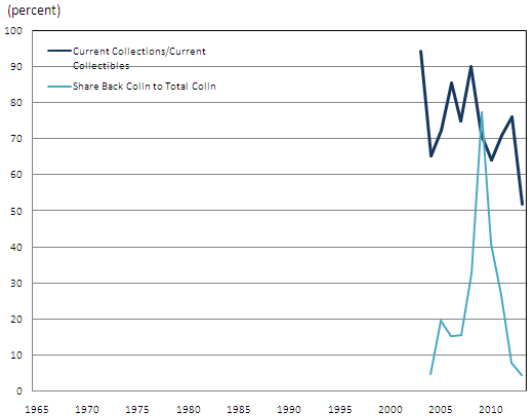
f. Viability index

Sources: NIA-SMD NISPER data, various years.

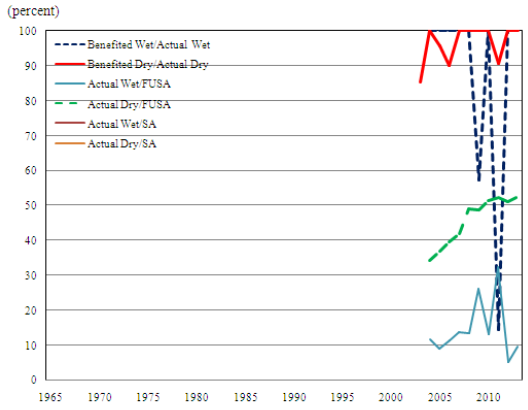
Figure 25. Trends in key performance indicators, Pampanga Delta RIS, Pampanga, Region 3, 1965-2013



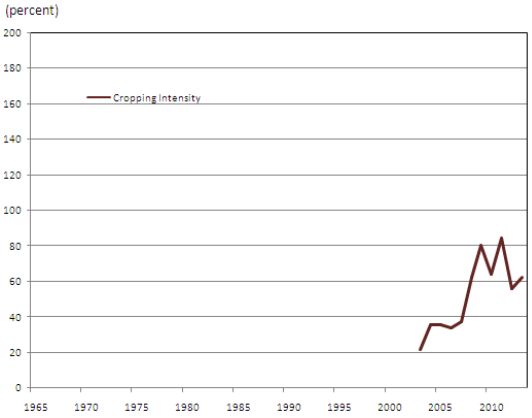
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



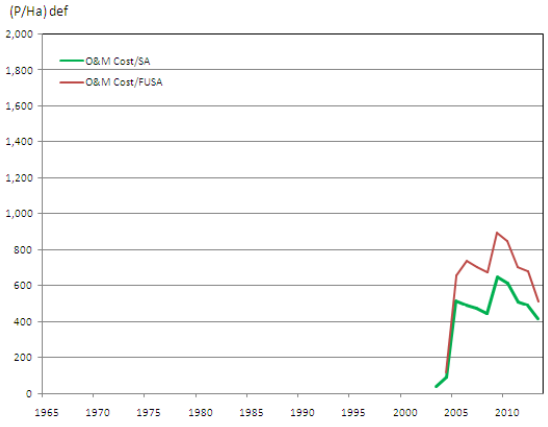
b. Collection efficiency



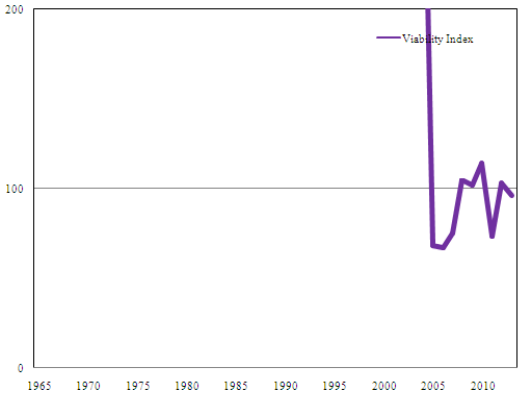
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD NISPER data, various years

Table 13. Performance Ratios of AMRIS, 1983 – 2003

Ratios	1983	1984	1985	1986	1987	1988	1989	1970	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Filled-up/Plantilla (%)																					
FUSA/Filled-up (Ha/staff)																					
FUSA/Filled-up + Daily Staff (Ha/staff)																					
FUSA/SA (%)																					
Ben. Wet/Actual Wet (%)	100	98	97	98	100	89	100	98	100	94	95	86	100	99	100	58	92	78	89	100	96
Ben. Dry/Actual Dry (%)	96	100	99	102	100	100	100	87	100	99	100	98	100	95	100		95	99	100	100	97
ISF Current Account/Total Income (%)	69	69	69	69	72	69	73	48	73	58	60	61	46	38	39	4	24	41	43	67	67
ISF Back Account/Total income (%)	31	31	31	31	33	31	27	22	13	13	17	17	18	25	21	23	12	19	22	14	24
Other Income/Total Income (%)								30	14	29	23	21	36	37	40	73	64	40	35	19	9
Total Income (%)	100	100	100	100	105	100	100	100	100	100	100	99	100	100	100	100	100	100	100	100	100
Total ISF/Total Income (%)	100	100	100	100	105	100	100	70	86	71	77	79	64	63	60	27	36	60	65	81	91
Yield Wet (cavan/ha)								76	78	79	80	82	82	80	82	82	85	85	85	82	82
Yield Dry (cavan/ha)								78	81	82	82	84	85	85	85		88	90	88	88	88

Sources: NIA-SMD NISPER data, various years.

Table 13. Performance Ratios of AMRIS, 2004 – 2013

Ratios	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					39	39	39	39	39	39
FUSA/Filled-up (Ha/staff)					188	189	189	206	206	208
FUSA/Filled-up + Daily Staff (Ha/staff)					184	185	185	201	201	203
FUSA/SA (%)	85	85	85	85	87	87	85	84	84	85
Ben. Wet/Actual Wet (%)	99	100	90	89	100	72	100	30	56	58
Ben. Dry/Actual Dry (%)	100	100	94	100	100	100	100	75	74	100
ISF Current Account/Total Income (%)	55	60	58	57	58	72	64	55	49	43
ISF Back Account/Total income (%)	19	14	22	19	22	19	23	24	20	29
Other Income/Total Income (%)	26	26	21	24	20	9	13	21	30	28
Total Income (%)	100	100	101	100	100	100	100	100	99	100
Total ISF/Total Income (%)	74	74	79	76	80	91	87	79	70	72
Yield Wet (cavan/ha)	81	82	82	82		85				
Yield Dry (cavan/ha)	88	86	85	86	91	95				

Sources: NIA-SMD NISPER data, various years.

Table 14. Performance Ratios of Pampanga Delta, 2003 – 2013

Ratios	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)											
FUSA/Filled-up (Ha/staff)											
FUSA/Filled-up + Daily Staff (Ha/staff)						237	262	262	262	262	304
FUSA/SA (%)		78	78	67	67	66	72	72	72	72	81
Ben. Wet/Actual Wet (%)		100	100	100	100	100	57	100	14	100	100
Ben. Dry/Actual Dry (%)	85	100	96	90	100	100	100	100	91	100	100
ISF Current Account/Total Income (%)	97	88	78	84	79	76	61	57	85	71	83
ISF Back Account/Total income (%)	0	4	19	15	15	12	8	4	8	5	4
Other Income/Total Income (%)	3	7	3	1	7	12	31	39	7	24	13
Total Income (%)	100	99	100	100	101	100	100	100	100	100	100
Total ISF/Total Income (%)	97	93	97	99	93	88	69	61	93	76	87
Yield Wet (cavan/ha)	83	80	81	85	89		82				
Yield Dry (cavan/ha)	86	83	83	95	94	85	85				

Sources: NIA-SMD NISPER data, various years.

Tarlac Groundwater Irrigation System (TGIS)

Given the interest in the viability and sustainability in deepwell irrigation, the TGIS was selected. However, there is hardly any information on the TGIS at the Central Office. Going to the field office, we found that data for the systems under the TGIS hardly exist except for the personal notes of the irrigation development officer (IDO) in-charged of amortization payments. The TGIS is actually 72 CIS systems which have been clustered and listed as among the NIS which partly explains the lack of data.

So, in place of the TGIS, the team decided to cover TASMORIS instead. Highlights of the interviews of IA officers from three TGIS systems are in **Annex 1**.

Tarlac-San-Miguel O'Donell River Irrigation System (TASMORIS)

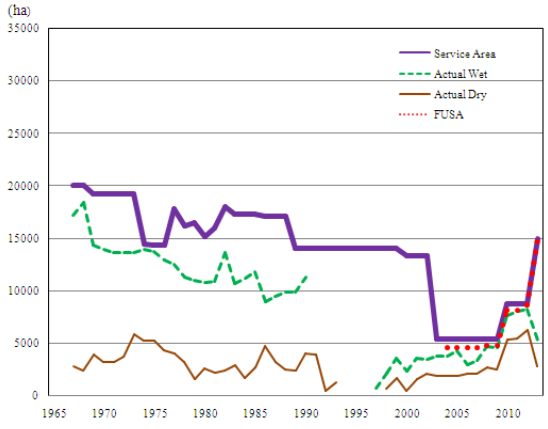
TASMORIS's service area has a generally declining trend starting at about 20,000 has. and dropping to 5,000 has. from the 1960s until 2009 (**Figure 26**). However, it recovered in the later years reaching 15,000 has. in 2013.The same trend can be observed for irrigated areas during both wet and dry seasons. Movement of collections ratios have no clear trend, but all measures experienced a huge dip in the early 2000s. Cropping intensity as ratio of the sum of irrigated wet and dry areas to either wet or dry generally falls below 150%, but starting in 2006 rose above 150%. TASMORIS' viability index generally has an upward trend.

Only 15% of plantilla positions are filled up likely due to either lack of funds or qualified applicants (**Table 15**). FUSA per filled-up position increased more than twice in five years with 596 ha as coverage per staff in 2013. This large coverage and lack of resources may hinder the staff from properly working on their assigned area.

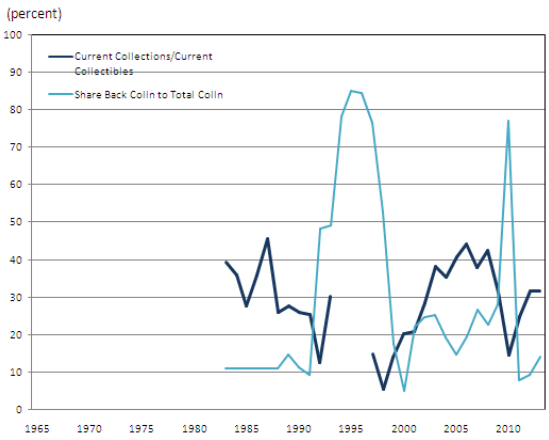
The ratio of irrigated area during the wet season to FUSA almost always remained double the ratio during the dry season from 2004 through 2013. This gap may be due to defective or inadequate facilities like lack of drainage.

Ratios to total income of ISF current account, ISF back account, and total ISF were relatively stable, along with collection efficiency. On the other hand, viability index fluctuated greatly with a peak of 147 in 2008 and low point of 42 in 2013.

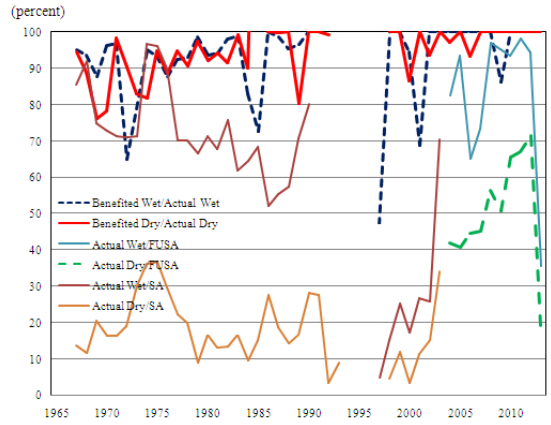
Figure 26. Trends in key performance indicators, TASMORIS, Tarlac, Region 3, 1965-2013



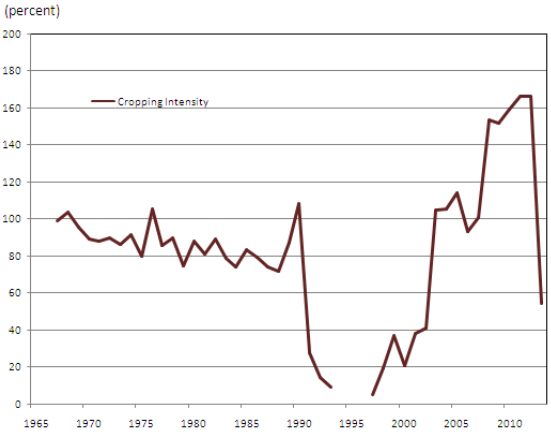
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



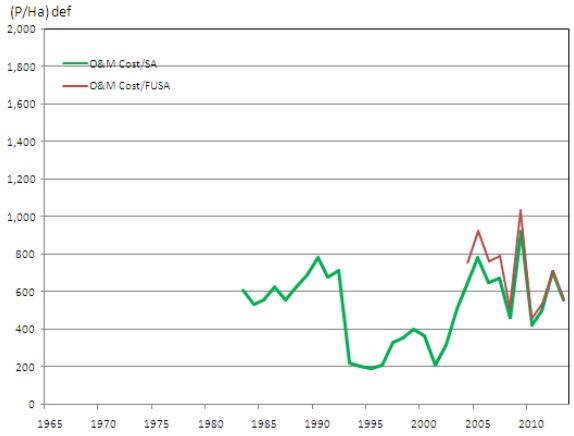
b. Collection efficiency



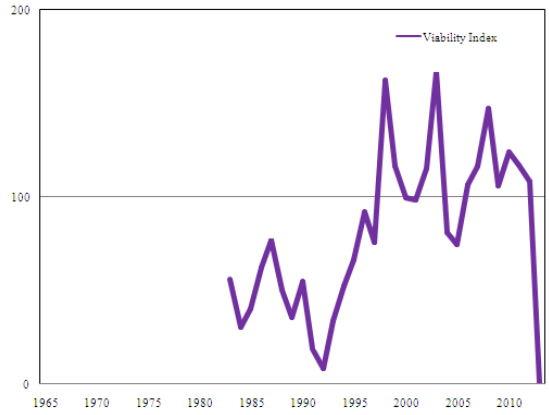
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD NISPER data, various years.

Table 15. Performance Ratios of TASMORIS, 1983 – 2003

Ratios	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Filled-up/Plantilla (%)																					
FUSA/Filled-up (Ha/staff)																					
FUSA/Filled-up + Daily Staff (Ha/staff)																					
FUSA/SA (%)																					
Ben. Wet/Actual Wet (%)	99	83	73	100	99	95	96	100		75					47	100	100	95	69	100	100
Ben. Dry/Actual Dry (%)	99	90	181	100	100	100	80	100	100	99	54					100	100	87	100	94	100
ISF Current Account/Total Income (%)	89	89	89	88	85	55	79	75	87	28	27	3	7	1	5	6	6	11	32	31	45
ISF Back Account/Total income (%)	11	11	11	11	10	7	14	10	9	26	26	11	37	8	15	6	1	1	9	10	15
Other Income/Total Income (%)								15	4	47	47	87	56	91	81	88	93	89	59	59	40
Total Income (%)	100	100	100	99	95	62	93	100	100	101	100	101	100	100	101	100	100	101	100	100	100
Total ISF/Total Income (%)	100	100	100	99	95	61	93	85	96	53	53	13	44	9	19	12	7	11	41	41	60
Yield Wet (cavan/ha)								75		77					80	81	81	82	82	83	83
Yield Dry (cavan/ha)								76	77	79	79					75	82	83	86	86	86

Sources: NIA-SMD NISPER data, various years.

Table 15. Performance Ratios of TASMORIS, 2004 – 2013

Ratios	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					15	15	15	15	15	15
FUSA/Filled-up (Ha/staff)					190	189	324	324	346	596
FUSA/Filled-up + Daily Staff (Ha/staff)					176	175	300	300	320	552
FUSA/SA (%)	85	85	85	85	90	89	93	93	100	100
Ben. Wet/Actual Wet (%)	100	100	100	100	100	86	100	100	100	100
Ben. Dry/Actual Dry (%)	97	100	93	100	100	100	100	100	100	100
ISF Current Account/Total Income (%)	66	72	52	42	73	40	47	65	67	78
ISF Back Account/Total income (%)	16	12	13	15	10	5	6	11	9	13
Other Income/Total Income (%)	19	16	35	42	17	55	47	25	24	10
Total Income (%)	101	100	100	99	100	100	100	101	100	101
Total ISF/Total Income (%)	81	84	65	58	83	45	53	75	76	90
Yield Wet (cavan/ha)	82	81	82	86		81				
Yield Dry (cavan/ha)	86	82	85	87	85	85				

Sources: NIA-SMD NISPER data, various years.

Upper Pampanga River Integrated Irrigation System (UPRIIS), Division 2

Figure 27a shows UPRIIS Division 2 service area has a slightly declining trend experiencing significant dips in 1994 and 2005. It dropped from 25,327 ha in 1976 to 24,000 has. in 2013. Irrigated areas also had big dips in various years especially during dry seasons. But, starting in 2004, they moved in a more or less stable manner following FUSA's trend. The share of total ISF to total income fluctuated across the years but stabilized starting in 2002. As share of back collection increased, share of current collectible to total collections fluctuated downward. Collection efficiency and total collections to current collectibles had an upward movement. Cropping intensities had drops over the years but seemed to smoothen out in the later years. O&M costs over service area (SA) followed the same pattern stabilizing at ₱1000 starting in 2003. Viability index fluctuated and exhibited an upward trend in the later years.

With the reduction of plantilla positions in 2009, the filled-up position per plantilla ratio has remained above 90% (**Table 16**). With this, FUSA per filled-up staff including daily staff average at around 350 ha in the past five years. UPRIIS's FUSA generally increased over time as well as its irrigated area closing the gap between FUSA to only 307 has. in 2013. Ratios of benefited area to irrigated area had fewer fluctuations compared to wet seasons averaging across the years at 97% and 90%, respectively. ISF current accounts make up majority of the total income averaging at 83% over the years, followed by back account collections at 12% and the rest from other incomes like equipment rentals.

Upper Pampanga River Integrated Irrigation System (UPRIIS), Division 3

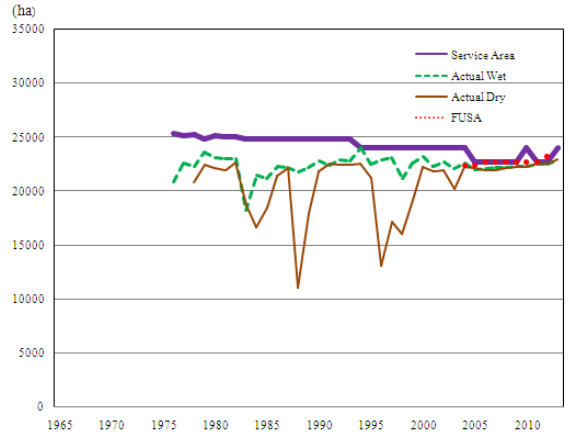
UPRIIS Division 3 service area averaged at about 27,000 ha until the early 2000s (**Figure 28**). Despite its big drop in 2008, its trend has been increasing. This rising trend is followed by the FUSA and actual irrigated areas during both wet and dry seasons.

Table 16 shows the shares to total income of current, total ISF collections, and back collection. These measures appear to be moving together over time. However, after 2005, share of back to total collection moved opposite the rest until 2013 (**Table 17**). It is interesting to note that cropping intensity moved similarly with irrigated area in the dry season, where downward fluctuations were prominent until the late 1990s. O&M costs over service area (SA) averaged below ₱1000 and the same is true even for the O&M over the firmed-up service area (FUSA). Viability index fluctuated but appears to be generally increasing.

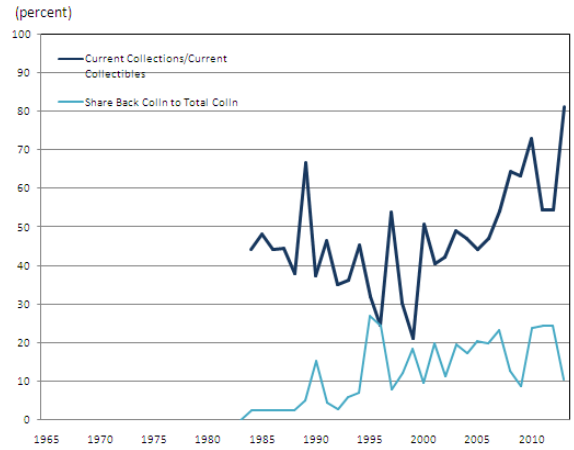
From 2008 with only 24% of its plantilla positions filled-up, the ratio increased in the succeeding years reaching 107% in 2013. The FUSA to filled-up plantilla in the past five years averaged at 400 ha/staff while the ratio to both plantilla and daily staff averaged at o 300 ha/staff.

The FUSA is increasing over time. Actual irrigated areas in both wet and dry seasons do not have a clear trend. The ISF current account ratio to total income slightly fluctuated over the years, with highs from 2008 to 2010. A similar pattern can be seen for ISF back accounts to total income ratio, with highs from 2004 to 2006. Total ISF collections comprise most of total income while collection efficiency averages at about 50%.

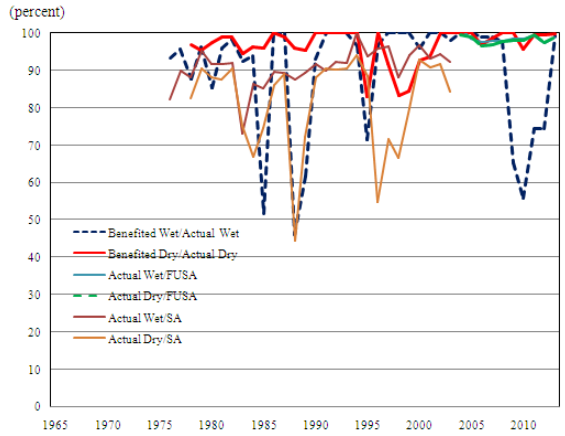
Figure 27. Trends in key performance indicators, UPRIIS 2, Nueva Ecija, Region 3, 1965-2013



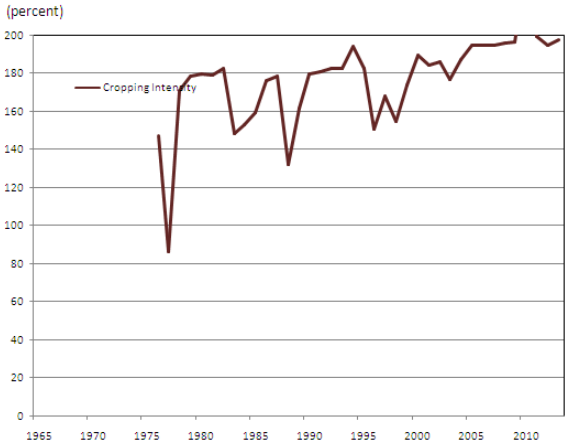
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



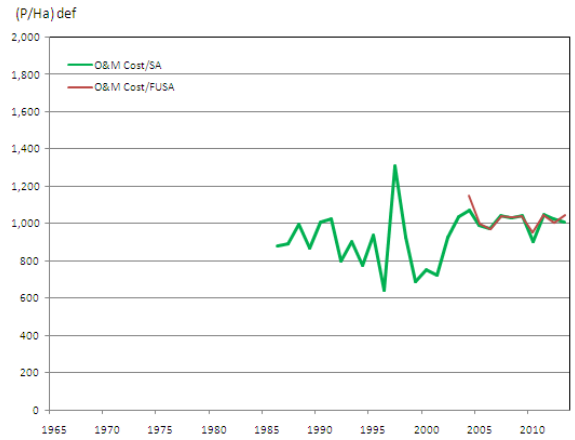
b. Collection efficiency



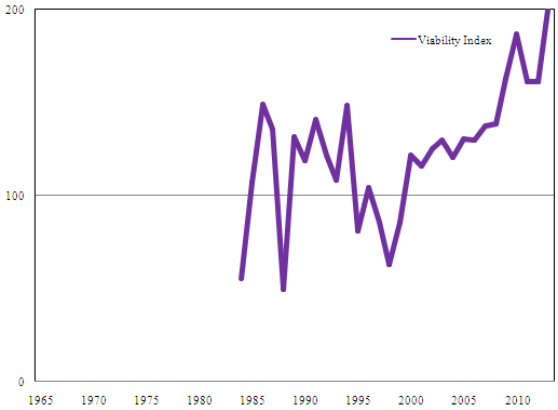
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



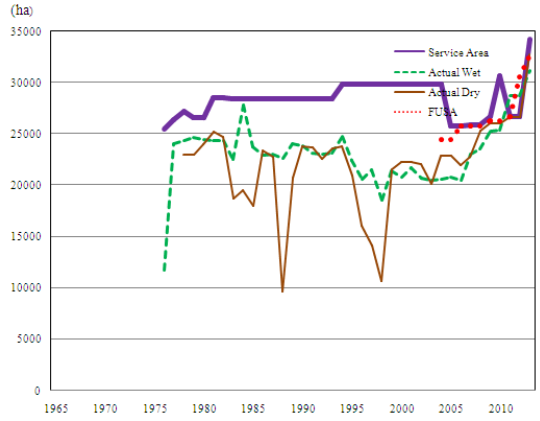
e. O&M per ha



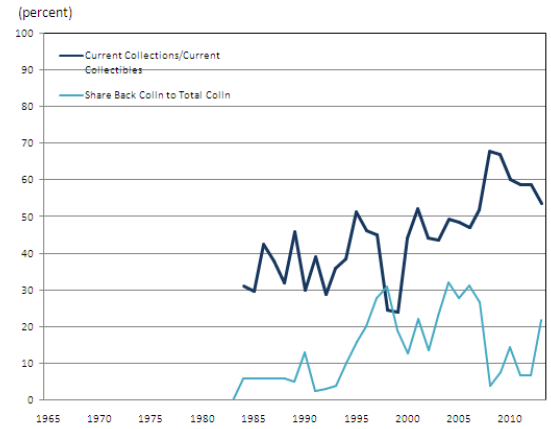
f. Viability index

Sources: NIA-SMD NISPER data, various years.

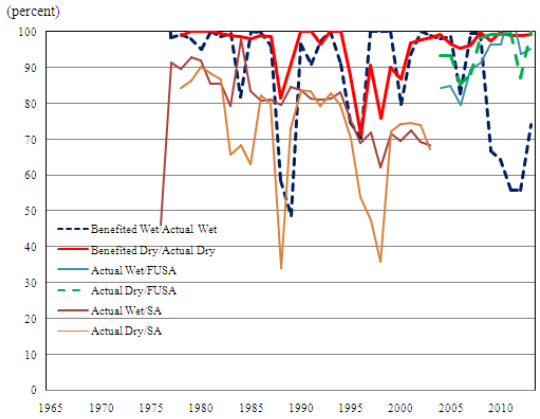
Figure 28. Trends in key performance indicators, UPRIIS 3, Nueva Ecija, Region 3, 1965-2013



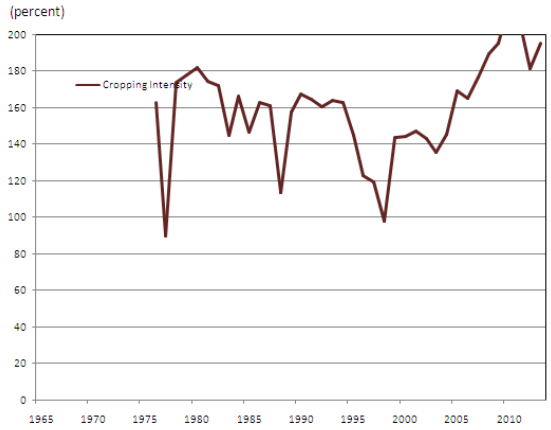
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



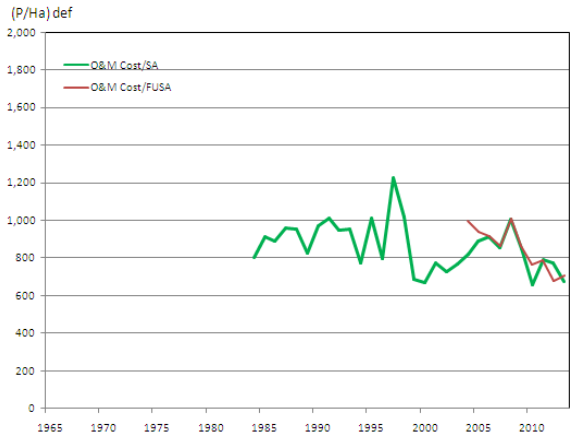
b. Collection efficiency



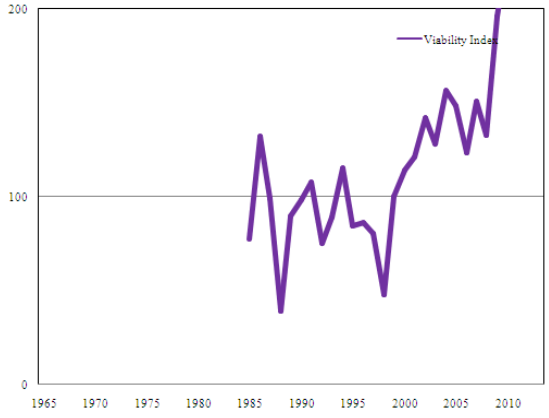
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD NISPER data, various years.

Table 16. Performance Ratios of UPRIIS 2, 1984 – 2003

Ratios	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Filled-up/Plantilla (%)																				
FUSA/Filled-up (Ha/staff)																				
FUSA/Filled-up + Daily Staff (Ha/staff)																				
FUSA/SA (%)																				
Ben. Wet/Actual Wet (%)	94	52	100	100	46	62	93	100	100	100	97	71	97	100	100	100	96	100	100	98
Ben. Dry/Actual Dry (%)	96	96	100	99	96	95	100	100	100	100	100	83	100	92	83	84	93	93	100	100
ISF Current Account/Total Income (%)	97	90	92	94	85	88	83	91	96	92	93	69	66	89	78	56	83	68	88	80
ISF Back Account/Total income (%)	2	2	2	2	2	5	15	4	3	6	7	25	21	8	11	13	8	17	11	20
Other Income/Total Income (%)							2	5	1	2	0	6	13	3	12	32	10	16	1	0
Total Income (%)	99	92	94	96	87	93	100	100	100	100	100	100	100	100	101	101	101	101	100	100
Total ISF/Total Income (%)	99	93	94	96	87	93	98	95	99	98	100	94	87	97	88	68	82	84	99	100
Yield Wet (cavan/ha)							77	78	79	80	80	80	80	81	82	83	50	73	52	66
Yield Dry (cavan/ha)							78	79	81	82	82	82	82	83	74	85	91	94	95	91

Sources: NIA-SMD NISPER data, various years.

Table 16. Performance Ratios of UPRIIS 2, 2004 – 2013

Ratios	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					35	92	94	94	94	95
FUSA/Filled-up (Ha/staff)					318	377	370	370	379	374
FUSA/Filled-up + Daily Staff (Ha/staff)					269	337	297	172	176	317
FUSA/SA (%)	93	99	100	100	100	100	94	100	102	97
Ben. Wet/Actual Wet (%)	100	100	99	99	98	65	56	75	75	99
Ben. Dry/Actual Dry (%)	100	100	97	99	100	100	96	99	99	99
ISF Current Account/Total Income (%)	82	79	80	77	88	85	91	78	78	89
ISF Back Account/Total income (%)	17	21	20	23	11	13	8	20	20	10
Other Income/Total Income (%)	1	0	0	0	1	2	1	2	2	1
Total Income (%)	100	100	100	100	100	100	100	100	100	100
Total ISF/Total Income (%)	99	100	100	100	99	98	99	98	98	99
Yield Wet (cavan/ha)	69	65	79	81	69	56	70	81	81	
Yield Dry (cavan/ha)	94	98	94	109	117	123	115	130	130	131

Sources: NIA-SMD NISPER data, various years.

Table 17. Performance Ratios of UPRIIS 3, 1985 –2003

Ratios	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Filled-up/Plantilla (%)																			
FUSA/Filled-up (Ha/staff)																			
FUSA/Filled-up + Daily Staff (Ha/staff)																			
FUSA/SA (%)																			
Ben. Wet/Actual Wet (%)	100	100	96	58	49	97	91	97	100	91	75	70	100	100	100	80	94	100	99
Ben. Dry/Actual Dry (%)	98	99	99	81	91	100	100	97	100	100	88	71	91	76	90	87	97	98	98
ISF Current Account/Total Income (%)	91	91	91	81	84	80	90	92	95	84	82	71	68	52	47	59	62	80	75
ISF Back Account/Total income (%)	6	6	6	5	4	12	2	3	4	10	16	18	26	23	11	13	18	13	22
Other Income/Total Income (%)						8	8	5	1	7	2	11	6	25	43	27	20	7	3
Total Income (%)	97	97	97	86	88	100	100	100	100	101	100	100	100	100	101	99	100	100	100
Total ISF/Total Income (%)	97	97	97	86	89	92	92	95	99	93	98	89	94	75	57	103	80	93	97
Yield Wet (cavan/ha)						77	78	79	80	80	81	81	82	81	82	47	73	63	81
Yield Dry (cavan/ha)						78	79	81	82	82	82	83	83	75	85	64	89	92	97

Sources: NIA-SMD NISPER data, various years.

Table 17. Performance Ratios of UPRIIS 3, 2004 –2013

Ratios	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					24	118	82	110	110	107
FUSA/Filled-up (Ha/staff)					429	332	477	361	413	454
FUSA/Filled-up + Daily Staff (Ha/staff)					343	285	385	183	209	371
FUSA/SA (%)	82	95	100	99	99	98	86	100	114	96
Ben. Wet/Actual Wet (%)	98	99	83	99	100	67	64	56	56	74
Ben. Dry/Actual Dry (%)	99	96	95	96	100	98	100	99	99	99
ISF Current Account/Total Income (%)	67	72	68	73	89	82	82	68	68	77
ISF Back Account/Total income (%)	32	28	31	27	11	16	14	31	31	21
Other Income/Total Income (%)	1	0	0	0	0	2	4	2	2	2
Total Income (%)	100	100	99	100	100	100	100	101	101	100
Total ISF/Total Income (%)	99	100	100	100	100	98	96	98	98	98
Yield Wet (cavan/ha)	77	84	80	81	82	73	71	80	80	
Yield Dry (cavan/ha)	100	74	100	100	103	104	120	136	136	122

Sources: NIA-SMD NISPER data, various years.

Upper Pampanga River Integrated Irrigation System (UPRIIS), Division 4

Figure 29 shows the service area for UPRIIS 4 fluctuated across the years, with 20,000 ha in the 1960s and mid-2000s, and ending 2013 back to 25,000 has. Irrigated area during the wet season dominated the dry season's until 2005 where the former was consistently outnumbered. Irrigation intensity had similar movements with dry actual as it continued with an upward trend in recent years. On the other hand, shares to total income of current and back collections appear to move in opposite directions. O&M costs per service area decreased after 1997 to PhP500 per ha in 1999. However, the average O&M remains below PhP1,000 although has been increasing after 2010.

Filled-up positions for plantilla started with 23% in 2008 and improved significantly ending 2013 with 86% (**Table 18**). FUSA covered by staff, both for filled-up and daily staff, were at 486 has in 2013 despite variable fluctuations in previous years.

Ratios of irrigated wet and irrigated dry to FUSA appear to move in similar directions and have little to no gap across the years. ISF current account as part of total income did not change variably unlike ISF back accounts as part of total income, which experienced a decline after 2007 but recovered back in 2011. Collection efficiency is slightly higher at around 60%. However, viability index is lower than the others at 180 percent.

Region 4A CALABARZON

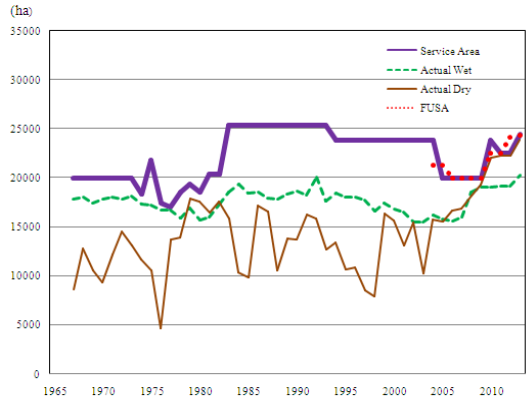
Cavite Friar Lands (Balayungan RIS)

While the system actually visited was Balayungan, the trends reported in this section pertain to the entire Cavite friar land irrigation system (FLIS). Cavite FLIS' service area has been decreasing over time (**Figure 30**). It started at 15,000 ha in 1967 and was at 13,500 ha in 2013. The actual irrigated area during wet season declined over time increasing the gap between the service area by 8,725 ha in 2013. During the dry season, even with the slightly increasing trend of actual irrigated area, the gap is bigger at 9,545 ha in 2013. This gap is mainly due to the lack of water supply and aggravated by inadequate and/or defective facilities. The ratio of benefited area to irrigated area has been consistently rising during dry seasons while decreasing in the wet seasons.

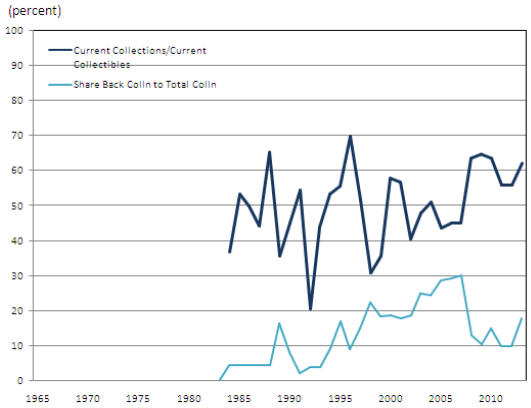
Collection efficiency fluctuated above 50% despite dips in several years. Contributions of back account collections averaged 17% over the years. Cropping intensity as ratio of the sum of irrigated wet and dry areas to either irrigated wet or dry seemed to increase over time reaching up to 183% in 2013. O&M cost per service area displayed steep variations through the year but levelled out starting 2002. Viability index showed no clear trend over the years.

In 2012, the staff had been reduced to 32 from 74, increasing the coverage area per staff to 265 ha from 115 ha (**Table 19**). During the wet season, the gap between irrigated area and FUSA ranged from 23% to 44%. While during dry season, the gap is even bigger ranging from 52% to 72%.

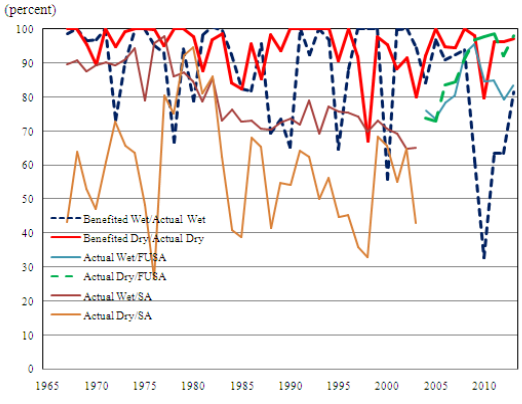
Figure 29. Trends in key performance indicators, UPRIIS 4, Nueva Ecija, Region 3, 1965-2013



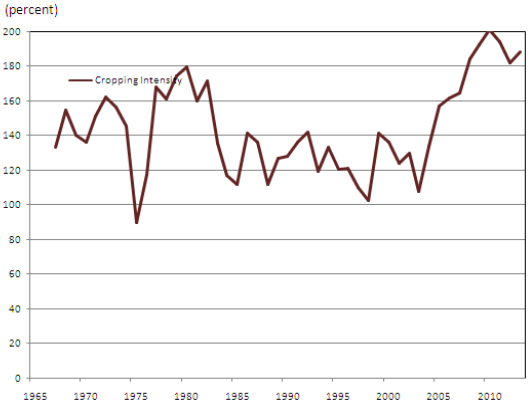
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



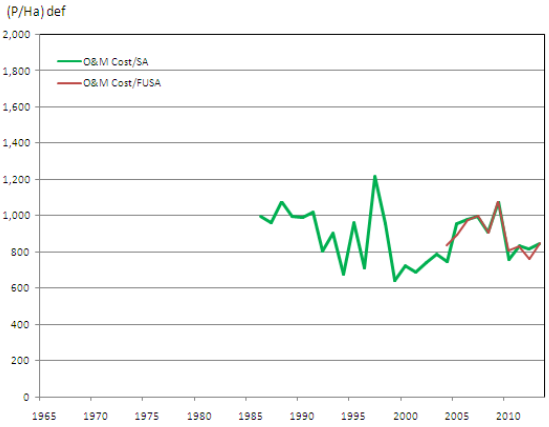
b. Collection efficiency



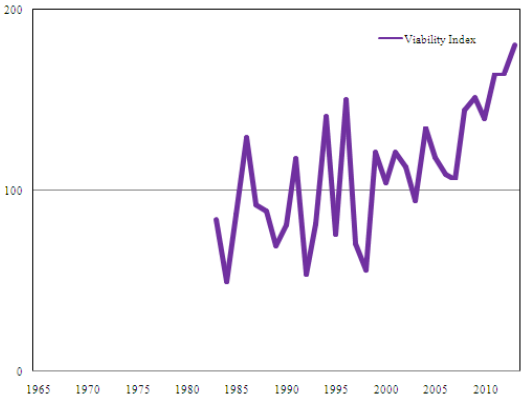
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



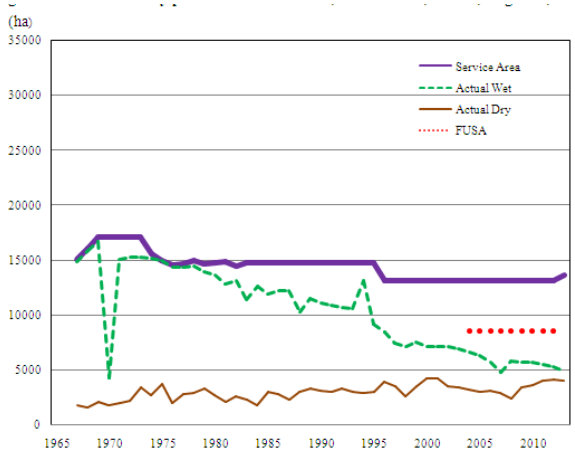
e. O&M per ha



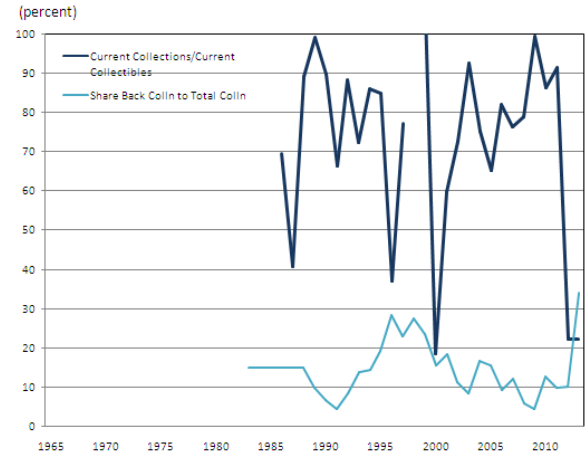
f. Viability index

Sources: NIA-SMD NISPER data, various years.

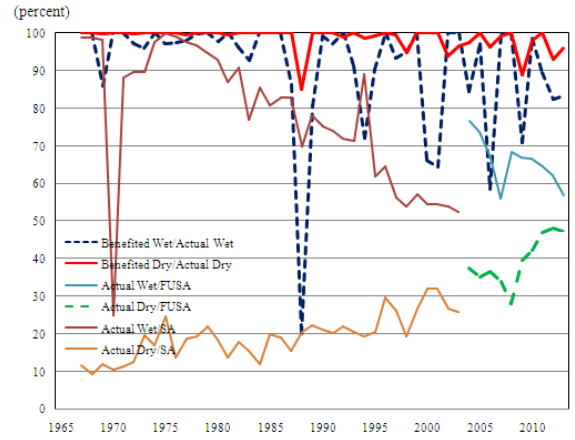
Figure 30. Trends in key performance indicators, Cavite FLIS, Cavite, Region 4, 1965-2013



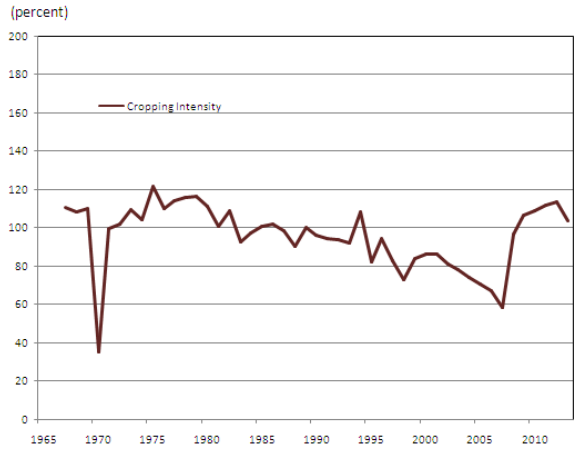
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



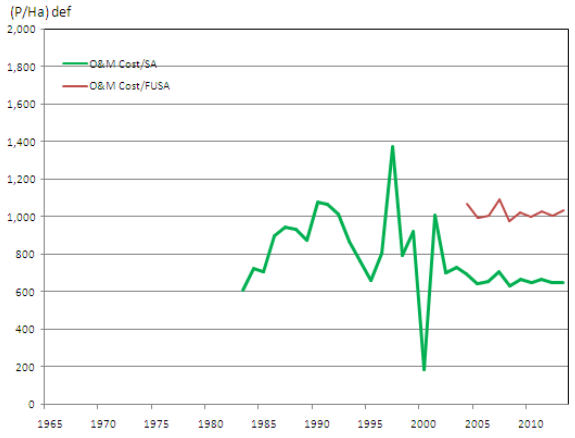
b. Collection efficiency



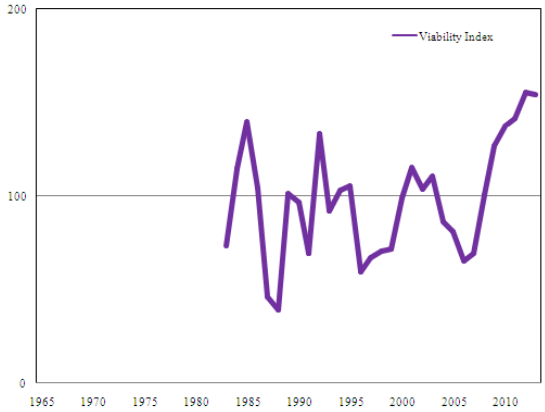
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD NISPER data, various years

Table 18. Performance Ratios of UPRIIS 4, 1984 – 2003

Ratios	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Filled-up/Plantilla (%)																				
FUSA/Filled-up (Ha/staff)																				
FUSA/Filled-up + Daily Staff (Ha/staff)																				
FUSA/SA (%)																				
Ben. Wet/Actual Wet (%)	93	82	82	96	69	74	65	100	93	100	97	65	88	100	100	100	56	100	100	94
Ben. Dry/Actual Dry (%)	84	82	96	85	98	94	100	100	100	100	100	91	100	92	67	98	95	88	92	80
ISF Current Account/Total Income (%)	84	77	76	88	80	65	88	96	94	95	88	78	88	82	59	60	68	62	77	73
ISF Back Account/Total income (%)	4	4	3	4	4	13	8	2	4	4	9	16	9	15	17	14	16	13	18	24
Other Income/Total Income (%)							4	1	3	1	3	6	3	4	24	26	16	25	5	2
Total Income (%)	88	81	79	92	84	78	100	99	101	100	100	100	100	101	100	100	100	100	100	99
Total ISF/Total Income (%)	87	81	79	92	84	78	96	99	97	99	97	94	97	96	76	74	87	75	95	98
Yield Wet (cavan/ha)							77	78	80	80	80	81	82	83	81	82	40	76	78	77
Yield Dry (cavan/ha)							79	80	81	82	82	82	83	85	75	85	62	89	77	64

Sources: NIA-SMD NISPER data, various years.

Table 18. Performance Ratios of UPRIIS 4, 2004 – 2013

Ratios	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					23	105	90	84	84	86
FUSA/Filled-up (Ha/staff)					383	327	433	459	491	486
FUSA/Filled-up + Daily Staff (Ha/staff)					321	302	417	227	243	486
FUSA/SA (%)	89	107	100	100	100	100	95	100	107	99
Ben. Wet/Actual Wet (%)	84	97	91	92	94	61	33	63	63	81
Ben. Dry/Actual Dry (%)	92	100	95	95	100	98	80	96	96	97
ISF Current Account/Total Income (%)	72	71	70	70	89	86	92	79	79	81
ISF Back Account/Total income (%)	23	28	29	30	9	11	7	21	21	17
Other Income/Total Income (%)	5	1	1	0	1	3	1	0	0	2
Total Income (%)	100	100	100	100	99	100	100	100	100	100
Total ISF/Total Income (%)	95	99	99	100	99	97	99	100	100	98
Yield Wet (cavan/ha)	69	75	70	74	76	50	103	122	122	
Yield Dry (cavan/ha)	76	81	73	73	85	88	85	112	112	95

Sources: NIA-SMD NISPER data, various years.

Table 19. Performance Ratios of Cavite Friar Lands, 1983 – 2003

Ratios	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Filled-up/Plantilla (%)																					
FUSA/Filled-up (Ha/staff)																					
FUSA/Filled-up + Daily Staff (Ha/staff)																					
FUSA/SA (%)																					
Ben. Wet/Actual Wet (%)	93	100	100	100	86	20	81	99	97	100	91	72	90	100	93	95	100	66	64	100	100
Ben. Dry/Actual Dry (%)	100	100	100	100	100	85	100	100	100	99	100	98	99	100	100	95	100	100	100	94	97
ISF Current Account/Total Income (%)	85	85	85	85	85	85	87	93	95	66	79	85	80	72	69	71	76	83	39	79	85
ISF Back Account/Total income (%)	15	15	15	15	15	15	9	7	5	6	13	15	19	28	21	27	23	15	9	10	8
Other Income/Total Income (%)								1	0	28	9	0	0	0	11	3	1	2	52	11	7
Total Income (%)	100	100	100	100	100	100	96	101	100	100	101	100	99	100	101	101	100	100	100	100	100
Total ISF/Total Income (%)	100	100	100	100	100	100	96	99	100	72	91	100	100	100	89	97	99	98	48	89	93
Yield Wet (cavan/ha)								75	76	77	77	79	79	80	80	81	81	82	81	66	81
Yield Dry (cavan/ha)								76	77	79	79	79	80	81	82	75	82	83	85	74	84

Sources: NIA-SMD NISPER data, various years.

Table 19. Performance Ratios of Cavite Friar Lands, 2004 – 2013

Ratios	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					32	32	32	32	80	80
FUSA/Filled-up (Ha/staff)					129	129	129	129	354	354
FUSA/Filled-up + Daily Staff (Ha/staff)					115	115	115	115	265	265
FUSA/SA (%)	65	65	65	65	65	65	65	65	65	63
Ben. Wet/Actual Wet (%)	84	97	59	100	100	71	99	90	82	83
Ben. Dry/Actual Dry (%)	97	100	96	99	100	89	98	100	93	96
ISF Current Account/Total Income (%)	77	79	86	78	64	68	76	66	66	64
ISF Back Account/Total income (%)	16	14	9	11	34	24	17	34	34	33
Other Income/Total Income (%)	8	6	5	11	3	8	7	0	0	4
Total Income (%)	101	99	100	100	101	100	100	100	100	101
Total ISF/Total Income (%)	92	94	95	89	97	92	93	100	100	96
Yield Wet (cavan/ha)	82	82	81	80		84				
Yield Dry (cavan/ha)	85	83	84	84	83	83			80	80

Sources: NIA-SMD NISPER data, various years.

These gaps are probably caused by lack of water supply and aggravated by defective facilities. But, despite these gaps, benefited to irrigated area showed high ratios of 91% during wet seasons and 99% during dry seasons.

About 77% of the total income comes from current account collections while 17% from back account collections. Collection efficiency showed no clear trend throughout the years but has a relatively high average at 73% compared to other systems. The viability index also displayed no clear course averaging at 96% over the years.

Dumacaa-Hanagdong-Lagnas

The service area of Dumacaa-Hanagdong-Lagnas has been stagnant over the years at about 3,300 ha from 1994 to 2013 (**Figure 32**). The actual irrigated areas during wet and dry seasons have been almost stagnant with minor declines in 1980 and 1998. The ratio of benefited area to irrigated area as well as the ratio of irrigated to FUSA exhibited minimal fluctuations except for sharp dips in 1981, 1982, 1988 and 2001.

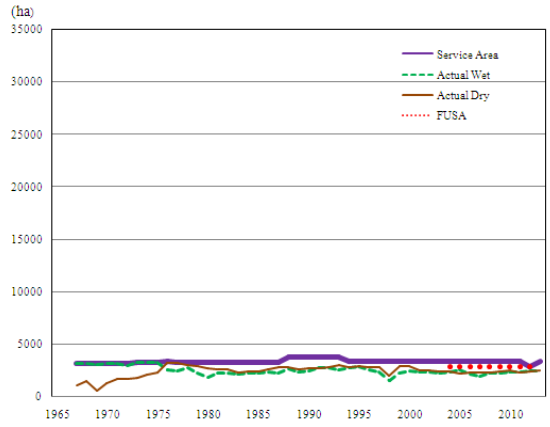
The ratios of collections to collectibles and income, on the other hand, exhibited sharp fluctuations throughout the years. But, despite these fluctuations, collection efficiency and share of current collections to total collection depicted an increasing trend.

In spite of fluctuations over the years, cropping intensity appears to be increasing. O&M cost per service area tend go towards PhP1,000 per ha. after its drop to PhP518 per ha. in 2000. Viability index rose from 56% in 1998 to 253% in 2013.

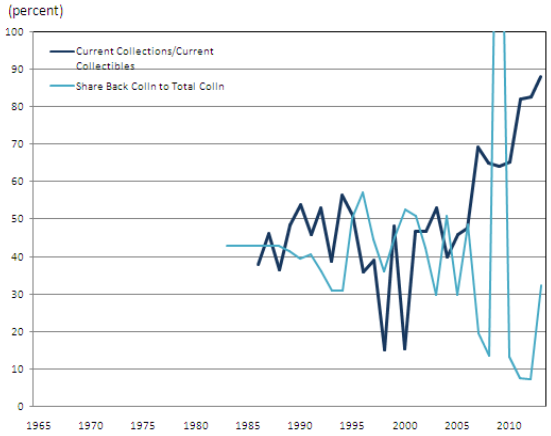
Even with the reduction of plantilla positions from 51 to 12 in 2012, the coverage area per staff of 229 ha is still relatively low compared with the other systems (**Table 20**). Ratios of benefited area to actual irrigated areas showed relatively high averages at 94% during wet season and 97% during dry season.

Sixty percent (60%) of the total income are obtained from current account collections. This source is followed by back accounts collections averaging at 35% and other income at 5%. The collection efficiency averaged only at 51% but rose in the later years. The viability index has been fluctuating over the years but t showed an upward trend in the later years and reached 253% in 2013.

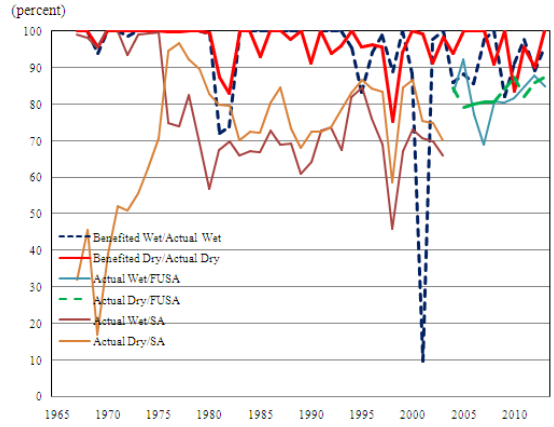
Figure 32. Trends in key performance indicators, Dumacaa-Hanagdong-Lagnas RC, Laguna, Region 4, 1965-2013



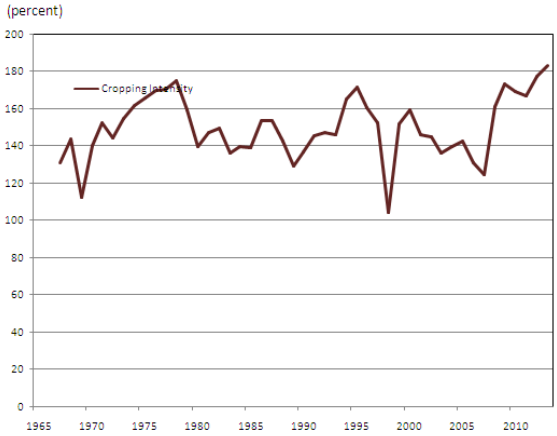
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



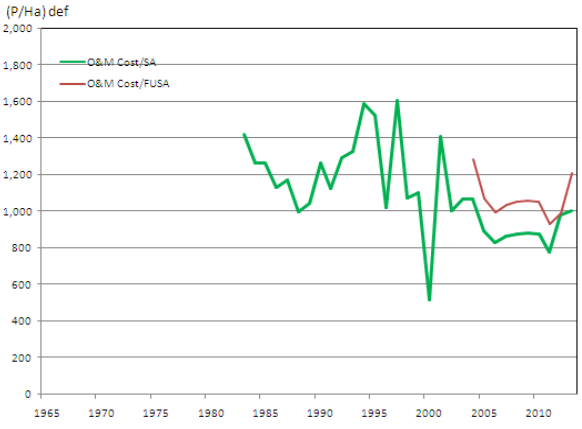
b. Collection efficiency



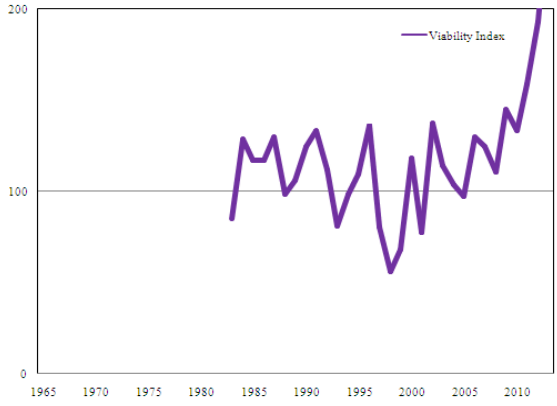
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD NISPER data, various years.

Table 20. Performance Ratios of Dumacaa-Hanagdong-Lagnas, 1983 – 2003

Ratios	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Filled-up/Plantilla (%)																					
FUSA/Filled-up (Ha/staff)																					
FUSA/Filled-up + Daily Staff (Ha/staff)																					
FUSA/SA (%)																					
Ben. Wet/Actual Wet (%)	100	100	100	100	100	100	100	106	100	100	100	95	83	94	99	89	100	88	10	98	100
Ben. Dry/Actual Dry (%)	100	100	93	100	100	98	100	91	100	94	96	100	96	96	96	75	94	100	99	91	98
ISF Current Account/Total Income (%)	57	57	57	57	57	57	57	58	58	63	59	61	46	40	51	64	54	47	48	50	63
ISF Back Account/Total income (%)	43	43	43	43	43	43	41	38	39	35	27	27	46	53	41	36	45	52	49	37	26
Other Income/Total Income (%)	0	0	0	0	0	0	0	5	2	2	14	12	8	7	9	0	1	0	3	13	11
Total Income (%)	100	100	100	100	100	100	98	101	99	100	100	100	100	100	101	100	100	99	100	100	100
Total ISF/Total Income (%)	100	100	100	100	100	100	98	95	98	98	86	88	92	93	91	100	99	100	97	87	89
Yield Wet (cavan/ha)								75	76	77	77	79	79	80	80	81	81	82	82	78	80
Yield Dry (cavan/ha)								76	77	79	79	79	80	81	82	75	82	83	84	83	83

Sources: NIA-SMD NISPER data, various years.

Table 20. Performance Ratios of Dumacaa-Hanagdong-Lagnas, 2004 – 2013

Ratios	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					45	45	45	45	100	100
FUSA/Filled-up (Ha/staff)					120	120	120	120	229	231
FUSA/Filled-up + Daily Staff (Ha/staff)					115	115	115	115	229	231
FUSA/SA (%)	83	83	83	83	83	83	83	83	100	83
Ben. Wet/Actual Wet (%)	86	88	86	98	100	82	91	98	89	96
Ben. Dry/Actual Dry (%)	94	100	100	100	91	100	84	96	90	100
ISF Current Account/Total Income (%)	46	69	51	74	75	71	81	91	75	61
ISF Back Account/Total income (%)	47	29	48	18	17	25	6	9	2	29
Other Income/Total Income (%)	7	2	0	8	8	4	13	0	23	10
Total Income (%)	100	100	99	100	100	100	100	100	100	100
Total ISF/Total Income (%)	93	98	100	92	92	96	87	100	77	90
Yield Wet (cavan/ha)	82	82	83	83	0	80	0	0	75	75
Yield Dry (cavan/ha)	83	83	85	86	82	82	0	0	80	80

Sources: NIA-SMD NISPER data, various years.

Region 4B MIMAROPA

Caguray RIS

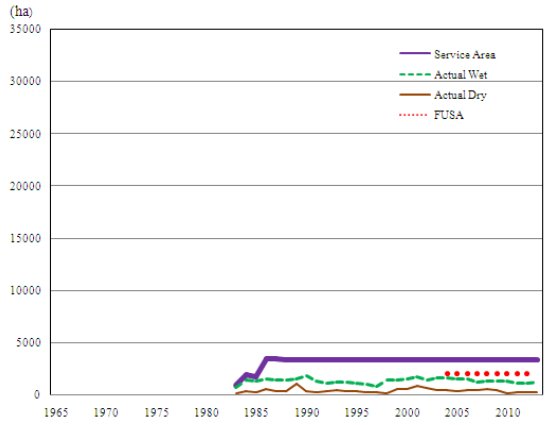
Starting in 1988, the service area of Caguray remained constant at 3,308 ha (**Figure 31**). The actual irrigated areas, however, fluctuated over the years and had been generally low during dry seasons. This is mainly due to inadequate water made worse by defective facilities. The ratio of benefited area to irrigated area also followed the same trend and reaching below 50% in various years.

The ratios of collections and income showed sharp fluctuations with no clear trends (**Table 21**). Cropping intensity as ratio of the sum of irrigated wet and dry areas to either irrigated wet or dry area whichever is bigger generally falls below 150%. O&M cost per service and viability index wavered throughout the years exhibiting no clear directions.

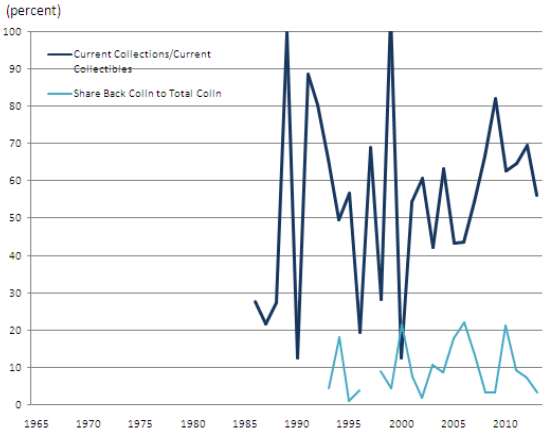
Despite the fact that only 47% of plantilla positions are filled up, the average area per staff is only 142 ha which is much better compared with the other systems. There is a big gap between actual irrigated areas and FUSA especially during the dry seasons where the ratios average 17%. This phenomenon is consistent with the ratio of benefited areas to actual irrigated areas during dry seasons averaging only at 75% compared to the 95% during wet seasons. Inadequate of water and inadequate or defective facilities are the likely causes of these gaps.

Majority of the income comes from collections of current account averaging at 78% and followed by other income at 15%. Collection efficiency averaged only at 55% across the years exhibiting no clear trend. The viability index also showed no clear trend averaging at 99% through the years.

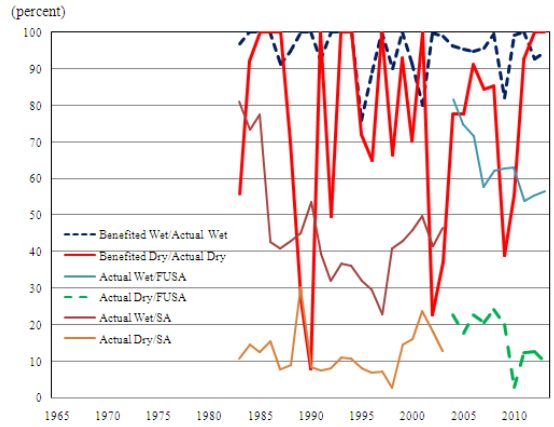
Figure 31. Trends in key performance indicators, Caguray RIS, Occidental Mindoro, Region 4, 1965-2013



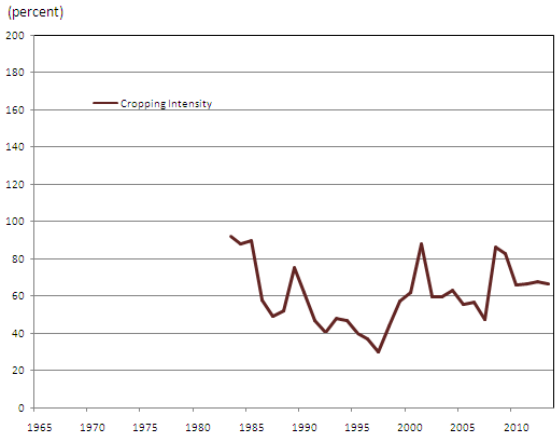
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



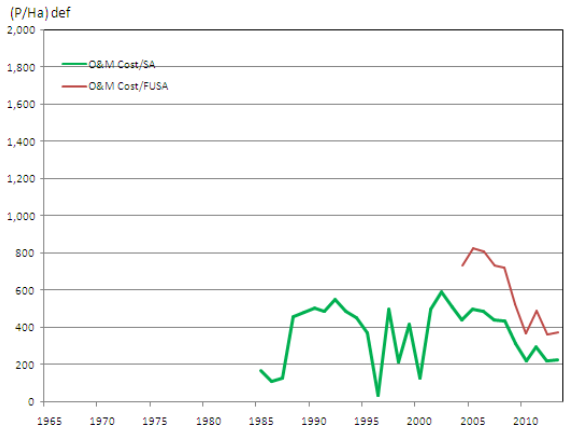
b. Collection efficiency



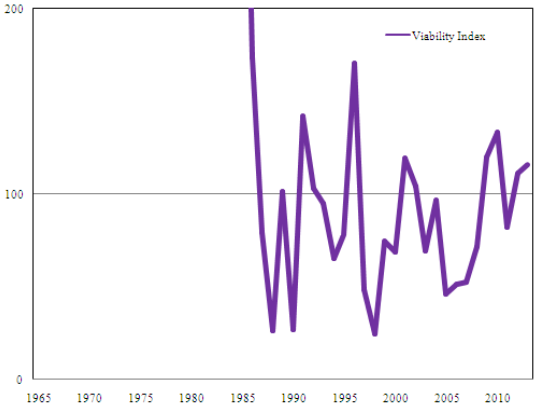
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD NISPER data, various years.

Table 21. Performance Ratios of Caguray, 1985 – 2003

Ratios	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Filled-up/Plantilla (%)																			
FUSA/Filled-up (Ha/staff)																			
FUSA/Filled-up + Daily Staff (Ha/staff)																			
FUSA/SA (%)																			
Ben. Wet/Actual Wet (%)	100	100	91	95	100	100	92	100	100	100	76	89	100	90	100	91	80	100	99
Ben. Dry/Actual Dry (%)	100	100	100	70	27	8	100	50	100	100	72	65	100	66	93	70	100	23	37
ISF Current Account/Total Income (%)	100	100	100	100	94	59	64	52	68	72	49	96	85	87	94	78	61	39	51
ISF Back Account/Total income (%)							31		3	16	1	4	0	9	4	22	5	1	6
Other Income/Total Income (%)					6	41	5	48	28	12	50	0	15	4	1	0	34	60	43
Total Income (%)	100	100	100	100	100	100	100	100	99	100	100	100	100	100	99	100	100	100	100
Total ISF/Total Income (%)	100	100	100	100	94	59	95	52	72	88	50	100	85	96	99	100	66	40	57
Yield Wet (cavan/ha)						72	72	73	73	74	75	75	76	75	76	55	60	94	94
Yield Dry (cavan/ha)						76	77	75	76	76	77	79	79	78	78	85	85	86	86

Sources: NIA-SMD NISPER data, various years.

Table 21. Performance Ratios of Caguray, 2004 – 2013

Ratios	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					47	47	47	47		
FUSA/Filled-up (Ha/staff)					142	142	142	142		
FUSA/Filled-up + Daily Staff (Ha/staff)					142	142	142	142		
FUSA/SA (%)	60	60	60	60	60	60	60	60	60	60
Ben. Wet/Actual Wet (%)	96	95	95	96	99	82	99	100	93	94
Ben. Dry/Actual Dry (%)	78	78	91	84	85	39	55	93	100	100
ISF Current Account/Total Income (%)	72	82	78	83	80	74	78	93	96	79
ISF Back Account/Total income (%)	7	18	22	13	16	7	1	7	4	3
Other Income/Total Income (%)	21	0	0	4	3	19	20	0	0	18
Total Income (%)	100	100	100	100	99	100	99	100	100	100
Total ISF/Total Income (%)	79	100	100	96	97	81	80	100	100	82
Yield Wet (cavan/ha)	82	82	79	82		82			85	85
Yield Dry (cavan/ha)	86	85	82	84	84	84			85	85

Sources: NIA-SMD NISPER data, various years.

Region 5 Bicol

Libmanan-Cabusao

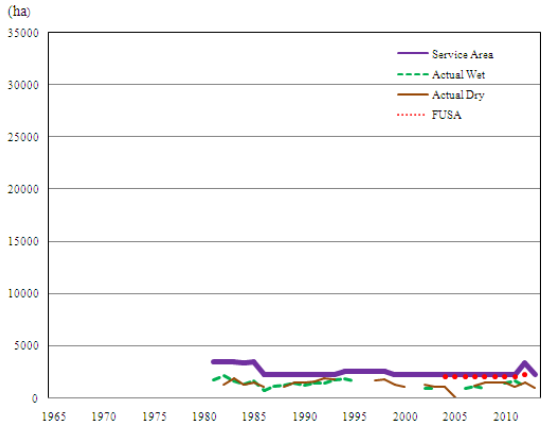
The service area of Libmanan-Cabusao has been generally decreasing from 3,427 ha to 2,195 ha in 1986 (**Figure 33**). However, irrigated areas during both wet and dry seasons showed no clear trend.

The collection and income ratios exhibit steep variations with no clear trends. Same sharp fluctuations are observed with the ratios of benefited to irrigated area, irrigated to FUSA and cropping intensity. O&M cost per service area, on the other hand, has a clear downward direction from Php3,263 per hectare in the early 1980s to less than Php500 per hectare in 2013. On the contrary, viability index despite its dips in various years tend to have a slightly increasing course from 35% in 1983 to 83% in 2013.

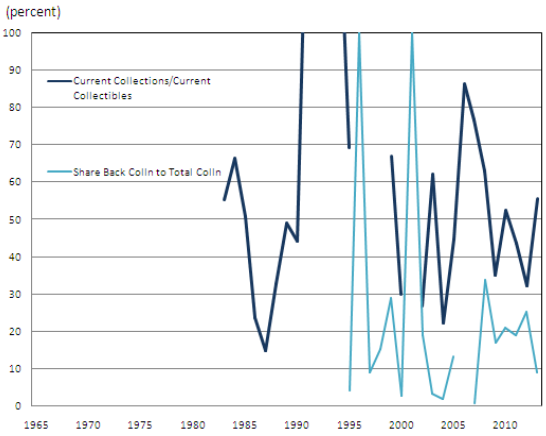
The filled-up plantilla positions remained constant at 22% from 2009 to 2013 (**Table 22**). FUSA to filled-up plantilla plus daily staff also has hardly changed, increasing slightly to 366 ha per staff in 2013. The ratio of irrigated area to FUSA averaged only around 53% to 56%. This is likely due to defective facilities and inadequate equipment like main irrigation pumps.

The ratios of ISF current account and total ISF fluctuated through the years following the movement of collection efficiency. The ratios of benefited area to irrigated area sharply declined in 1999 and 2013 reaching below 50%. The O&M cost to SA generally appeared to have a downward direction dropping from PhP3263/ha to PhP422/ha. in 2013. Despite low levels in various years, the viability index seemed to have a slightly increasing trend starting from 35% in 1983 and ending at 83% in 2013.

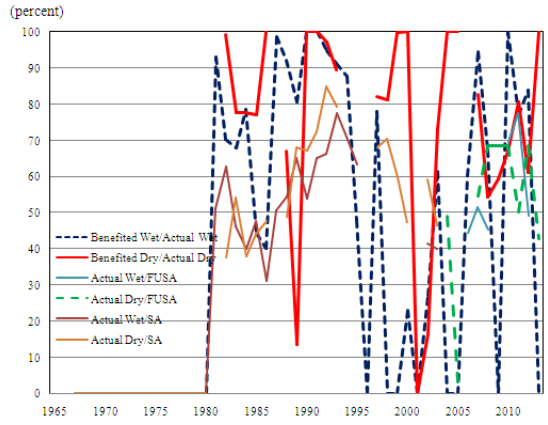
Figure 33. Trends in key performance indicators, Libmanan-Cabusao PIS, Camarines Sur, Region 5, 1965-2013



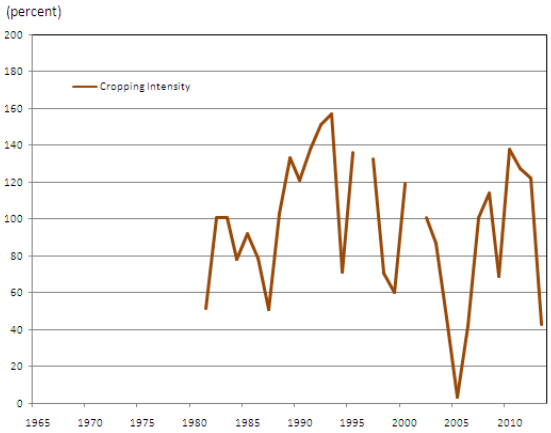
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



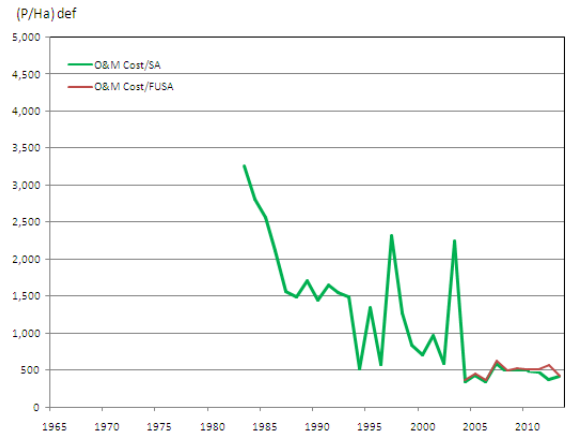
b. Collection efficiency



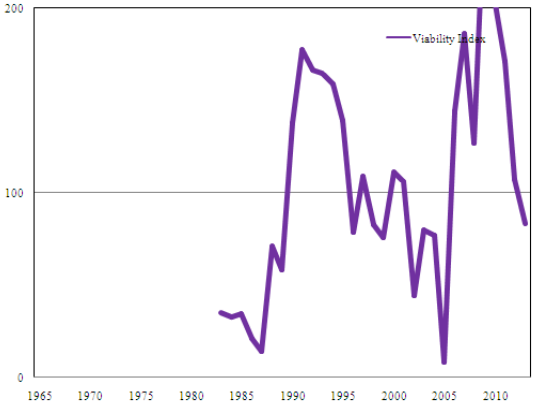
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/SA or FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD NISPER data, various years.

Table 22. Performance Ratios of Libmanan-Cabusao, 1983 – 2003

Ratios	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Filled-up/Plantilla (%)																					
FUSA/Filled-up (Ha/staff)																					
FUSA/Filled-up + Daily Staff (Ha/staff)																					
FUSA/SA (%)																					
Ben. Wet/Actual Wet (%)	68	78	44	40	99	92	81	100	100	95	91	88	48		78			23		27	61
Ben. Dry/Actual Dry (%)	78	78	77	100		67	13	100	100	97	89		89		82	81	100	100		16	73
ISF Current Account/Total Income (%)	100	100	100	100	99	68	73	82	96	96	98	87	81		81	67	46	71		56	52
ISF Back Account/Total income (%)							5						4	29	8	12	19	2	2	13	2
Other Income/Total Income (%)								18	4	4	2	13	15	71	10	20	36	27	98	31	47
Total Income (%)	100	100	100	100	99	68	78	100	100	100	100	100	100	100	99	99	101	100	100	100	101
Total ISF/Total Income (%)	100	100	100	100	99	68	78	82	96	96	98	87	85	29	90	80	64	73	2	69	53
Yield Wet (cavan/ha)								75	76	77	77	79	79		80	81	81	82		79	83
Yield Dry (cavan/ha)								76	77	79	79	0	80		82	75	82	83		82	82

Sources: NIA-SMD NISPER data, various years.

Table 22. Performance Ratios of Libmanan-Cabusao, 2004 – 2013

Ratios	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					33	22	22	22	22	22
FUSA/Filled-up (Ha/staff)					692	1038	1038	1038	1098	1098
FUSA/Filled-up + Daily Staff (Ha/staff)					297	346	346	346	366	366
FUSA/SA (%)	95	95	95	95	95	95	95	95	66	100
Ben. Wet/Actual Wet (%)			60	95	67		100	77	84	
Ben. Dry/Actual Dry (%)	100	100		83	54	59	67	81	61	100
ISF Current Account/Total Income (%)	98	87	100	99	71	28	81	87	79	91
ISF Back Account/Total income (%)	2	13		1	13	41	1	2	9	9
Other Income/Total Income (%)	1	0	0	0	16	31	18	11	13	0
Total Income (%)	101	100	100	100	100	100	100	100	101	100
Total ISF/Total Income (%)	99	100	100	100	84	69	82	89	87	100
Yield Wet (cavan/ha)	80	81	82	82		82				
Yield Dry (cavan/ha)	82	82	84	85	84	84				

Sources: NIA-SMD NISPER data, various years.

ANALYSIS AND CHARACTERIZATION OF THE SAMPLE NIS

This study examines 22 NIS cases by province, size (large, medium, small), technology (gravity type vs pump type), location (upstream, midstream, downstream), vintage, and by some measures of "success".

For vintage of systems, the sample is classified into three periods: pre-NIA, 1965-1980, 1980-onwards. For size, the sample systems (and effectively the IAs) is classified into large, medium and small according to their firmed-up service area (FUSA). IAs with FUSA size of above 5,000 ha are classified as large. IAs falling between 1,000 and 5,000 ha FUSA are classified as medium while those with FUSA below 1000 ha are classified as small.

Then following NIA's loose definition of successful IAs, the sample IAs is classified into "successful" and "less successful". The first group are those that satisfy the following criteria: NIA's functionality survey rating of very satisfactory to outstanding, IA's own financial rating of at least 3, with 4 as very strong, IA's ISF collection performance rating of 3 to 4 with 4 as excellent and/or having a collection rate of 65% and above. On the other hand, "less successful" IAs are defined as those which satisfy the following criteria: NIA's functionality survey of poor to satisfactory, IA's own financial rating of 0 to 2 with 4 as very strong, IA's ISF collection performance rating of 0 to 2 with 4 as excellent and/or having a collection rate below 65%.

These typologies capture various technical and institutional aspects of providing irrigation service by national systems. Pump systems will have different challenges from reservoir and diversion systems. Size of IAs based on firmed-up service area will likely be correlated with complexity of design, and operation of physical structures and facilities, and the corresponding type of management. Vintage entails different technical and institutional concerns between relatively old vs. newer systems. "Successful IAs" entail institutional factors at play but also probably technical aspects contributing to such performance.

By Province

The characterization of the sample NIS according to province is captured in various tables (**Tables 23.1** to **23.18**).

The IA sample of Bulacan reported lack of facilities like farm-to-market roads (FMRs) and high occurrence of calamities like pest infestations as key concerns. On the brighter side, the IAs have relatively high functionality ratings, reported the minimum count of irrigation structure problems and moderate occurrence of siltation problem.

The Cagayan sample IAs did not report inadequate water supply as a problem. All the IAs claimed high collection efficiencies. However, these IAs are characterized by the following as problems in decreasing order: low yield due to pest infestation, lack of facilities/infrastructure like solar driers

and FMRs, deteriorated lateral canals, siltation problems, and institutional problems like water theft.

The Camarines Sur sample is saddled with of inadequate water supply, lack of machineries and equipment like pumps, low functionality survey ratings, financially weak IAs and high occurrence of poor structure design. On the plus side, the IAs have minimal problems in their irrigation canals and irrigation structures, no occurrence of siltation problems and lack of facilities.

The Cavite sample reports high counts of FMR problems, institutional problems like water theft and lack of discipline among members, low functionality survey ratings, high percentage of financially weak IAs, low buying price of produce, occurrence of siltation, headwork and lateral canal problems.

The hierarchy of prevailing problems of Ilocos Norte IA sample is as follows (in decreasing order): inadequacy of water supply, lateral canal problems and siltation problems. On a positive note, the IAs did not report institutional problems as key concerns, FMR problems or lack of facilities. A high collection rate is reported.

Ilocos Sur sample IAs does not consider inadequacy of water supply during dry seasons as a key concern, and reported moderate count of irrigation canal problems, minimal siltation problems, moderate institutional problems like lack of safety policies and training and generally have high collection efficiencies. But, half of these IAs have problems with the main and lateral canals.

The dominating negative features of NIS systems reported by the Isabela sample IAs are as follows (in decreasing importance): irrigation main canal, lateral canal and control structure problems, institutional problems like lack of policies and water theft, crop production problems due to calamities and pest infestations/diseases and occurrence of siltation. But, all sample IAs reported adequate water supply, no occurrence of flooding, very high IA functionality ratings and very strong financial position.

The Nueva Ecija sample IAs reported adequate water supply, no occurrence of siltation problems, minimal problems in their irrigation structures, low counts of problems in their FMRs and lack of facilities, and minimal occurrence of flooding. Furthermore, they only have slight institutional concerns like few hard headed members and water theft.

Mindoro Occidental sample IAs consider inadequate water supply especially during dry season as a key problem, followed by very high siltation problems and high occurrence of headwork and canal problems. However, the IAs have not reported flooding, calamity/pest infestation problems and problems with lacking facilities, machineries and equipment, as important concerns.

Most of the Pampanga sample IAs have control structure problems like damaged or vandalized check gates. They also encounter several institutional problems, like water theft and delinquent members and flooding problems due to low level areas acting as catch basins in the wet season.

The Pangasinan IAs generally exhibit many irrigation structure problems, especially headwork and control structures, inadequacy of water supply, siltation problems, deteriorated FMRs, and lack of machineries (e.g. backhoe for dredging works).

IAs sample from Quezon showed the following problems in decreasing order: inadequate water supply, irrigation canal problems, institutional concerns like water theft, and solid waste deposits in canals. Given the problems, majority of these samples are considered less successful IAs.

The Tarlac IA samples experience the following predominant problems, in decreasing severity: water supply inadequacy, solid waste in canals, and siltation problems. On the contrary, these IAs do not experience flooding, have only slight irrigation structure problems, and relatively high collection efficiencies.

Table 23.1. NIS IA Profile, Cropping Information and Financial Aspects by Province

Provinces	No. of IA sample	Ave. of No. of Members	Ave. of No. of Farmers-Landowner-operator (%)	Ave. of No. of Farmers-Tenant (%)	Ave. of No. of Farmers - Lessees (%)	Does IA have water permit? (answer: no)	Does IA have water permit? (answer: yes)	Does IA have water permit? (no answer)	No. of Crops Irrigated: rice only	No of Crops Irrigated: rice and other crops	No. of IAs paying ISF/DCC/amortization
Bulacan	2	192	40	60		2			2		1
Cagayan	9	403	59	40	10	4	3	2	8	1	4
Camarines Sur	3	256	67	50			1		2	1	3
Cavite	3	44		100				3	3		
Ilocos Norte	3	263	45	55		2		1	1	2	1
Ilocos Sur	4	136	69	28	10	3		1	3	1	1
Isabela	9	158	66	28	19	5	3	1	9		9
Nueva Ecija	12	203	77	55	10	5	1	5	8		5
Occidental Mindoro	3	72	63	37		1	1	1	1	2	1
Pampanga	5	69	52	35	13	2	2	1	4	1	2
Pangasinan	5	131	54	39	15	2	1	2		5	2
Quezon	3	74	32	68		1	2		3		2
Tarlac	3	97	38	45	50	2	1			3	3
Average for All Sample/Total	64	187	60	45	17	29	15	17	44	16	34

Sources: NIS KII

Table 23.2. Problems/concerns of NIS IAs by Province

Provinces	No. of IA sample	No. of IAs with inadequate water supply in dry season	No. of IAs with flooding problem during wet season	No. of IAs with Irrigation Headwork Problems (damaged, deteriorated, lacking)	No. of IAs with Irrigation Main Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Lateral Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Control Structure Problems (damaged, deteriorated, lacking, unlined)	No. of IAs with Siltation, Solid Waste, Informal Settlers & Water Quality Problems	No. of IAs with problems due to lack of facilities, infrastructure (FMRs), canal extensions, drainage, storage, pipelines, STWs, solar drier & etc.	No. of IAs with problems due to damaged/lack of Machineries & Equipment (ex. Backhoes, pumps, pipes & etc.)	No. of IAs with institutional/management problems
Bulacan	2	1				1		1	2	1	
Cagayan	9			1	2	6	3	4	6	4	4
Camarines Sur	3	3		2						3	1
Cavite	3	1		1		1		1	3		3
Ilocos Norte	3	2	1	1		2	1	2		1	
Ilocos Sur	4				2	2		1			2
Isabela	9	1			5	8	3	2	2	1	6
Nueva Ecija	12	1	1		1	2	1		4	2	4
Occidental Mindoro	3	3		2	1	1	1	2			2
Pampanga	5	1					3				2
Pangasinan	5	4	1	4	1	2	3	1	2	3	2
Quezon	3	2			1	1		1			2
Tarlac	3	3		1		1		2		1	1
Total	64	22	3	12	13	27	15	17	19	16	29

Sources: NIS KII

Note: Institutional/Management Problems - Water Stealing, lack of discipline, water scheduling problems, illegal turnouts, animals like carabaos allowed in canal, attendance during maintenance work, conflict among members, rules not followed, safety problems

Table 23.3. NIA's NIS Functionality Survey rating, IA's own Financial Strength rating, Collection Efficiency and IA's performance rating of ISF collection by Province

Provinces	No. of IA sample	IA Functionality Survey Rating (No Data)	IA Functionality Survey Rating (Poor - Satisfactory)	IA Functionality Survey Rating (Very Satisfactory - Outstanding)	IA's Financial Strength Rating (no data)	IA's Financial Strength Rating (0 - 2, weak)	IA's Financial Strength Rating (3-4, strong)	IA's Collection Efficiency (0 - 64%, weak)
Bulacan	2			2		1	1	1
Cagayan	9	3	3	3	2	5	2	
Camarines Sur	3		3		1	2		2
Cavite	3		3			2	1	
Ilocos Norte	3	3			1	2		
Ilocos Sur	4	4			2	1	1	
Isabela	9			9			9	2
Nueva Ecija	12	12			9	1	2	2
Occidental Mindoro	3	3			2		1	1
Pampanga	5	5			3	1	1	1
Pangasinan	5	5			1	2	1	2
Quezon	3		2	1	1	2		1
Tarlac	3		1	2	1	2		
Total	64	35	12	17	23	21	19	12

Sources: NIS KII

Provinces	IA's Collection Efficiency (65% - 100%, strong)	IA's Performance Rating of Collection of ISF (no data)	IA's Performance Rating of Collection of ISF (0-2, weak)	IA's Performance Rating of Collection of ISF (3-4, strong)	No. of IAs by "Success" (insufficient data)	No. of IAs by "Success" (Not Successful)	No. of IAs by "Success" (Successful)
Bulacan	1	1		1		1	1
Cagayan	9	4	1	4	5	4	
Camarines Sur	1	1		2	1	2	
Cavite	3	1		2		3	
Ilocos Norte	3	3			3		
Ilocos Sur	4	3		1	4		
Isabela	7			9			9
Nueva Ecija	5	9	1	2	12		
Occidental Mindoro		3			3		
Pampanga	3	3		2	5		
Pangasinan	3	3	1	1	5		
Quezon	2	1	1	1	1	2	
Tarlac	3	1	1	1	1	2	
Total	44	33	5	26	40	14	10

Sources: NIS KII

Table 23.4. NIS IA's Performance Ratings of their water distribution and delivery service by Province

Provinces	No. of IA sample	Flexibility Index - no answer	Flexibility Index Rating - (0-2, not flexible)	Flexibility Index Rating - (3-4, flexible)	Reliability Index Rating - no answer	Reliability Index Rating - (0-2, not reliable)	Reliability Index Rating - (3-4, reliable)	Equitability Index Rating - no answer	Equitability Index Rating - (0-2, not equitable)	Equitability Index Rating - (3-4, equitable)	Adequacy of Service Delivery Rating - no data	Adequacy of Service Delivery Rating - (0-2, inadequate service)	Adequacy of Service Delivery Rating - (3-4, adequate service)
Bulacan	2	1	1		1		1	1		1	1		1
Cagayan	9	1	3	5	1	4	4	4	2	3	2	3	4
Camarines Sur	3			3			3		2	1	1	2	
Cavite	3		3				3			3		1	2
Ilocos Norte	3	1		2	1		2	1		2		3	
Ilocos Sur	4	1		3	1		3	1		3			4
Isabela	9	1		8	1		8	1		8			9
Nueva Ecija	12	5		6	5	1	6	6		6	8		4
Occidental Mindoro	3	1	1	1	1	2		1	1	1		3	
Pampanga	5	3		2	3		2	3		2	2	1	2
Pangasinan	5	1	2	2	1	1	3	2	1	2	2	2	1
Quezon	3		1	2		1	2		1	2		2	1
Tarlac	3	1	1	1		1	2			3		2	1
Total	64	16	12	35	15	10	39	20	7	37	16	19	29

Sources: NIS KII

Table 23.5. NIS IA's rating of their ability to seek outside help by Province

Provinces	No. of IA sample	Ave. Rating for ability of NIS IAs to seek outside help (0-4, 4 most influential)	Rating for ability of NIS IAs to seek outside help (0)	Rating for ability of NIS IAs to seek outside help (1)	Rating for ability of NIS IAs to seek outside help (2)	Rating for ability of NIS IAs to seek outside help (3)	Rating for ability of NIS IAs to seek outside help (4)	Rating for ability of NIS IAs to seek outside help (No answer)
Bulacan	2	3				1		1
Cagayan	9	3			2	1	2	4
Camarines Sur	3	3				2		1
Cavite	3	2			3			
Ilocos Norte	3	3			1	1		1
Ilocos Sur	4	1	1		2			1
Isabela	9	2	2		1	4	2	
Nueva Ecija	12	2	1			1		10
Occidental Mindoro	3	3			1	1		1
Pampanga	5	4				1	1	3
Pangasinan	5							5
Quezon	3	3		1			1	1
Tarlac	3	2		1		1		1
Average for All Sample/Total	64	2	4	2	10	13	6	29

Sources: NIS KII

Table 23.6. Assistance received by NIS IAs from Various Sources by Province

Provinces	No. of IA sample	Assistance received by NIS IAs from Various sources. BSWM - Free Soil analysis	Assistance received by NIS IAs from Various sources. LGU - Farm inputs/seed subsidy	Assistance received by NIS IAs from Various sources. LGU - Repair farm to market roads	Assistance received by NIS IAs from Various sources. LGU - financial/livelihood	Assistance received by NIS IAs from Various sources. LGU - technical support	Assistance received by NIS IAs from Various sources. LGU - equipment/thresher/fuel	Assistance received by NIS IAs from Various sources. Others - flatbed dryer/solar dryer	Assistance received by NIS IAs from Various sources. Others - pump/thresher / fuel	Assistance received by NIS IAs from Various sources. Others - Seed subsidy/analysis	Assistance received by NIS IAs from Various sources. Others - soil sampling/training
Bulacan	2		1						1	1	
Cagayan	9	1	1	1						1	
Camarines Sur	3				1			1		2	
Cavite	3										
Ilocos Norte	3										
Ilocos Sur	4							2	2	2	
Isabela	9	7	1		3	1			1	3	1
Nueva Ecija	12		1				1			2	
Occidental Mindoro	3			1			1		1	1	
Pampanga	5									1	
Pangasinan	5	1							1		
Quezon	3						1			1	
Tarlac	3	1						1		1	1
Total	64	10	4	2	4	1	3	4	6	15	2

Sources: NIS KII

Table 23.7. Cropping problems of NIS IAs by Province

Provinces	No. of IA sample	Cropping problems of NIS IAs. Garbage in the canals	Cropping problems of NIS IAs. Lack of water supply	Cropping problems of NIS IAs. Water delivery schedule	Cropping problems of NIS IAs. Low yield/calamities	Cropping problems of NIS IAs. High production cost/low buying price	Cropping problems of NIS IAs. FMR/high harvest loss	Cropping problems of NIS IAs. Others - informal settlers, govt. Support
Bulacan	2				2			
Cagayan	9				7	1		
Camarines Sur	3		1		2			
Cavite	3					3		
Ilocos Norte	3	1			1			1
Ilocos Sur	4				3	1		
Isabela	9				5	2		
Nueva Ecija	12		1		1		1	
Occidental Mindoro	3			1				
Pampanga	5				2	1		
Pangasinan	5		1		2			
Quezon	3			1	1			
Tarlac	3		1	1	1	1		
Total	64	1	4	3	27	9	1	1

Sources: NIS KII

Table 23.8. Problems encountered by NIS IAs by Province

Provinces	No. of IA sample	Problems encountered by NIS-IAs. Unlined canals and turnout	Problems encountered by NIS-IAs. Poor structure design	Problems encountered by NIS-IAs. Damaged irrigation structure	Problems encountered by NIS-IAs. Lack of water supply	Problems encountered by NIS-IAs. Solid waste in canals/siltation	Problems encountered by NIS-IAs. Some members don't follow the schedule	Problems encountered by NIS-IAs. Illegal turnouts	Problems encountered by NIS-IAs. Damaged farm to market road	Problems encountered by NIS-IAs. Others
Bulacan	2			1		1				
Cagayan	9	1		2		2	2	1	4	2
Camarines Sur	3		2		3					2
Cavite	3	1			1	1	1		3	
Ilocos Norte	3			2	3	1				
Ilocos Sur	4	1			1	1	1		1	1
Isabela	9		2	4		3	1	1		
Nueva Ecija	12	1		1			1		1	4
Occidental Mindoro	3	1			2	2				1
Pampanga	5	1		1	1		2		1	2
Pangasinan	5	1	1		3				1	1
Quezon	3				2	1				
Tarlac	3				2	2				
Total	64	7	5	11	18	14	8	2	11	13

Sources: NIS KII

Note: Others - extension of water schedule, lack of equipment; lack of irrigation facilities; monitoring of water delivery & maintenance of laterals with certain stretch; none; improve the irrigation facilities; irrigation structure not yet finished; lack of discipline; not following cropping calendar; political intervention; slow action of NIS; ISF very high; lack of water pump

Table 23.9. Performance Rating of various functions of NIS IAs by Province

Provinces	No. of IA sample	Performance Rating of NIS IAs (0-4, 4 excellent). Water distribution	Performance Rating of NIS IAs (0-4, 4 excellent). Maintenance of canals	Performance Rating of NIS IAs (0-4, 4 excellent). Maintenance of control structures	Performance Rating of NIS IAs (0-4, 4 excellent). Construction of facilities	Performance Rating of NIS IAs (0-4, 4 excellent). Collection of ISF	Performance Rating of NIS IAs (0-4, 4 excellent). Collection of other fees	Performance Rating of NIS IAs (0-4, 4 excellent). Technical Advice to farmers	Performance Rating of NIS IAs. Overall rating
Bulacan	2	4	4	3	4	3	3	3	3
Cagayan	9	3	3	3	3	3	3	3	2
Camarines Sur	3	4	4	4	1	4	-	4	2
Cavite	3	3	3	3		4		4	3
Ilocos Norte	3								-
Ilocos Sur	4	4	4	4	4	3	3	4	1
Isabela	9	4	4	3	2	3		3	3
Nueva Ecija	12	4	4	4	4	3	3	4	1
Occidental Mindoro	3	3	3	2				3	1
Pampanga	5	3	4	3	4	3		3	1
Pangasinan	5	2	3	2	1	3	3	4	1
Quezon	3	4	3	3	1	2	3	4	2
Tarlac	3	3	3	3	3	3	3	3	2
Average for All Sample/Total	64	3	3	3	2	3	3	3	2

Sources: NIS KII

Table 23.10. NIS IA's Rating on Water Delivery Service and Water Distribution Policy by Province

Provinces	No. of IA sample	Rating of NIS IAs' water delivery service (0-4, 4 highest). 0	Rating of NIS IAs' water delivery service (0-4, 4 highest). 1	Rating of NIS IAs' water delivery service (0-4, 4 highest). 2	Rating of NIS IAs' water delivery service (0-4, 4 highest). 3	Rating of NIS IAs' water delivery service (0-4, 4 highest). 4	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 0	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 1	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 2	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 3	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 4
Bulacan	2				1					1	1
Cagayan	9			3	2	2			2		3
Camarines Sur	3		2								2
Cavite	3			1	1	1					3
Ilocos Norte	3			3						1	1
Ilocos Sur	4				1	3				2	2
Isabela	9				2	7				2	7
Nueva Ecija	12				1	3				1	2
Occidental Mindoro	3		1	1						1	
Pampanga	5					2					2
Pangasinan	5			1		1					2
Quezon	3	1				1	1				1
Tarlac	3			1		1					2
Total	64	1	3	10	8	21	1		2	8	28

Sources: NIS KII

Table 23.11. Mode of irrigation scheduling and rating for effectiveness of accountability provision among NIS IAs by Province

Provinces	No. of IA sample	Mode of irrigation scheduling by NIS IAs. Downstream-upstream	Mode of irrigation scheduling by NIS IAs. Upstream-downstream	Mode of irrigation scheduling by NIS IAs. By groups by hour/day on rotation/ depends on IA	Mode of irrigation scheduling by NIS IAs. No answer	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective).	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 0	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 1	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 2	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 3	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 4	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). No Answer
Bulacan	2			1	1							2
Cagayan	9	1	7		1	3			1	3	2	3
Camarines Sur	3		3			3				2		1
Cavite	3	2	1			3				3		
Ilocos Norte	3		2		1	3				1		2
Ilocos Sur	4	1	1		2	4				1	3	
Isabela	9	1	8			4				4	5	
Nueva Ecija	12	1		1	10	4					3	9
Occidental Mindoro	3	1	1		1	1		1				2
Pampanga	5		1	1	3	4				1	1	3
Pangasinan	5		3		2	4					1	4
Quezon	3	1	2			2	1				1	1
Tarlac	3	2	1			3			1	1		1
Total	64	10	30	3	21	3	1	1	2	16	16	28

Sources: NIS KII

Table 23.12. Provisions in NIS IA policies holding IA officers/BOD accountable by Province

Provinces	No. of IA sample	Provisions in NIS IA policies holding water users accountable. No	Provisions in NIS IA policies holding water users accountable. Yes	Provisions in NIS IA policies holding water users accountable. No Answer	Provisions in NIS IA policies holding water users accountable. No Comment	Provisions in NIS IA policies holding IA officers/BOD accountable. No	Provisions in NIS IA policies holding IA officers/BOD accountable. Yes	Provisions in NIS IA policies holding IA officers/BOD accountable. No Answer
Bulacan	2				2	1		1
Cagayan	9	2	6	1		1	4	4
Camarines Sur	3		3			1	2	
Cavite	3		3				2	1
Ilocos Norte	3		1	2			1	2
Ilocos Sur	4		4				4	
Isabela	9		8	1		2	6	1
Nueva Ecija	12	3	2	7		2		10
Occidental Mindoro	3	2		1		1		2
Pampanga	5		1	4		1	1	3
Pangasinan	5	1	1	3			1	4
Quezon	3		3			1	2	
Tarlac	3	1	1	1		1	2	
Total	64	9	33	20	2	11	25	28

Sources: NIS KII

Table 23.13. Policies which are not adequately implemented by NIS IAs by Province

Provinces	No. of IA sample	Policies which are not adequately implemented by NIS IAs. Payment of ISF/IA dues	Policies which are not adequately implemented by NIS IAs. Water delivery schedules	Policies which are not adequately implemented by NIS IAs. Penalty clauses	Policies which are not adequately implemented by NIS IAs. Others	Policies which are not adequately implemented by NIS IAs. No Answer	Policies which are not adequately implemented by NIS IAs. None	Policies which are not adequately implemented by NIS IAs. Not Applicable
Bulacan	2					1		1
Cagayan	9		1	2	1	2	2	3
Camarines Sur	3	1	2			1		
Cavite	3		3		1			
Ilocos Norte	3					3		
Ilocos Sur	4			2		2		
Isabela	9				2		7	
Nueva Ecija	12			1	3		2	7
Occidental Mindoro	3			2				1
Pampanga	5					2	1	2
Pangasinan	5		1	1		1		2
Quezon	3	1	2					
Tarlac	3		1	1		1		
Total	64	2	10	9	7	13	12	16

Sources: NIS KII

Note: Others - wearing of uniform, securing for personal needs, irrigation procedure, improper behavior, restriction of garbage/illegal settlers, destruction of turnouts.

Table 23.14. Trainings attended by NIS IAs by Province

Provinces	No. of IA sample	Trainings attended by NIS IAs. Basic Leadership Devt. Course	Trainings attended by NIS IAs. Financial Management	Trainings attended by NIS IAs. Org. Management/Capability/Policy	Trainings attended by NIS IAs. Values formation	Trainings attended by NIS IAs. System/water management	Trainings attended by NIS IAs. Cropping/AWD/ quality control/fertilizer
Bulacan	2		1	2		1	1
Cagayan	9	4	6	1	1	5	4
Camarines Sur	3		1				2
Cavite	3						3
Ilocos Norte	3						1
Ilocos Sur	4						
Isabela	9	3	5	3	3	5	3
Nueva Ecija	12	2	1			2	4
Occidental Mindoro	3	2	1			1	
Pampanga	5	2	2	1		1	1
Pangasinan	5			2			1
Quezon	3	1	1		1	3	
Tarlac	3	1	1		1	1	
Total	64	15	19	9	6	19	20

Sources: NIS KII

Table 23.15. Average participation to NIS-IA meetings of IA officers and BODs by Province

Provinces	No. of IA sample	Participation to NIS-IA meetings - IA officers (50 and below)	Participation to NIS-IA meetings - IA officers (51 - 80)	Participation to NIS-IA meetings - IA officers (more than 80)	Participation to NIS-IA meetings - BODs (50 and below)	Participation to NIS-IA meetings - BODs (51 - 80)	Participation to NIS-IA meetings - BODs (more than 80)	Participation to NIS-IA meetings - General assembly (50 and below)	Participation to NIS-IA meetings - General assembly (51 - 80)	Participation to NIS-IA meetings - General assembly (more than 80)
Bulacan	2		1	1		1	1			1
Cagayan	9		3	4		3	4	1	4	2
Camarines Sur	3		1	2			3		1	1
Cavite	3			3			3		2	1
Ilocos Norte	3		1				1		2	
Ilocos Sur	4		2	1	2		1		2	
Isabela	9	1		8		2	7	1	5	3
Nueva Ecija	12	1	1	2	1		2	2	1	
Occidental Mindoro	3			1			1			1
Pampanga	5			1			1			1
Pangasinan	5			3			3	3		
Quezon	3		2	1		1	2	2	1	
Tarlac	3			3			3	1	1	
Total	64	2	11	30	3	7	32	10	19	10

Sources: NIS KII

Table 23.16. Frequency of meeting of NIS-IA officers/BODs and members by Province

Provinces	No. of IA sample	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (once-thrice a month)	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (once to 6 times per cropping)	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (1-2 times per month)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (once a year-every cropping)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (monthly-twice a year)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (yearly/every two years)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (have not yet conducted)
Bulacan	2	2			2				1		1
Cagayan	9	7	1		8			5	4		
Camarines Sur	3	3			3			1	2		
Cavite	3	3			3			2	1		
Ilocos Norte	3	3			3			2	1		
Ilocos Sur	4	3		1	3			4			
Isabela	9	8	1		9			4	5		
Nueva Ecija	12	4		2	4		2	4	1		
Occidental Mindoro	3	1	1		2			2			
Pampanga	5	1	1	3	2	1	2	3		2	
Pangasinan	5	5			5			2	3		
Quezon	3	3			2				3		
Tarlac	3	1	2		1	2		1	2		
Total	64	44	6	6	47	3	4	30	23	2	1

Sources: NIS KII

Table 23.17. Manner of choosing and term of office and forms of compensation of NIS-IA officers/BOD by Province

Provinces	No. of IA sample	Manner of choosing and term of office of NIS-IA officers/BOD - election by general assembly	Manner of choosing and term of office of NIS-IA officers/BOD - voted by BOD	Manner of choosing and term of office of NIS-IA officers/BOD - 1-2 years	Manner of choosing and term of office of NIS-IA officers/BOD - 3-4 years	Forms of compensation of NIS-IA (15-30% of collection, if 70-90% collection)	Forms of compensation of NIS-IA (BOD with honorarium P1,000-P2,000)	Forms of compensation of NIS-IA (P100-200/mgt/activity)	Forms of compensation of NIS-IA (P5000/season)	Forms of compensation of NIS-IA (P200-800/month)	Forms of compensation of NIS-IA (Other incentives - snacks, P500/group discounts)	Forms of compensation of NIS-IA (none)
Bulacan	2	2		1	1					1		1
Cagayan	9	9		7	2	2		1			2	3
Camarines Sur	3	3			3	1		1				1
Cavite	3	3		3								3
Ilocos Norte	3	2	1		3				1			2
Ilocos Sur	4	3	1	3	1							4
Isabela	9	8	1	9			2	2		3	2	
Nueva Ecija	12	6		5						1		5
Occidental Mindoro	3	3		3								3
Pampanga	5	4			4		1					4
Pangasinan	5	5		4	1		1					2
Quezon	3	3		3								3
Tarlac	3	3		3								1
Total	64	54	3	41	15	3	4	4	1	5	4	32

Sources: NIS
KII

Table 23.18. Respondents' rating on NIA's support to NIS IAs and modifications by NIS IAs to IS by Province

Provinces	No. of IA sample	Respondents' average rating on NIA's support to NIS-IAs. (Technical - 0-4, 4 excellent)	Respondents' average rating on NIA's support to NIS-IAs. (Financial - 0-4, 4 excellent)	Respondents' average rating on NIA's support to NIS-IAs. (Institutional - 0-4, 4 excellent)	Modifications by NIS IAs to IS. Structure non-operational (No)	Modifications by NIS IAs to IS. Structure non-operational (Yes)	Modifications by NIS IAs to IS. Structure non-operational (No Answer)	Modifications by NIS IAs to IS. Undertook rehabilitation (No)	Modifications by NIS IAs to IS. Undertook rehabilitation (Yes)
Bulacan	2	3		3			2		
Cagayan	9	4	3	4	6		3	4	2
Camarines Sur	3	4		3	1	1	1	2	
Cavite	3	3	3	3			3		
Ilocos Norte	3	3				1	2		1
Ilocos Sur	4	4	3	3		2	2	1	
Isabela	9	4	4	4	6	3		4	5
Nueva Ecija	12	4	4	4	5		7	6	
Occidental Mindoro	3	4		4	1		2	1	
Pampanga	5	4	4	4	1	2	2	1	1
Pangasinan	5	3	3	3	3		2	3	
Quezon	3	4	4	4	2	1		2	
Tarlac	3	4	4	4	2		1	2	
Total	64	4	4	4	27	10	27	26	9

Sources: NIS KII

Provinces	Modifications by NIS IAs to IS. Undertook rehabilitation (No Answer)	Modifications by NIS IAs to IS. Other Modifications (Canal Lining)	Modifications by NIS IAs to IS. Other Modifications (Drainage Rehab)	Modifications by NIS IAs to IS. Other Modifications (Canal Desiltation/rehab)	Modifications by NIS IAs to IS. Other Modifications (Others)
Bulacan	2				
Cagayan	3	1	2		2
Camarines Sur	1	1			
Cavite	3				
Ilocos Norte	2				
Ilocos Sur	3				
Isabela		8			2
Nueva Ecija	6	3		3	4
Occidental Mindoro	2			1	1
Pampanga	3			1	1
Pangasinan	2				1
Quezon	1				
Tarlac	1				1
Total	29	13	2	5	12

Sources: NIS KII

By Size

Characterizing the NIS sample according to size provide some useful insights (**Tables 24.1** to **24.19**).

The 64 IA NIS samples are not well distributed by size, as defined above. Small sized IAs come from only one province. These IAs reported the highest incidence of water scarcity in the dry season, flooding in the wet season, canal problems (e.g. lateral canals), and siltation/solid waste problems. These IAs are financially weaker compared to the medium and large ones.

Medium-sized systems/IAs come second in severity of water scarcity in the dry season and siltation problems. They have the highest count of problems of irrigation headwork and main canal. They also have the highest count of lacking facilities or damaged FMRs. On the other hand, they have reported flooding and the lateral canal and control structures problems as their least concerns. In terms of gravity, institutional problems comprising of water theft, lack of discipline and conflict among members, lack of policies and weak policy enforcement have been identified. These are followed by inadequacy of water and irrigation structure condition problems.

Large systems/IAs indicated adequate water supply, least occurrence of siltation problems, lowest count of irrigation headwork and main canal problems, minimal occurrence of flooding and adequacy of budget. Furthermore, they have a high percentage of "successful" IAs compared with the small and medium size IAs. On the flip side, they come second in terms of lateral canal and control structure problems, lack of facilities/infrastructures and institutional problems like lack of policies and weak enforcement of their laws. In this sample IAs, institutional problems have the highest count, followed by irrigation structure problems and lastly, production problems caused by calamities/pest infestations.

Table 24.1. NIS IA Profile, Cropping Information and Financial Aspects by "Size"

Size	No. of IA sample	Ave. of No. of Members	Ave. of No. of Farmers-Landowner-operator (%)	Ave. of No. of Farmers-Tenant (%)	Ave. of No. of Farmers-Lessees (%)	Does IA have water permit? (answer: no)	Does IA have water permit? (answer: yes)	Does IA have water permit? (no answer)	No. of Crops Irrigated: rice only	No of Crops Irrigated: rice and other crops	No. of IAs paying ISF/DCC/amortization
Large	43	190	61	40	17	23	9	10	29	10	24
Medium	12	221	57	47		4	5	1	9	3	8
Small	9	127	56	62		2	1	6	6	3	2
Average for All Sample/Total	64	187	60	45	17	29	15	17	44	16	34

Sources: NIS KII

Table 24.2. Problems/concerns of NIS IAs by "Size"

Size	No. of IA sample	No. of IAs with inadequate water supply in dry season	No. of IAs with flooding problem during wet season	No. of IAs with Irrigation Headwork Problems (damaged, deteriorated, lacking)	No. of IAs with Irrigation Main Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Lateral Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Control Structure Problems (damaged, deteriorated, lacking, unlined)	No. of IAs with Siltation, Solid Waste, Informal Settlers & Water Quality Problems	No. of IAs with problems due to lack of facilities, infrastructure (FMRs), canal extensions, drainage, storage, pipelines, STWs, solar drier & etc.	No. of IAs with problems due to damaged/lack of Machineries & Equipment (ex. Backhoes, pumps, pipes & etc.)	No. of IAs with institutional/management problems
Large	43	11	2	5	9	18	11	10	12	9	19
Medium	12	8		4	3	5	2	4	2	5	7
Small	9	3	1	3	1	4	2	3	5	2	3
Total	64	22	3	12	13	27	15	17	19	16	29

Sources: NIS KII

Note: Institutional/Management Problems - Water Stealing, lack of discipline, water scheduling problems, illegal turnouts, animals like carabaos allowed in canal, attendance during maintenance work, conflict among members, rules not followed, safety problems

Table 24.3. NIA's NIS Functionality Survey rating, IA's own Financial Strength rating, Collection Efficiency and IA's performance rating of ISF collection by "Size"

Size	No. of IA sample	IA Functionality Survey Rating (No Data)	IA Functionality Survey Rating (Poor - Satisfactory)	IA Functionality Survey Rating (Very Satisfactory - Outstanding)	IA's Financial Strength Rating (no data)	IA's Financial Strength Rating (0 - 2, weak)	IA's Financial Strength Rating (3-4, strong)	IA's Collection Efficiency (No Data)	IA's Collection Efficiency (0 -64%, weak)	IA's Collection Efficiency (65% - 100%, strong)
Large	43	11	4	6	5	9	6	2	6	13
Medium	12	11	4	6	9	6	6	2	3	16
Small	9	11	4	5	7	6	7	2	3	15
Total	64	2			2			2		

Sources: NIS
KII

Note: Not Successful - IAs having FS of poor to satisfactory, financial strength rating of 0 -2, collection efficiency below of 0 to 64% and/or ISF collection rating of 0-2

Successful - IAs having FS of very satisfactory to outstanding, financial strength rating of 3 -4, collection efficiency of at least 65% and/or ISF collection rating of 3-4

Table 24.4. NIS IA's Performance Ratings of their water distribution and delivery service by "Size"

Size	No. of IA sample	Flexibility Index - no answer	Flexibility Index Rating - (0-2, not flexible)	Flexibility Index Rating - (3-4, flexible)	Reliability Index Rating - no answer	Reliability Index Rating - (0-2, not reliable)	Reliability Index Rating - (3-4, reliable)	Equitability Index Rating - no answer	Equitability Index Rating - (0-2, not equitable)	Equitability Index Rating - (3-4, equitable)	Adequacy of Service Delivery Rating - no data	Adequacy of Service Delivery Rating - (0-2, inadequate service)	Adequacy of Service Delivery Rating - (3-4, adequate service)
Large	43	13	4	25	12	4	27	15	2	26	13	6	24
Medium	12	1	4	7	1	5	6	2	5	5	2	8	2
Small	9	2	4	3	2	1	6	3		6	1	5	3
Total	64	16	12	35	15	10	39	20	7	37	16	19	29

Sources: NIS KII

Table 24.5. NIS IA's rating of their ability to seek outside help by "Size"

No. of IA sample	Ave. Rating for ability of NIS IAs to seek outside help (0-4, 4 most influential)	Rating for ability of NIS IAs to seek outside help (0)	Rating for ability of NIS IAs to seek outside help (1)	Rating for ability of NIS IAs to seek outside help (2)	Rating for ability of NIS IAs to seek outside help (3)	Rating for ability of NIS IAs to seek outside help (4)	Rating for ability of NIS IAs to seek outside help (No answer)
43	2	4	1	5	8	3	22
12	3		1	1	4	2	4
9	3			4	1	1	3
64	2	4	2	10	13	6	29

Table 24.6. Assistance received by NIS IAs from Various Sources by "Size"

Size	No. of IA sample	Assistance received by NIS IAs from Various sources. BSWM - Free Soil analysis	Assistance received by NIS IAs from Various sources. LGU - Farm inputs/seed subsidy	Assistance received by NIS IAs from Various sources. LGU - Repair farm to market roads	Assistance received by NIS IAs from Various sources. LGU - financial/livelihood	Assistance received by NIS IAs from Various sources. LGU - technical support	Assistance received by NIS IAs from Various sources. LGU - equipment/thresher/ fuel	Assistance received by NIS IAs from Various sources. Others - flatbed dryer/solar dryer	Assistance received by NIS IAs from Various sources. Others - pump/thresher / fuel	Assistance received by NIS IAs from Various sources. Others - Seed subsidy/analysis	Assistance received by NIS IAs from Various sources. Others - soil sampling/training
Large	43	10	3		3	1	1	3	5	10	2
Medium	12		1	1	1		2	1	1	4	
Small	9			1						1	
Total	64	10	4	2	4	1	3	4	6	15	2

Sources: NIS KII

Table 24.7. Cropping problems of NIS IAs by "Size"

Size	No. of IA sample	Cropping problems of NIS IAs. Garbage in the canals	Cropping problems of NIS IAs. Lack of water supply	Cropping problems of NIS IAs. Water delivery schedule	Cropping problems of NIS IAs. Low yield/calamities	Cropping problems of NIS IAs. High production cost/low buying price	Cropping problems of NIS IAs. FMR/high harvest loss	Cropping problems of NIS IAs. Others - informal settlers, govt. Support
Large	43		3	1	18	6	1	
Medium	12		1	2	6			
Small	9	1			3	3		1
Total	64	1	4	3	27	9	1	1

Sources: NIS KII

Table 24.8. Problems encountered by NIS IAs by "Size"

Size	No. of IA sample	Problems encountered by NIS-IAs. Unlined canals and turnout	Problems encountered by NIS-IAs. Poor structure design	Problems encountered by NIS-IAs. Damaged irrigation structure	Problems encountered by NIS-IAs. Lack of water supply	Problems encountered by NIS-IAs. Solid waste in canals/siltation	Problems encountered by NIS-IAs. Some members don't follow the schedule	Problems encountered by NIS-IAs. Illegal turnouts	Problems encountered by NIS-IAs. Damaged farm to market road	Problems encountered by NIS-IAs. Others
Large	43	4	3	8	7	9	6	2	5	8
Medium	12	1	2		7	3	1			5
Small	9	2		3	4	2	1		6	
Total	64	7	5	11	18	14	8	2	11	13

Sources: NIS KII

Note: Others - extension of water schedule; lack of equipment; lack of irrigation facilities; monitoring of water delivery & maintenance of laterals with certain stretch; none; improve the irrigation facilities; irrigation structure not yet finished; lack of discipline; not following cropping calendar; political intervention; slow action of NIS; ISF very high; lack of water pump

Table 24.9. Average Performance Rating of various functions of NIS IAs by "Size"

Size	No. of IA sample	Performance Rating of NIS IAs (0-4, 4 excellent). Water distribution	Performance Rating of NIS IAs (0-4, 4 excellent). Maintenance of canals	Performance Rating of NIS IAs (0-4, 4 excellent). Maintenance of control structures	Performance Rating of NIS IAs (0-4, 4 excellent). Construction of facilities	Performance Rating of NIS IAs (0-4, 4 excellent). Collection of ISF	Performance Rating of NIS IAs (0-4, 4 excellent). Collection of other fees	Performance Rating of NIS IAs (0-4, 4 excellent). Technical Advice to farmers	Performance Rating of NIS IAs. Overall rating
Large	43	3	4	3	3	3	3	3	2
Medium	12	3	3	3	2	3	2	3	2
Small	9	4	3	3		4	4	4	2
Average for All Sample/Total	64	3	3	3	2	3	3	3	2

Sources: NIS KII

Table 24.10. NIS IA's Collection Rate by "Size"

Size	No. of IA sample	Ave. of Collection Rate (%) of NIS IAs	Collection Rate (%) of NIS IAs. 30 and below	Collection Rate (%) of NIS IAs. 31 - 60	Collection Rate (%) of NIS IAs. 61 - 90	Collection Rate (%) of NIS IAs. 91 and above	Collection Rate (%) of NIS IAs. No answer	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). 2	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). 3	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). 4	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). No Answer
Large	43	77		6	21	6	10	1	5	18	19
Medium	12	70	1	2	5	1	3		3	4	5
Small	9	83			6	3		2	1	5	1
Average for All Sample/Total	64	77	1	8	32	10	13	3	9	27	25

Sources: NIS KII

Table 24.11. NIS IA's Rating on Water Delivery Service and Water Distribution Policy by "Size"

Size	No. of IA sample	Rating of NIS IAs' water delivery service (0-4, 4 highest). 0	Rating of NIS IAs' water delivery service (0-4, 4 highest). 1	Rating of NIS IAs' water delivery service (0-4, 4 highest). 2	Rating of NIS IAs' water delivery service (0-4, 4 highest). 3	Rating of NIS IAs' water delivery service (0-4, 4 highest). 4	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 0	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 1	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 2	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 3
Large	43			3	6	18			1	6
Medium	12	1	3	2	1	1	1		1	1
Small	9			5	1	2				1
Total	64	1	3	10	8	21	1		2	8

Sources: NIS KII

Table 24.12. Mode of irrigation scheduling and rating for effectiveness of accountability provision among NIS IAs by "Size"

Size	No. of IA sample	Mode of irrigation scheduling by NIS IAs. Downstream-upstream	Mode of irrigation scheduling by NIS IAs. Upstream-downstream	Mode of irrigation scheduling by NIS IAs. By groups by hour/day on rotation/ depends on IA	Mode of irrigation scheduling by NIS IAs. No answer	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective).	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 0	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 1	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 2	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 3
Large	43	5	17	3	18	3			2	8
Medium	12	2	9		1	3	1	1		3
Small	9	3	4		2	3				5
Total	64	10	30	3	21	3	1	1	2	16

Sources: NIS KII

Size	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 4	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). No Answer
Large	13	20
Medium	2	5
Small	1	3
Total	16	28

Sources: NIS KII

Table 24.13. Provisions in NIS IA policies holding IA officers/BOD accountable by "Size"

Size	No. of IA sample	Provisions in NIS IA policies holding water users accountable. No	Provisions in NIS IA policies holding water users accountable. Yes	Provisions in NIS IA policies holding water users accountable. No Answer	Provisions in NIS IA policies holding water users accountable. No Comment	Provisions in NIS IA policies holding IA officers/BOD accountable. No	Provisions in NIS IA policies holding IA officers/BOD accountable. Yes	Provisions in NIS IA policies holding IA officers/BOD accountable. No Answer
Large	43	6	19	16	2	7	16	20
Medium	12	3	8	1		4	5	3
Small	9		6	3			4	5
Total	64	9	33	20	2	11	25	28

Sources: NIS KII

Table 24.14. Policies which are not adequately implemented by NIS IAs by "Size"

No. of IA sample	Policies which are not adequately implemented by NIS IAs. Payment of ISF/IA dues	Policies which are not adequately implemented by NIS IAs. Water delivery schedules	Policies which are not adequately implemented by NIS IAs. Penalty clauses	Policies which are not adequately implemented by NIS IAs. Others	Policies which are not adequately implemented by NIS IAs. No Answer	Policies which are not adequately implemented by NIS IAs. None	Policies which are not adequately implemented by NIS IAs. Not Applicable
43		3	7	6	8	10	12
12	2	4	2		2	1	2
9		3		1	3	1	2
64	2	10	9	7	13	12	16

Sources: NIS KII

Note: Others - wearing of uniform, securing for personal needs, irrigation procedure, improper behavior, restriction of garbage/illegal settlers, destruction of turnouts.

Table 24.15. Trainings attended by NIS IAs by "Size"

Size	No. of IA sample	Trainings attended by NIS IAs. Basic Leadership Devt. Course	Trainings attended by NIS IAs. Financial Management	Trainings attended by NIS IAs. Org. Management/Capability/Policy	Trainings attended by NIS IAs. Values formation	Trainings attended by NIS IAs. System/water management	Trainings attended by NIS IAs. Cropping/AWD/quality control/fertilizer
Large	43	10	12	8	4	11	11
Medium	12	4	5	1	2	6	3
Small	9	1	2			2	6
Total	64	15	19	9	6	19	20

Sources: NIS KII

Table 24.16. Average participation to NIS-IA meetings of IA officers and BODs by "Size"

Participation to NIS-IA meetings - IA officers (50 and below)	Participation to NIS-IA meetings - IA officers (51 - 80)	Participation to NIS-IA meetings - IA officers (more than 80)	Participation to NIS-IA meetings - BODs (50 and below)	Participation to NIS-IA meetings - BODs (51 - 80)	Participation to NIS-IA meetings - BODs (more than 80)	Participation to NIS-IA meetings - General assembly (50 and below)	Participation to NIS-IA meetings - General assembly (51 - 80)	Participation to NIS-IA meetings - General assembly (more than 80)
2	6	19	3	5	18	8	10	5
	3	6		1	8	2	3	3
	2	5		1	6		6	2
2	11	30	3	7	32	10	19	10

Sources: NIS KII

Table 24.17. Frequency of meeting of NIS-IA officers/BODs and members by "Size"

Size	No. of IA sample	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (once-thrice a month)	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (once to 6 times per cropping)	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (1-2 times per month)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (once a year-every cropping)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (monthly-twice a year)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (yearly/every two years)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (have not yet conducted)
Large	43	27	4	6	29	3	4	19	14	2	1
Medium	12	9	1		10			5	6		
Small	9	8	1		8			6	3		
Total	64	44	6	6	47	3	4	30	23	2	1

Sources: NIS KII

Table 24.18. Manner of choosing and term of office and forms of compensation of NIS-IA officers/BOD by "Size"

Size	No. of IA sample	Manner of choosing and term of office of NIS-IA officers/BOD - election by general assembly	Manner of choosing and term of office of NIS-IA officers/BOD - voted by BOD	Manner of choosing and term of office of NIS-IA officers/BOD - 1-2 years	Manner of choosing and term of office of NIS-IA officers/BOD - 3-4 years	Forms of compensation of NIS-IA (15-30% of collection, if 70-90% collection)	Forms of compensation of NIS-IA (BOD with honorarium P1,000-P2,000)	Forms of compensation of NIS-IA (P100-200/mgt/activity)	Forms of compensation of NIS-IA (P5000/season)	Forms of compensation of NIS-IA (P200-800/month)	Forms of compensation of NIS-IA (Other incentives - snacks, P500/group discounts)	Forms of compensation of NIS-IA (none)
Large	43	34	2	27	8	1	4	3		5	2	18
Medium	12	12		8	4	2		1			1	8
Small	9	8	1	6	3				1		1	6
Total	64	54	3	41	15	3	4	4	1	5	4	32

Sources: NIS KII

Table 24.19. Respondents' rating on NIA's support to NIS IAs and modifications by NIS IAs to IS by "Size"

Size	No. of IA sample	Respondents' average rating on NIA's support to NIS-IAs. (Technical - 0-4, 4 excellent)	Respondents' average rating on NIA's support to NIS-IAs. (Financial - 0-4, 4 excellent)	Respondents' average rating on NIA's support to NIS-IAs. (Institutional - 0-4, 4 excellent)	Modifications by NIS IAs to IS. Structure non-operational (No)	Modifications by NIS IAs to IS. Structure non-operational (Yes)	Modifications by NIS IAs to IS. Structure non-operational (No Answer)	Modifications by NIS IAs to IS. Undertook rehabilitation (No)	Modifications by NIS IAs to IS. Undertook rehabilitation (Yes)
Large	43	4	4	4	20	7	16	19	7
Medium	12	4	4	4	6	2	4	6	1
Small	9	3	3	3	1	1	7	1	1
Total	64	4	4	4	27	10	27	26	9

Sources: NIS KII

Size	Modifications by NIS IAs to IS. Undertook rehabilitation (No Answer)	Modifications by NIS IAs to IS. Other Modifications (Canal Lining)	Modifications by NIS IAs to IS. Other Modifications (Drainage Rehab)	Modifications by NIS IAs to IS. Other Modifications (Canal Desiltation/rehab)	Modifications by NIS IAs to IS. Other Modifications (Others)
Large	17	11	1	4	10
Medium	5	2	1	1	1
Small	7				1
Total	29	13	2	5	12

Sources: NIS KII

By Technology

Tables 25.1 to **25.19** provide the profiles of the NIS sample in terms of technology: gravity, reservoir and pump.

There are three types of irrigation technologies, irrigation by gravity, use of pump technology, and reservoir systems. IA samples irrigated by gravity experience the most severe water supply shortage in the dry season. Other problems they experience include flooding, irrigation headwork and control structure problems, deteriorated FMRs, and having several financially weak IAs. On the contrary, IAs irrigated by gravity have the least irrigation canal and institutional problems, and second for siltation problems.

IA samples that use pump technology have adequate and dependable sources of water, do not experience flooding problems, and have higher collection efficiencies compared to the gravity system IAs. However, these IAs also have the highest incidence of siltation problems lateral canal, and institutional problems. The most prevalent problem among this group is the poor condition of their lateral canals, accompanied by problems induced by lack of machineries and equipment (e.g. backhoe and back-up pumps).

Reservoir systems appear to be the most successful of the three technologies. In general, the sample IAs had adequate water supply, low count of siltation problems, with more financially strong IAs, high functionality survey ratings, and high collection efficiencies. On the contrary, they also have the most number of deteriorated FMRs and the worst main canal conditions. Other problems are institutional, and those caused by calamities and/or pest infestations.

Table 25.1. NIS IA Profile, Cropping Information and Financial Aspects by "Technology"

Technology	No. of IA sample	Ave. of No. of Members	Ave. of No. of Farmers-Landowner-operator (%)	Ave. of No. of Farmers-Tenant (%)	Ave. of No. of Farmers-Lessees (%)	Does IA have water permit? (answer: no)	Does IA have water permit? (answer: yes)	Does IA have water permit? (no answer)	No. of Crops Irrigated: rice only	No of Crops Irrigated: rice and other crops	No. of IAs paying ISF/DCC/amortization
Diversion	28	105	51	50	18	9	8	10	15	13	12
Pump	14	375	59	42	10	8	3	1	11	3	7
Reservoir	22	161	71	40	19	12	4	6	18		15
Average for All Sample/Total	64	187	60	45	17	29	15	17	44	16	34

Sources: NIS KII

Table 25.2. Problems/concerns of NIS IAs by "Technology"

Technology	No. of IA sample	No. of IAs with inadequate water supply in dry season	No. of IAs with flooding problem during wet season	No. of IAs with Irrigation Headwork Problems (damaged, deteriorated, lacking)	No. of IAs with Irrigation Main Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Lateral Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Control Structure Problems (damaged, deteriorated, lacking, unlined)	No. of IAs with Siltation, Solid Waste, Informal Settlers & Water Quality Problems	No. of IAs with problems due to lack of facilities, infrastructure (FMRs), canal extensions, drainage, storage, pipelines, STWs, solar drier & etc.	No. of IAs with problems due to damaged/lack of Machineries & Equipment (ex. Backhoes, pumps, pipes & etc.)	No. of IAs with institutional/management problems
Diversion	28	15	2	10	4	9	8	8	8	5	12
Pump	14	4		2	3	8	3	6	4	7	7
Reservoir	22	3	1		6	10	4	3	7	4	10
Total	64	22	3	12	13	27	15	17	19	16	29

Sources: NIS KII

Note: Institutional/Management Problems - Water Stealing, lack of discipline, water scheduling problems, illegal turnouts, animals like carabaos allowed in canal, attendance during maintenance work, conflict among members, rules not followed, safety problems

Table 25.3. NIA's NIS Functionality Survey rating, IA's own Financial Strength rating, Collection Efficiency and IA's performance rating of ISF collection by "Technology"

Technology	No. of IA sample	IA Functionality Survey Rating (No Data)	IA Functionality Survey Rating (Poor - Satisfactory)	IA Functionality Survey Rating (Very Satisfactory - Outstanding)	IA's Financial Strength Rating (no data)	IA's Financial Strength Rating (0 - 2, weak)	IA's Financial Strength Rating (3-4, strong)	IA's Collection Efficiency (No Data)	IA's Collection Efficiency (0 -64%, weak)	IA's Collection Efficiency (65% - 100%, strong)	IA's Performance Rating of Collection of ISF (no data)
Diversion	28	16	6	6	12	11	4	3	5	20	17
Pump	14	8	6		3	8	3		2	12	7
Reservoir	22	11		11	8	2	12	5	5	12	9
Total	64	35	12	17	23	21	19	8	12	44	33

Sources: NIS KII

Note: Not Successful - IAs having FS of poor to satisfactory, financial strength rating of 0 -2, collection efficiency below of 0 to 64% and/or ISF collection rating of 0-2

Successful - IAs having FS of very satisfactory to outstanding, financial strength rating of 3 -4, collection efficiency of at least 65% and/or ISF collection rating of 3-4

Technology	IA's Performance Rating of Collection of ISF (0-2, weak)	IA's Performance Rating of Collection of ISF (3-4, strong)	No. of IAs by "Success" (insufficient data)	No. of IAs by "Success" (Not Successful)	No. of IAs by "Success" (Successful)
Diversion	3	8	20	8	
Pump	1	6	9	5	
Reservoir	1	12	11	1	10
Total	5	26	40	14	10

Sources: NIS KII

Note: Not Successful - IAs having FS of poor to satisfactory, financial strength rating of 0 -2, collection efficiency below of 0 to 64% and/or ISF collection rating of 0-2

Successful - IAs having FS of very satisfactory to outstanding, financial strength rating of 3 -4, collection efficiency of at least 65% and/or ISF collection rating of 3-4

Table 25.4. NIS IA's Performance Ratings of their water distribution and delivery service by "Technology"

Technology	No. of IA sample	Flexibility Index - no answer	Flexibility Index Rating - (0-2, not flexible)	Flexibility Index Rating - (3-4, flexible)	Reliability Index Rating - no answer	Reliability Index Rating - (0-2, not reliable)	Reliability Index Rating - (3-4, reliable)	Equitability Index Rating - no answer	Equitability Index Rating - (0-2, not equitable)	Equitability Index Rating - (3-4, equitable)	Adequacy of Service Delivery Rating - no data	Adequacy of Service Delivery Rating - (0-2, inadequate service)	Adequacy of Service Delivery Rating - (3-4, adequate service)
Diversion	28	8	9	10	8	6	14	10	3	15	6	14	8
Pump	14	1	2	11	1	3	10	3	4	7	2	5	7
Reservoir	22	7	1	14	6	1	15	7		15	8		14
Total	64	16	12	35	15	10	39	20	7	37	16	19	29

Sources: NIS KII

Table 25.5. NIS IA's rating of their ability to seek outside help by "Technology"

Technology	No. of IA sample	Ave. Rating for ability of NIS IAs to seek outside help (0-4, 4 most influential)	Rating for ability of NIS IAs to seek outside help (0)	Rating for ability of NIS IAs to seek outside help (1)	Rating for ability of NIS IAs to seek outside help (2)	Rating for ability of NIS IAs to seek outside help (3)	Rating for ability of NIS IAs to seek outside help (4)	Rating for ability of NIS IAs to seek outside help (No answer)
Diversion	28	3		2	5	3	3	15
Pump	14	2	1		4	4	1	4
Reservoir	22	2	3		1	6	2	10
Average for All Sample/Total	64	2	4	2	10	13	6	29

Sources: NIS KII

Table 25.6. Assistance received by NIS IAs from Various Sources by "Technology"

Technology	No. of IA sample	Assistance received by NIS IAs from Various sources. BSWM - Free Soil analysis	Assistance received by NIS IAs from Various sources. LGU - Farm inputs/seed subsidy	Assistance received by NIS IAs from Various sources. LGU - Repair farm to market roads	Assistance received by NIS IAs from Various sources. LGU - financial/livelihood	Assistance received by NIS IAs from Various sources. LGU - technical support	Assistance received by NIS IAs from Various sources. LGU - equipment/thresher/fuel	Assistance received by NIS IAs from Various sources. Others - flatbed dryer/solar dryer	Assistance received by NIS IAs from Various sources. Others - pump/thresher / fuel	Assistance received by NIS IAs from Various sources. Others - Seed subsidy/analysis	Assistance received by NIS IAs from Various sources. Others - soil sampling/training
Diversion	28	2		2			2	1	2	5	1
Pump	14	1	1		1			3	2	4	
Reservoir	22	7	3		3	1	1		2	6	1
Total	64	10	4	2	4	1	3	4	6	15	2

Sources: NIS KII

Table 25.7. Cropping problems of NIS IAs by "Technology"

Technology	No. of IA sample	Cropping problems of NIS IAs. Garbage in the canals	Cropping problems of NIS IAs. Lack of water supply	Cropping problems of NIS IAs. Water delivery schedule	Cropping problems of NIS IAs. Low yield/calamities	Cropping problems of NIS IAs. High production cost/low buying price	Cropping problems of NIS IAs. FMR/high harvest loss	Cropping problems of NIS IAs. Others - informal settlers, govt. Support
Diversion	28	1	2	3	8	5	1	1
Pump	14		1		11	2		
Reservoir	22		1		8	2		
Total	64	1	4	3	27	9	1	1

Sources: NIS KII

Table 25.8. Problems encountered by NIS IAs by "Technology"

Technology	No. of IA sample	Problems encountered by NIS-IAs. Unlined canals and turnout	Problems encountered by NIS-IAs. Poor structure design	Problems encountered by NIS-IAs. Damaged irrigation structure	Problems encountered by NIS-IAs. Lack of water supply	Problems encountered by NIS-IAs. Solid waste in canals/siltation	Problems encountered by NIS-IAs. Some members don't follow the schedule	Problems encountered by NIS-IAs. Illegal turnouts	Problems encountered by NIS-IAs. Damaged farm to market road	Problems encountered by NIS-IAs. Others
Diversion	28	5	1	3	13	6	3		8	4
Pump	14	1	2	2	5	4	3	1	2	5
Reservoir	22	1	2	6		4	2	1	1	4
Total	64	7	5	11	18	14	8	2	11	13

Sources: NIS KII

Note: Others - extension of water schedule; lack of equipment; lack of irrigation facilities; monitoring of water delivery & maintenance of laterals with certain stretch; none; improve the irrigation facilities; irrigation structure not yet finished; lack of discipline; not following cropping calendar; political intervention; slow action of NIS; ISF very high; lack of water pump

Table 25.9. Average Performance Rating of various functions of NIS IAs by "Technology"

Technology	No. of IA sample	Performance Rating of NIS IAs (0-4, 4 excellent). Water distribution	Performance Rating of NIS IAs (0-4, 4 excellent). Maintenance of canals	Performance Rating of NIS IAs (0-4, 4 excellent). Maintenance of control structures	Performance Rating of NIS IAs (0-4, 4 excellent). Construction of facilities	Performance Rating of NIS IAs (0-4, 4 excellent). Collection of ISF	Performance Rating of NIS IAs (0-4, 4 excellent). Collection of other fees	Performance Rating of NIS IAs (0-4, 4 excellent). Technical Advice to farmers	Performance Rating of NIS IAs. Overall rating
Diversion	28	3	3	3	2	3	3	4	1
Pump	14	3	3	3	3	3	3	3	2
Reservoir	22	4	4	3	2	3	3	3	2
Average for All Sample/Total	64	3	3	3	2	3	3	3	2

Sources: NIS KII

Table 25.10. NIS IA's Collection Rate by "Technology"

Technology	No. of IA sample	Average of Collection Rate (%) of NIS IAs	Collection Rate (%) of NIS IAs. 30 and below	Collection Rate (%) of NIS IAs. 31 - 60	Collection Rate (%) of NIS IAs. 61 - 90	Collection Rate (%) of NIS IAs. 91 and above	Collection Rate (%) of NIS IAs. No answer	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). 2	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). 3	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). 4	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). No Answer
Diversion	28	77	1	3	12	7	5	1	6	9	12
Pump	14	78		2	8	2	2	2	1	6	5
Reservoir	22	74		3	12	1	6		2	12	8
Average for All Sample/Total	64	77	1	8	32	10	13	3	9	27	25

Sources: NIS KII

Table 25.11. NIS IA's Rating on Water Delivery Service and Water Distribution Policy by "Technology"

Technology	No. of IA sample	Rating of NIS IAs' water delivery service (0-4, 4 highest). 0	Rating of NIS IAs' water delivery service (0-4, 4 highest). 1	Rating of NIS IAs' water delivery service (0-4, 4 highest). 2	Rating of NIS IAs' water delivery service (0-4, 4 highest). 3	Rating of NIS IAs' water delivery service (0-4, 4 highest). 4	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 0	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 1	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 2	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 3	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 4
Diversion	28	1	1	7	1	7	1			1	12
Pump	14		2	3	3	4			2	3	6
Reservoir	22				4	10				4	10
Total	64	1	3	10	8	21	1		2	8	28

Sources: NIS KII

Table 25.12. Mode of irrigation scheduling and rating for effectiveness of accountability provision among NIS IAs by "Technology"

Technology	No. of IA sample	Mode of irrigation scheduling by NIS IAs. Downstream-upstream	Mode of irrigation scheduling by NIS IAs. Upstream-downstream	Mode of irrigation scheduling by NIS IAs. By groups by hour/day on rotation/ depends on IA	Mode of irrigation scheduling by NIS IAs. No answer	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective).	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 0	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 1	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 2	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 3	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 4	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). No Answer
Diversion	28	7	11	1	9	3	1	1	1	6	4	15
Pump	14	1	11		2	3			1	6	4	3
Reservoir	22	2	8	2	10	4				4	8	10
Total	64	10	30	3	21	3	1	1	2	16	16	28

Sources: NIS KII

Table 25.13. Provisions in NIS IA policies holding IA officers/BOD accountable by "Technology"

Technology	No. of IA sample	Provisions in NIS IA policies holding water users accountable. No	Provisions in NIS IA policies holding water users accountable. Yes	Provisions in NIS IA policies holding water users accountable. No Answer	Provisions in NIS IA policies holding water users accountable. No Comment	Provisions in NIS IA policies holding IA officers/BOD accountable. No	Provisions in NIS IA policies holding IA officers/BOD accountable. Yes	Provisions in NIS IA policies holding IA officers/BOD accountable. No Answer
Diversion	28	4	12	12		4	10	14
Pump	14	2	11	1		2	9	3
Reservoir	22	3	10	7	2	5	6	11
Total	64	9	33	20	2	11	25	28

Table 25.14. Policies which are not adequately implemented by NIS IAs by "Technology"

Technology	No. of IA sample	Policies which are not adequately implemented by NIS IAs. Payment of ISF/IA dues	Policies which are not adequately implemented by NIS IAs. Water delivery schedules	Policies which are not adequately implemented by NIS IAs. Penalty clauses	Policies which are not adequately implemented by NIS IAs. Others	Policies which are not adequately implemented by NIS IAs. No Answer	Policies which are not adequately implemented by NIS IAs. None	Policies which are not adequately implemented by NIS IAs. Not Applicable
Diversion	28	1	7	4	1	6	2	8
Pump	14	1	3	4	1	6	1	1
Reservoir	22			1	5	1	9	7
Total	64	2	10	9	7	13	12	16

Sources: NIS KII

Note: Others - wearing of uniform, securing for personal needs, irrigation procedure, improper behavior, restriction of garbage/illegal settlers, destruction of turnouts.

Table 25.15. Trainings attended by NIS IAs by "Technology"

Technology	No. of IA sample	Trainings attended by NIS IAs. Basic Leadership Devt. Course	Trainings attended by NIS IAs. Financial Management	Trainings attended by NIS IAs. Org. Management/Capability/Policy	Trainings attended by NIS IAs. Values formation	Trainings attended by NIS IAs. System/water management	Trainings attended by NIS IAs. Cropping/AWD/quality control/fertilizer
Diversion	28	7	7	3	2	8	8
Pump	14	3	5	1	1	3	4
Reservoir	22	5	7	5	3	8	8
Total	64	15	19	9	6	19	20

Sources: NIS KII

Table 25.16. Average participation to NIS-IA meetings of IA officers and BODs by "Technology"

Technology	No. of IA sample	Participation to NIS-IA meetings - IA officers (50 and below)	Participation to NIS-IA meetings - IA officers (51 - 80)	Participation to NIS-IA meetings - IA officers (more than 80)	Participation to NIS-IA meetings - BODs (50 and below)	Participation to NIS-IA meetings - BODs (51 - 80)	Participation to NIS-IA meetings - BODs (more than 80)	Participation to NIS-IA meetings - General assembly (50 and below)	Participation to NIS-IA meetings - General assembly (51 - 80)	Participation to NIS-IA meetings - General assembly (more than 80)
Diversion	28		4	14		2	16	6	7	4
Pump	14		5	5	2	2	6	1	6	2
Reservoir	22	2	2	11	1	3	10	3	6	4
Total	64	2	11	30	3	7	32	10	19	10

Table 25.17. Frequency of meeting of NIS-IA officers/BODs and members by "Technology"

Technology	No. of IA sample	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (once-thrice a month)	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (once to 6 times per cropping)	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (1-2 times per month)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (once a year-every cropping)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (monthly-twice a year)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (yearly/every two years)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (have not yet conducted)
Diversion	28	18	5	3	19	3	2	14	10	2	
Pump	14	12		1	13			8	6		
Reservoir	22	14	1	2	15		2	8	7		1
Total	64	44	6	6	47	3	4	30	23	2	1

Sources: NIS KII

Table 25.18. Manner of choosing and term of office and forms of compensation of NIS-IA officers/BOD by "Technology"

Technology	No. of IA sample	Manner of choosing and term of office of NIS-IA officers/BOD - election by general assembly	Manner of choosing and term of office of NIS-IA officers/BOD - voted by BOD	Manner of choosing and term of office of NIS-IA officers/BOD - 1-2 years	Manner of choosing and term of office of NIS-IA officers/BOD - 3-4 years	Forms of compensation of NIS-IA (15-30% of collection, if 70-90% collection)	Forms of compensation of NIS-IA (BOD with honorarium P1,000-P2,000)	Forms of compensation of NIS-IA (P100-200/mgt/activity)	Forms of compensation of NIS-IA (P5000/season)	Forms of compensation of NIS-IA (P200-800/month)	Forms of compensation of NIS-IA (Other incentives - snacks, P500/group discounts)	Forms of compensation of NIS-IA (none)
Diversion	28	26		19	7		2				1	19
Pump	14	12	2	7	7	3		2	1		1	7
Reservoir	22	16	1	15	1		2	2		5	2	6
Total	64	54	3	41	15	3	4	4	1	5	4	32

Table 25.19. Respondents' rating on NIA's support to NIS IAs and modifications by NIS IAs to IS by "Technology"

Technology	No. of IA sample	Respondents' average rating on NIA's support to NIS-IAs. (Technical - 0-4, 4 excellent)	Respondents' average rating on NIA's support to NIS-IAs. (Financial - 0-4, 4 excellent)	Respondents' average rating on NIA's support to NIS-IAs. (Institutional - 0-4, 4 excellent)	Modifications by NIS IAs to IS. Structure non-operational (No)	Modifications by NIS IAs to IS. Structure non-operational (Yes)	Modifications by NIS IAs to IS. Structure non-operational (No Answer)	Modifications by NIS IAs to IS. Undertook rehabilitation (No)	Modifications by NIS IAs to IS. Undertook rehabilitation (Yes)	Modifications by NIS IAs to IS. Undertook rehabilitation (No Answer)
Diversion	28	3	4	3	10	4	14	11	1	16
Pump	14	4	3	4	6	3	5	6	3	5
Reservoir	22	4	4	4	11	3	8	9	5	8
Total	64	4	4	4	27	10	27	26	9	29

Sources: NIS KII

Table 25.19. Respondents' rating on NIA's support to NIS IAs and modifications by NIS IAs to IS by "Technology"

Technology	Modifications by NIS IAs to IS. Other Modifications (Canal Lining)	Modifications by NIS IAs to IS. Other Modifications (Drainage Rehab)	Modifications by NIS IAs to IS. Other Modifications (Canal Desiltation/rehab)	Modifications by NIS IAs to IS. Other Modifications (Others)
Diversion			2	6
Pump	2	2		1
Reservoir	11		3	5
Total	13	2	5	12

Sources: NIS KII

By Location

Following earlier studies (Cablayan, Inocencio, et al 2014), location of the IAs relative to the main canals of the NIS (upstream, mid-stream, downstream) is a key factor influencing performance. **Tables 26.1** to **26.19** show the IAs profiles by location.

Downstream IAs in the sample are characterized by high count of siltation and/or solid waste problems, water supply shortages, flooding in the wet season, damaged FMRs, financially weak IAs, and low ratings of water delivery service (i.e. in terms of adequacy and timeliness). In addition, other problems include institutional, crop production and irrigation canal problems. On the positive side, downstream IAs have no issues with their irrigation headwork and control structures.

Midstream IAs are almost the opposite of the downstream IAs. They have the least solid waste/siltation problems, no flooding problems,, low count of damaged FMRs, main canal, and lateral canal problems. Despite lacking machineries and equipment, they face the least problems brought by the deficiency. However, midstream IAs showed the most irrigation control structure problems, least number of facilities/infrastructure, and the most institutional problems.

Prominent attributes of upstream IA group are low incidence of water supply shortage and solid waste/siltation problems and a high percentage of financially strong IAs. This group also experienced the following problems, in order of decreasing severity: , irrigation structure problems (e.g, irrigation canal), institutional problems, cropping problems due to calamities/ pest infestation, and inadequate machineries and equipment.

Table 26.1. NIS IA Profile, Cropping Information and Financial Aspects by "Location"

Location	No. of IA sample	Ave. of No. of Members	Ave. of No. of Farmers-Landowner-operator (%)	Ave. of No. of Farmers-Tenant (%)	Ave. of No. of Farmers-Lessees (%)	Does IA have water permit? (answer: no)	Does IA have water permit? (answer: yes)	Does IA have water permit? (no answer)	No. of Crops Irrigated: rice only	No of Crops Irrigated: rice and other crops	No. of IAs paying ISF/DCC/amortization
Downstream	21	162	59	44	15	8	7	5	16	5	15
Midstream	21	207	52	48	20	11	5	4	16	4	13
Upstream	20	184	66	47	16	10	2	7	12	7	6
Unclassified/Insufficient Data	2	279	94	12			1	1			
Average for All Sample/Total	64	187	60	45	17	29	15	17	44	16	34

Sources: NIS KII

Table 26.2. Problems/concerns of NIS IAs by "Location"

Location	No. of IA sample	No. of IAs with inadequate water supply in dry season	No. of IAs with flooding problem during wet season	No. of IAs with Irrigation Headwork Problems (damaged, deteriorated, lacking)	No. of IAs with Irrigation Main Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Lateral Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Control Structure Problems (damaged, deteriorated, lacking, unlined)	No. of IAs with Siltation, Solid Waste, Informal Settlers & Water Quality Problems	No. of IAs with problems due to lack of facilities, infrastructure (FMRs), canal extensions, drainage, storage, pipelines, STWs, solar drier & etc.	No. of IAs with problems due to damaged/lack of Machineries & Equipment (ex. Backhoes, pumps, pipes & etc.)	No. of IAs with institutional/management problems
Downstream	21	7	2	2	5	9	4	8	6	6	10
Midstream	21	8		4	2	8	6	5	7	3	11
Upstream	20	7	1	6	6	10	5	4	6	7	8
Unclassified/Insufficient Data	2										
Total	64	22	3	12	13	27	15	17	19	16	29

Sources: NIS KII

Note: Institutional/Management Problems - Water Stealing, lack of discipline, water scheduling problems, illegal turnouts, animals like carabao's allowed in canal, attendance during maintenance work, conflict among members, rules not followed, safety problems

Table 26.3. NIA's NIS Functionality Survey rating, IA's own Financial Strength rating, Collection Efficiency and IA's performance rating of ISF collection by "Location"

Location	No. of IA sample	IA Functionality Survey Rating (No Data)	IA Functionality Survey Rating (Poor - Satisfactory)	IA Functionality Survey Rating (Very Satisfactory - Outstanding)	IA's Financial Strength Rating (no data)	IA's Financial Strength Rating (0 - 2, weak)	IA's Financial Strength Rating (3-4, strong)	IA's Collection Efficiency (No Data)	IA's Collection Efficiency (0 -64%, weak)	IA's Collection Efficiency (65% - 100%, strong)
Downstream	21	11	4	6	5	9	6	2	6	13
Midstream	21	11	4	6	9	6	6	2	3	16
Upstream	20	11	4	5	7	6	7	2	3	15
Unclassified/Insufficient Data	2	2			2			2		
Total	64	35	12	17	23	21	19	8	12	44

Sources: NIS KII

Note: Not Successful - IAs having FS of poor to satisfactory, financial strength rating of 0 -2, collection efficiency below of 0 to 64% and/or ISF collection rating of 0-2
Successful - IAs having FS of very satisfactory to outstanding, financial strength rating of 3 -4, collection efficiency of at least 65% and/or ISF collection rating of 3-4

Location	IA's Performance Rating of Collection of ISF (no data)	IA's Performance Rating of Collection of ISF (0-2, weak)	IA's Performance Rating of Collection of ISF (3-4, strong)	No. of IAs by "Success" (insufficient data)	No. of IAs by "Success" (Not Successful)	No. of IAs by "Success" (Successful)
Downstream	9	3	9	12	5	4
Midstream	11		10	13	5	3
Upstream	11	2	7	13	4	3
Unclassified/Insufficient Data	2			2		
Total	33	5	26	40	14	10

Sources: NIS KII

Note: Not Successful - IAs having FS of poor to satisfactory, financial strength rating of 0 -2, collection efficiency below of 0 to 64% and/or ISF collection rating of 0-2
Successful - IAs having FS of very satisfactory to outstanding, financial strength rating of 3 -4, collection efficiency of at least 65% and/or ISF collection rating of 3-4

Table 26.4. NIS IA's Performance Ratings of their water distribution and delivery service by "Location"

Location	No. of IA sample	Flexibility Index - no answer	Flexibility Index Rating - (0-2, not flexible)	Flexibility Index Rating - (3-4, flexible)	Reliability Index Rating - no answer	Reliability Index Rating - (0-2, not reliable)	Reliability Index Rating - (3-4, reliable)	Equitability Index Rating - no answer	Equitability Index Rating - (0-2, not equitable)	Equitability Index Rating - (3-4, equitable)	Adequacy of Service Delivery Rating - no data	Adequacy of Service Delivery Rating - (0-2, inadequate service)	Adequacy of Service Delivery Rating - (3-4, adequate service)
Downstream	21	7	5	9	7	6	8	8	5	8	6	8	7
Midstream	21	5	2	13	4	2	15	5	1	15	3	7	11
Upstream	20	4	5	11	4	2	14	6	1	13	5	4	11
Unclassified/Insufficient Data	2			2			2	1		1	2		
Total	64	16	12	35	15	10	39	20	7	37	16	19	29

Sources: NIS KII

Table 26.5. NIS IA's rating of their ability to seek outside help by "Location"

Location	No. of IA sample	Ave. Rating for ability of NIS IAs to seek outside help (0-4, 4 most influential)	Rating for ability of NIS IAs to seek outside help (0)	Rating for ability of NIS IAs to seek outside help (1)	Rating for ability of NIS IAs to seek outside help (2)	Rating for ability of NIS IAs to seek outside help (3)	Rating for ability of NIS IAs to seek outside help (4)	Rating for ability of NIS IAs to seek outside help (No answer)
Downstream	21	2	2		3	4	2	10
Midstream	21	3		1	4	6	3	7
Upstream	20	2	2	1	3	3	1	10
Unclassified/Insufficient Data	2							2
Average for All Sample/Total	64	2	4	2	10	13	6	29

Sources: NIS KII

Table 26.6. Assistance received by NIS IAs from Various Sources by "Location"

Location	No. of IA sample	Assistance received by NIS IAs from Various sources. BSWM - Free Soil analysis	Assistance received by NIS IAs from Various sources. LGU - Farm inputs/seed subsidy	Assistance received by NIS IAs from Various sources. LGU - Repair farm to market roads	Assistance received by NIS IAs from Various sources. LGU - financial/livelihood	Assistance received by NIS IAs from Various sources. LGU - technical support	Assistance received by NIS IAs from Various sources. LGU - equipment /thresher/fuel	Assistance received by NIS IAs from Various sources. Others - flatbed dryer/solar dryer	Assistance received by NIS IAs from Various sources. Others - pump/thresher / fuel	Assistance received by NIS IAs from Various sources. Others - Seed subsidy/analysis	Assistance received by NIS IAs from Various sources. Others - soil sampling/training
Downstream	21	3	2			1	2	1		2	
Midstream	21	5		2	3		1	2	2	8	1
Upstream	20	2	2		1			1	4	5	1
Unclassified/Insufficient Data	2										
Total	64	10	4	2	4	1	3	4	6	15	2

Sources: NIS KII

Table 26.7. Cropping problems of NIS IAs by "Location"

Location	No. of IA sample	Cropping problems of NIS IAs. Garbage in the canals	Cropping problems of NIS IAs. Lack of water supply	Cropping problems of NIS IAs. Water delivery schedule	Cropping problems of NIS IAs. Low yield/calamities	Cropping problems of NIS IAs. High production cost/low buying price	Cropping problems of NIS IAs. FMR/high harvest loss	Cropping problems of NIS IAs. Others - informal settlers, govt. Support
Downstream	21	1	1		10	4		1
Midstream	21		2	2	10	3	1	
Upstream	20		1	1	7	2		
Unclassified/Insufficient Data	2							
Total	64	1	4	3	27	9	1	1

Sources: NIS KII

Table 26.8. Problems encountered by NIS IAs by "Location"

Location	No. of IA sample	Problems encountered by NIS-IAs. Unlined canals and turnout	Problems encountered by NIS-IAs. Poor structure design	Problems encountered by NIS-IAs. Damaged irrigation structure	Problems encountered by NIS-IAs. Lack of water supply	Problems encountered by NIS-IAs. Solid waste in canals/siltation	Problems encountered by NIS-IAs. Some members don't follow the schedule	Problems encountered by NIS-IAs. Illegal turnouts	Problems encountered by NIS-IAs. Damaged farm to market road	Problems encountered by NIS-IAs. Others
Downstream	21	1	2	6	8	7	4		6	6
Midstream	21	2	1		6	3	4	1	2	4
Upstream	20	4	2	5	4	4		1	3	3
Unclassified/Insufficient Data	2									
Total	64	7	5	11	18	14	8	2	11	13

Sources: NIS KII

Note: Others - extension of water sched.; lack of equipment; lack of irrigation facilities; monitoring of water delivery & maintenance of laterals with certain stretch; none; improve the irrigation facilities; irrigation structure not yet finished; lack of discipline; not following cropping calendar; political intervention; slow action of NIS; ISF very high; lack of water pump

Table 26.9. Average Performance Rating of various functions of NIS IAs by "Location"

Location	No. of IA sample	Performance Rating of NIS IAs (0-4, 4 excellent). Water distribution	Performance Rating of NIS IAs (0-4, 4 excellent). Maintenance of canals	Performance Rating of NIS IAs (0-4, 4 excellent). Maintenance of control structures	Performance Rating of NIS IAs (0-4, 4 excellent). Construction of facilities	Performance Rating of NIS IAs (0-4, 4 excellent). Collection of ISF	Performance Rating of NIS IAs (0-4, 4 excellent). Collection of other fees	Performance Rating of NIS IAs (0-4, 4 excellent). Technical Advice to farmers	Performance Rating of NIS IAs. Overall rating
Downstream	21	3	3	3	3	3	4	4	2
Midstream	21	4	4	3	3	3	3	3	2
Upstream	20	4	3	3	2	3	3	3	2
Unclassified/Insufficient Data	2								-
Average for All Sample/Total	64	3	3	3	2	3	3	3	2

Sources: NIS KII

Table 26.10. NIS IA's Collection Rate by "Location"

Location	No. of IA sample	Ave. of Collection Rate (%) of NIS IAs	Collection Rate (%) of NIS IAs. 30 and below	Collection Rate (%) of NIS IAs. 31 - 60	Collection Rate (%) of NIS IAs. 61 - 90	Collection Rate (%) of NIS IAs. 91 and above	Collection Rate (%) of NIS IAs. No answer	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). 2	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). 3	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). 4	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). No Answer
Downstream	21	71	1	4	9	2	5	1	2	10	8
Midstream	21	80		2	11	5	3	1	5	7	8
Upstream	20	78		2	12	3	3	1	2	10	7
Unclassified/Insufficient Data	2						2				2
Average for All Sample/Total	64	77	1	8	32	10	13	3	9	27	25

Sources: NIS KII

Table 26.11. NIS IA's Rating on Water Delivery Service and Water Distribution Policy by "Location"

Location	No. of IA sample	Rating of NIS IAs' water delivery service (0-4, 4 highest). 0	Rating of NIS IAs' water delivery service (0-4, 4 highest). 1	Rating of NIS IAs' water delivery service (0-4, 4 highest). 2	Rating of NIS IAs' water delivery service (0-4, 4 highest). 3	Rating of NIS IAs' water delivery service (0-4, 4 highest). 4	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 0	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 1	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 2	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 3	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 4
Downstream	21	1	1	5	2	5	1		2		11
Midstream	21		2	2	4	7				5	9
Upstream	20			3	2	9				3	8
Unclassified/Insufficient Data	2										
Total	64	1	3	10	8	21	1		2	8	28

Sources: NIS KII

Table 26.12. Mode of irrigation scheduling and rating for effectiveness of accountability provision among NIS IAs by "Location"

Location	No. of IA sample	Mode of irrigation scheduling by NIS IAs. Downstream-upstream	Mode of irrigation scheduling by NIS IAs. Upstream-downstream	Mode of irrigation scheduling by NIS IAs. By groups by hour/day on rotation/ depends on IA	Mode of irrigation scheduling by NIS IAs. No answer	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective).	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 0	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 1	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 2	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 3	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 4	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). No Answer
Downstream	21	4	9	3	5	3	1		1	6	5	8
Midstream	21	3	10		8	3		1	1	5	6	8
Upstream	20	3	11		6	4				5	5	10
Unclassified/Insufficient Data	2				2							2
Total	64	10	30	3	21	3	1	1	2	16	16	28

Sources: NIS KII

Table 26.13. Provisions in NIS IA policies holding IA officers/BOD accountable by "Location"

Location	No. of IA sample	Provisions in NIS IA policies holding water users accountable. No	Provisions in NIS IA policies holding water users accountable. Yes	Provisions in NIS IA policies holding water users accountable. No Answer	Provisions in NIS IA policies holding water users accountable. No Comment	Provisions in NIS IA policies holding IA officers/BOD accountable. No	Provisions in NIS IA policies holding IA officers/BOD accountable. Yes	Provisions in NIS IA policies holding IA officers/BOD accountable. No Answer
Downstream	21	3	10	7	1	2	11	8
Midstream	21	4	13	4		7	7	7
Upstream	20	2	10	7	1	2	7	11
Unclassified/Insufficient Data	2			2				2
Total	64	9	33	20	2	11	25	28

Sources: NIS KII

Table 26.14. Policies which are not adequately implemented by NIS IAs by "Location"

Location	No. of IA sample	Policies which are not adequately implemented by NIS IAs. Payment of ISF/IA dues	Policies which are not adequately implemented by NIS IAs. Water delivery schedules	Policies which are not adequately implemented by NIS IAs. Penalty clauses	Policies which are not adequately implemented by NIS IAs. Others	Policies which are not adequately implemented by NIS IAs. No Answer	Policies which are not adequately implemented by NIS IAs. None	Policies which are not adequately implemented by NIS IAs. Not Applicable
Downstream	21	1	3	3	2	2	4	7
Midstream	21	1	5	3	3	4	3	5
Upstream	20		2	3	2	7	4	3
Unclassified/Insufficient Data	2						1	1
Total	64	2	10	9	7	13	12	16

Sources: NIS KII

Note: Others - wearing of uniform, securing for personal needs, irrigation procedure, improper behavior, restriction of garbage/illegal settlers, destruction of turnouts.

Table 26.15. Trainings attended by NIS IAs by "Location"

Location	No. of IA sample	Trainings attended by NIS IAs. Basic Leadership Devt. Course	Trainings attended by NIS IAs. Financial Management	Trainings attended by NIS IAs. Org. Management/Capability/Policy	Trainings attended by NIS IAs. Values formation	Trainings attended by NIS IAs. System/water management	Trainings attended by NIS IAs. Cropping/AWD/quality control/fertilizer
Downstream	21	6	6	5	3	7	6
Midstream	21	4	4	2	1	4	8
Upstream	20	5	9	2	2	8	6
No data	2						
Total	64	15	19	9	6	19	20

Sources: NIS KII

Table 26.16. Average participation to NIS-IA meetings of IA officers and BODs by "Location"

Location	No. of IA sample	Participation to NIS-IA meetings - IA officers (50 and below)	Participation to NIS-IA meetings - IA officers (51 - 80)	Participation to NIS-IA meetings - IA officers (more than 80)	Participation to NIS-IA meetings - BODs (50 and below)	Participation to NIS-IA meetings - BODs (51 - 80)	Participation to NIS-IA meetings - BODs (more than 80)	Participation to NIS-IA meetings - General assembly (50 and below)	Participation to NIS-IA meetings - General assembly (51 - 80)	Participation to NIS-IA meetings - General assembly (more than 80)
Downstream	21	2	4	7		2	11	3	7	4
Midstream	21		5	13	3	3	11	4	5	4
Upstream	20		2	10		2	10	3	7	2
Unclassified/Insufficient Data	2									
Total	64	2	11	30	3	7	32	10	19	10

Sources: NIS KII

Table 26.17. Frequency of meeting of NIS-IA officers/BODs and members by "Location"

Location	No. of IA sample	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (once-thrice a month)	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (once to 6 times per cropping)	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (1-2 times per month)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (once a year-every cropping)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (monthly-twice a year)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (yearly/every two years)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (have not yet conducted)
Downstream	21	14	2	2	16	2		12	7		
Midstream	21	14	3	2	16	1	2	8	8	2	
Upstream	20	16	1	2	15		2	10	8		1
Unclassified/Insufficient Data	2										
Total	64	44	6	6	47	3	4	30	23	2	1

Sources: NIS KII

Table 26.18. Manner of choosing and term of office and forms of compensation of NIS-IA officers/BOD by "Location"

Location	No. of IA sample	Manner of choosing and term of office of NIS-IA officers/BOD - election by general assembly	Manner of choosing and term of office of NIS-IA officers/BOD - voted by BOD	Manner of choosing and term of office of NIS-IA officers/BOD - 1-2 years	Manner of choosing and term of office of NIS-IA officers/BOD - 3-4 years	Forms of compensation of NIS-IA (15-30% of collection, if 70-90% collection)	Forms of compensation of NIS-IA (BOD with honorarium P1,000-P2,000)	Forms of compensation of NIS-IA (P100-200/mgt/activity)	Forms of compensation of NIS-IA (P5000/season)	Forms of compensation of NIS-IA (P200-800/month)	Forms of compensation of NIS-IA (Other incentives - snacks, P500/group discounts)	Forms of compensation of NIS-IA (none)
Downstream	21	18	2	13	7	1	1	2		2	1	12
Midstream	21	18		14	3		1	2		1	1	10
Upstream	20	18	1	14	5	2	2		1	2	2	10
Unclassified/Insufficient Data	2											
Total	64	54	3	41	15	3	4	4	1	5	4	32

Sources: NIS KII

Table 26.19. Respondents' rating on NIA's support to NIS IAs and modifications by NIS IAs to IS by "Location"

Location	No. of IA sample	Respondents' average rating on NIA's support to NIS-IAs. (Technical - 0-4, 4 excellent)	Respondents' average rating on NIA's support to NIS-IAs. (Financial - 0-4, 4 excellent)	Respondents' average rating on NIA's support to NIS-IAs. (Institutional - 0-4, 4 excellent)	Modifications by NIS IAs to IS. Structure non-operational (No)	Modifications by NIS IAs to IS. Structure non-operational (Yes)	Modifications by NIS IAs to IS. Structure non-operational (No Answer)	Modifications by NIS IAs to IS. Undertook rehabilitation (No)	Modifications by NIS IAs to IS. Undertook rehabilitation (Yes)
Downstream	21	4	3	4	9	6	6	8	5
Midstream	21	4	3	4	10	2	9	11	1
Upstream	20	4	4	4	8	2	10	7	3
Unclassified/Insufficient Data	2		4	4			2		
Total	64	4	4	4	27	10	27	26	9

Sources: NIS KII

Location	Modifications by NIS IAs to IS. Undertook rehabilitation (No Answer)	Modifications by NIS IAs to IS. Other Modifications (Canal Lining)	Modifications by NIS IAs to IS. Other Modifications (Drainage Rehab)	Modifications by NIS IAs to IS. Other Modifications (Canal Desiltation/rehab)	Modifications by NIS IAs to IS. Other Modifications (Others)
Downstream	8	5	2	2	6
Midstream	9	3		2	5
Upstream	10	5		1	1
Unclassified/Insufficient Data	2				
Total	29	13	2	5	12

Sources: NIS KII

By Vintage

Tables 27.1 to **27.19** report the profile of the sample NIS according to vintage covering the pre-NIA and post NIA eras.

IAs with systems built before establishment of NIA generally have few irrigation structure problems, sufficient machineries and equipment, and adequate water supply. However, they lack facilities, lateral canal problems, and have the lowest ratings in NIA's functionality surveys, indicating poor management performance.

IAs constructed between 1965 and 1980 predominantly have irrigation headwork and control structure condition problems, problems brought about by lack of machineries and equipment, financially weak IAs, lack of water supply, damaged FMRs, cropping problems due to calamities/ pests. On the other hand, they have the least occurrence of institutional problems and siltation/solid waste problems.

Generally, IA systems built from 1981 to 2013 are financially strong, successful, experience the least flooding, have adequate water supply, and have FMRs in good condition. However, they also exhibit the most and lateral canal problems, siltation problems, and institutional problems.

Table 27.1. NIS IA Profile, Cropping Information and Financial Aspects by "Vintage"

Vintage	No. of IA sample	Ave. of No. of Members	Ave. of No. of Farmers-Landowner-operator (%)	Ave. of No. of Farmers-Tenant (%)	Ave. of No. of Farmers-Lessees (%)	Does IA have water permit? (answer: no)	Does IA have water permit? (answer: yes)	Does IA have water permit? (no answer)	No. of Crops Irrigated: rice only	No of Crops Irrigated: rice and other crops	No. of IAs paying ISF/DCC/amortization
1965-1980	9	160	55	41	15	3	2	4	2	7	3
1981-2013	35	211	59	37	18	18	10	5	26	9	23
Before NIA	20	151	63	70	10	8	3	8	16		8
Average for All Sample/Total	64	187	60	45	17	29	15	17	44	16	34

Sources: NIS KII

Table 27.2. Problems/concerns of NIS IAs by "Vintage"

Vintage	No. of IA sample	No. of IAs with inadequate water supply in dry season	No. of IAs with flooding problem during wet season	No. of IAs with Irrigation Headwork Problems (damaged, deteriorated, lacking)	No. of IAs with Irrigation Main Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Lateral Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Control Structure Problems (damaged, deteriorated, lacking, unlined)	No. of IAs with Siltation, Solid Waste, Informal Settlers & Water Quality Problems	No. of IAs with problems due to lack of facilities, infrastructure (FMRs), canal extensions, drainage, storage, pipelines, STWs, solar drier & etc.	No. of IAs with problems due to damaged/lack of Machineries & Equipment (ex. Backhoes, pumps, pipes & etc.)	No. of IAs with institutional/management problems
1965-1980	9	5	1	5	2	4	5	2	4	5	2
1981-2013	35	12	1	6	9	18	9	12	6	8	18
Before NIA	20	5	1	1	2	5	1	3	9	3	9
Total	64	22	3	12	13	27	15	17	19	16	29

Sources: NIS KII

Note: Institutional/Management Problems - Water Stealing, lack of discipline, water scheduling problems, illegal turnouts, animals like carabao's allowed in canal, attendance during maintenance work, conflict among members, rules not followed, safety problems

Table 27.3. NIA's NIS Functionality Survey rating, IA's own Financial Strength rating, Collection Efficiency and IA's performance rating of ISF collection by "Vintage"

Vintage	No. of IA sample	IA Functionality Survey Rating (No Data)	IA Functionality Survey Rating (Poor - Satisfactory)	IA Functionality Survey Rating (Very Satisfactory - Outstanding)	IA's Financial Strength Rating (no data)	IA's Financial Strength Rating (0 - 2, weak)	IA's Financial Strength Rating (3-4, strong)	IA's Collection Efficiency (No Data)	IA's Collection Efficiency (0 -64%, weak)	IA's Collection Efficiency (65% - 100%, strong)
1965-1980	9	6		3	3	4	1		2	7
1981-2013	35	17	7	11	10	11	14	3	6	26
Before NIA	20	12	5	3	10	6	4	5	4	11
Total	64	35	12	17	23	21	19	8	12	44

Sources: NIS KII

Note: Not Successful - IAs having FS of poor to satisfactory, financial strength rating of 0 -2, collection efficiency below of 0 to 64% and/or ISF collection rating of 0-2
Successful - IAs having FS of very satisfactory to outstanding, financial strength rating of 3 -4, collection efficiency of at least 65% and/or ISF collection rating of 3-4

Vintage	IA's Performance Rating of Collection of ISF (no data)	IA's Performance Rating of Collection of ISF (0-2, weak)	IA's Performance Rating of Collection of ISF (3-4, strong)	No. of IAs by "Success" (insufficient data)	No. of IAs by "Success" (Not Successful)	No. of IAs by "Success" (Successful)
1965-1980	6	1	2	8	1	
1981-2013	15	2	18	19	7	9
Before NIA	12	2	6	13	6	1
Total	33	5	26	40	14	10

Sources: NIS KII

Note: Not Successful - IAs having FS of poor to satisfactory, financial strength rating of 0 -2, collection efficiency below of 0 to 64% and/or ISF collection rating of 0-2
Successful - IAs having FS of very satisfactory to outstanding, financial strength rating of 3 -4, collection efficiency of at least 65% and/or ISF collection rating of 3-4

Table 27.4. NIS IA's Performance Ratings of their water distribution and delivery service by "Vintage"

Vintage	No. of IA sample	Flexibility Index - no answer	Flexibility Index Rating - (0-2, not flexible)	Flexibility Index Rating - (3-4, flexible)	Reliability Index Rating - no answer	Reliability Index Rating - (0-2, not reliable)	Reliability Index Rating - (3-4, reliable)	Equitability Index Rating - no answer	Equitability Index Rating - (0-2, not equitable)	Equitability Index Rating - (3-4, equitable)	Adequacy of Service Delivery Rating - no data	Adequacy of Service Delivery Rating - (0-2, inadequate service)	Adequacy of Service Delivery Rating - (3-4, adequate service)
1965-1980	9	2	3	4	2	2	5	4	1	4	3	4	2
1981-2013	35	8	4	23	7	6	22	9	5	21	4	12	19
Before NIA	20	6	5	8	6	2	12	7	1	12	9	3	8
Total	64	16	12	35	15	10	39	20	7	37	16	19	29

Sources: NIS KII

Table 27.5. NIS IA's rating of their ability to seek outside help by "Vintage"

Vintage	No. of IA sample	Ave. Rating for ability of NIS IAs to seek outside help (0-4, 4 most influential)	Rating for ability of NIS IAs to seek outside help (0)	Rating for ability of NIS IAs to seek outside help (1)	Rating for ability of NIS IAs to seek outside help (2)	Rating for ability of NIS IAs to seek outside help (3)	Rating for ability of NIS IAs to seek outside help (4)	Rating for ability of NIS IAs to seek outside help (No answer)
1965-1980	9	4				1	1	7
1981-2013	35	2	3	1	7	10	4	10
Before NIA	20	2	1	1	3	2	1	12
Average for All Sample/Total	64	2	4	2	10	13	6	29

Sources: NIS KII

Table 27.6. Assistance received by NIS IAs from Various Sources by "Vintage"

Vintage	No. of IA sample	Assistance received by NIS IAs from Various sources. BSWM - Free Soil analysis	Assistance received by NIS IAs from Various sources. LGU - Farm inputs/seed subsidy	Assistance received by NIS IAs from Various sources. LGU - Repair farm to market roads	Assistance received by NIS IAs from Various sources. LGU - financial/livelihood	Assistance received by NIS IAs from Various sources. LGU - technical support	Assistance received by NIS IAs from Various sources. LGU - equipment /thresher/fuel	Assistance received by NIS IAs from Various sources. Others - flatbed dryer/solar dryer	Assistance received by NIS IAs from Various sources. Others - pump/thresher / fuel	Assistance received by NIS IAs from Various sources. Others - Seed subsidy/analysis	Assistance received by NIS IAs from Various sources. Others - soil sampling/training
1965-1980	9	1		1					1	1	
1981-2013	35	9	2	1	4	1	1	4	4	10	2
Before NIA	20		2				2		1	4	
Total	64	10	4	2	4	1	3	4	6	15	2

Sources: NIS KII

Table 27.7. Cropping problems of NIS IAs by "Vintage"

Vintage	No. of IA sample	Cropping problems of NIS IAs. Garbage in the canals	Cropping problems of NIS IAs. Lack of water supply	Cropping problems of NIS IAs. Water delivery schedule	Cropping problems of NIS IAs. Low yield/calamities	Cropping problems of NIS IAs. High production cost/low buying price	Cropping problems of NIS IAs. FMR/high harvest loss	Cropping problems of NIS IAs. Others - informal settlers, govt. Support
1965-1980	9		1		5			
1981-2013	35	1	2	2	18	6		1
Before NIA	20		1	1	4	3	1	
Total	64	1	4	3	27	9	1	1

Sources: NIS KII

Table 27.8. Problems encountered by NIS IAs by "Vintage"

Vintage	No. of IA sample	Problems encountered by NIS-IAs. Unlined canals and turnout	Problems encountered by NIS-IAs. Poor structure design	Problems encountered by NIS-IAs. Damaged irrigation structure	Problems encountered by NIS-IAs. Lack of water supply	Problems encountered by NIS-IAs. Solid waste in canals/siltation	Problems encountered by NIS-IAs. Some members don't follow the schedule	Problems encountered by NIS-IAs. Illegal turnouts	Problems encountered by NIS-IAs. Damaged farm to market road	Problems encountered by NIS-IAs. Others
1965-1980	9	2	1	2	4	1			4	1
1981-2013	35	3	4	7	11	10	6	2	3	8
Before NIA	20	2		2	3	3	2		4	4
Total	64	7	5	11	18	14	8	2	11	13

Sources: NIS KII

Note: Others - extension of water sched.; lack of equipment; lack of irrigation facilities; monitoring of water delivery & maintenance of laterals with certain stretch; none; improve the irrigation facilities; irrigation structure not yet finished; lack of discipline; not following cropping calendar; political intervention; slow action of NIS; ISF very high; lack of water pump

Table 27.9. Performance Rating of various functions of NIS IAs by "Vintage"

Vintage	No. of IA sample	Performance Rating of NIS IAs (0-4, 4 excellent). Water distribution	Performance Rating of NIS IAs (0-4, 4 excellent). Maintenance of canals	Performance Rating of NIS IAs (0-4, 4 excellent). Maintenance of control structures	Performance Rating of NIS IAs (0-4, 4 excellent). Construction of facilities	Performance Rating of NIS IAs (0-4, 4 excellent). Collection of ISF	Performance Rating of NIS IAs (0-4, 4 excellent). Collection of other fees	Performance Rating of NIS IAs (0-4, 4 excellent). Technical Advice to farmers	Performance Rating of NIS IAs. Overall rating
1965-1980	9	3	3	2	1	3	4	4	1
1981-2013	35	3	4	3	3	3	3	3	2
Before NIA	20	4	3	3	3	3	3	4	2
Average for All Sample/Total	64	3	3	3	2	3	3	3	2

Sources: NIS KII

Table 27.10. NIS IA's Collection Rate by "Vintage"

Vintage	No. of IA sample	Ave. of Collection Rate (%) of NIS IAs	Collection Rate (%) of NIS IAs. 30 and below	Collection Rate (%) of NIS IAs. 31 - 60	Collection Rate (%) of NIS IAs. 61 - 90	Collection Rate (%) of NIS IAs. 91 and above	Collection Rate (%) of NIS IAs. No answer	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). 2	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). 3	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). 4	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective) . No Answer
1965-1980	9	80		2	3	4		2		3	4
1981-2013	35	78		4	21	4	6	1	6	17	11
Before NIA	20	70	1	2	8	2	7		3	7	10
Average for All Sample/Total	64	77	1	8	32	10	13	3	9	27	25

Sources: NIS KII

Table 27.11. NIS IA's Rating on Water Delivery Service and Water Distribution Policy by "Vintage"

Vintage	No. of IA sample	Rating of NIS IAs' water delivery service (0-4, 4 highest). 0	Rating of NIS IAs' water delivery service (0-4, 4 highest). 1	Rating of NIS IAs' water delivery service (0-4, 4 highest). 2	Rating of NIS IAs' water delivery service (0-4, 4 highest). 3	Rating of NIS IAs' water delivery service (0-4, 4 highest). 4	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 0	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 1	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 2	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 3	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 4
1965-1980	9			3		2				1	3
1981-2013	35		3	6	5	14			2	5	18
Before NIA	20	1		1	3	5	1			2	7
Total	64	1	3	10	8	21	1		2	8	28

Sources: NIS KII

Table 27.12. Mode of irrigation scheduling and rating for effectiveness of accountability provision among NIS IAs by "Vintage"

Vintage	No. of IA sample	Mode of irrigation scheduling by NIS IAs. Downstream-upstream	Mode of irrigation scheduling by NIS IAs. Upstream-downstream	Mode of irrigation scheduling by NIS IAs. By groups by hour/day on rotation/ depends on IA	Mode of irrigation scheduling by NIS IAs. No answer	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective).	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 0	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 1	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 2	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 3	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 4	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). No Answer
1965-1980	9	1	5		3	4				2	2	5
1981-2013	35	5	22	1	7	3		1	2	11	10	11
Before NIA	20	4	3	2	11	3	1			3	4	12
Total	64	10	30	3	21	3	1	1	2	16	16	28

Sources: NIS KII

Table 27.13. Provisions in NIS IA policies holding IA officers/BOD accountable by "Vintage"

Vintage	No. of IA sample	Provisions in NIS IA policies holding water users accountable. No	Provisions in NIS IA policies holding water users accountable. Yes	Provisions in NIS IA policies holding water users accountable. No Answer	Provisions in NIS IA policies holding water users accountable. No Comment	Provisions in NIS IA policies holding IA officers/BOD accountable. No	Provisions in NIS IA policies holding IA officers/BOD accountable. Yes	Provisions in NIS IA policies holding IA officers/BOD accountable. No Answer
1965-1980	9	1	3	5			2	7
1981-2013	35	5	22	8		7	19	9
Before NIA	20	3	8	7	2	4	4	12
Total	64	9	33	20	2	11	25	28

Sources: NIS KII

Table 27.14. Policies which are not adequately implemented by NIS IAs by "Vintage"

Vintage	No. of IA sample	Policies which are not adequately implemented by NIS IAs. Payment of ISF/IA dues	Policies which are not adequately implemented by NIS IAs. Water delivery schedules	Policies which are not adequately implemented by NIS IAs. Penalty clauses	Policies which are not adequately implemented by NIS IAs. Others	Policies which are not adequately implemented by NIS IAs. No Answer	Policies which are not adequately implemented by NIS IAs. None	Policies which are not adequately implemented by NIS IAs. Not Applicable
1965-1980	9		1	1		2	1	4
1981-2013	35	1	4	7	3	10	9	4
Before NIA	20	1	5	1	4	1	2	8
Total	64	2	10	9	7	13	12	16

Sources: NIS KII

Note: Others - wearing of uniform, securing for personal needs, irrigation procedure, improper behavior, restriction of garbage/illegal settlers, destruction of turnouts.

Table 27.15. Trainings attended by NIS IAs by "Vintage"

Vintage	No. of IA sample	Trainings attended by NIS IAs. Basic Leadership Devt. Course	Trainings attended by NIS IAs. Financial Management	Trainings attended by NIS IAs. Org. Management/Capability/Policy	Trainings attended by NIS IAs. Values formation	Trainings attended by NIS IAs. System/water management	Trainings attended by NIS IAs. Cropping/AWD/quality control/fertilizer
1965-1980	9	8	7	3		7	9
1981-2013	35	4	7	2	3	7	7
Before NIA	20	3	5	4	3	5	4
Total	64	15	19	9	6	19	20

Sources: NIS KII

Table 27.16. Average participation to NIS-IA meetings of IA officers and BODs by "Vintage"

Vintage	No. of IA sample	Participation to NIS-IA meetings - IA officers (50 and below)	Participation to NIS-IA meetings - IA officers (51 - 80)	Participation to NIS-IA meetings - IA officers (more than 80)	Participation to NIS-IA meetings - BODs (50 and below)	Participation to NIS-IA meetings - BODs (51 - 80)	Participation to NIS-IA meetings - BODs (more than 80)	Participation to NIS-IA meetings - General assembly (50 and below)	Participation to NIS-IA meetings - General assembly (51 - 80)	Participation to NIS-IA meetings - General assembly (more than 80)
1965-1980	9		1	5		1	5	3	3	1
1981-2013	35	1	6	18	2	4	19	3	12	7
Before NIA	20	1	4	7	1	2	8	4	4	2
Total	64	2	11	30	3	7	32	10	19	10

Sources: NIS KII

Table 27.17. Frequency of meeting of NIS-IA officers/BODs and members by "Vintage"

Vintage	No. of IA sample	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (once-thrice a month)	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (once to 6 times per cropping)	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (1-2 times per month)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (once a year-every cropping)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (monthly-twice a year)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (yearly/every two years)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (have not yet conducted)
1965-1980	9	8	1		8			4	5		
1981-2013	35	24	5	4	28	3	2	20	12	2	
Before NIA	20	12		2	11		2	6	6		1
Total	64	44	6	6	47	3	4	30	23	2	1

Sources: NIS KII

Table 27.18. Manner of choosing and term of office and forms of compensation of NIS-IA officers/BOD by "Vintage"

Vintage	No. of IA sample	Manner of choosing and term of office of NIS-IA officers/BOD - election by general assembly	Manner of choosing and term of office of NIS-IA officers/BOD - voted by BOD	Manner of choosing and term of office of NIS-IA officers/BOD - 1-2 years	Manner of choosing and term of office of NIS-IA officers/BOD - 3-4 years	Forms of compensation of NIS-IA (15-30% of collection, if 70-90% collection)	Forms of compensation of NIS-IA (BOD with honorarium P1,000-P2,000)	Forms of compensation of NIS-IA (P100-200/mgt/activity)	Forms of compensation of NIS-IA (P5000/season)	Forms of compensation of NIS-IA (P200-800/month)	Forms of compensation of NIS-IA (Other incentives - snacks, P500/group discounts)	Forms of compensation of NIS-IA (none)
1965-1980	9	8	1	7	2		1		1		1	3
1981-2013	35	32	2	22	12	3	3	4		3	3	17
Before NIA	20	14		12	1					2		12
Total	64	54	3	41	15	3	4	4	1	5	4	32

Sources: NIS KII

Table 27.19. Respondents' rating on NIA's support to NIS ISs and modifications by NIS IAs to IS by "Vintage"

Vintage	No. of IA sample	Respondents' average rating on NIA's support to NIS-IAs. (Technical - 0-4, 4 excellent)	Respondents' average rating on NIA's support to NIS-IAs. (Financial - 0-4, 4 excellent)	Respondents' average rating on NIA's support to NIS-IAs. (Institutional - 0-4, 4 excellent)	Modifications by NIS IAs to IS. Structure non-operational (No)	Modifications by NIS IAs to IS. Structure non-operational (Yes)	Modifications by NIS IAs to IS. Structure non-operational (No Answer)	Modifications by NIS IAs to IS. Undertook rehabilitation (No)	Modifications by NIS IAs to IS. Undertook rehabilitation (Yes)	Modifications by NIS IAs to IS. Undertook rehabilitation (No Answer)
1965-1980	9	4	3	3	4		5	4	1	4
1981-2013	35	4	4	4	16	9	10	14	8	13
Before NIA	20	3	4	3	7	1	12	8		12
Total	64	4	4	4	27	10	27	26	9	29

Sources: NIS KII

Vintage	Modifications by NIS IAs to IS. Other Modifications (Canal Lining)	Modifications by NIS IAs to IS. Other Modifications (Drainage Rehab)	Modifications by NIS IAs to IS. Other Modifications (Canal Desiltation/rehab)	Modifications by NIS IAs to IS. Other Modifications (Others)
1965-1980				2
1981-2013	10	2	2	6
Before NIA	3		3	4
Total	13	2	5	12

Sources: NIS KII

By "Success"

The characterization of the sample according to a measure of "success" is reported in **Tables 28.1** to **28.19**.

The NIA IA Functionality Survey classifies the IA into either successful or less successful, where data collected from the field are few. In the samples, successful IAs generally have adequate water supply, few institutional problems, high functionality survey ratings, sufficient budget, and fewer problems due to lack of facilities, machineries and equipment. Despite these good attributes, these IAs still exhibited cropping problems due to calamities/ pest infestation, severe siltation problems, and condition problems for main canals, lateral canals, and control structures

On the other hand, less successful IAs experience water shortage in the dry seasons, irrigation headwork problems, problems due to lack of facilities, machineries and equipment, inadequate budget, and low ratings in functionality surveys

Table 28.1. NIS IA Profile, Cropping Information and Financial Aspects by "Success"

Classification	No. of IA sample	Ave. of No. of Members	Ave. of No. of Farmers-Landowner-operator (%)	Ave. of No. of Farmers-Tenant (%)	Ave. of No. of Farmers-Lessees (%)	Does IA have water permit? (answer: no)	Does IA have water permit? (answer: yes)	Does IA have water permit? (no answer)	No. of Crops Irrigated: rice only	No of Crops Irrigated: rice and other crops	No. of IAs paying SF/DCC/amortization
Not Successful	14	186	51	57	50	5	5	3	12	2	8
Successful	10	161	63	32	19	6	3	1	10		10
Insufficient Data	40	194	62	44	12	18	7	13	22	14	16
Average for All Sample/Total	64	187	60	45	17	29	15	17	44	16	34

Sources: NIS KII

Table 28.2. Problems/concerns of NIS IAs by "Success"

Classification	No. of IA sample	No. of IAs with inadequate water supply in dry season	No. of IAs with flooding problem during wet season	No. of IAs with Irrigation Headwork Problems (damaged, deteriorated, lacking)	No. of IAs with Irrigation Main Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Lateral Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Control Structure Problems (damaged, deteriorated, lacking, unlined)	No. of IAs with Siltation, Solid Waste, Informal Settlers & Water Quality Problems	No. of IAs with problems due to lack of facilities, infrastructure (FMRs), canal extensions, drainage, storage, pipelines, STWs, solar drier & etc.	No. of IAs with problems due to damaged/lack of Machineries &Equipment (ex. Backhoes, pumps, pipes & etc.)	No. of IAs with institutional/ management problems
Not Successful	14	7		3	1	5	1	4	7	6	9
Successful	10	1			5	9	3	3	3	1	6
Insufficient Data	40	14	3	9	7	13	11	10	9	9	14
Total	64	22	3	12	13	27	15	17	19	16	29

Source: NIS KII

Note: Institutional/Management Problems - Water Stealing, lack of discipline, water scheduling problems, illegal turnouts, animals like carabao's allowed in canal, attendance during maintenance work, conflict among members, rules not followed, safety problems

Table 28.3. NIA's NIS Functionality Survey rating, IA's own Financial Strength rating, Collection Efficiency and IA's performance rating of ISF collection by "Success"

Classification	No. of IA sample	IA Functionality Survey Rating (No Data)	IA Functionality Survey Rating (Poor - Satisfactory)	IA Functionality Survey Rating (Very Satisfactory - Outstanding)	IA's Financial Strength Rating (no data)	IA's Financial Strength Rating (0 - 2, weak)	IA's Financial Strength Rating (3-4, strong)	IA's Collection Efficiency (No Data)	IA's Collection Efficiency (0 - 64%, weak)	IA's Collection Efficiency (65% - 100%, strong)	IA's Performance Rating of Collection of ISF (no data)	IA's Performance Rating of Collection of ISF (0-2, weak)	IA's Performance Rating of Collection of ISF (3-4, strong)	No. of IAs by "Success" (insufficient data)	No. of IAs by "Success" (Not Successful)	No. of IAs by "Success" (Successful)
Not Successful	14		11	3		13	1		3	11	4	3	7		14	
Successful	10			10			10		2	8			10			10
Insufficient Data	40	35	1	4	23	8	8	8	7	25	29	2	9	40		
Total	64	35	12	17	23	21	19	8	12	44	33	5	26	40	14	10

Source: NIS KII

Note: Not Successful - IAs having FS of poor to satisfactory, financial strength rating of 0 -2, collection efficiency below of 0 to 64% and/or ISF collection rating of 0-2

Successful - IAs having FS of very satisfactory to outstanding, financial strength rating of 3 -4, collection efficiency of at least 65% and/or ISF collection rating of 3-4

Table 28.4. NIS IA's Performance Ratings of their water distribution and delivery service by "Success"

Classification	No. of IA sample	Flexibility Index - no answer	Flexibility Index Rating - (0-2, not flexible)	Flexibility Index Rating - (3-4, flexible)	Reliability Index Rating - no answer	Reliability Index Rating - (0-2, not reliable)	Reliability Index Rating - (3-4, reliable)	Equitability Index Rating - no answer	Equitability Index Rating - (0-2, not equitable)	Equitability Index Rating - (3-4, equitable)	Adequacy of Service Delivery Rating - no data	Adequacy of Service Delivery Rating - (0-2, inadequate service)	Adequacy of Service Delivery Rating - (3-4, adequate service)
Not Successful	14	2		8	2		8	2		8	1		9
Successful	10		7	7		4	10	1	2	11	1	7	6
Insufficient Data	40	14	5	20	13	6	21	17	5	18	14	12	14
Total	64	16	12	35	15	10	39	20	7	37	16	19	29

Source: NIS KII

Table 28.5. NIS IA's rating of their ability to seek outside help by "Success"

Classification	No. of IA sample	Ave. Rating for ability of NIS IAs to seek outside help (0-4, 4 most influential)	Rating for ability of NIS IAs to seek outside help (0)	Rating for ability of NIS IAs to seek outside help (1)	Rating for ability of NIS IAs to seek outside help (2)	Rating for ability of NIS IAs to seek outside help (3)	Rating for ability of NIS IAs to seek outside help (4)	Rating for ability of NIS IAs to seek outside help (No answer)
Not Successful	14	3		2	3	5	3	1
Successful	10	2	2		1	4	2	1
Insufficient Data	40	2	2		6	4	1	27
Average for All Sample/Total	64	2	4	2	10	13	6	29

Source: NIS KII

Table 28.6. Assistance received by NIS IAs from Various Sources by "Success"

Classification	No. of IA sample	Assistance received by NIS IAs from Various sources. BSWM - Free Soil analysis	Assistance received by NIS IAs from Various sources. LGU - Farm inputs/seed subsidy	Assistance received by NIS IAs from Various sources. LGU - Repair farm to market roads	Assistance received by NIS IAs from Various sources. LGU - financial/livelihood	Assistance received by NIS IAs from Various sources. LGU - technical support	Assistance received by NIS IAs from Various sources. LGU - equipment/thresher/fuel	Assistance received by NIS IAs from Various sources. Others - flatbed dryer/solar dryer	Assistance received by NIS IAs from Various sources. Others - pump/thresher/ fuel	Assistance received by NIS IAs from Various sources. Others - Seed subsidy/analysis	Assistance received by NIS IAs from Various sources. Others - soil sampling/training
Not Successful	14	7	1		3	1			1	3	1
Successful	10	1	2	1	1		1	1	1	2	1
Insufficient Data	40	2	1	1			2	3	4	10	
Total	64	10	4	2	4	1	3	4	6	15	2

Source: NIS KII

Table 28.7. Cropping problems of NIS IAs by "Success"

Classification	No. of IA sample	Cropping problems of NIS IA's. Garbage in the canals	Cropping problems of NIS IA's. Lack of water supply	Cropping problems of NIS IAs. Water delivery schedule	Cropping problems of NIS IAs. Low yield/calamities	Cropping problems of NIS IAs. High production cost/low buying price	Cropping problems of NIS IAs. FMR/high harvest loss	Cropping problems of NIS IAs. Others - informal settlers, govt. Support
Not Successful	14				6	2		
Successful	10		2	2	6	4		
Insufficient Data	40	1	2	1	15	3	1	1
Total	64	1	4	3	27	9	1	1

Source: NIS KII

Table 28.8. Problems encountered by NIS IAs by "Success"

Classification	No. of IA sample	Problems encountered by NIS-IAs. Unlined canals and turnout	Problems encountered by NIS-IAs. Poor structure design	Problems encountered by NIS-IAs. Damaged irrigation structure	Problems encountered by NIS-IAs. Lack of water supply	Problems encountered by NIS-IAs. Solid waste in canals/siltation	Problems encountered by NIS-IAs. Some members don't follow the schedule	Problems encountered by NIS-IAs. Illegal turnouts	Problems encountered by NIS-IAs. Damaged farm to market road	Problems encountered by NIS-IAs. Others
Not Successful	14	1	2	6	3	2	4	3		
Successful	10		2	5	4	1	1			
Insufficient Data	40	6	1	6	12	7	5	1	7	10
Total	64	7	5	11	18	14	8	2	11	13

Source: NIS KII

Note: Others - extension of water sched.. lack of equipment; lack of irrigation facilities; monitoring of water delivery & maintenance of laterals with certain stretch; none; improve the irrigation facilities; irrigation structure not yet finished; lack of discipline; not following cropping calendar; political intervention; slow action of NIS; ISF very high; lack of water pump

Table 28.9. Average Performance Rating of various functions of NIS IAs by "Success"

Classification	No. of IA sample	Performance Rating of NIS IAs (0-4, 4 excellent). Water distribution	Performance Rating of NIS IAs (0-4, 4 excellent). Maintenance of canals	Performance Rating of NIS IAs (0-4, 4 excellent). Maintenance of control structures	Performance Rating of NIS IAs (0-4, 4 excellent). Construction of facilities	Performance Rating of NIS IAs (0-4, 4 excellent). Collection of ISF	Performance Rating of NIS IAs (0-4, 4 excellent). Collection of other fees	Performance Rating of NIS IAs (0-4, 4 excellent). Technical Advice to farmers	Performance Rating of NIS IAs. Overall rating
Not Successful	14	3	3	3	2	3	3	3	3
Successful	10	4	4	3	2	3	3	3	3
Insufficient Data	40	3	3	3	3	3	3	3	1
Average for All Sample/Total	64	3	3	3	2	3	3	3	2

Source: NIS KII

Table 28.10. NIS IA's Collection Rate by "Success"

Classification	No. of IA sample	Ave. of Collection Rate (%) of NIS IAs	Collection Rate (%) of NIS IAs. 30 and below	Collection Rate (%) of NIS IAs. 31 - 60	Collection Rate (%) of NIS IAs. 61 - 90	Collection Rate (%) of NIS IAs. 91 and above	Collection Rate (%) of NIS IAs. No answer	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). 2	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). 3	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). 4	Rating on NIS IAs' ability to resolve conflict (0-4, 4 effective). No Answer
Not Successful	14	72	1	1	10	1	1	1	5	7	1
Successful	10	75		1	9					9	1
Insufficient Data	40	79		6	13	9	12	2	4	11	23
Average for All Sample/Total	64	77	1	8	32	10	13	3	9	27	25

Source: NIS KII

Table 28.11. NIS IA's Rating on Water Delivery Service and Water Distribution Policy by "Success"

Classification	No. of IA sample	Rating of NIS IAs' water delivery service (0-4, 4 highest). 0	Rating of NIS IAs' water delivery service (0-4, 4 highest). 1	Rating of NIS IAs' water delivery service (0-4, 4 highest). 2	Rating of NIS IAs' water delivery service (0-4, 4 highest). 3	Rating of NIS IAs' water delivery service (0-4, 4 highest). 4	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 0	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 1	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 2	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 3	Rating of NIS IAs' policy on water distribution scheme (0-4, 4 highest). 4
Not Successful	14	1	2	4	3	3	1		1	1	9
Successful	10				2	7				2	8
Insufficient Data	40		1	6	3	11			1	5	11
Total	64	1	3	10	8	21	1		2	8	28

Source: NIS KII

Table 28.12. Mode of irrigation scheduling and rating for effectiveness of accountability provision among NIS IAs by "Success"

Classification	No. of IA sample	Mode of irrigation scheduling by NIS IAs. Downstream-upstream	Mode of irrigation scheduling by NIS IAs. Upstream-downstream	Mode of irrigation scheduling by NIS IAs. By groups by hour/day on rotation/ depends on IA	Mode of irrigation scheduling by NIS IAs. No answer	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective).	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 0	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 1	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 2	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 3	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). 4	Rating for effectiveness of accountability provision among NIS IAs (0-4, 4 most effective). No Answer
Not Successful	14	3	10		1	3	1		1	7	3	2
Successful	10	1	8	1		4				4	5	1
Insufficient Data	40	6	12	2	20	3		1	1	5	8	25
Total	64	10	30	3	21	3	1	1	2	16	16	28

Source: NIS KII

Table 28.13. Provisions in NIS IA policies holding IA officers/BOD accountable by "Success"

Classification	No. of IA sample	Provisions in NIS IA policies holding water users accountable. No	Provisions in NIS IA policies holding water users accountable. Yes	Provisions in NIS IA policies holding water users accountable. No Answer	Provisions in NIS IA policies holding water users accountable. No Comment	Provisions in NIS IA policies holding IA officers/BOD accountable. No	Provisions in NIS IA policies holding IA officers/BOD accountable. Yes	Provisions in NIS IA policies holding IA officers/BOD accountable. No Answer
Not Successful	14	2	10	1	1	3	9	2
Successful	10		8	1	1	2	6	2
Insufficient Data	40	7	15	18		6	10	24
Total	64	9	33	20	2	11	25	28

Source: NIS KII

Table 28.14. Policies which are not adequately implemented by NIS IAs by "Success"

Classification	No. of IA sample	Policies which are not adequately implemented by NIS IAs. Payment of ISF/IA dues	Policies which are not adequately implemented by NIS IAs. Water delivery schedules	Policies which are not adequately implemented by NIS IAs. Penalty clauses	Policies which are not adequately implemented by NIS IAs. Others	Policies which are not adequately implemented by NIS IAs. No Answer	Policies which are not adequately implemented by NIS IAs. None	Policies which are not adequately implemented by NIS IAs. Not Applicable
Not Successful	14	1	8	1	1	2	2	1
Successful	10				2		7	1
Insufficient Data	40	1	2	8	4	11	3	14
Total	64	2	10	9	7	13	12	16

Source: NIS KII

Note: Others - wearing of uniform, securing for personal needs, irrigation procedure, improper behavior, restriction of garbage/illegal settlers, destruction of turnouts.

Table 28.15. Trainings attended by NIS IAs by "Success"

Classification	No. of IA sample	Trainings attended by NIS IAs. Basic Leadership Devt. Course	Trainings attended by NIS IAs. Financial Management	Trainings attended by NIS IAs. Org. Management/Capability/Policy	Trainings attended by NIS IAs. Values formation	Trainings attended by NIS IAs. System/water management	Trainings attended by NIS IAs. Cropping/AWD/quality control/fertilizer
Not Successful	14	4	7	2	3	7	7
Successful	10	3	5	4	3	5	4
Insufficient Data	40	8	7	3		7	9
Total	64	15	19	9	6	19	20

Source: NIS KII

Table 28.16. Average participation to NIS-IA meetings of IA officers and BODs by "Success"

Classification	No. of IA sample	Participation to NIS-IA meetings - IA officers (50 and below)	Participation to NIS-IA meetings - IA officers (51 - 80)	Participation to NIS-IA meetings - IA officers (more than 80)	Participation to NIS-IA meetings - BODs (50 and below)	Participation to NIS-IA meetings - BODs (51 - 80)	Participation to NIS-IA meetings - BODs (more than 80)	Participation to NIS-IA meetings - General assembly (50 and below)	Participation to NIS-IA meetings - General assembly (51 - 80)	Participation to NIS-IA meetings - General assembly (more than 80)
Not Successful	14		3	10		1	12	3	6	3
Successful	10	1		9		2	8	1	5	4
Insufficient Data	40	1	8	11	3	4	12	6	8	3
Total	64	2	11	30	3	7	32	10	19	10

Source: NIS KII

Table 28.17. Frequency of meeting of NIS-IA officers/BODs and members by "Success"

Classification	No. of IA sample	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (once-thrice a month)	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (once to 6 times per cropping)	Frequency of meeting of NIS-IA officers/BODs and members. IA officers (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (1-2 times per month)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (once a year-every cropping)	Frequency of meeting of NIS-IA officers/BODs and members. BODs (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (monthly-twice a year)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (yearly/every two years)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (as needed)	Frequency of meeting of NIS-IA officers/BODs and members. General Assembly (have not yet conducted)
Not Successful	14	11	2		11	2		7	6		1
Successful	10	9	1		10			4	6		
Insufficient Data	40	24	3	6	26	1	4	19	11	2	
Total	64	44	6	6	47	3	4	30	23	2	1

Source: NIS KII

Table 28.18. Manner of choosing and term of office and forms of compensation of NIS-IA officers/BOD by "Success"

Classification	No. of IA sample	Manner of choosing and term of office of NIS-IA officers/BOD - election by general assembly	Manner of choosing and term of office of NIS-IA officers/BOD - voted by BOD	Manner of choosing and term of office of NIS-IA officers/BOD - 1-2 years	Manner of choosing and term of office of NIS-IA officers/BOD - 3-4 years	Forms of compensation of NIS-IA (15-30% of collection, if 70-90% collection)	Forms of compensation of NIS-IA (BOD with honorarium P1,000-P2,000)	Forms of compensation of NIS-IA (P100-200/mgt/activity)	Forms of compensation of NIS-IA (P5000/season)	Forms of compensation of NIS-IA (P200-800/month)	Forms of compensation of NIS-IA (Other incentives - snacks, P500/group discounts)	Forms of compensation of NIS-IA (none)
Not Successful	14	14		11	3	1		1			1	10
Successful	10	9	1	9	1		2	2		4	2	
Insufficient Data	40	31	2	21	11	2	2	1	1	1	1	22
Total	64	54	3	41	15	3	4	4	1	5	4	32

Source: NIS KII

Table 28.19. Respondents' rating on NIA's support to NIS IAs and modifications by NIS IAs to IS by "Success"

Classification	No. of IA sample	Respondents' average rating on NIA's support to NIS-IAs. (Technical - 0-4, 4 excellent)	Respondents' average rating on NIA's support to NIS-IAs. (Financial - 0-4, 4 excellent)	Respondents' average rating on NIA's support to NIS-IAs. (Institutional - 0-4, 4 excellent)	Modifications by NIS IAs to IS. Structure non-operational (No)	Modifications by NIS IAs to IS. Structure non-operational (Yes)	Modifications by NIS IAs to IS. Structure non-operational (No Answer)	Modifications by NIS IAs to IS. Undertook rehabilitation (No)	Modifications by NIS IAs to IS. Undertook rehabilitation (Yes)	Modifications by NIS IAs to IS. Undertook rehabilitation (No Answer)	Modifications by NIS IAs to IS. Other Modifications (Canal Lining)	Modifications by NIS IAs to IS. Other Modifications (Drainage Rehab)	Modifications by NIS IAs to IS. Other Modifications (Canal Desiltation /rehab)	Modifications by NIS IAs to IS. Other Modifications (Others)
Not Successful	14	3	3	3	8	1	5	8	1	5	2	1		2
Successful	10	4	4	4	6	3	1	4	5	1	8			2
Insufficient Data	40	4	3	4	13	6	21	14	3	23	3	1	5	8
Total	64	4	4	4	27	10	27	26	9	29	13	2	5	12

Source: NIS KII

Technical and Institutional Issues and Concerns across the 22 Sample NIS

Tables 29-31 show the summary of technical/environmental and institutional issues and concerns across all the 22 NIS cases. This table reports siltation, damaged irrigation canals and control structures, double pumping and high operation costs when private pumps are used when NIS water is inadequate or not timely. For the environmental concerns, the high pH which can potentially result in sodocity and lack of data are dominant. For the institutional concerns, water theft, scheduling and distribution appear to be the more common concerns.

Overall Irrigation Performance Assessment[8]

In the initial development of Irrigation Performance Index (IPI) using PCA based on a small sample size of 64, results show that performance ranged from low to high level with majority of the IAs (37/64) having moderate level of performance as reflected in the IPI of the different NIS cases analyzed. The key indicators that affect the performance of NIS consist of Financial, Economic, Institutional, Technical and Environmental factors.

Within the *financial component*, the key indicators that posed significant contribution as computed by the PCA are: 1) IA's rate on their financial strength – this could imply the financial capability of the IA which could be critical in the organization's development; 2) Collection efficiency – a higher collection efficiency would mean higher capacity to pay the ISF and consequently more incentives for the organization; and 3) Collection delinquency – this indicator posed a negative relationship with the overall CPI since a higher delinquency would decrease the performance index of the IAs. This is expected since more uncollected ISFs would mean less incentive and could imply a very low capacity to pay.

Within the *economic component*, the indicators Annual yield and Annual gross profit posed significant contribution to the overall impact. Increase in the annual yield could also be consequent to the increase in the annual profit. An increase in any of these factors also indicates an increase in the overall CPI.

The significant indicators for the *institutional component* includes: 1) Effectiveness of policies; 2) Flexibility index rating; 3) Reliability index rating; and 4) Satisfaction rate on farm to market road availability. All institutional component indicators are based on satisfaction rating of IAs towards the policies implemented by NIA.

The *technical component* indicators include Canal structure's ease of operability and Canal structure's operability vs the design. Canal structure's ease of operability pertains to how easy it is to operate the structures such as check gates, turnout gates, etc. While Canal structure's operability vs design pertains to the comparison between the original designs of the irrigation system vs the actual use of the irrigation structure.

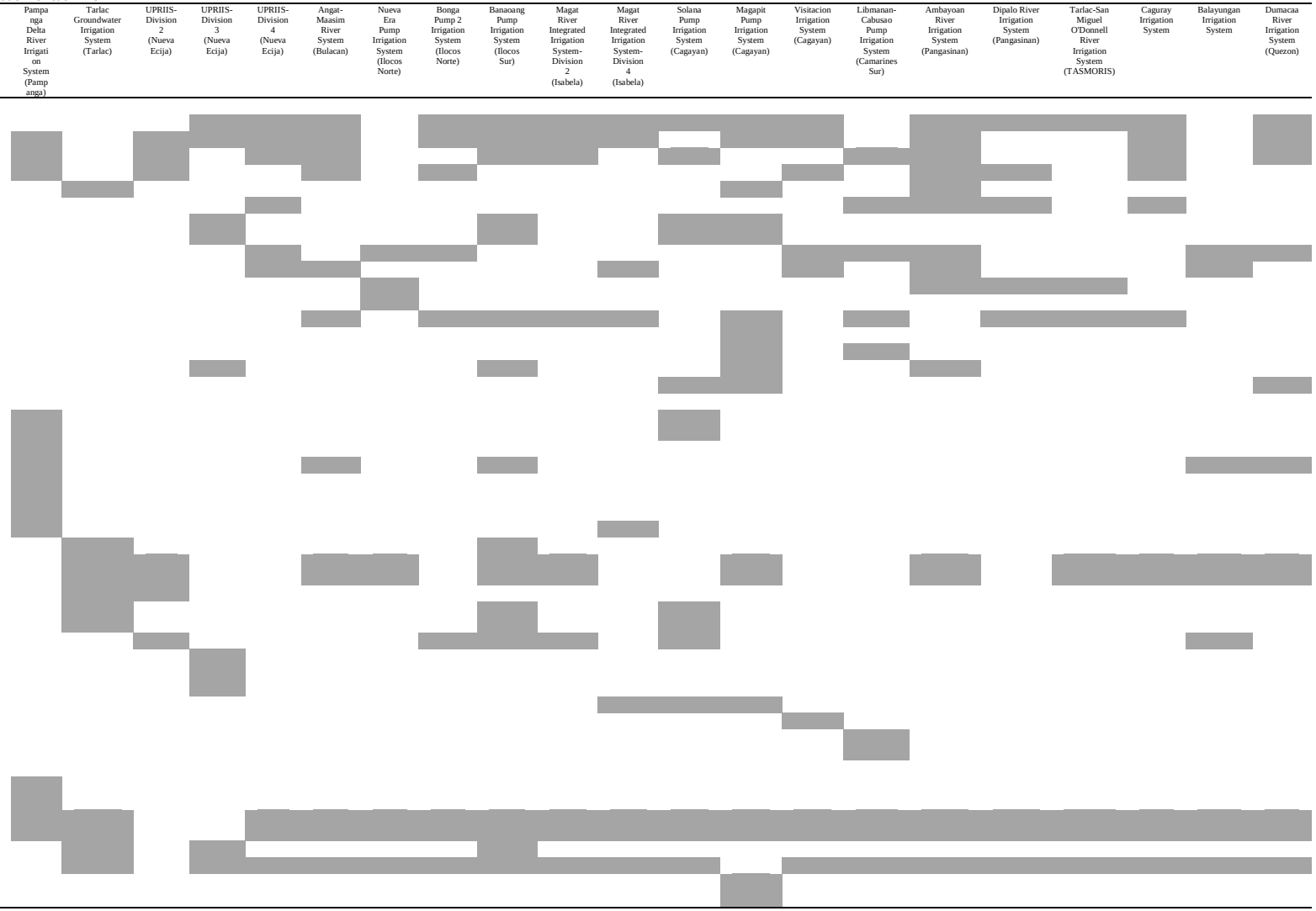
[8] This section is drawn from Clemente, et al. (2015).

Finally, the *environmental component* indicators show that the Dissolve Oxygen content and acidity (indicated by pH content <5) posed significant effect to the overall CPI. Higher DO (i.e. > 6 ppm) and pH content (i.e. >5) means better quality of water. However, the pH found in most water samples show levels >7 which indicate alkaline conditions and can pose some sodicity problems in water quality if not addressed on time.

This impact assessment on performance is from the point of view of IAs and will have to be complemented or validated by technical data. However this initial assessment already provides some indication how an NIS is performing based on the overall index.

The results indicate that only 12% of the 64 sample IAs consider their systems' performance as "high" based on the five areas of irrigation service performance while 58% rated their systems' performance as "moderate" and the rest of the systems, low performance. These results indicate opportunities to improve overall irrigation service performance.

Table 29 Summary of Observation for each NIS



Issues	Pampanga Delta River Irrigation System (Pampanga)	Tarlac Groundwater Irrigation System (Tarlac)	UPRIIS-Division 2 (Nueva Ecija)	UPRIIS-Division 3 (Nueva Ecija)	UPRIIS-Division 4 (Nueva Ecija)	Angat-Maasim River System (Bulacan)	Nueva Era Pump Irrigation System (Ilocos Norte)	Bonga Pump 2 Irrigation System (Ilocos Norte)	Banaoang Pump Irrigation System (Ilocos Sur)	Magat River Integrated Irrigation System-Division 2 (Isabela)	Magat River Integrated Irrigation System-Division 4 (Isabela)	Solana Pump Irrigation System (Cagayan)	Magapit Pump Irrigation System (Cagayan)	Visitacion Irrigation System (Cagayan)	Libmanan-Cabusao Pump Irrigation System (Camarines Sur)	Ambayoan River Irrigation System (Pangasinan)	Dipalo River Irrigation System (Pangasinan)	Tarlac-San Miguel O'Donnell River Irrigation System (TASMORIS)	Caguray Irrigation System	Balayungan Irrigation System	Dumacaa River Irrigation System (Quezon)
Technical Issues																					
Siltation																					
Canal related																					
High operation cost of pump																					
Control Structure																					
Flooding																					
Shortage of Water Supply																					
Informal Settlers/ Solid Waste																					
Water Source																					
Farm-to-market road																					
Irrigation Headwork																					
Others																					
Machineries & Equipment																					
Drainage																					
Salt Intrusion																					
Calamities/Low Yield																					
Pest Infestation																					
Institutional Issues																					
Implementation of NIA's Programs																					
LGU support																					
ISF Payment																					
Inadequate Policies or Ordinances																					
Organizational																					
Funds																					
Registration																					
Water Theft, Scheduling & Distribution																					
NIA Assistance/Support																					
Training Adaptation/ Competency																					
Profitability																					
Converted Area																					
Collection Efficiency																					
Problems																					
Lacking Regulation/Policy																					
Others:																					
Participation in Maintenance Work																					
Environmental Issues:																					
Water quality measurements																					
Low DO levels of 2.7 ppm.																					
Measured pH values are greater than 7																					
High salinity																					
No water quality data																					
Sea water intrusion																					
Salinity																					

Source: NIS KII and Ocular Inspection, PIDS Irrigation Study team (2015).
Note: For each NIS, 3 Irrigators Associations representing up-, mid-, downstream relative to main canals were interviewed.
For more details, refer to Excel file.

Table 30. Summary of Problems Encountered by the Sampled 21 Luzon NIS, 2015

Issues	Percentage of Total NIS Sampled (%)
Technical Issues	
Siltation	71
Canal related	67
High operation cost of pump	52
Control Structure	38
Flooding	14
Shortage of Water Supply	24
Informal Settlers/ Solid Waste	19
Water Source	38
Farm-to-market road	29
Irrigation Headwork	19
Others	5
Machineries & Equipment	48
Drainage	5
Salt Intrusion	10
Calamities/Low Yield	19
Pest Infestation	14
Institutional Issues	
Implementation of NIA's Programs	10
LGU support	5
ISF Payment	24
Inadequate Policies or Ordinances	5
Organizational	5
Funds	10
Registration	10
Water Theft, Scheduling & Distribution	57
NIA Assistance/Support	10
Training Adaptation/ Competency	14
Profitability	29
Converted Area	5
Collection Efficiency Problems	5
Lacking Regulation/Policy	14
Others:	5
Participation in Maintenance Work	5
Environmental Issues	
Water quality measurements	5
Low DO levels of 2.7 ppm.	5
Measured pH values are greater than 7	90
High salinity	14
No water quality data	86
Sea water intrusion	5
Salinity	5

Source: NIS KII and Ocular Inspection, PIDS Irrigation Study team (2015).

Note: For each NIS, 3 Irrigators Associations representing up-, mid-, downstream relative to main canals were interviewed.

Table 31. Summary of IA responses and rating to technical, institutional, organizational, economic and financial inquiries

Questions	Upstream		Midstream		Downstream	
	Y	N	Y	N	Y	N
Does the IA have water permit?	10%	90%	27%	73%	33%	67%
Had there been a complete turnover by NIA to IA?	43%	29%	59%	5%	57%	19%
Is there a MOA regarding the turnover?	81%	0%	64%	18%	76%	14%
Is there regular support from NIA?	57%	0%	73%	0%	71%	5%
Were there IA initiated modifications?	10%	38%	9%	45%	29%	43%
Has the IA undertaken rehabilitation?	14%	33%	5%	50%	24%	38%
Has the IA undertaken restoration?	10%	38%	0%	50%	5%	52%
At present, are there irrigation infrastructures that are not 100% operational?	29%	29%	23%	36%	24%	38%
Are there farms irrigated by supplemental mode (pumps)?	38%	19%	18%	36%	19%	38%
How do IAs decide on water allocation? (Y = quorum; N = GA votes)	52%	24%	59%	14%	48%	10%
Do you practice scheduling or rotational irrigation?	67%	33%	59%	41%	76%	24%
Preferred irrigation flow (Y = upstream-downstream; N = downstream-upstream)	86%	14%	86%	14%	67%	33%
Are there written rules regarding proper behavior of members?	67%	0%	77%	5%	71%	10%
How are decisions made? (Y - quorum; N - GA vote)	43%	38%	64%	14%	57%	24%
Are there provisions in the rule holding water users accountable?	48%	10%	59%	18%	48%	14%
If violated, how is accountability/liability enforced? (Y-penalty; N-sanctions)	38%	0%	45%	14%	43%	10%
Were there actions from local government, water district, NGO, or other organizations?	0%	100%	0%	100%	5%	95%
Are there provisions in the rule holding officers/BOD accountable?	33%	10%	32%	32%	52%	10%
If conflict arises, are there conflict resolution mechanisms?	38%	24%	41%	32%	62%	14%
Are there legally specified mechanisms for transboundary conflict?	5%	57%	9%	41%	10%	52%
Has the IA received any awards related to operation/performance?	19%	43%	23%	41%	19%	48%
Has the IA availed of financial assistance through government or other agencies?	0.19	0.29	0.23	0.36	0.14	0.52
Are water charges collected?	0.57	0.29	0.5	0.36	0.57	0.33
Are there any incentives for paying on time?	0.33	0.29	0.41	0.36	0.33	0.38

Source: NIS KII

COMMUNAL IRRIGATION SYSTEM PROVINCIAL OR IMO TRENDS

To put the CIS institutional and technical assessments of 64 sample cases in perspective, trends in provincial or IMO data are analyzed. The national CIS trends are used as benchmark (**Table 32**, **Figure 34**).

Figure 34 shows the national trends in CIS performance. Service area has been growing but at a relatively slow pace while firmed up service area has been closely following. Given the relatively stable difference between the SA and FUSA, land conversion or growth in permanently non-restorable area does not appear to be a concern as it peaked at 10% but down to 4% in 2013. However, the trends in actual irrigated areas during the wet and dry seasons are much lower than the FUSA and faltered in 2012. In fact, the wet and dry seasons irrigation intensities never reached the 80% mark and even declined by about 20% in 2012.

The decline in collection efficiency has been steady and substantial from about 70% to just over 40%. The decrease in back account to collectible ratio is even more drastic. And yet, the share of actual current amortization to total income has been largely reduced indicating amortization collection has drastically dropped (Table 32). One explanation has to do with the reduction in the CIS staff due to the RatPlan which started in 2008 and confirmed by the drastic declines in the ratios of FUSA to plantilla staff even if the daily staff would be added. Another possible explanation is the remoteness of many CIS and the lack of operating funds which may have limited the efforts and effectiveness of NIA in collecting. A basic issue is that there is no incentive for NIA to collect because whether the IAs would pay the amortization or not, the CIS staff are paid salaries.

The O&M per ha had been declining since late 2000 although appear to be increasing again from 2012 (**Figure 35**). This pattern appears to be consistent with the observations of poor system maintenance

Figure 36 shows the regional trends in service area indicating where the developments had been in the last eight years. Hardly any change can be observed except in two regions – CAR and Region 1 and region 5 since 2012. Eye catching is the sharp decline in Region 2 which may be explained by the conversion of many CIS to NIS. Looking at the IMO or Provincial trends, it looks like the decline in Region 2 is largely happening in Cagayan, followed by Isabela and Nueva Vizcaya (**Figure 37**).

The regional trends in O&M and O&M per ha show a telling picture (**Figure 38**). Except for CAR & Region 1, Regions 2 and 8, the rest of the regions show declining spending on O&M/ha. **Figure 39** shows the trends for the sample IMO-Provinces clearly indicating where O&M spending are relatively better particularly in Region 2.

Interestingly, irrigation intensities are seen to be increasing in Regions 2 and 9 from 2012 onward, and generally in Regions 3 and 8 (**Figure 40**). The sample IMO-Provinces however, show only Pangasinan and Nueva Ecija as seemingly consistent with the increasing regional patterns in Regions 2 and 3 (**Figure 41**).

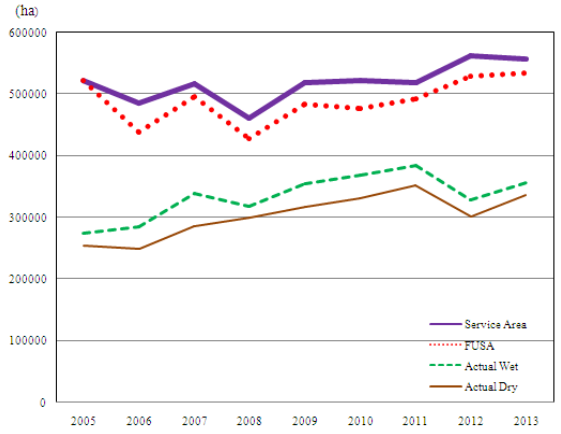
Figure 42 shows which regions show dismal collection efficiencies with below 50% or generally declining trends. It appears that the Mindanao CIS are doing far better. Among the IMO sample, Isabela and Nueva Vizcaya are doing better (**Figure 43**).

Table 32. CIS Performance Ratios of National, 2005 to 2013

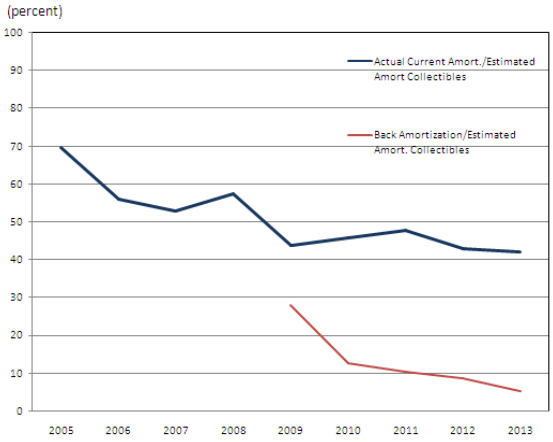
Ratios	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					50	48	48	54	56
FUSA/Filled-up (Ha/staff)					835	842	870	1003	948
FUSA/Filled-up + Daily Staff (Ha/staff)					710	710	734	841	800
FUSA/SA (%)	100	90	96	93	93	91	95	94	96
Ben. Wet/Actual Wet (%)	92	90	84	94	100	98	93	97	97
Ben. Dry/Actual Dry (%)					100	98	97	94	95
CIS Amort./Total Income (%)	16	16	20	19	15	20	21	12	14
Amort. Back/Total Income (%)					10	5	5	2	2
Equipment Rental/Total Income (%)	27	25	18	19	16	17	19	12	11
Equity Payment/Total Income (%)	48	51	50	49	56	48	44	57	58
Total Income (%)	91	92	88	87	96	90	89	84	84
Wet Yield (cavan/ha)	80	80	80	81	33				10
Dry Yield (cavan/ha)	81	80	81	82					18

Sources: NIA-SMD CISPER data, various years.

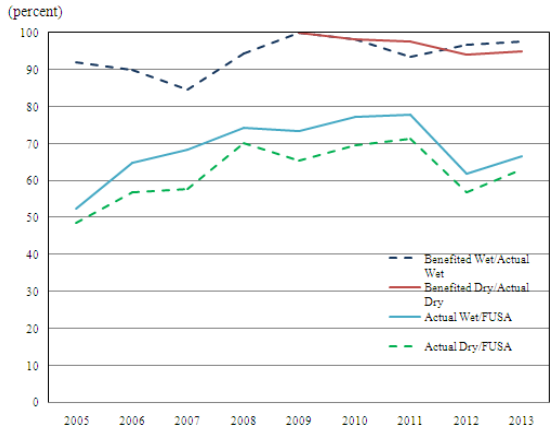
Figure 34. Trends in key performance indicators of CIS, Philippines, 2005-2013



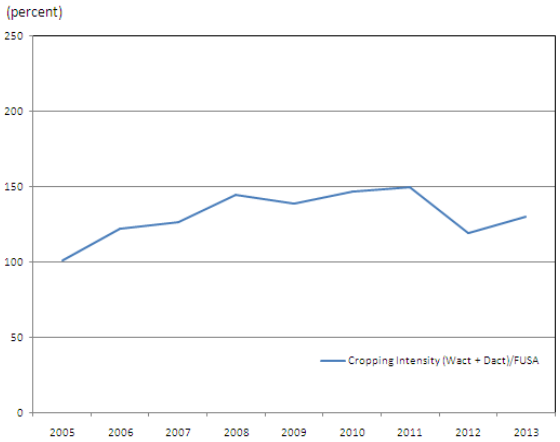
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



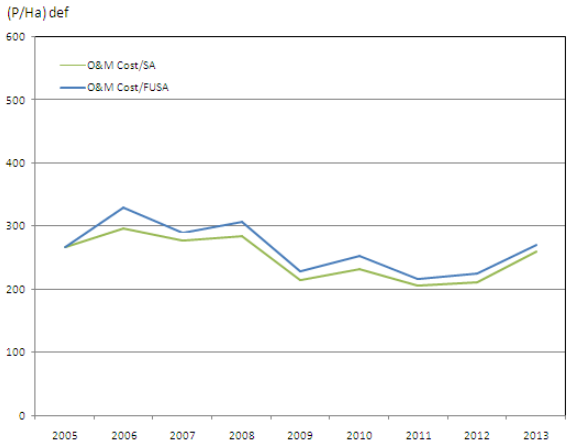
b. Collection efficiency



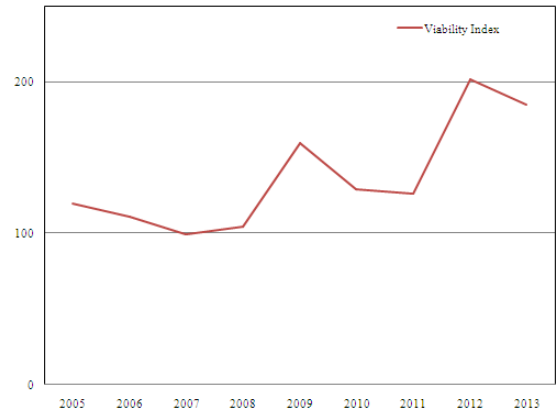
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/FUSA



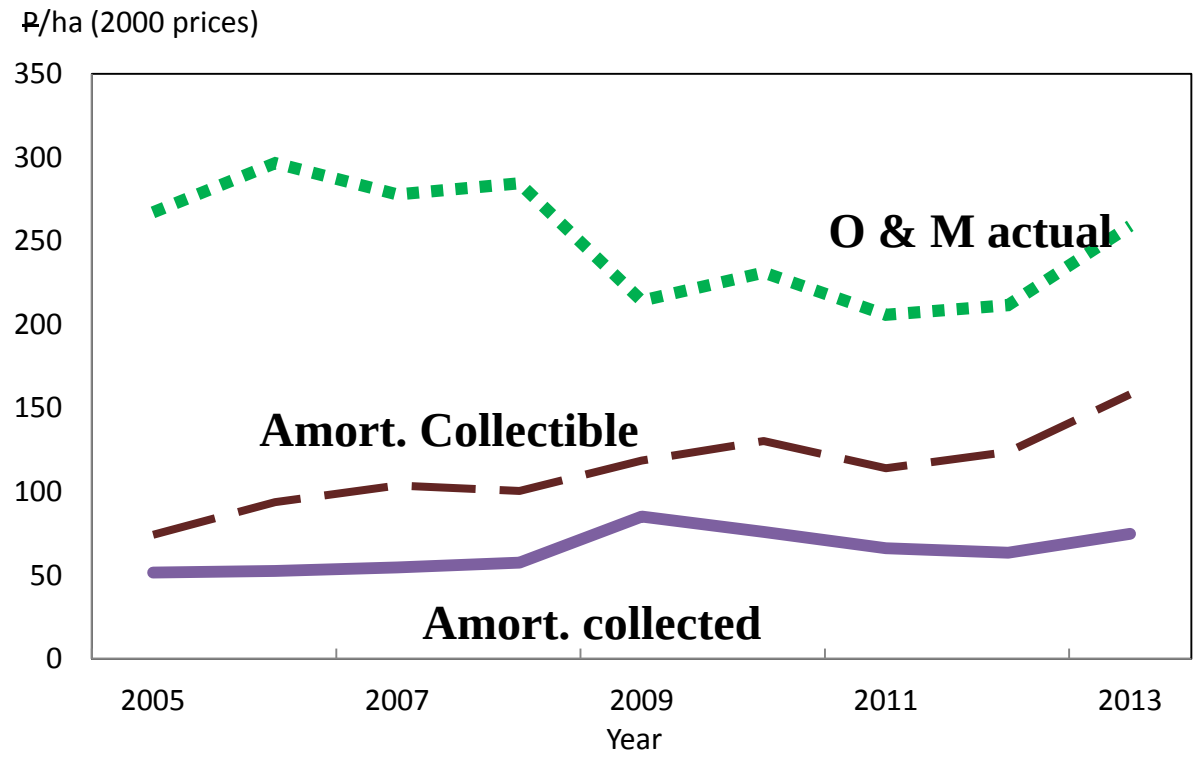
e. O&M per ha



f. Viability index

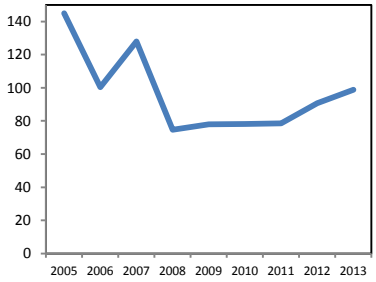
Sources: NIA-SMD CISPER data, various years.

Figure 35. Trends in O&M, Amort. Collectible and Amortization Collected, CIS, Philippines, 2005-2013

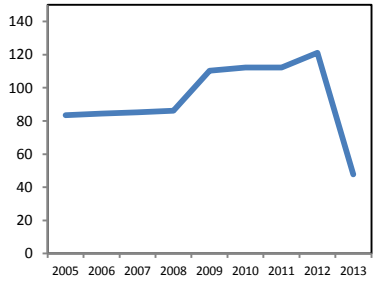


Sources: CISPER, NIA-SMD, various years.

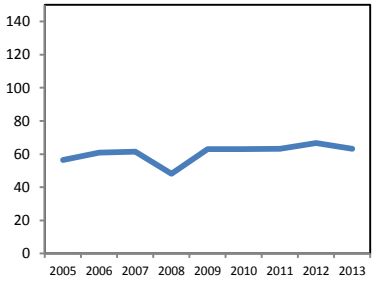
Figure 36. Trends in the service area of CIS by region, 2005-2013 (‘000 ha)



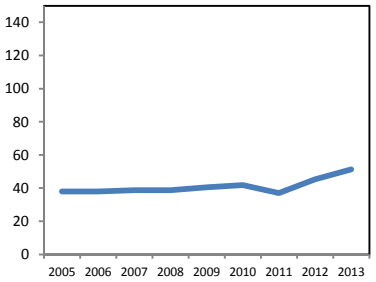
Car & Region 1



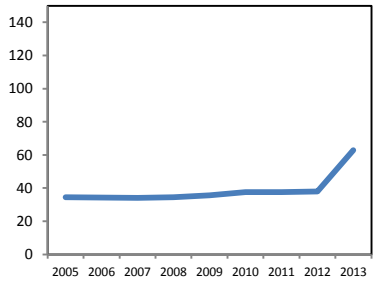
Region 2



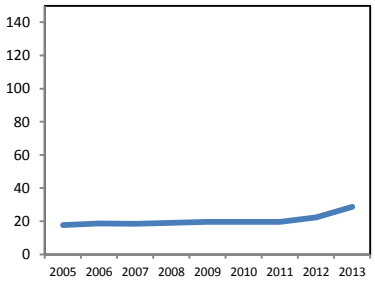
Region 3



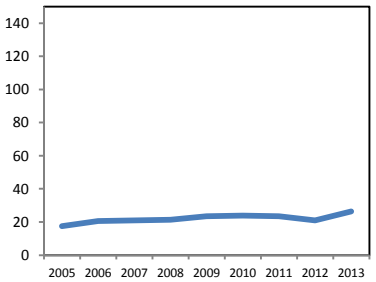
Region 4



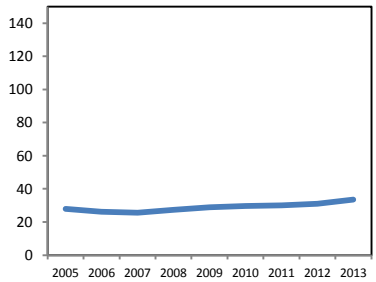
Region 5



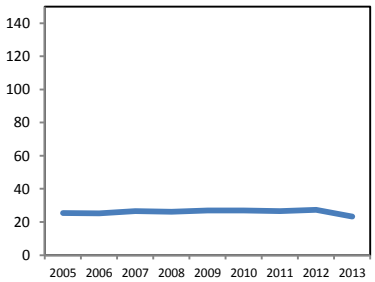
Region 6



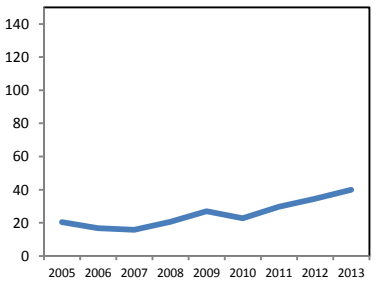
Region 7



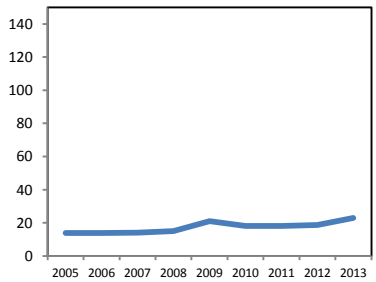
Region 8



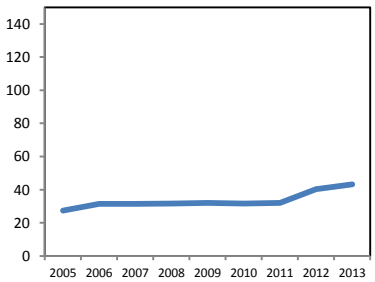
Region 9



Region 10, 10AR & Region 13



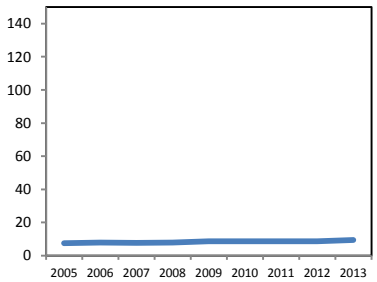
Region 11



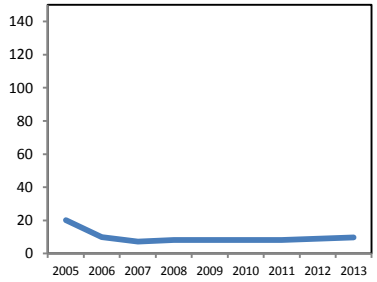
Region 12 & ARMM

Sources: CISPER, NIA-SMD, various years.

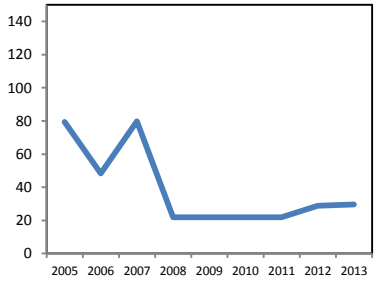
Figure 37. Trends in the service area of CIS by IMO-Province, 2005-2013 ('000 ha)



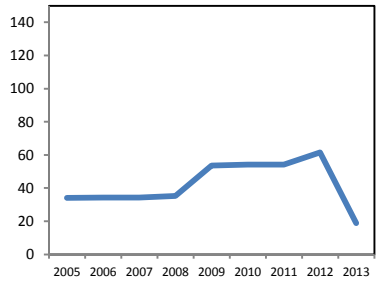
Benguet



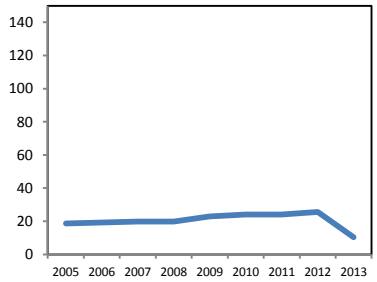
Ilocos Norte IMO



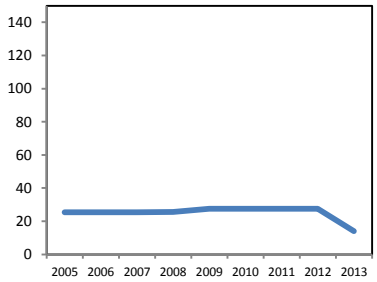
Pangasinan IMO



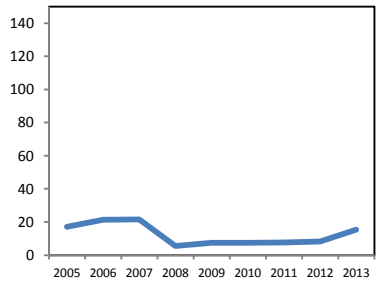
Cagayan



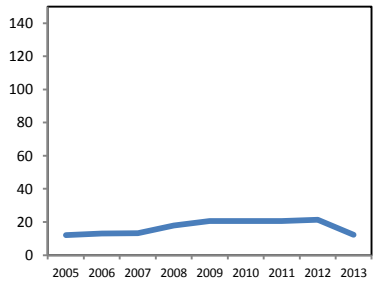
Isabela IMO



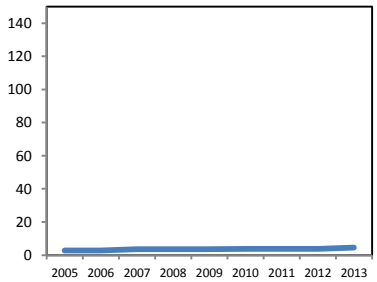
Nueva Vizcaya IMO



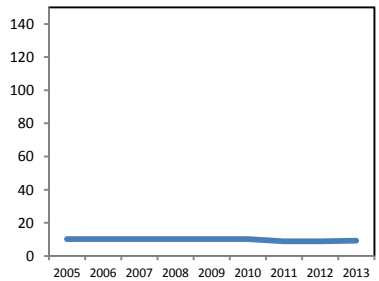
Pampanga



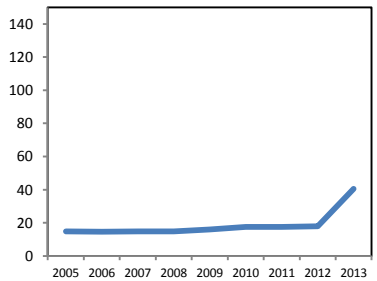
Nueva Ecija



Laguna



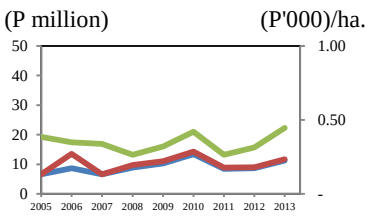
Occidental Mindoro IMO



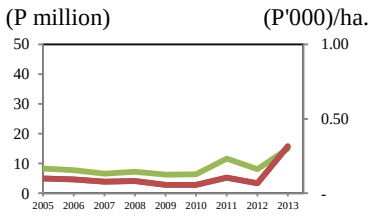
Camarines Sur IMO

Sources: CISPER, NIA-SMD, various years.

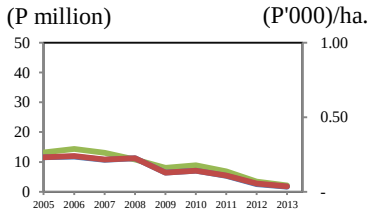
Figure 38. Trends in the real O&M, O&M/SA and O&M/FUSA of CIS by region, 2005-2013 (at 2000 prices).



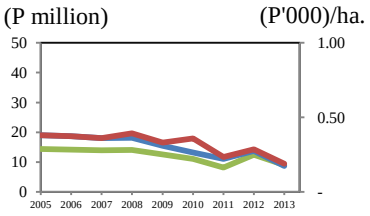
CAR & Region 1



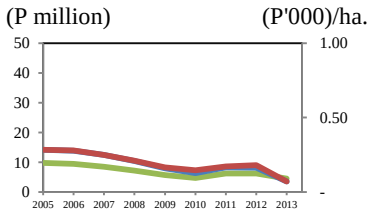
Region 2



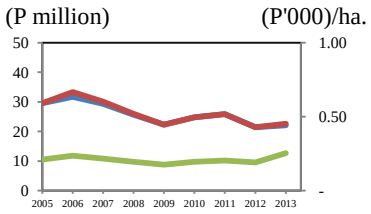
Region 3



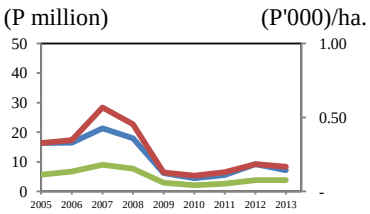
Region 4



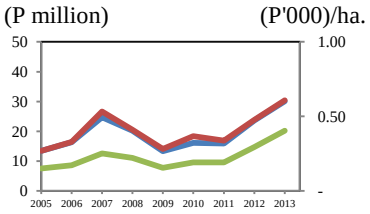
Region 5



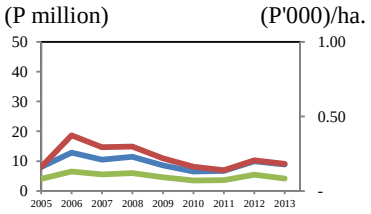
Region 6



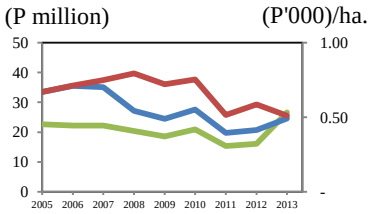
Region 7



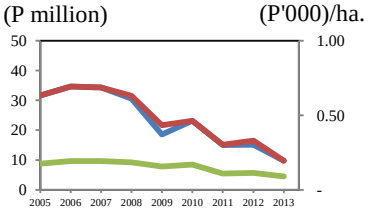
Region 8



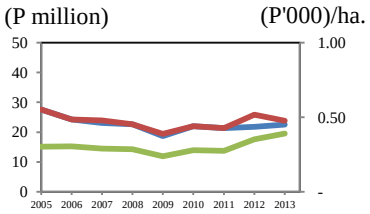
Region 9



Region 10, 10AR & 13



Region 11



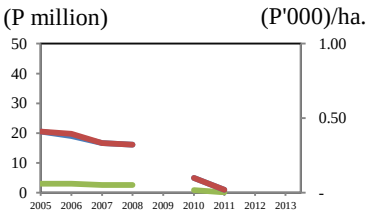
Region 12 & ARMM

Legend:

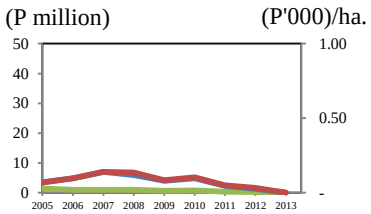
Real O&M Real O&M/SA Real O&M/FUSA

Sources: CISPER, NIA-SMD, various years.

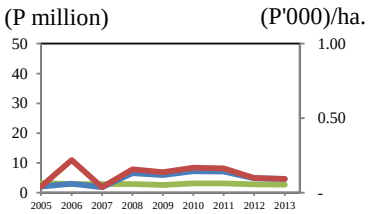
Figure 39. Trends in the real O&M, O&M/SA and O&M/FUSA of CIS by IMO-Province, 2005-2013 (at 2000 prices).



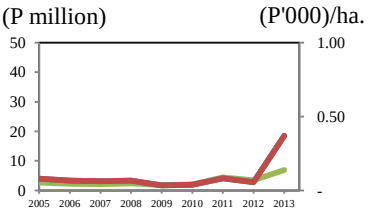
Benguet



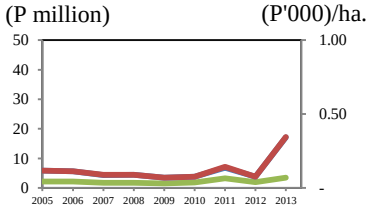
Ilocos Norte IMO



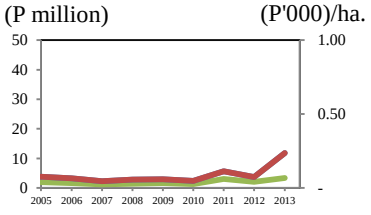
Pangasinan IMO



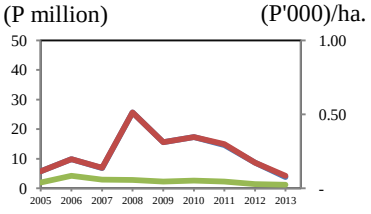
Cagayan



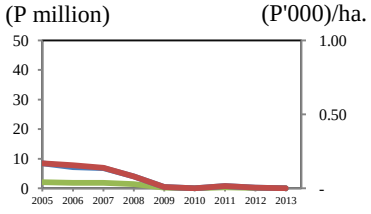
Isabela IMO



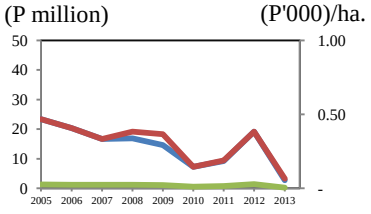
Nueva Vizcaya IMO



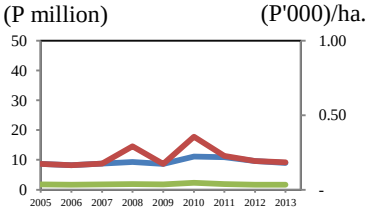
Pampanga



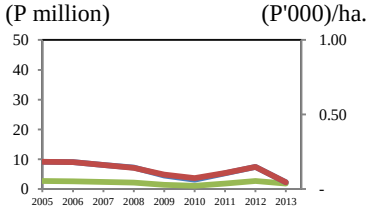
Nueva Ecija



Laguna



Occidental Mindoro IMO



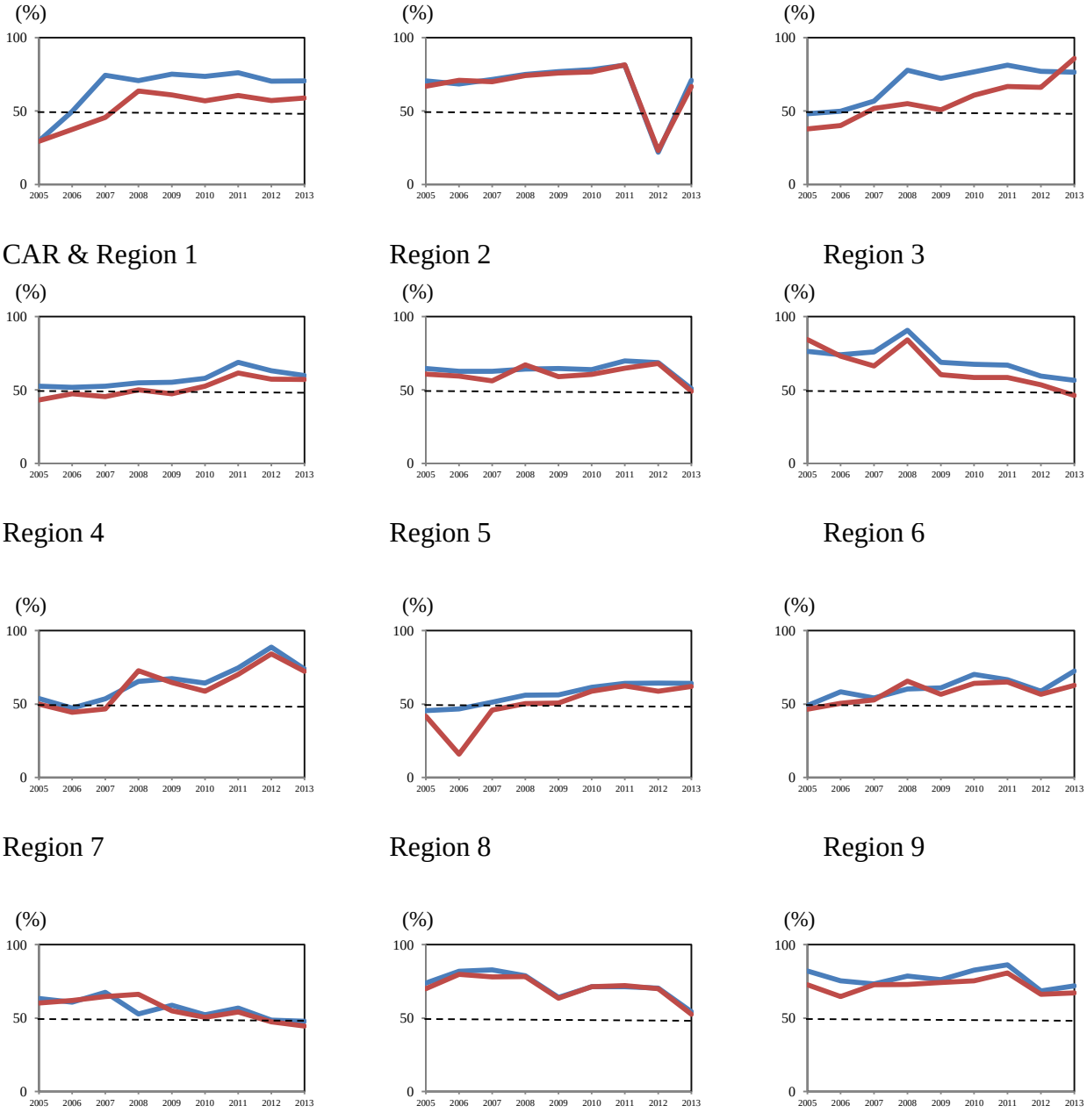
Camarines Sur IMO

Legend:

Real O&M Real O&M/SA Real O&M/FUSA

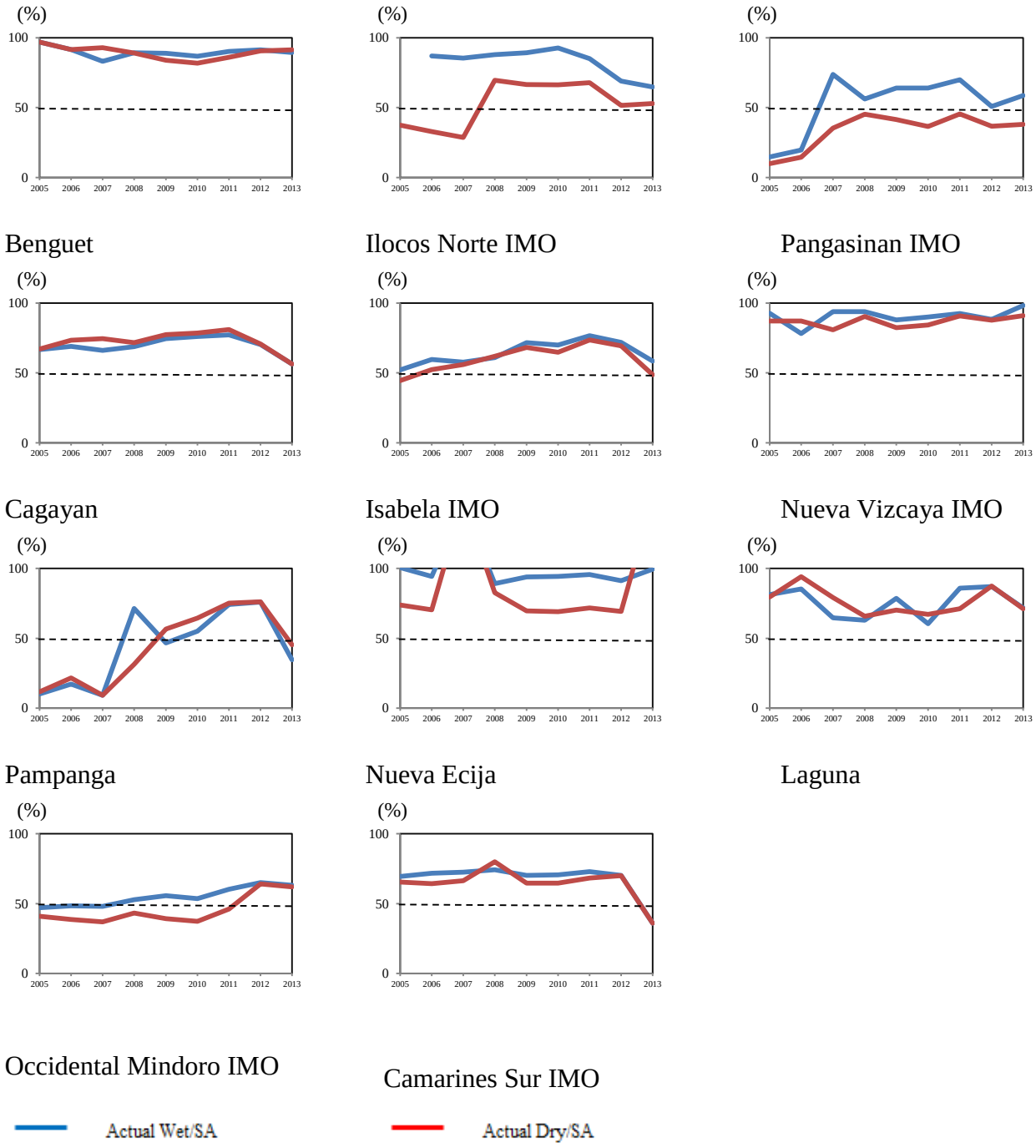
Sources: CISPER, NIA-SMD, various years.

Figure 40. Trends in irrigation intensities of CIS by region, 2005-2013.



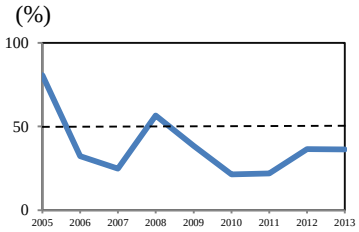
Sources: CISPER, NIA-SMD, various years.

Figure 41. Trends in irrigation intensities of CIS by IMO-Province, 2005-2013.

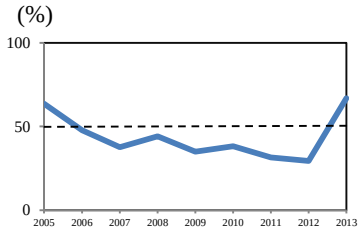


Sources: CISPER, NIA-SMD, various years.

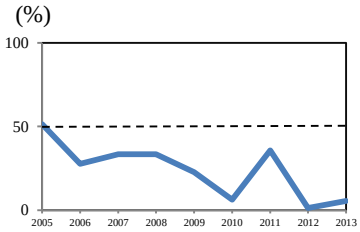
Figure 42. Trends in collection efficiency of CIS by region, 2005-2013.



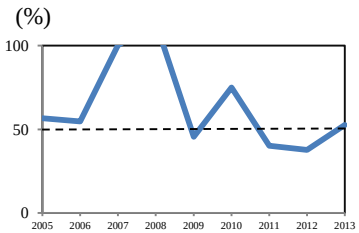
CAR & Region 1



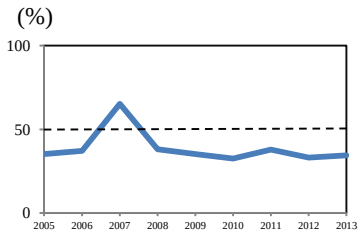
Region 2



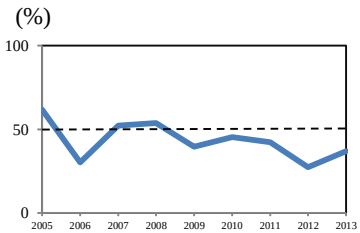
Region 3



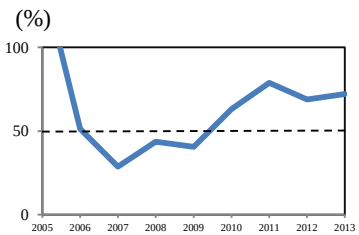
Region 4



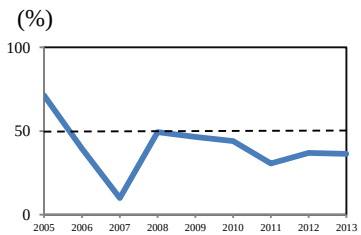
Region 5



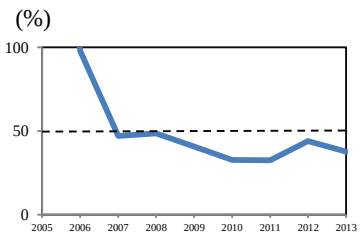
Region 6



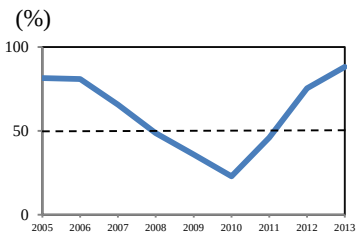
Region 7



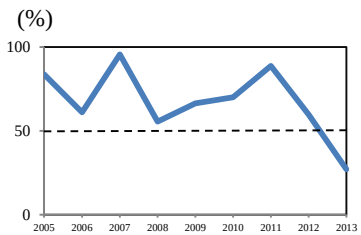
Region 8



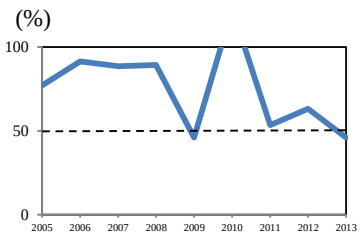
Region 9



Region 10, 10AR & 13



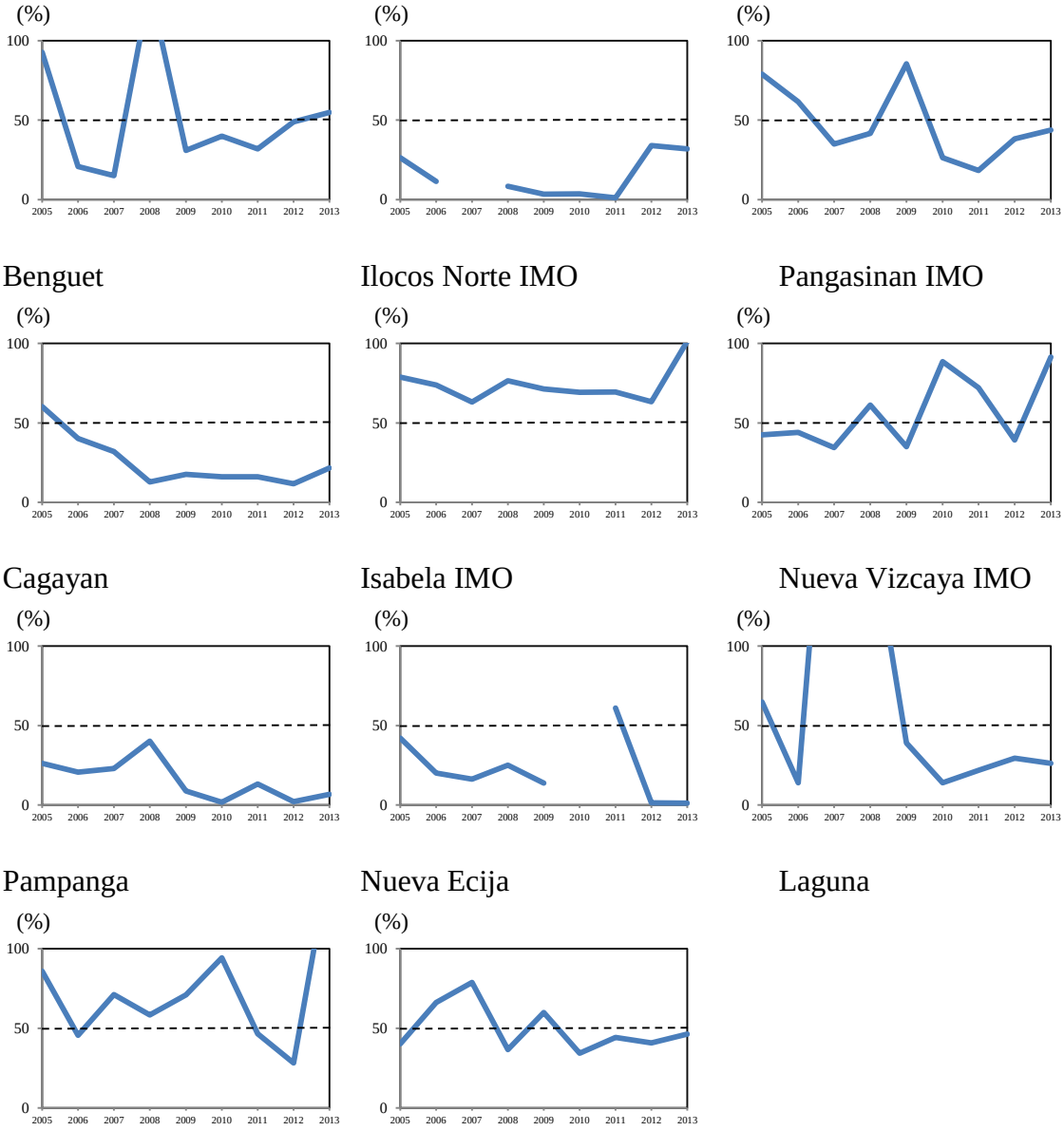
Region 11



Region 12 & ARMM

Sources: CISPER, NIA-SMD, various years.

Figure 43. Trends in collection efficiency of CIS by IMO-Province, 2005-2013.



Sources: CISPER, NIA-SMD, various years.

CAR

Benguet (part of Abra, Benguet-Ifugao-Mt. Province IMO)

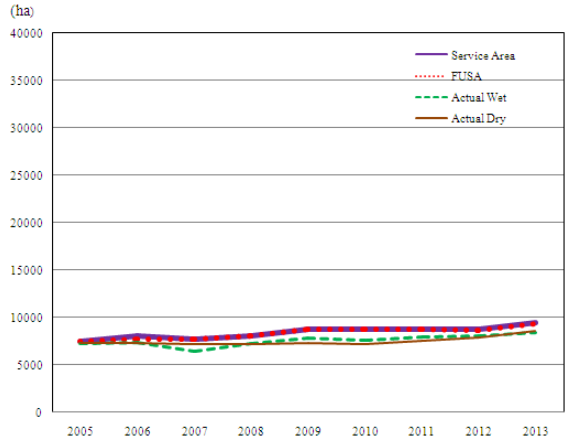
Both service area and irrigated area had increasing pattern (**Figure 44**). While the ratio of total amortization to total income has a slightly increasing trend, total collection to collectibles and collection efficiency have no clear trend (**Table 33**). There is a small gap between and the irrigated areas in both wet and dry seasons. Minimal fluctuations are also observed between the ratios of benefited areas to irrigated areas. O&M cost per SA has a declining trend. In contrast, the viability index has been increasing over time. Cropping intensities have been showing nominal increases from 2012. .

In 2012, the coverage per plantilla jumped from 350 has. per staff in 2011 to 573 has. (Table 33). But, despite this increase, the coverage per staff is still better compared to other systems.

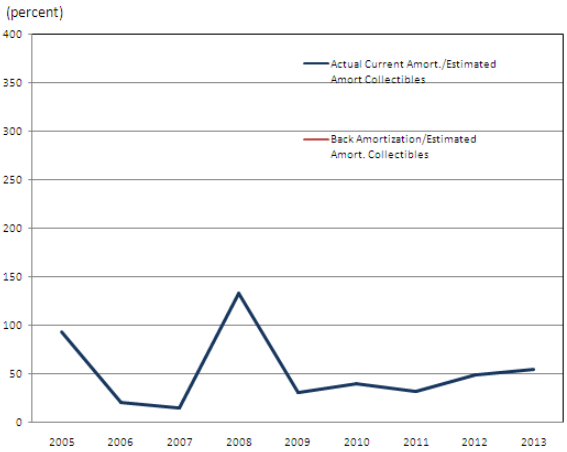
There is just a small gap between irrigated areas across the years reaching only 9% during wet season and 18% during dry season. This gap is mainly due defective facilities and inadequate water supply.

An average 62% of the total income over the years comes from equity. This is followed by equipment rental at 26% and then, amortization at 9%. Cropping intensity followed a stable trend. Viability generally had an upward trend.

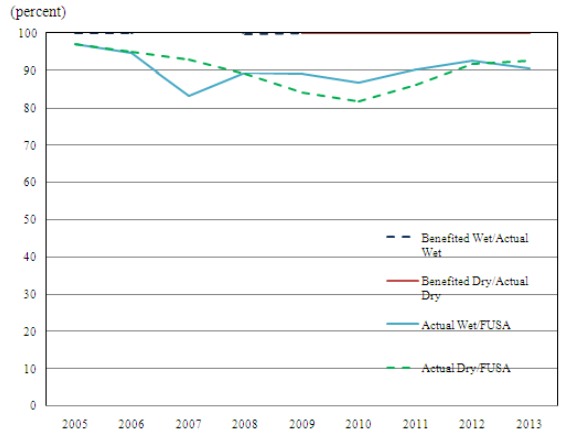
Figure 44. Trends in key performance indicators, Benguet, CAR, 2005-2013



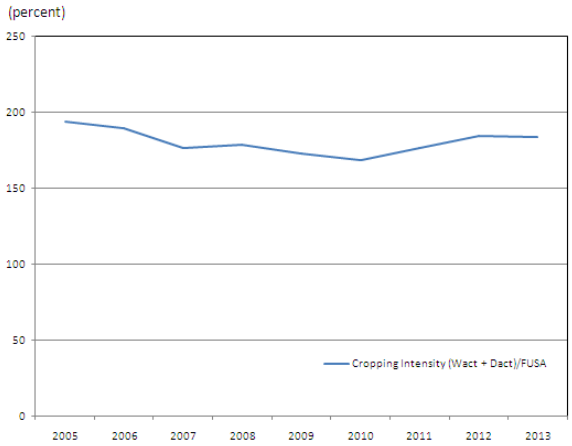
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



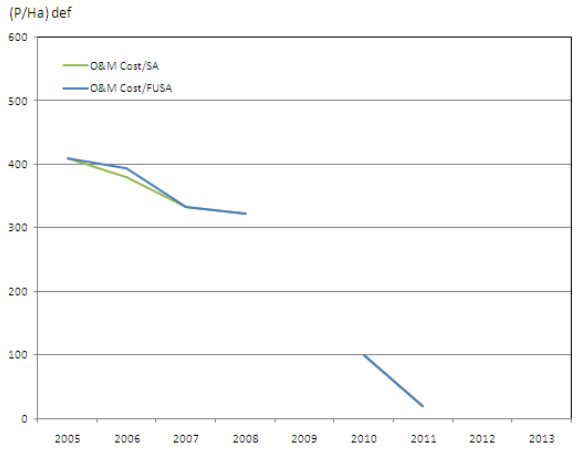
b. Collection efficiency



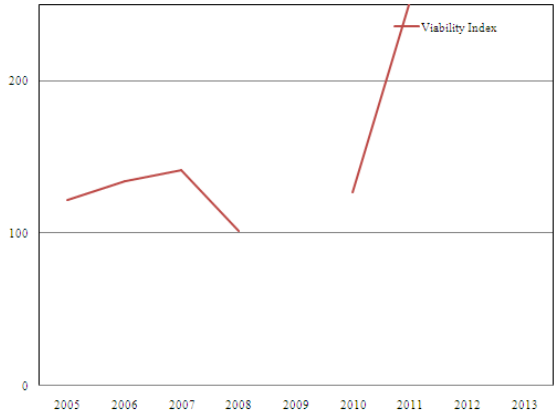
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD CISPER data, various years

Table 33. CIS Performance Ratios of Benguet, 2005 to 2013

Ratios	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					63	63	63	100	100
FUSA/Filled-up (Ha/staff)					580	578	583	8,597	9,271
FUSA/Filled-up + Daily Staff (Ha/staff)					348	347	350	573	618
FUSA/SA (%)	100	97	100	100	100	100	100	99	99
Ben. Wet/Actual Wet (%)	100	100	112	100	100	100	100	100	100
Ben. Dry/Actual Dry (%)					100	100	100	100	100
CIS Amort./Total Income (%)	2	2	2	5	8	11	21	9	17
Amort. Back/Total Income (%)									
Equipment Rental/Total Income (%)	19	9	8	13	17	34	47	59	25
Equity Payment/Total Income (%)	74	85	87	76	69	50	31	32	57
Total Income (%)	95	96	97	94	94	95	99	100	99
Wet Yield (cavan/ha)	82	82	80	82	78				
Dry Yield (cavan/ha)	86	83	81	82	80				

Sources: NIA-SMD CISPER data, various years.

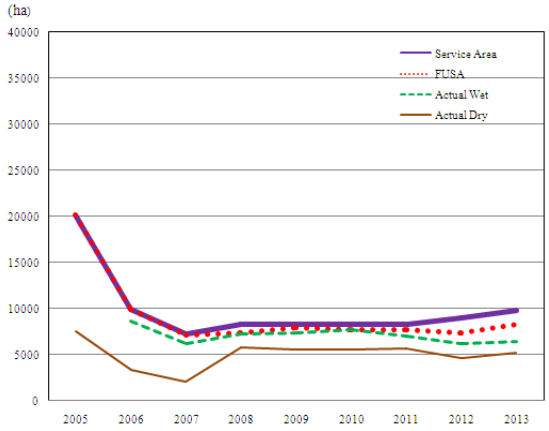
Region 1 Ilocos

Ilocos Norte IMO

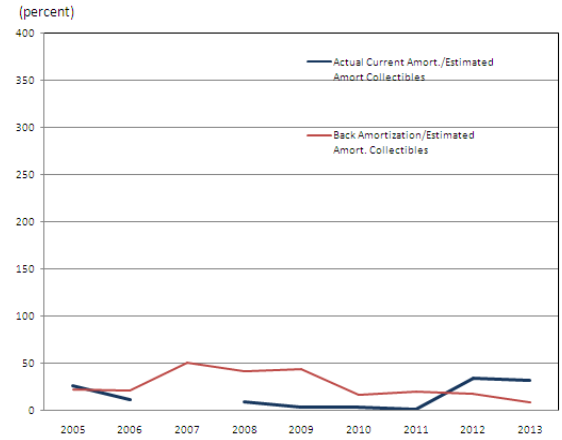
Figure 45 shows that Ilocos Norte's CIS service area dropped from 20,111 ha in 2005 to 7,124 ha in 2007 with FUSA following the same trend (Figure 30). But after 2007, it slightly increased. The gap between FUSA and the irrigated area is mainly due to lack of water supply especially during dry season. Amortization payments and collection efficiency have downward trends from 2006 to 2011 but started increasing in the later years. The cropping intensity and viability index generally have an increasing trend over the years.

Even if the filled-up plantilla positions are augmented by the daily staff, 76% of the plantilla positions are not yet filled up **Table 34**). One major reason for this is for cost reduction of overhead but this would result in a large coverage per staff of about 1,000 ha.

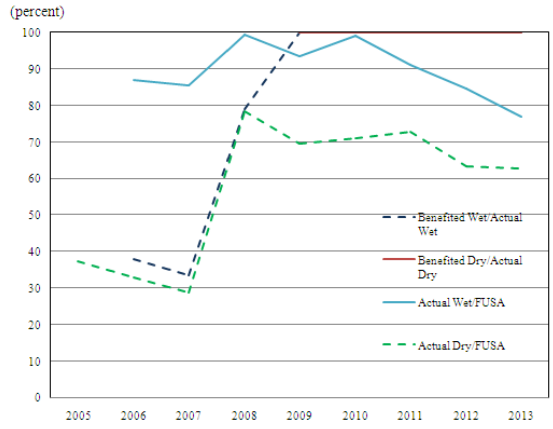
Figure 45. Trends in key performance indicators, Ilocos Norte IMO, Region 1, 2005-2013



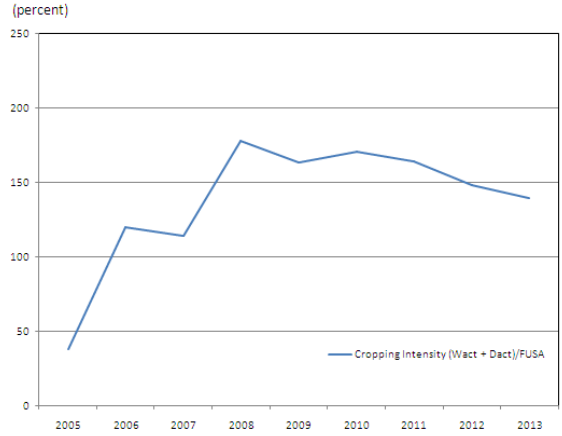
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



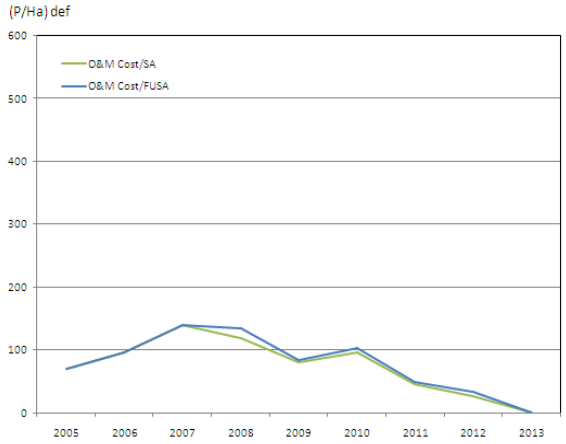
b. Collection efficiency



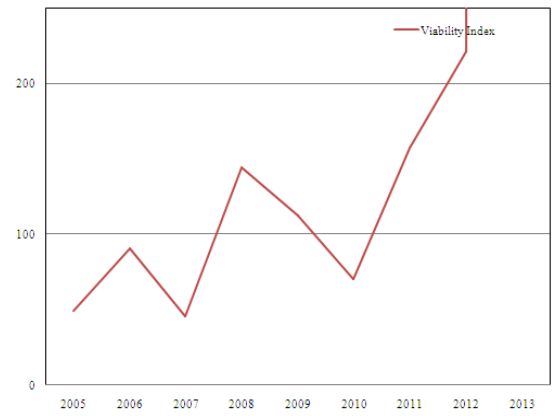
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD CISPER data, various years.

During wet season, the gap between irrigated area and FUSA ranges from 1% to 23%, while during dry season, the gap is bigger ranging from 22% to 71%. This gap is mainly due to lack of water supply in the dry season.

Majority of the total income comes from equity reaching up to 74% followed by CIS back amortization ranging from 5% to 85% and then, CIS current amortization ranging from 2% to 30%. The equity scheme had been chosen by the IAs because they received financial support from LGUs. Viability and cropping intensity generally have an upward trend.

Table 34. CIS Performance Ratios of Ilocos Norte IMO, 2005 to 2013

Ratios	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)						21	21	21	21
FUSA/Filled-up (Ha/staff)					1,316	1,286	1,286	1,223	1,379
FUSA/Filled-up + Daily Staff (Ha/staff)					1,128	1,102	1,102	1,048	1,182
FUSA/SA (%)	100	100	100	89	96	94	94	82	84
Ben. Wet/Actual Wet (%)		38	33	79	100	100	100	100	100
Ben. Dry/Actual Dry (%)					100	100	100	100	100
CIS Amort./Total Income (%)	30	8		4	2	8	2	27	19
Amort. Back/Total Income (%)	25	15	85	21	26	34	30	14	5
Equipment Rental/Total Income (%)	1	5			10	8	1	19	2
Equity Payment/Total Income (%)	44	71	13	71	60	50	67	39	74
Total Income (%)	100	99	98	96	98	100	100	99	100
Wet Yield (cavan/ha)	80	79	80	83					
Dry Yield (cavan/ha)	82	81	80	85					

Sources: NIA-SMD CISPER data, various years.

Pangasinan IMO

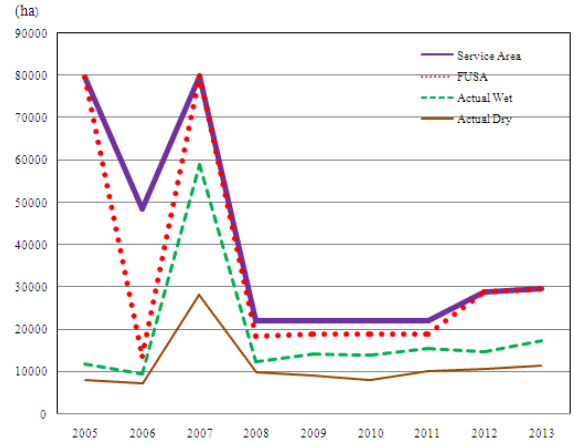
Pangasinan's CIS service area dropped from 79,398 has. in 2005 to 21,854 ha in 2008 with FUSA following the same trend (**Figure 46**). But, it has a slightly increasing trend in the later years. There a big gap between FUSA and the irrigated area. This is probably due to lack of water supply especially during dry season where the gap almost tripled. Amortization payments and collection efficiency have a downward trend. Despite few dips, cropping intensities more or less moved at the same level. However, viability index generally have an upward trend over the years.

Even if the filled-up plantilla positions are augmented by the daily staff, the coverage per staff for CIS only is about 1,016 ha (**Table 35**). This is relatively big coverage per staff and without necessary resources the staff may not be able to properly cover their assigned area.

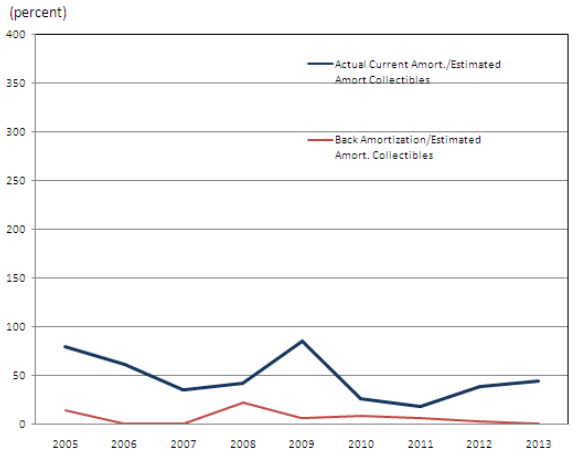
During wet season the gap between irrigated area and FUSA ranges from 19% to 85%. While during dry season, the gap is even bigger ranging from 46% to 90%. This gap is mainly due to lack of water supply.

About 64% to 90% of the total income comes from equity while 6% to 21% comes from amortization. Viability is not affected by the decreasing trend of amortization due to the increasing trend of equity generated.

Figure 46. Trends in key performance indicators, Pangasinan IMO, Region 1, 2005-2013

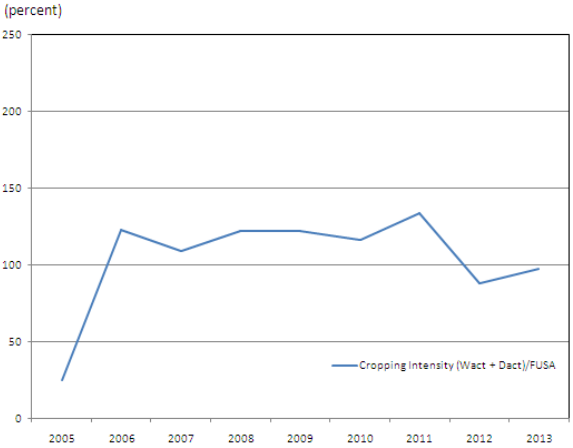


a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)

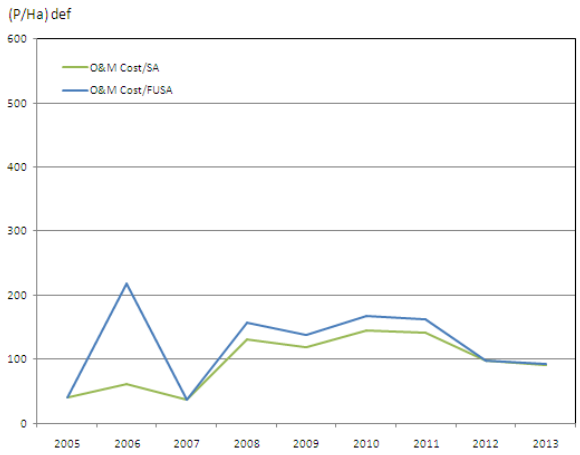


b. Collection efficiency

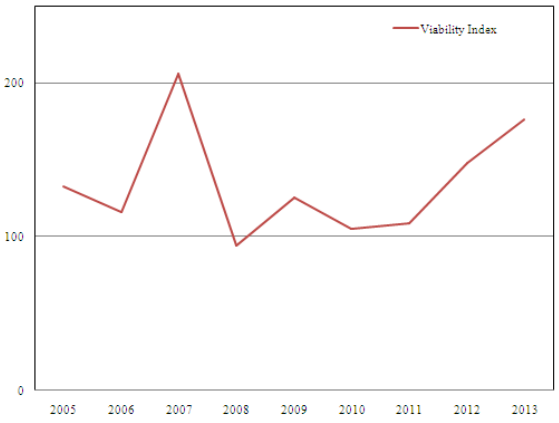
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD CISPER data, various years.

Table 35. CIS Performance Ratios of Pangasinan IMO, 2005 to 2013

Ratios	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					57	57	57	57	57
FUSA/Filled-up (Ha/staff)					1,112	1,112	1,112	1,689	1,734
FUSA/Filled-up + Daily Staff (Ha/staff)					652	652	652	990	1016
FUSA/SA (%)	100	28	100	83	87	87	87	100	100
Ben. Wet/Actual Wet (%)	67	74	48	80	100	100	100	100	100
Ben. Dry/Actual Dry (%)					100	100	100	100	100
CIS Amort./Total Income (%)	16	20	6	16	21	10	7	9	9
Amort. Back/Total Income (%)	3			8	1	3	2	1	
Equipment Rental/Total Income (%)	10	8	3	8	5	4	4	2	12
Equity Payment/Total Income (%)	70	69	90	64	72	76	86	70	78
Total Income (%)	99	97	99	96	99	93	99	82	99
Wet Yield (cavan/ha)	88	79	82	82					
Dry Yield (cavan/ha)	93	80	82	85					

Sources: NIA-SMD CISPER data, various years.

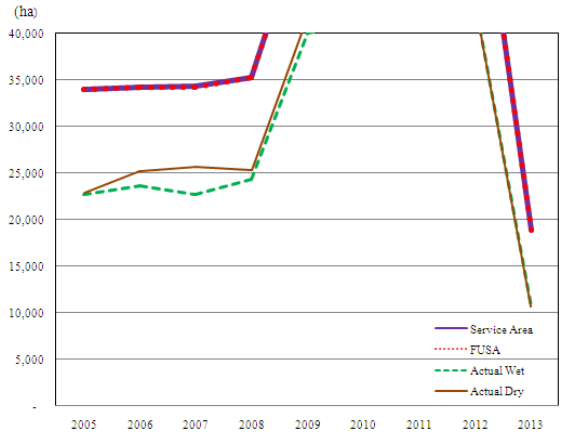
Region 2 Cagayan Valley

Cagayan (Cagayan-Batanes IMO)

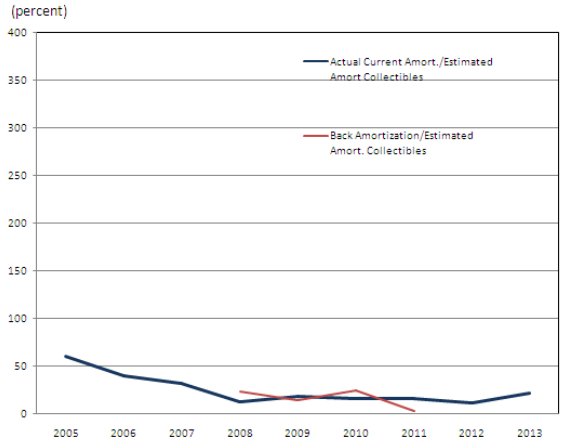
With minimal data, no clear trend can be seen on the Cagayan province CIS. But, the service area and actual irrigated area appeared to have increasing trends. Notable is the large gap between actual irrigated area and FUSA (**Figure 47**). This gap reached up to 34% in 2005 and is likely due to inadequate and/or defective facilities aggravated by lack of water supply. The ratios of collections and collection efficiency appeared to have a downward trend. Cropping intensity on the other hand, seems stable while the viability index is decreasing (**Table 36**).

Almost half of the income of the province is derived from amortization and the other half from equity payments.

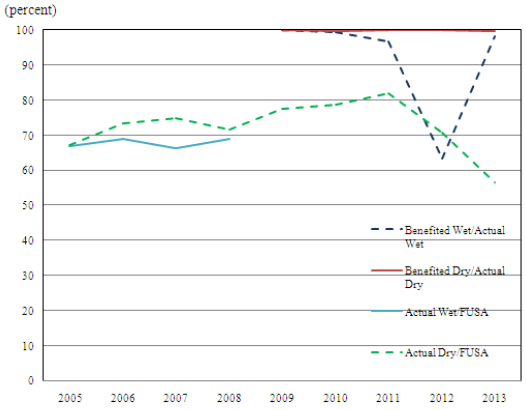
Figure 47. Trends in key performance indicators, Cagayan (Cagayan-Batanes IMO), Region 2, 2005-2013



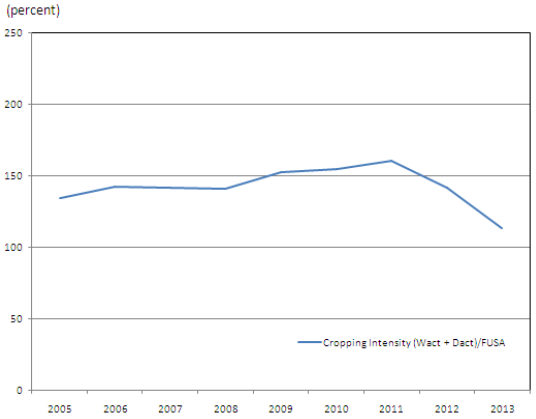
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



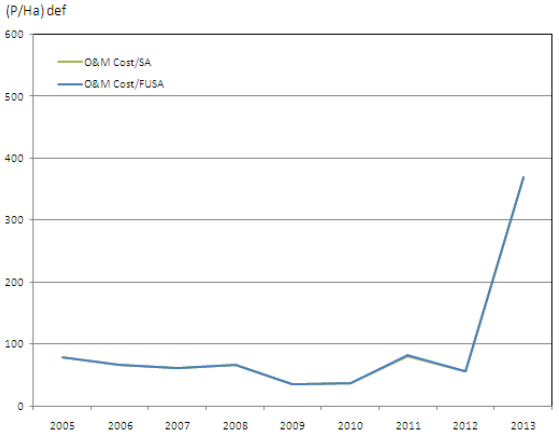
b. Collection efficiency



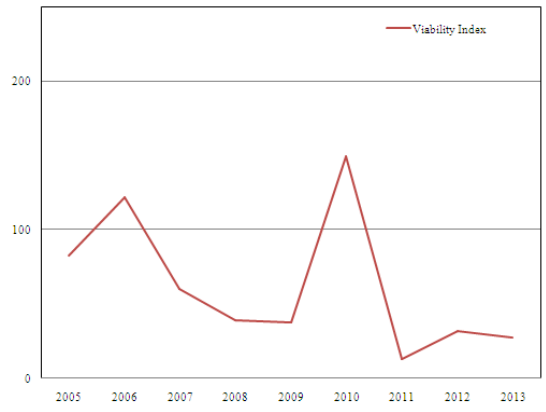
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD CISPER data, various years.

Note: Data from 2009 to 2013 are combined data of Cagayan and Batanes Provinces

Table 36. CIS Performance Ratios of Cagayan (Cagayan-Batanes IMO), 2005 to2013

Ratios	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)									
FUSA/Filled-up (Ha/staff)									
FUSA/Filled-up + Daily Staff (Ha/staff)									
FUSA/SA (%)	100	100	100	100					
Ben. Wet/Actual Wet (%)	101	106	113	104					
Ben. Dry/Actual Dry (%)									
CIS Amort./Total Income (%)	49	27	46	23					
Amort. Back/Total Income (%)				42					
Equipment Rental/Total Income (%)	3	6	23	1					
Equity Payment/Total Income (%)	47	54	17	29					
Total Income (%)	99	87	86	95					
Wet Yield (cavan/ha)	82	81	81	82					
Dry Yield (cavan/ha)	82	83	82	84					

Sources: NIA-SMD CISPER data, various years.

Isabela IMO

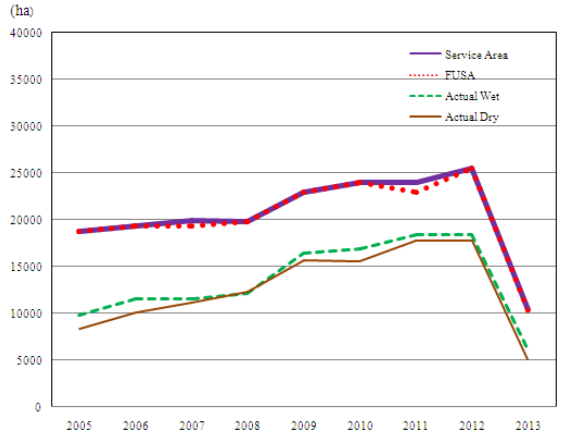
Isabela CIS service area and irrigated area both had the same increasing trend across the years but dropped significantly in 2013 (**Figure 48**). It is interesting to note that as the SA drooped in 2013 O&M cost reached its peak. This drop is probably due to defective facilities like silted canals and lack of water supply. The ratios of total collections to collectibles, amortization to total income, collection efficiency and back amortization to collectibles had no clear trends. Over the years, cropping intensity increased to 200% despite dips in various years. The viability index, on the other hand, recovered at a lower index after it decreased in 2011 and 2012.

About 79% of the plantilla positions are not filled up yet as of 2013 (**Table 37**). But with the reduction of FUSA by more than half in 2013, the coverage per staff was also reduced from 3,643 ha to 1,464 ha. Yet even with this reduction, the coverage per staff is still large which consequently could result in a poor service.

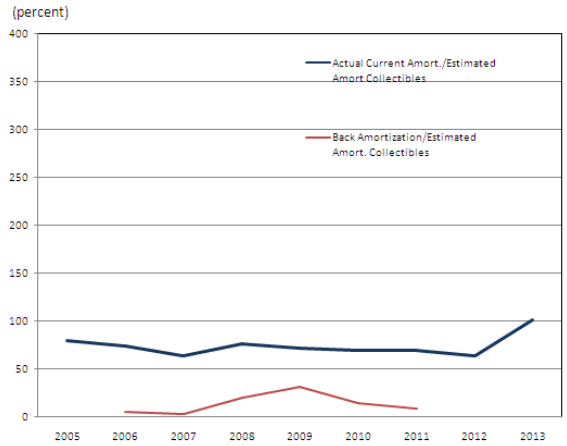
The gap between irrigated area and FUSA reached 48% in wet season and 55% in dry season. This gap is likely due to defective facilities and/or lack of water supply.

The income consisted of equity collections followed by amortization and then, equipment rental. Cropping intensity generally moved toward 200% in spite of drops in various. Viability index, however, followed a declining trend with significant dips in 2011 and 2012.

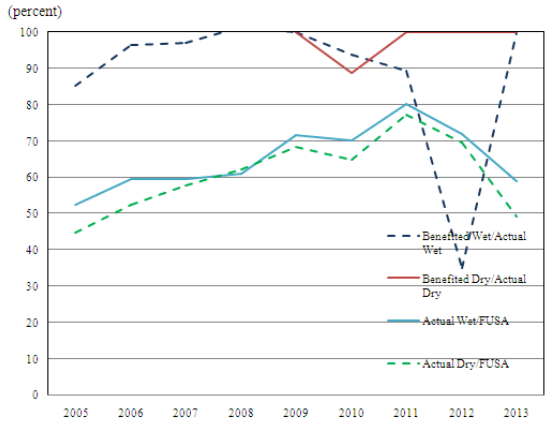
Figure 48. Trends in key performance indicators, Isabela IMO, Region 2, 2005-2013



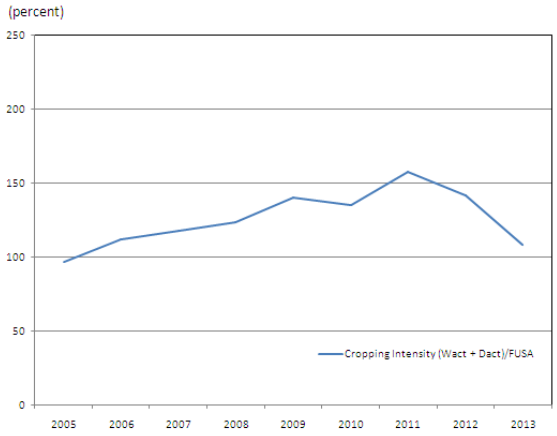
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



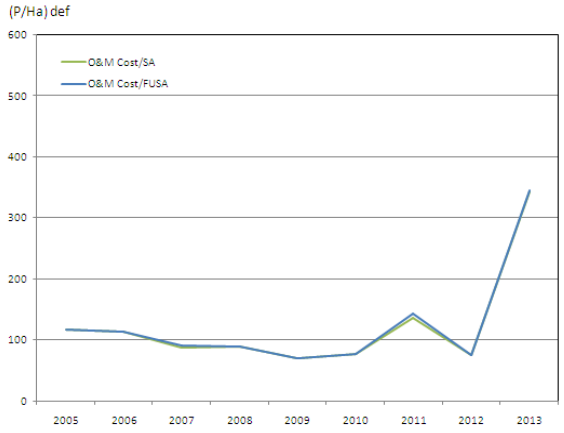
b. Collection efficiency



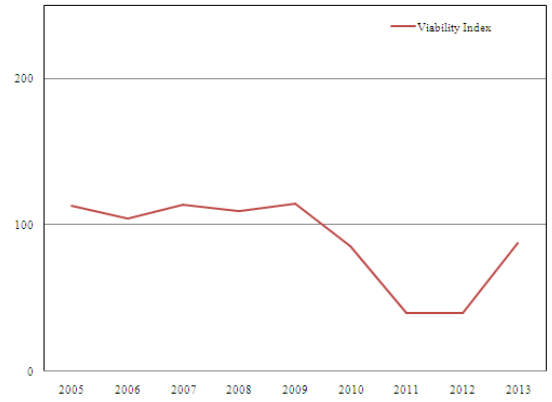
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD CISPER data, various years

Table 37. CIS Performance Ratios of Isabela IMO, 2005 to2013

Ratios	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					42	21	21	21	21
FUSA/Filled-up (Ha/staff)					1,636	3,428	3,271	3,643	1,464
FUSA/Filled-up + Daily Staff (Ha/staff)					1,636	3,428	3,271	3,643	1,464
FUSA/SA (%)	100	100	97	100	100	100	95	100	99
Ben. Wet/Actual Wet (%)	85	96	97	102	100	94	89	35	100
Ben. Dry/Actual Dry (%)					100	89	100	100	100
CIS Amort./Total Income (%)	24	24	26	30	21	27	31	47	18
Amort. Back/Total Income (%)		1	1	8	9	5	3		14
Equipment Rental/Total Income (%)	27	26	6	17	12	21	29	21	21
Equity Payment/Total Income (%)	47	47	64	44	56	44	35	19	16
Total Income (%)	98	98	97	99	98	97	98	87	69
Wet Yield (cavan/ha)	79	80	82	82	77	75	75	75	
Dry Yield (cavan/ha)	81	81	83	82	88	85	85	85	

Sources: NIA-SMD CISPER data, various years.

Nueva Vizcaya IMO

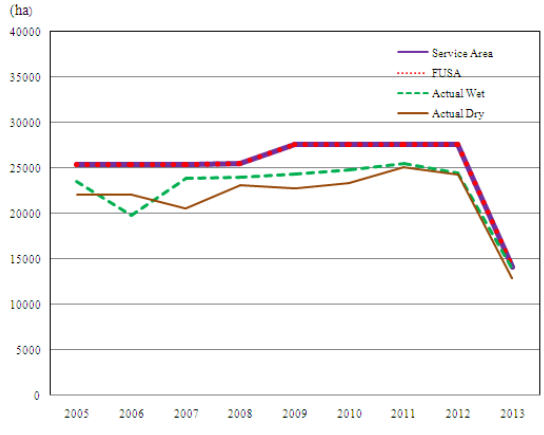
Nueva Vizcaya IMO's service area and irrigated area slightly increased over the years but dropped significantly below 15,000 ha in 2013 (**Figure 49**). Inadequate water supply and defective facilities is the probable cause of the gap between irrigated area and FUSA. Amortization payments and collection efficiency generally have increasing trend over the years. The share of total amortization to total income dropped to 18% in 2013. This might be due to maintenance work since equipment rental peaked at 71% in the same year. The cropping intensities followed stabilized pattern in the later years with a slightly increasing trend. While viability index, on the other hand, fluctuated and seemed to have a downward trend.

Sixty-nine percent (69%) of the plantilla positions are not filled up yet (**Table 38**). With the reduction of FUSA by almost half in 2013, the coverage per staff was also reduced from 3,446 ha to 1,760 has. But, even with this reduction, the coverage per staff is still large that would consequently affect the quality of serve.

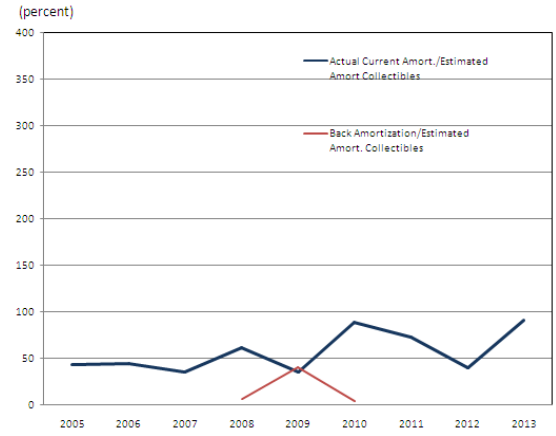
The gap between irrigated area and FUSA during both wet and dry season reached 22% and 19%, respectively. Defective and inadequate facilities coupled with lack of water supply are likely the reasons for this gap.

In the later years, majority of the farmers opted to pay amortization with the decrease of equity payments. Cropping intensities slightly fluctuated over the years while viability has a declining trend.

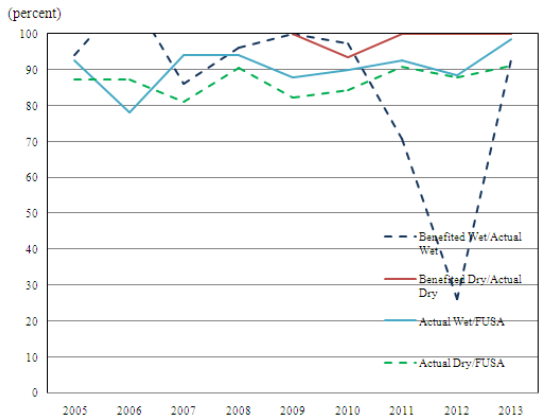
Figure 49. Trends in key performance indicators, Nueva Vizcaya IMO, Region 2, 2005-2013



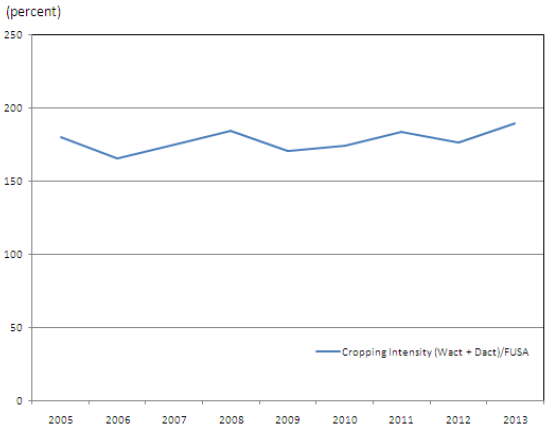
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



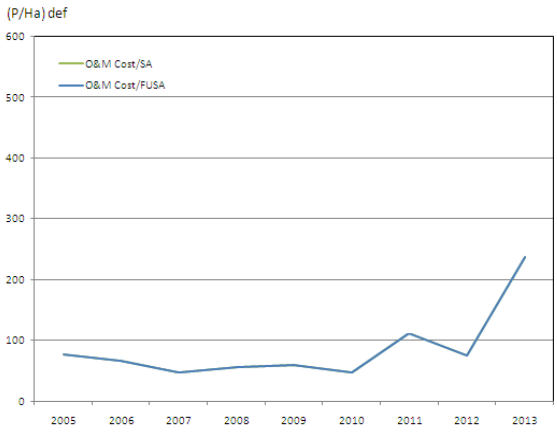
b. Collection efficiency



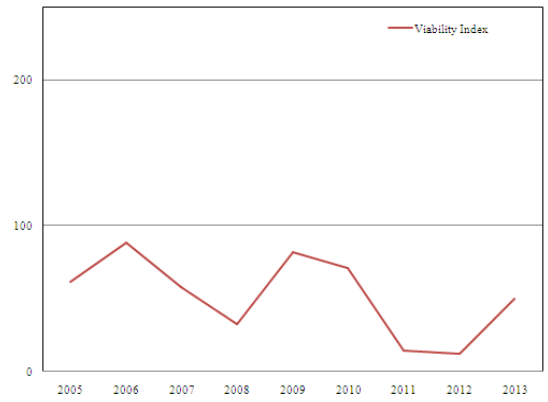
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD CISPER data, various years

Table 38. CIS Performance Ratios of Nueva Vizcaya IMO, 2005 to2013

Ratios	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					42	31	31	31	31
FUSA/Filled-up (Ha/staff)					2,506	3,447	3,446	3,446	1,760
FUSA/Filled-up + Daily Staff (Ha/staff)					2,506	3,447	3,446	3,446	1,760
FUSA/SA (%)	100	100	100	100	100	100	100	100	100
Ben. Wet/Actual Wet (%)	94	112	86	96	100	97	71	26	93
Ben. Dry/Actual Dry (%)					100	93	100	100	100
CIS Amort./Total Income (%)	20	18	28	66	11	33	54	50	18
Amort. Back/Total Income (%)				7	12	1			1
Equipment Rental/Total Income (%)			24	9	54	43	1	1	71
Equity Payment/Total Income (%)	79	81	19	14	22	20	39	29	2
Total Income (%)	99	99	71	96	99	97	94	80	92
Wet Yield (cavan/ha)	81	81	83	82	79	85	85	85	
Dry Yield (cavan/ha)	80	81	85	83	85	90	90	90	

Sources: NIA-SMD CISPER data, various years.

Region 3 Central Luzon

Pampanga (Pampanga-Bataan IMO)

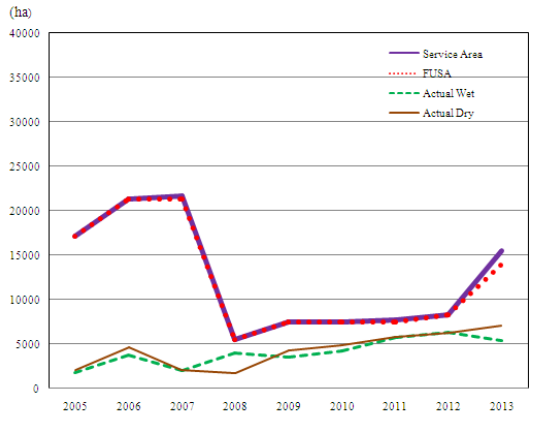
Pampanga's CIS service area drastically dropped in 2008 as O&M/ha reached its peak due to a major O&M work (**Figure 50**). But, it gradually recovered over the years. The irrigated area is also increased reaching above 5,000 has. Many opted to pay equity reaching more than 50% of total income from 2008 up to 2010. Cropping intensities fluctuated across the years but generally had an upward trend. Viability index, on the other hand, did not improve over the years due to declining collection rate.

Table 39 shows that only 43% of plantilla positions are filled up due to lack of funds or lack of qualified applicants but probably more of the first. On average, each staff covers a bigger service area of about 398 ha. This is relatively a big coverage and without the necessary resources, NIA will be likely unable to deliver the expected service.

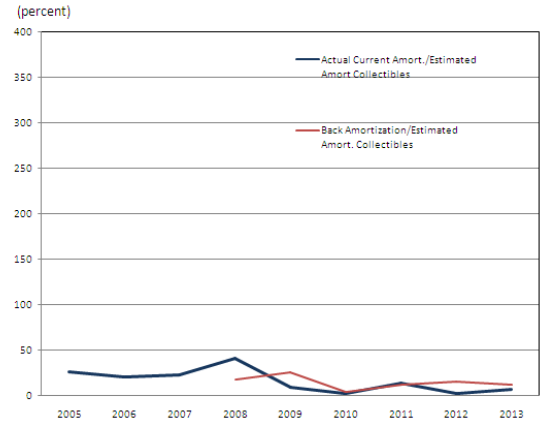
Although the irrigated area is increasing over time, there is still about 62% gap between irrigated wet and FUSA (Firmed-up Service Area) and about 50% between irrigated dry and FUSA in 2013. The difference in gap might be due to defective or inadequate facilities like lack of drainage.

CIS current amortization ranged from 1% to 31% of the total income while the CIS back amortization ranged between 3% and 32%. There is a big decline in amortization collection efficiency from 26% in 2005 to only 7% in 2013.

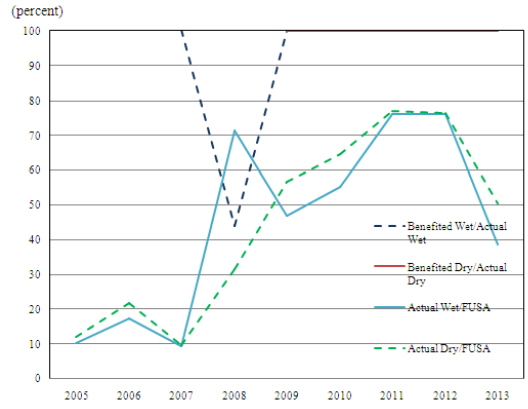
Figure 50. Trends in key performance indicators, Pampanga (PAMBAT IMO), Region 3, 2005-2013



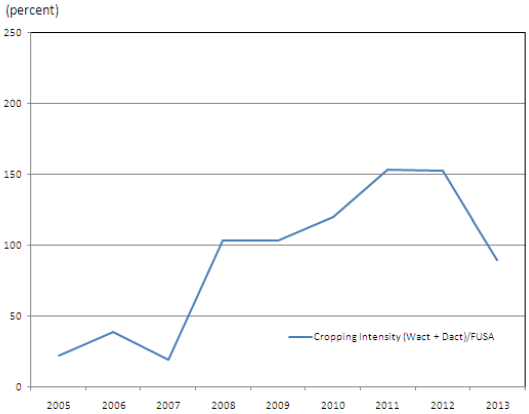
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



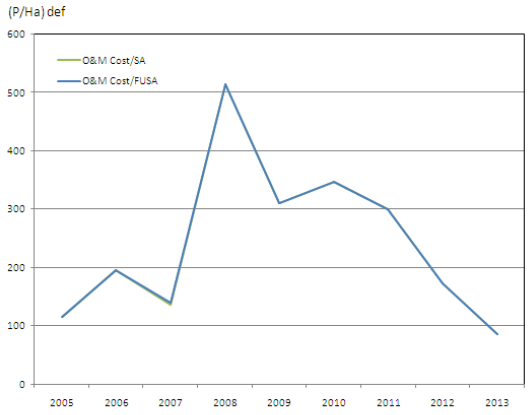
b. Collection efficiency



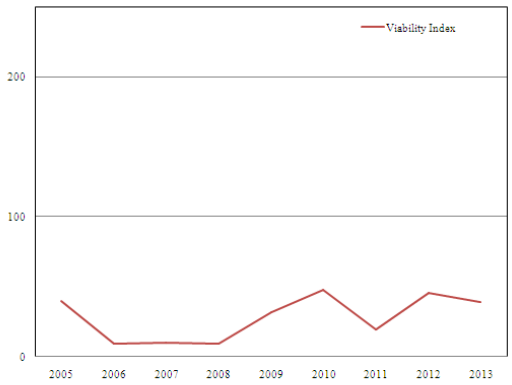
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD CISPER data, various years.

Table 39. CIS Performance Ratios of Pampanga (PAMBAT IMO), 2005 to 2013

Ratios	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					43	43	43	43	43
FUSA/Filled-up (Ha/staff)					214	214	214	235	398
FUSA/Filled-up + Daily Staff (Ha/staff)									
FUSA/SA (%)	100	100	100	98	100	100	98	100	90
Ben. Wet/Actual Wet (%)	117	125	100	44	100	100	100		95
Ben. Dry/Actual Dry (%)					100	100	100	100	100
CIS Amort./Total Income (%)	15	29	21	31	4	1	19	5	18
Amort. Back/Total Income (%)				13	12	3	16	32	32
Equipment Rental/Total Income (%)	35	3	5			7		1	
Equity Payment/Total Income (%)	23	21	26	56	63	55	21	12	25
Total Income (%)	73	53	52	100	79	66	56	50	75
Wet Yield (cavan/ha)	82	80	82	80					
Dry Yield (cavan/ha)	83	82	85	80					

Sources: NIA-SMD CISPER data, various years.

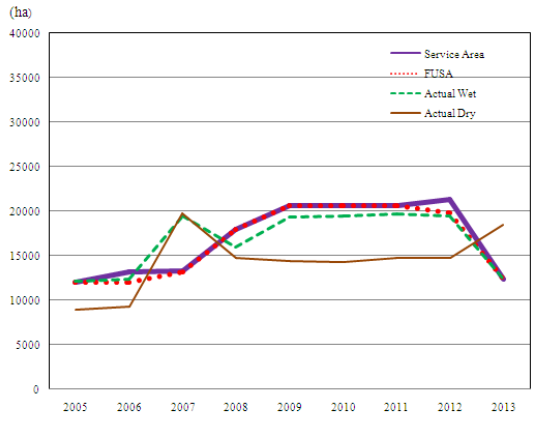
Nueva Ecija (Bulacan-Aurora-Nueva Ecija IMO)

Nueva Ecija's CIS service area almost doubled its size in 2012 but dropped back in 2013 (**Figure 51**). But, it gradually recovered over the years. The irrigated areas during wet season almost have the same areas as FUSA. But during dry season in 2008 to 2012, it falls down. The share of CIS current amortization to the total income is very minimal with a decreasing collection rate in the later years. Despite fluctuations, cropping intensities move smoothly between 2008 and 2012. Viability index generally increased over the years.

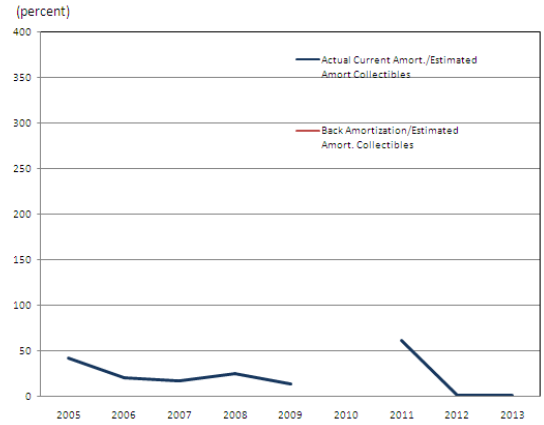
About 56% of plantilla positions are not filled up yet might be due to lack of funds or lack of qualified applicants but probably more of the first (**Table 40**). Aside from the NIS coverage of NIA staff, about 586 has. more for CIS is added to the staff's responsibility. This is relatively big coverage per staff and without necessary resources the staff may not be able to properly cover their assigned area.

More areas are irrigated during wet season by up to 37% more. This is mainly due to lesser available water during dry season.

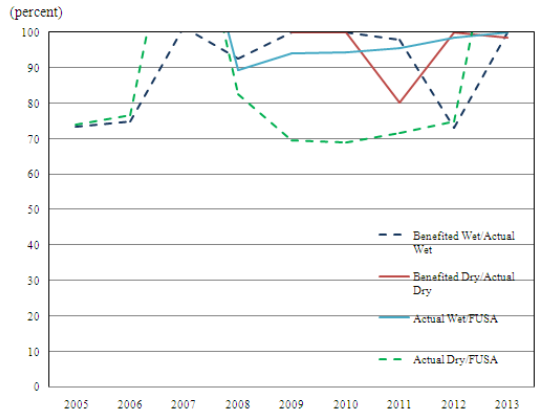
Figure 51. Trends in key performance indicators, Nueva Ecija (BANE IMO), Region 3, 2005-2013



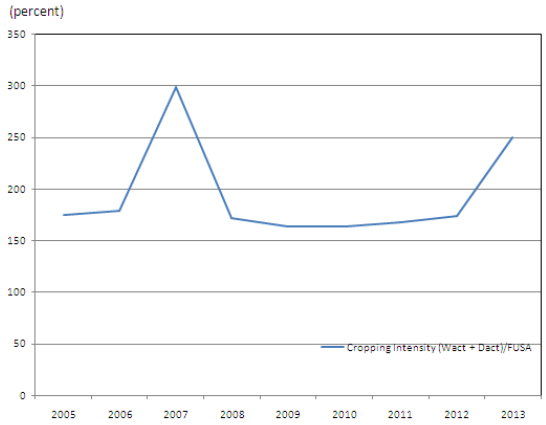
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



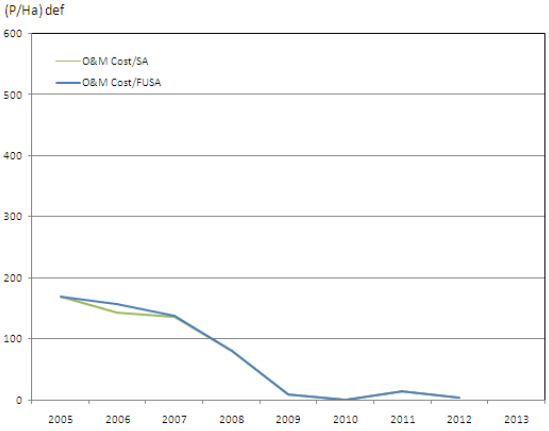
b. Collection efficiency



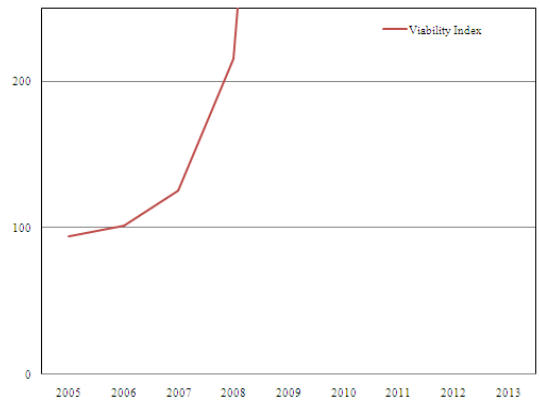
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD CISPER data, various years.

Table 40. CIS Performance Ratios of Nueva Ecija (BANE IMO), 2005 to2013

Ratios	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					44	44	44	44	44
FUSA/Filled-up (Ha/staff)					1371	1371	1371	1314	820
FUSA/Filled-up + Daily Staff (Ha/staff)					980	980	980	938	586
FUSA/SA (%)	100	92	99	100	100	100	100	93	100
Ben. Wet/Actual Wet (%)	73	75	102	93	100	100	98	73	100
Ben. Dry/Actual Dry (%)					100	100	80	100	98
CIS Amort./Total Income (%)	5	3	3	2	3	1	2	1	2
Amort. Back/Total Income (%)									
Equipment Rental/Total Income (%)	23	26	9	22	23				
Equity Payment/Total Income (%)	68	71	88	76	73	99	97	98	98
Total Income (%)	96	100	100	100	99	100	99	99	100
Wet Yield (cavan/ha)	80	81	82	82					
Dry Yield (cavan/ha)	82	82	85	82					

Sources: NIA-SMD CISPER data, various years.

Majority of the systems in Nueva Ecija opted to pay equity ranging from 68% to 99% of total income while CIS current amortization only ranged from 1% to 5% of the total income. There is a big decline in amortization collection efficiency from 20% in 2005 to only 1% in 2013.

Region 4A CALABARZON

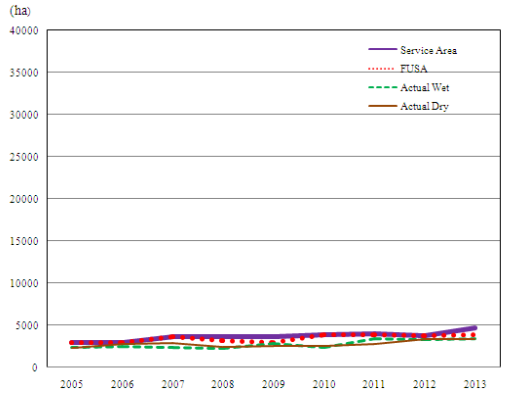
Laguna (Laguna-Rizal IMO)

The service area and irrigated area of Laguna-Rizal CIS exhibited an upward trend over the years (**Figure 52**). There is little gap between FUSA, SA and the irrigated area probably owing to sufficient water supply of the system. Ratios of amortization payments, collections and collection efficiency peaked between 2007 and 2008 with the drastic reduction of the estimated amortization collectible. Cropping intensities fluctuated through the years but moved towards increasing values in the later years. Viability index had a slight increasing trend over the years.

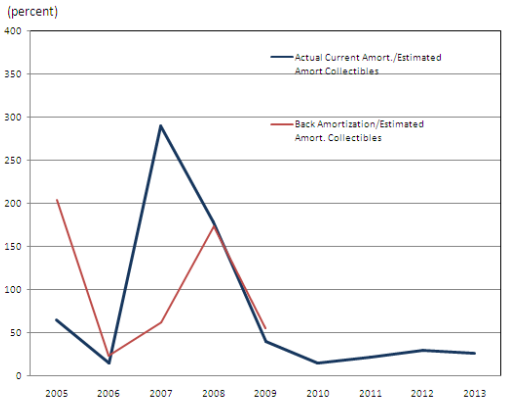
The filled-up plantilla is only 42%. But, in spite of this, the coverage area per staff has a fairly good ratio of only 475 ha (**Table 41**)

The ratios of benefited area to irrigated area during wet season are generally lower compared to dry season ratios. This is probably due occurrence of calamities and flooding during wet season.

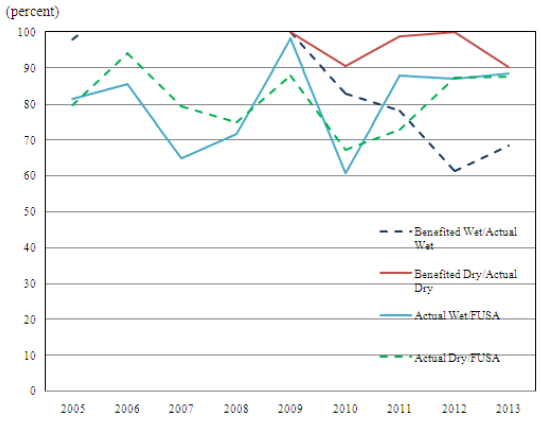
Figure 52. Trends in key performance indicators, Laguna (Laguna-Rizal IMO), Region 4, 2005-2013



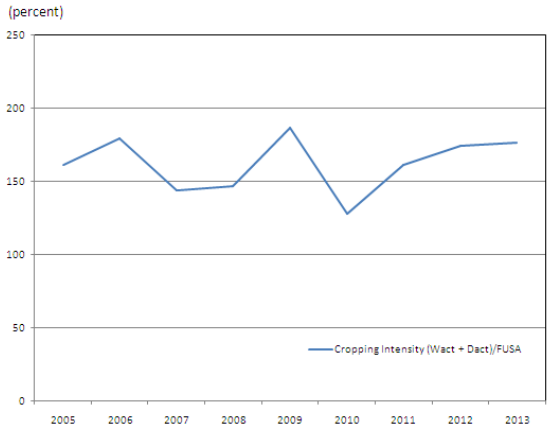
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



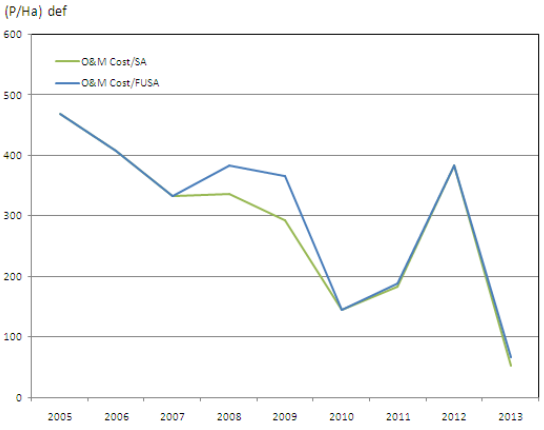
b. Collection efficiency



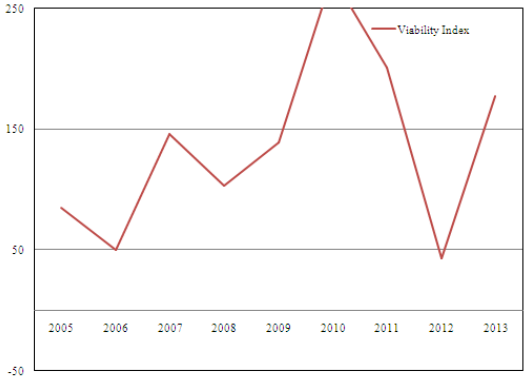
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD CISPER data, various years.

Table 41. CIS Performance Ratios of Laguna (Laguna-Rizal IMO), 2005 to 2013

Ratios	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					42	42	42		
FUSA/Filled-up (Ha/staff)					358	475	475		
FUSA/Filled-up + Daily Staff (Ha/staff)					358	475	475		
FUSA/SA (%)	100	100	100	88	80	100	98	100	81
Ben. Wet/Actual Wet (%)	98	110	122	104	100	83	78	61	68
Ben. Dry/Actual Dry (%)					100	91	99	100	90
CIS Amort./Total Income (%)	23	9	15	20	17	8	9	27	43
Amort. Back/Total Income (%)	73	15	3	19	24				
Equipment Rental/Total Income (%)			63	36	41	25	49	3	
Equity Payment/Total Income (%)	4	76	18	26	19	10	15		53
Total Income (%)	100	100	99	101	101	43	73	30	96
Wet Yield (cavan/ha)	81	80	80	81					
Dry Yield (cavan/ha)	83	81	82	84					

Sources: NIA-SMD CISPER data, various years.

The total income comes from equity averaging 25% across the years followed by equipment rental at 24%, CIS current amortization at 19% and then, equipment rental at 15%. Viability index dipped in 2012 but generally have an upward trend.

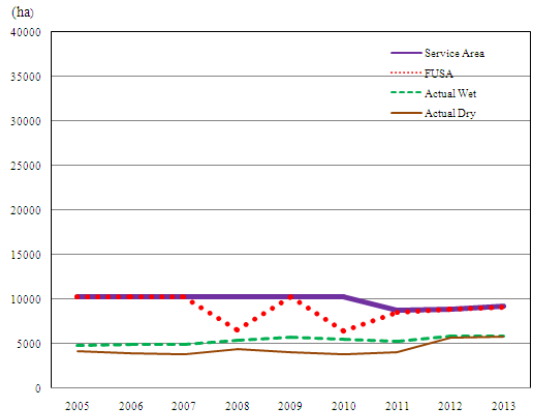
Region 4B MIMAROPA

Occidental Mindoro IMO

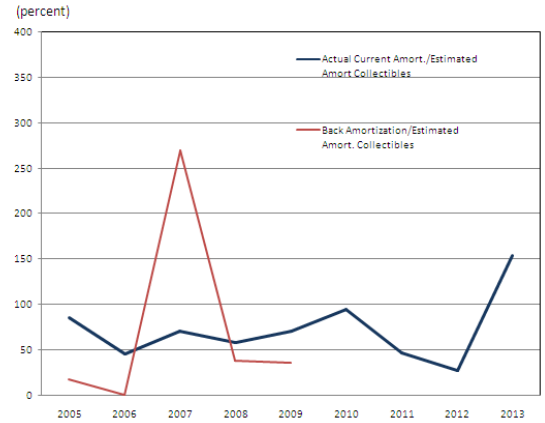
Occidental Mindoro CIS service area has more or less stable movement over the years as well as its irrigated area. FUSA, on the other hand, fluctuated with dips in 2008 and 2010 (**Figure 53**). The gap between FUSA and the irrigated area is probably due to lack of water supply and defective facilities. Share of amortization to total income dropped as equity payments increased. Collection efficiency fluctuated across the years reaching its peak in 2013. O&M cost per SA and FUSA had moved in a stable pattern over the years. The ratios of benefited area to irrigated area generally have an upward trend. The upward trend is observed with both cropping intensities and viability index.

In 2012, 88% of the plantilla positions are filled up, reducing the coverage per staff (**Table 42**). But even with the reduction, the 610 ha per staff in 2013 is still a relatively large area to cover considering distance and remoteness of some CIS and limited resources to support IDO activities.

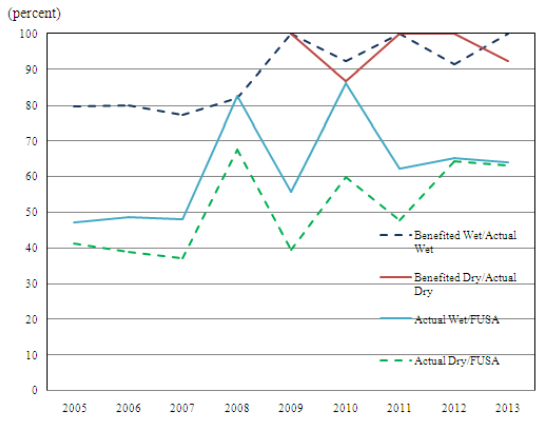
Figure 53. Trends in key performance indicators, Occidental Mindoro IMO, Region 4, 2005-2013



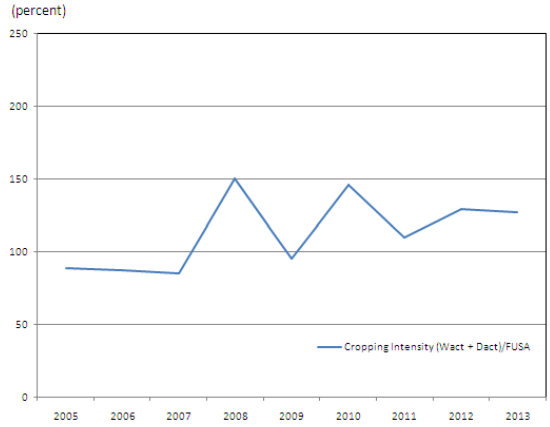
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



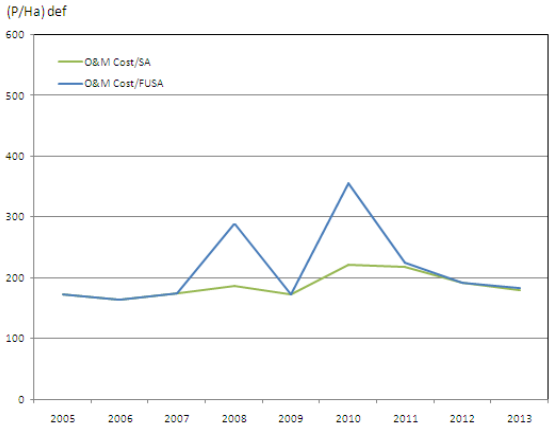
b. Collection efficiency



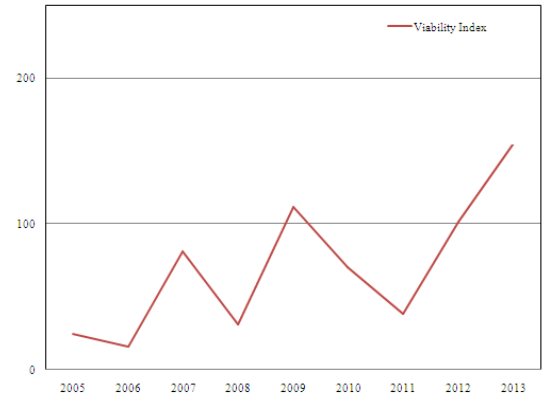
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD CISPER data, various years

Table 42. CIS Performance Ratios of Occidental Mindoro IMO, 2005 to2013

Ratios	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					42	42	42	88	88
FUSA/Filled-up (Ha/staff)					1,028	641	852	594	610
FUSA/Filled-up + Daily Staff (Ha/staff)					1,028	641	852	594	610
FUSA/SA (%)	100	100	100	64	100	62	97	100	99
Ben. Wet/Actual Wet (%)	79	80	77	82	100	92	100	91	100
Ben. Dry/Actual Dry (%)					100	87	100	100	92
CIS Amort./Total Income (%)	57	73	15	30	22	40	36	9	33
Amort. Back/Total Income (%)	12	1	58	20	11				
Equipment Rental/Total Income (%)			6	27	59	10	19		
Equity Payment/Total Income (%)	31	27	21	23	7	33	1	77	52
Total Income (%)	100	101	100	100	99	83	56	86	85
Wet Yield (cavan/ha)	82	81	79	80				61	61
Dry Yield (cavan/ha)	83	82	81	80				61	67

Sources: NIA-SMD CISPER data, various years.

The gap in irrigated area and FUSA is higher during dry season ranging from 33% to 66% compared to the 14% to 53% during wet season. The ratios of benefited area to irrigated area fluctuated during wet and season due to calamities and inadequate, respectively.

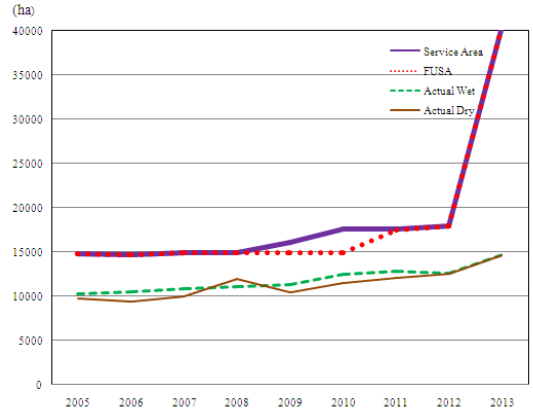
The total income consisted of the amortization repayment averaging over the years at 35% and followed by equity payments averaging at 30%. Viability and cropping intensities generally showed an upward trend.

Region 5 BICOL

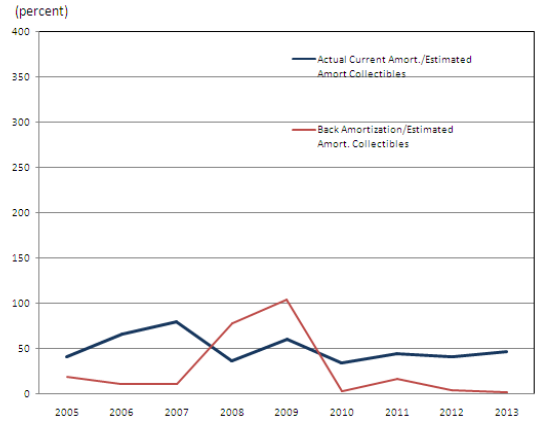
Camarines Sur IMO

The service area of Camarines Sur CIS has increased over the years reaching around 40,500 ha in 2013 (**Figure 54**). The irrigated area during both wet and dry seasons followed the same pattern. The gap between FUSA and the irrigated area is probably due to defective facilities. Ratios of total amortization collections to total, total collections to estimated collectibles and collection efficiency had no clear trend but tend to converge to 50% starting in 2010. After 2008, benefited areas during wet and dry seasons tend to equalize. The cropping intensities reached a peak in 2007 but generally had a stable movement through the years. The viability index, on the other hand, generally has an increasing trend over the years despite its fluctuations.

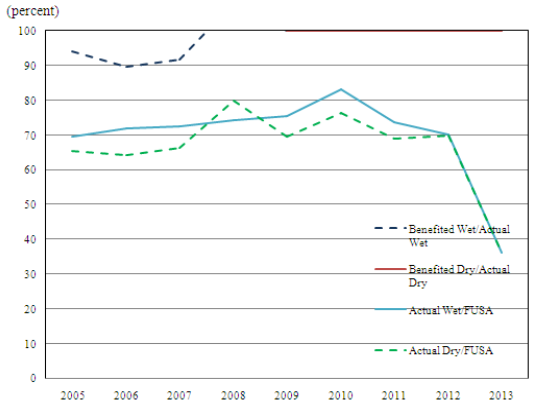
Figure 54. Trends in key performance indicators, Camarines Sur IMO, Region 5, 2005-2013



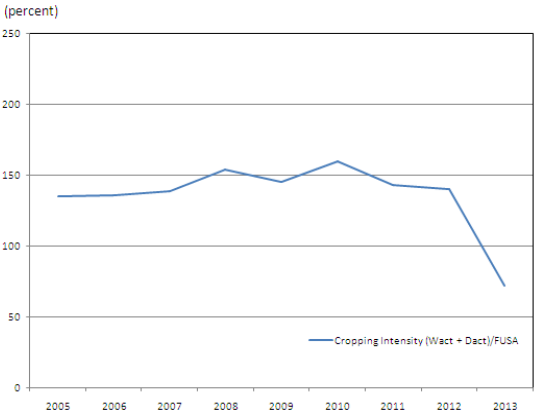
a. Service area, firmed-up SA, actual irrigated area (wet & dry seasons)



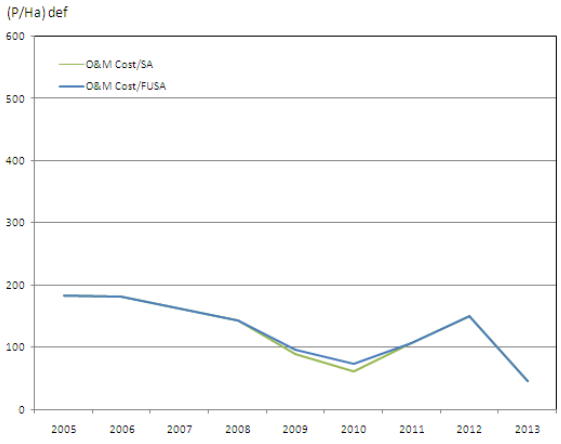
b. Collection efficiency



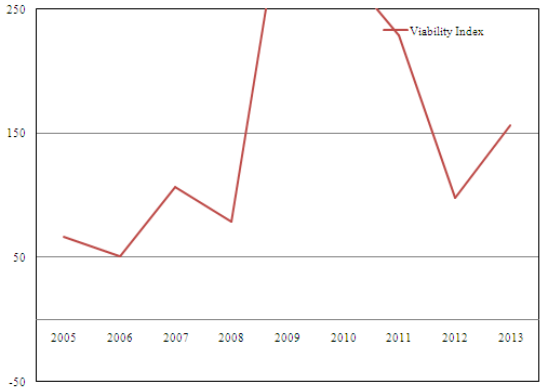
c. Benefitted to actual irrigated area & irrigation intensities (wet & dry seasons)



d. Cropping intensity, (actual irrigated wet + actual irrigated dry)/FUSA



e. O&M per ha



f. Viability index

Sources: NIA-SMD CISPER data, various years.

Table 43. CIS Performance Ratios of Camarines Sur IMO, 2005 to2013

Ratios	2005	2006	2007	2008	2009	2010	2011	2012	2013
Filled-up/Plantilla (%)					75	75	75	75	75
FUSA/Filled-up (Ha/staff)					995	995	1,162	1,190	2,699
FUSA/Filled-up + Daily Staff (Ha/staff)					995	995	1,162	1,190	2,699
FUSA/SA (%)	100	100	100	100	93	85	99	100	100
Ben. Wet/Actual Wet (%)	94	90	92	108	100	100	100	100	100
Ben. Dry/Actual Dry (%)					100	100	100	100	100
CIS Amort./Total Income (%)	46	55	28	20	24	35	32	51	50
Amort. Back/Total Income (%)	21	9	4	43	41	3	12	4	1
Equipment Rental/Total Income (%)		5	9	8	4	4	2		1
Equity Payment/Total Income (%)	5	25	37	44	41	41			
Total Income (%)	72	94	78	115	110	83	46	55	52
Wet Yield (cavan/ha)	80	82	82	82					
Dry Yield (cavan/ha)	84	84	82	82					

Sources: NIA-SMD CISPER data, various years.

Even with the plantilla positions filled-up to up to 75%, each personnel still have a very large coverage of 2,699 ha per staff (**Table 43**). The reduction of staff might be due to lack of funds. But, this large coverage per staff would consequently diminish the quality of their service.

During wet and dry seasons, the gap between irrigated area and FUSA ranged from 17% to 64% and 20% to 64%, respectively. This gap is might be due to defective and/or inadequate facilities.

Majority of the total income comes from amortization repayment averaging up to 38% over total income across the years. This is followed by equity payments averaging at 29%. Cropping intensities generally had a stable movement despite few fluctuations across the years. Viability index, on the other hand, had some fluctuations but generally followed an upward trend.

CHARACTERIZING THE SAMPLE CIS

The 66 communal irrigation systems (CIS) sample are characterized according to size, technology, "success" or "failure" and by province. On size, three types are defined: small, medium, large, based on the size of the firmed-up service area (FUSA). IAs with FUSA of 100 ha or more are classified as large while those with FUSA between 50 ha and 99 ha. are classified as medium. IAs with FUSA below 50 ha are classified as small. Based on technology, the CIS are classified as gravity or pump systems. To profile "successful" or "failed" CIS, "success" is defined in terms of three criteria: (1) NIA's functionality survey rating of very satisfactory to outstanding; (2) IA's own financial rating of 3 to 4, with 4 as very strong; and (3) IA's ISF collection performance rating of 3 to 4 with 4 as excellent and/or a collection rate of 65% and above. "Unsuccessful" or "less successful" IAs are then defined as those which are not "successful" or with NIA's functionality survey rating of poor to satisfactory, with own financial rating of 0 to 2 , and ISF collection performance rating of 0 to 2 or a collection rate below 65%.

By province

To establish patterns according to province, the provincial profiles of the sample CIS are reported in **Tables 44.1** to **44.7**.

Benguet IA samples have more successful IAs than less successful ones. Generally, Benguet has the highest cropping intensity and collection efficiency does not experience water shortage in the dry season or flooding problems, and have minimal siltation problems However, they do have moderate problems in funding and in the condition of their headwork and old piping structures. They also have the least number of facilities, such as water storage, among the IAs from 11 provinces.

Cagayan is one of the 3 provinces that only have less successful IAs. Their IA samples have high incidence of water supply shortages especially on dry seasons, severe condition problems of canals, very high siltation problems, low cropping intensity, low collection efficiency, and high occurrence of water theft.

For Camarines Sur, half of the sample IAs are considered successful and the other half, less successful. Of the 11 provinces in the study, Camarines Sur IAs have the highest average yield, high dependability, adequate water supply, and , fewer funding problems. On the contrary, they have the most number of lateral canal problems, moderate occurrence of flooding, and, slight siltation problems. They also lack facilities and equipment like farm-to-market-roads and backup pumps.

IAs from Ilocos Norte are also considered as less successful. The sample IAs have the highest count of water inadequacy, funding problems, and the most problems with the lateral canals and control structures. In addition, the CISs have relatively low cropping intensity and low average yield.

The IAs of Isabela have the least access to production credit, high siltation, and inadequate water supply. They also have high counts of irrigation headwork structure problems and main and lateral canal problems. Despite these constraints, Isabela has more "successful" IAs than less successful ones, likely due to good management performance, resulting in high functionality ratings, and relatively good levels of collection efficiency.

Of the Laguna IAs visited, only one would qualify as "successful". The rest are "less successful." high cropping intensities, adequate of water supply, and good levels of collection efficiency, Laguna IAs have the most flooding problems, funding problems, and condition problems for lateral canal and control structures. In addition, their management rating is not very good, resulting in lower functionality survey ratings.

Nueva Ecija has many less successful IAs, attributed to having low collection efficiency, inadequate water supply during dry seasons, high siltation and funding problems,, water theft, and problems with headwork and lateral canal conditions. On the positive side, most of the sample IAs have good management performance resulting in high ratings.

IAs in Nueva Vizcaya are less successful IAs. Despite having high average cropping intensity and yield, these IAs exhibit high counts of canal and headwork problems, inadequate water supply, high count of siltation problems, low collection efficiency, and several funding problems.

Occidental Mindoro has the largest amortization rate among the 11 provinces. Their IAs have minimal funding problems, good levels of collection efficiency, and do not experience siltation problems. However, their "less successful" IAs dominate the "successful" ones. This disparity is likely due to inadequate water supply especially during the dry season, very low average yield, low cropping intensity, flooding problems, problems with irrigation canals and headwork structures, water theft, and lack of facilities (e.g. FMR, solar driers, canal extensions and STWs).

Pampanga IAs have the same percentage of successful and less successful IAs. They experience both minimal water shortages in dry seasons and flooding in wet seasons. All sample IAs have high ratings in the functionality surveys, indicating very good management performance. Albeit the good ratings, Pampanga IAs have high siltation problems, low average collection efficiencies, and problems with the condition of their canal and control structures.

Pangasinan IAs have a higher percentage of successful IAs compared to less successful ones. Their IAs have not experienced flooding and funding problems, and have high collection efficiencies, and good functionality ratings. However, they still experience water supply shortages during the dry seasons, low average cropping intensity, problems with physical conditions of irrigation canals, water theft, and slight siltation problems.

Table 44.1. CIS IA Profile, Cropping Information and Financial Aspects by Province

Province	No. of IA sample	Ave. No. of Members	Ave. Irrig. Wet	Ave. Irrig. Dry	Ave. Cropping Intensity 1	Ave. Cropping Intensity 2	Ave. No. of Farmers-Landowner-operator (%)	Ave. of No. of Farmers-Tenant (%)	Ave. of No. of Farmers-lessees (%)	Ave. of Others (%)
Benguet	6	63	64	61	193	197	98		3	
Cagayan	6	82	67	63	144	196	62	46	0	
Camarines Sur	6	187	184	184	169	200	58	19	28	29
Ilocos Norte	6	207	156	99	157	157	65	31	3	
Isabela	6	138	92	104	150	189	49	52	8	
Laguna	6	64	87	87	181	200	22	74	5	81
Nueva Ecija	6	105	159	108	161	176	79	30	2	
Nueva Vizcaya	6	161	179	151	177	184	52	40	15	
Occidental Mindoro	6	143	298	259	193	192	75	37		
Pampanga	6	68	149	83	162	162	78	14	3	95
Pangasinan	6	106	108	52	136	149	62	38	0	
Total	66	120	140	114	166	182	64	41	7	68

Sources: CIS KII

Notes: Cropping intensity 1 = (Wet actual + Dry actual irrig)/FUSA

Cropping intensity 2 = (Wet actual + Dry actual irrig)/Wet actual (except in cases where actual dry season irrigated is bigger)

Province	No. of Crops Irrigated: Rice Only	No. of Crops Irrigated: Rice & Other Crops	Ave. Amount of Loan	Ave. Equity	Ave. Rate of Remittance (Peso/year)	Ave. Amortization Rate (Php/Year)
Benguet		6				
Cagayan	6		13253757	75000	161750	149560
Camarines Sur	6		14458647	1027985	161923	161923
Ilocos Norte	3	3	1500000	150000	37000	37000
Isabela	5	1	6380667		80333	80333
Laguna	6		3466520		55453	55453
Nueva Ecija	2	4	7391427	1173000	51250	32500
Nueva Vizcaya	6		4170239	61000	64112	64112
Occidental Mindoro	3	3	10066667	950000	52000	299926
Pampanga	2	4	1600000	450000	66867	67400
Pangasinan	4	2	28735087	1180000	67056	56699
Total	43	23	11037753	861598	89051	114802

Sources: CIS KII

Notes: Cropping intensity 1 = (Wet actual + Dry actual irrig)/FUSA

Cropping intensity 2 = (Wet actual + Dry actual irrig)/Wet actual (except in cases where actual dry season irrigated is bigger)

Table 44.2. Problems/concerns of CIS IAs by Province

Province	No. of IA sample	No. of IAs with inadequate water supply in dry season	No. of IAs with flooding problem during wet season	No. of IAs with Irrigation Headwork Problems (damaged, deteriorated, lacking)	No. of IAs with Irrigation Main Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Lateral Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Control Structure Problems (damaged, deteriorated, lacking, unlined)	No. of IAs with Siltation, Solid Waste, Informal Settlers & Water Quality Problems	No. of IAs with problems due to lack of facilities, infrastructure (FMRs), canal extensions, drainage, storage, pipelines, STWs, solar drier & etc.	No. of IAs with problems due to damaged/lack of Machineries & Equipment (ex. Backhoes, pumps, pipes & etc.)
Benguet	6			2	1	1		1	6	1
Cagayan	6	6		2	2	4	1	4	4	1
Camarines Sur	6		2	2		5		2	3	2
Ilocos Norte	6	5	1		1	5	4	3	1	3
Isabela	6	3		3	2	4		4	2	
Laguna	6	1	3	1		3	2		1	
Nueva Ecija	6	5	1	3	1	3		4	2	2
Nueva Vizcaya	6	3	1	5	2	5	3	4		1
Occidental Mindoro	6	4	2	2	2	5	1		4	2
Pampanga	6	2	1	1	2	5	3	4	2	1
Pangasinan	6	6		1	3	3	1	2	1	
Total	66	35	11	22	16	43	15	28	26	13

Sources: CIS KII

Table 44.3. NIA's CIS Functionality Survey rating, IA's own Financial Strength rating, IA's performance rating of ISF collection and Collection Efficiency by Province

Province	No. of IA sample	Ave. Collection Efficiency (%)	IA Functionality Survey Rating (No Data)	IA Functionality Survey Rating (Poor - Satisfactory)	IA Functionality Survey Rating (Very Satisfactory - Outstanding)	IA's Financial Strength Rating (no data)	IA's Financial Strength Rating (0 - 2, weak)	IA's Financial Strength Rating (3-4, strong)	IA's Performance Rating of Collection of ISF (no data)	IA's Performance Rating of Collection of ISF (0-2, weak)
Benguet	6	100	1		5		3	3	4	
Cagayan	6	73	3	2	1		3	3		3
Camarines Sur	6	83		2	4		1	5		1
Ilocos Norte	6	85	1	3	2	1	4	1	3	1
Isabela	6	89	1	1	4	1	2	3	2	2
Laguna	6	83		4	2		3	3	1	1
Nueva Ecija	6	43		2	4		4	2		4
Nueva Vizcaya	6	76	2	2	2		3	3	1	4
Occidental Mindoro	6	80	3	2	1		1	5	1	3
Pampanga	6	78			6	1	1	4	2	2
Pangasinan	6	88	1	2	3			6		3
Total	66	80	12	20	34	3	25	38	14	24

Sources: CIS KII

Note: Not Successful - IAs having FS of poor to satisfactory, financial strength rating of 0 -2, collection efficiency below of 0 to 64% and/or ISF collection rating of 0-2
Successful - IAs having FS of very satisfactory to outstanding, financial strength rating of 3 -4, collection efficiency of at least 65% and/or ISF collection rating of 3-4

Province	IA's Performance Rating of Collection of ISF (3-4, strong)	IA's Collection Efficiency (No Data)	IA's Collection Efficiency (0 - 64%, weak)	IA's Collection Efficiency (65% - 100%, strong)	No. of IAs by "Success" (insufficient data)	No. of IAs by "Success" (Not Successful)	No. of IAs by "Success" (Successful)
Benguet	2	2		4	3		3
Cagayan	3		1	5	3	3	
Camarines Sur	5		1	5		3	3
Ilocos Norte	2	4		2	4	2	
Isabela	2	1	1	4	1	2	3
Laguna	4	1		5	1	4	1
Nueva Ecija	2	1	3	2		4	2
Nueva Vizcaya	1	1	1	4	2	4	
Occidental Mindoro	2		3	3	3	2	1
Pampanga	2	1	2	3	2	2	2
Pangasinan	3	1	1	4	1	2	3
Total	28	12	13	41	20	28	18

Sources: CIS KII

Table 44.4. CIS IA's Performance Ratings of their water distribution and delivery service by Province

Province	No. of IA sample	Flexibility Index Rating - (3-4, flexible)	Reliability Index Rating - (3-4, reliable)	Equitability Index Rating - (3-4, equitable)	Adequacy of Service Delivery Rating - (3-4, adequate service)
Benguet	6	6	6	6	3
Cagayan	6	4	3	5	
Camarines Sur	6	6	6	6	6
Ilocos Norte	6	6	5	6	1
Isabela	6	3	4	5	4
Laguna	6	5	5	6	5
Nueva Ecija	6	2	4	4	3
Nueva Vizcaya	6	5	6	6	3
Occidental Mindoro	6	4	6	6	2
Pampanga	6	6	5	6	4
Pangasinan	6	6	5	6	
Total	66	53	55	62	31

Sources: CIS KII

Table 44.5 CIS IA's Average SA, Converted Area, Permanently Non-Restorable Area, FUSA, Operational & Non-operational SA by Province

Province	No. of IA sample	Service Area	Converted Area	Permanently Non-Restorable Area	Firmed Up Service Area	Operational SA	Non-Operational SA
Benguet	6	110	0	0	110	110	0
Cagayan	6	134	0	0	134	72	62
Camarines Sur	6	244	0	0	244	195	49
Ilocos Norte	6	187	2	39	146	126	20
Isabela	6	191	0	0	191	187	3
Laguna	6	107	1	20	86	80	7
Nueva Ecija	6	167	0	0	167	154	12
Nueva Vizcaya	6	203	0	0	203	196	7
Occidental Mindoro	6	385	0	0	385	271	114
Pampanga	6	179	2	0	177	166	11
Pangasinan	6	125	0	0	125	103	22
Total	66	185	0	6	179	151	28

Sources: NIA-SMD Inventory data, 2014.

Table 44.6 CIS IA's Average Irrigated and Benefited Area by Province

Province	No. of IA sample	Irrigated Wet Area (ha.)	Irrigated Dry Area (ha.)	Irrigated Ratooning / QTA Area (ha.)	Irrigated Third Crop Area (ha.)	Benefited Wet Area (ha.)	Benefited Dry Area (ha.)	Benefited Ratooning / QTA Area (ha.)	Benefited Third Crop Area (ha.)
Benguet	6	110	110	0	8	110	110	0	8
Cagayan	6	72	72	0	0	72	72	0	0
Camarines Sur	6	186	186	35	34	186	186	35	34
Ilocos Norte	6	126	117	0	0	126	117	0	0
Isabela	6	88	182	0	0	88	182	0	0
Laguna	6	80	80	0	1	71	80	0	0
Nueva Ecija	6	146	143	0	0	146	143	0	0
Nueva Vizcaya	6	184	183	0	0	184	183	0	0
Occidental Mindoro	6	233	203	0	0	233	203	0	0
Pampanga	6	94	156	0	0	94	156	0	0
Pangasinan	6	98	63	0	0	98	63	0	0
Total	66	128	136	3	4	127	136	3	4

Sources: NIA-SMD Inventory data, 2014.

Table 44.7 CIS IA's Average Cropping Intensities, Average Yield and Farmer Beneficiaries by Province

Province	No. of IA sample	Cropping Intensity 1	Cropping Intensity 2	Yield Wet	Yield Dry	Yield Ratooning / QTA	Yield Third Crop	Farmer Beneficiaries
Benguet	6	199	200	58	60	0	0	84
Cagayan	6	118	199	83	83	0	0	89
Camarines Sur	6	155	200	100	96	7	28	206
Ilocos Norte	6	165	187	76	81	0	0	189
Isabela	6	169	173	76	90	0	0	159
Laguna	6	186	200	78	98	0	0	50
Nueva Ecija	6	166	183	78	83	0	0	89
Nueva Vizcaya	6	185	192	88	91	0	0	135
Occidental Mindoro	6	156	192	61	61	0	0	95
Pampanga	6	158	183	68	89	0	0	85
Pangasinan	6	121	156	93	83	0	0	96
Total	66	160	187	79	85	1	3	118

Sources: NIA-SMD Inventory data, 2014.

Notes: Cropping intensity 1 = (Wet actual + Dry actual irrig)/FUSA

Cropping intensity 2 = (Wet actual + Dry actual irrig)/Wet actual (except in cases where actual dry season irrigated is bigger)

By size of system

The CIS sample has been categorized and characterized according to three sizes: small, medium, and large as shown in **Tables 45.1 to 45.7**.

Compared to medium and large CIS, the small CIS have the least incidence of inadequate water during dry seasons, siltation and solid waste problems. The small CIS have the least problem in their irrigation structures and canals compared to the large systems. They come second to the medium size CIS on incidence of water theft. The small CIS report the highest average cropping intensity and yield. However, despite this favorable profile, they have the lowest collection efficiency and highest count of funding problem. Following the criteria above on "successful" CIS, the small systems have the highest percentage of "successful" IAs compared to the larger systems.

Medium-sized CIS have the lowest average cropping intensity and yield. They have the highest incidence of inadequate water supply during dry seasons and siltation problems. They have the highest count of irrigation headwork and control structures-related problems. On the other hand, they have the highest collection efficiency and least incidence of floods and water theft. The medium CIS have the second highest percentage of successful IAs.

Large CIS have the highest incidence of floods during the wet seasons. They also have the highest count of irrigation canal problems and water theft. But, they have the least count of funding problems.

Table 45.1. CIS IA Profile, Cropping Information and Financial Aspects by "Size"

Size	No. of IA sample	Ave. No. of Members	Ave. Irrig. Wet	Ave. Irrig. Dry	Ave. Cropping Intensity 1	Ave. Cropping Intensity 2	Ave. No. of Farmers-Landowner-operator (%)	Ave. of No. of Farmers-Tenant (%)	Ave. of No. of Farmers-lessees (%)	Ave. of Others (%)
Large	36	174	219	181	165	182	59	41	10	68
Medium	17	67	58	44	156	175	68	36	5	
Small	13	41	30	26	180	191	70	51	2	
Average for All Sample/Total	66	120	140	114	166	182	64	41	7	68

Sources: CIS KII

Notes: Cropping intensity 1 = (Wet actual + Dry actual irrig)/FUSA

Cropping intensity 2 = (Wet actual + Dry actual irrig)/Wet actual (except in cases where actual dry season irrigated is bigger)

Size	No. of Crops Irrigated: Rice Only	No. of Crops Irrigated: Rice & Other Crops	Ave. Amount of Loan	Ave. Equity	Ave. Rate of Remittance (Peso/year)	Ave. Amortization Rate (Php/Year)
Large	25	11	16505807	1333710	130979	163153
Medium	13	4	3457834	580167	41987	48407
Small	5	8	4076512	53500	32240	31240
Average for All Sample/Total	43	23	11037753	861598	89051	114802

Sources: CIS KII

Notes: Cropping intensity 1 = (Wet actual + Dry actual irrig)/FUSA

Cropping intensity 2 = (Wet actual + Dry actual irrig)/Wet actual (except in cases where actual dry season irrigated is bigger)

Table 45.2. Problems/concerns of CIS IAs by "Size"

Size	No. of IA sample	No. of IAs with inadequate water supply in dry season	No. of IAs with flooding problem during wet season	No. of IAs with Irrigation Headwork Problems (damaged, deteriorated, lacking)	No. of IAs with Irrigation Main Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Lateral Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Control Structure Problems (damaged, deteriorated, lacking, unlined)	No. of IAs with Siltation, Solid Waste, Informal Settlers & Water Quality Problems	No. of IAs with problems due to lack of facilities, infrastructure (FMRs), canal extensions, drainage, storage, pipelines, STWs, solar drier & etc.	No. of IAs with problems due to damaged/lack of Machineries & Equipment (ex. Backhoes, pumps, pipes & etc.)
Large	36	21	7	12	10	27	7	14	17	5
Medium	17	10	2	7	4	9	5	10	3	4
Small	13	4	2	3	2	7	3	4	6	4
Total	66	35	11	22	16	43	15	28	26	13

Sources: CIS KII

Table 45.3. NIA's CIS Functionality Survey rating, IA's own Financial Strength rating, IA's performance rating of ISF collection and Collection Efficiency by "Size"

Size	No. of IA sample	Ave. Collection Efficiency (%)	IA Functionality Survey Rating (No Data)	IA Functionality Survey Rating (Poor - Satisfactory)	IA Functionality Survey Rating (Very Satisfactory - Outstanding)	IA's Financial Strength Rating (no data)	IA's Financial Strength Rating (0 - 2, weak)	IA's Financial Strength Rating (3-4, strong)	IA's Performance Rating of Collection of ISF (no data)	IA's Performance Rating of Collection of ISF (0-2, weak)
Large	36	80	6	13	17	2	9	25	8	12
Medium	17	81	4	3	10	1	8	8	2	9
Small	13	78	2	4	7		8	5	4	3
Average for All Sample/Total	66	80	12	20	34	3	25	38	14	24

Sources: CIS KII

Note: Not Successful - IAs having FS of poor to satisfactory, financial strength rating of 0 -2, collection efficiency below of 0 to 64% and/or ISF collection rating of 0-2
Successful - IAs having FS of very satisfactory to outstanding, financial strength rating of 3 -4, collection efficiency of at least 65% and/or ISF collection rating of 3-4

Size	IA's Performance Rating of Collection of ISF (3-4, strong)	IA's Collection Efficiency (No Data)	IA's Collection Efficiency (0 - 64%, weak)	IA's Collection Efficiency (65% - 100%, strong)	No. of IAs by "Success" (insufficient data)	No. of IAs by "Success" (Not Successful)	No. of IAs by "Success" (Successful)
Large	16	6	8	22	9	17	10
Medium	6	2	4	11	5	7	5
Small	6	4	1	8	6	4	3
Average for All Sample/Total	28	12	13	41	20	28	18

Sources: CIS KII

Table 45.4. CIS IA's Performance Ratings of their water distribution and delivery service by "Size"

Size	No. of IA sample	Flexibility Index Rating - (3-4, flexible)	Reliability Index Rating - (3-4, reliable)	Equitability Index Rating - (3-4, equitable)	Adequacy of Service Delivery Rating - (3-4, adequate service)
Large	36	29	32	34	16
Medium	17	13	12	16	7
Small	13	11	11	12	8
Total	66	53	55	62	31

Sources: CIS KII

Table 45.5 CIS IA's Average SA, Converted Area, Permanently Non-Restorable Area, FUSA, Operational & Non-operational SA by "Size"

Size	Service Area	Converted Area	Permanently Non-Restorable Area	Firmed Up Service Area	Operational SA	Non-Operational SA	Average of NON-OPERATIONAL (SA)
Large	36	270	0	4	265	226	40
Medium	17	83	1	7	76	61	15
Small	13	62	0	11	52	43	9
Average for All Sample/Total	66	185	0	6	179	151	28

Sources: CIS KII

Table 45.6 CIS IA's Average Irrigated and Benefited Area by "Size"

Size	No. of IA sample	Irrigated Wet Area (ha.)	Irrigated Dry Area (ha.)	Irrigated Ratooning / QTA Area (ha.)	Irrigated Third Crop Area (ha.)	Benefited Wet Area (ha.)	Benefited Dry Area (ha.)	Benefited Ratooning / QTA Area (ha.)	Benefited Third Crop Area (ha.)
Large	36	187	204	6	6	185	204	6	6
Medium	17	57	54	0	0	57	54	0	0
Small	13	42	38	0	3	42	38	0	3
Average for All Sample/Total	66	128	136	3	4	127	136	3	4

Sources: CIS KII

Table 45.7 CIS IA's Average Cropping Intensities, Average Yield and Farmer Beneficiaries by "Size"

Size	No. of IA sample	Cropping Intensity 1	Cropping Intensity 2	Yield Wet	Yield Dry	Yield Ratooning / QTA	Yield Third Crop	Farmer Beneficiaries
Large	36	159	188	77	83	1	5	166
Medium	17	151	184	84	86	0	0	61
Small	13	178	188	80	87	0	0	47
Average for All Sample/Total	66	160	187	79	85	1	3	118

Sources: CIS KII

Notes: Cropping intensity 1 = (Wet actual + Dry actual irrig)/FUSA

Cropping intensity 2 = (Wet actual + Dry actual irrig)/Wet actual (except in cases where actual dry season irrigated is bigger)

By technology

The CIS sample is also characterized in terms of usage of pump vs. gravity systems (**Tables 46.1** to **46.7**).

Contrary to the common findings, IAs using pump technology in the sample have more successful IAs despite having higher amortization rates, incidence of flooding and funding problems, and low cropping intensities. The disparity is likely due to their adequate water supply even during dry seasons, fewer problems with their irrigation canals and structures, and high collection efficiencies.

On the other hand, IAs irrigated by gravity have the highest cropping intensity and a low occurrence of flooding. However, when compared to IAs using pump systems, they have more problems with irrigation canals and structures, more severe water shortages, and greater incidence of funding problems and water theft.[9]

[9] Of the 66 sample IAs, only one IA with a reservoir scheme does not have much data to allow comparison with the other schemes.

Table 46.1. CIS IA Profile, Cropping Information and Financial Aspects by "Technology"

Technology	No. of IA sample	Ave. No. of Members	Ave. Irrig. Wet	Ave. Irrig. Dry	Ave. Cropping Intensity 1	Ave. Cropping Intensity 2	Ave. No. of Farmers-Landowner-operator (%)	Ave. of No. of Farmers-Tenant (%)	Ave. of No. of Farmers-lessees (%)
Gravity	56	122	141	116	172	183	65	40	7
Pump	9	109	136	106	130	182	60	47	8
Reservoir	1	150	160	80	150	150	33	66	1
Average for All Sample/Total	66	120	140	114	166	182	64	41	7

Sources: CIS KII

Notes: Cropping intensity 1 = (Wet actual + Dry actual irrig)/FUSA

Cropping intensity 2 = (Wet actual + Dry actual irrig)/Wet actual (except in cases where actual dry season irrigated is bigger)

Technology	Ave. of Others (%)	No. of Crops Irrigated: Rice Only	No. of Crops Irrigated: Rice & Other Crops	Ave. Amount of Loan	Ave. Equity	Ave. Rate of Remittance (Peso/year)	Ave. Amortization Rate (Php/Year)
Gravity	55	37	19	7727362	911385	87906	116999
Pump	95	5	4	5263114	537985	114329	122029
Reservoir		1		150000000		20000	20000
Average for All Sample/Total	68	43	23	11037753	861598	89051	114802

Sources: CIS KII

Notes: Cropping intensity 1 = (Wet actual + Dry actual irrig)/FUSA

Cropping intensity 2 = (Wet actual + Dry actual irrig)/Wet actual (except in cases where actual dry season irrigated is bigger)

Table 46.2. Problems/concerns of CIS IAs by "Technology"

Technology	No. of IA sample	No. of IAs with inadequate water supply in dry season	No. of IAs with flooding problem during wet season	No. of IAs with Irrigation Headwork Problems (damaged, deteriorated, lacking)	No. of IAs with Irrigation Main Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Lateral Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Control Structure Problems (damaged, deteriorated, lacking, unlined)	No. of IAs with Siltation, Solid Waste, Informal Settlers & Water Quality Problems	No. of IAs with problems due to lack of facilities, infrastructure (FMRs), canal extensions, drainage, storage, pipelines, STWs, solar drier & etc.	No. of IAs with problems due to damaged/lack of Machineries & Equipment (ex. Backhoes, pumps, pipes & etc.)
Gravity	56	31	8	22	15	38	14	24	22	11
Pump	9	3	3		1	4	1	4	4	2
Reservoir	1	1				1				
Total	66	35	11	22	16	43	15	28	26	13

Sources: CIS KII

Table 46.3. NIA's CIS Functionality Survey rating, IA's own Financial Strength rating, IA's performance rating of ISF collection and Collection Efficiency by "Technology"

Technology	No. of IA sample	Ave. Collection Efficiency (%)	IA Functionality Survey Rating (No Data)	IA Functionality Survey Rating (Poor - Satisfactory)	IA Functionality Survey Rating (Very Satisfactory - Outstanding)	IA's Financial Strength Rating (no data)	IA's Financial Strength Rating (0 - 2, weak)	IA's Financial Strength Rating (3-4, strong)	IA's Performance Rating of Collection of ISF (no data)	IA's Performance Rating of Collection of ISF (0-2, weak)
Gravity	56	79	10	16	30	2	23	31	10	22
Pump	9	87	1	4	4	1	2	6	4	1
Reservoir	1		1					1		1
Average for All Sample/Total	66	80	12	20	34	3	25	38	14	24

Sources: CIS KII

Note: Not Successful - IAs having FS of poor to satisfactory, financial strength rating of 0 -2, collection efficiency below of 0 to 64% and/or ISF collection rating of 0-2
Successful - IAs having FS of very satisfactory to outstanding, financial strength rating of 3 -4, collection efficiency of at least 65% and/or ISF collection rating of 3-4

Technology	IA's Performance Rating of Collection of ISF (3-4, strong)	IA's Collection Efficiency (No Data)	IA's Collection Efficiency (0 - 64%, weak)	IA's Collection Efficiency (65% - 100%, strong)	No. of IAs by "Success" (insufficient data)	No. of IAs by "Success" (Not Successful)	No. of IAs by "Success" (Successful)
Gravity	24	9	12	35	16	25	15
Pump	4	3	1	5	3	3	3
Reservoir				1	1		
Average for All Sample/Total	28	12	13	41	20	28	18

Sources: CIS KII

Note: Not Successful - IAs having FS of poor to satisfactory, financial strength rating of 0 -2, collection efficiency below of 0 to 64% and/or ISF collection rating of 0-2
Successful - IAs having FS of very satisfactory to outstanding, financial strength rating of 3 -4, collection efficiency of at least 65% and/or ISF collection rating of 3-4

Table 46.4. CIS IA's Performance Ratings of their water distribution and delivery service by "Technology"

Technology	No. of IA sample	Flexibility Index Rating - (3-4, flexible)	Reliability Index Rating - (3-4, reliable)	Equitability Index Rating - (3-4, equitable)	Adequacy of Service Delivery Rating - (3-4, adequate service)
Gravity	56	45	48	53	25
Pump	9	7	6	8	6
Reservoir	1	1	1	1	
Total	66	53	55	62	31

Sources: CIS KII

Table 46.5 CIS IA's Average SA, Converted Area, Permanently Non-Restorable Area, FUSA, Operational & Non-operational SA by "Technology"

Technology	No. of IA sample	Service Area	Converted Area	Permanently Non-Restorable Area	Firmed Up Service Area	Operational SA	Non-Operational SA
Gravity	56	178	1	5	172	147	26
Pump	9	236	0	12	224	187	37
Reservoir	1	108	0	0	108	60	48
Average for All Sample/Total	66	185	0	6	179	151	28

Sources: NIA-SMD Inventory data, 2014.

Table 46.6 CIS IA's Average Irrigated and Benefited Area by "Technology"

Technology	No. of IA sample	Irrigated Wet Area (ha.)	Irrigated Dry Area (ha.)	Irrigated Ratooning / QTA Area (ha.)	Irrigated Third Crop Area (ha.)	Benefited Wet Area (ha.)	Benefited Dry Area (ha.)	Benefited Ratooning / QTA Area (ha.)	Benefited Third Crop Area (ha.)
Gravity	56	138	130	3	1	137	130	3	1
Pump	9	77	180	7	22	76	180	7	22
Reservoir	1	50	30	0	0	50	30	0	0
Average for All Sample/Total	66	128	136	3	4	127	136	3	4

Sources: NIA-SMD Inventory data, 2014.

Table 46.7 CIS IA's Average Cropping Intensities, Average Yield and Farmer Beneficiaries by "Technology"

Technology	No. of IA sample	Cropping Intensity 1	Cropping Intensity 2	Yield Wet	Yield Dry	Yield Ratooning / QTA	Yield Third Crop	Farmer Beneficiaries
Gravity	56	169	191	80	84	0	2	119
Pump	9	118	167	70	86	2	10	128
Reservoir	1	74	160	100	80	0	0	0
Average for All Sample/Total	66	160	187	79	85	1	3	118

Sources: NIA-SMD Inventory data, 2014.

Notes: Cropping intensity 1 = (Wet actual + Dry actual irrig)/FUSA

Cropping intensity 2 = (Wet actual + Dry actual irrig)/Wet actual (except in cases where actual dry season irrigated is bigger)

By "success"

The profiles of the CIS sample in terms of some "success" measure are reported in **Tables 47.1** to **47.7**.

Despite flooding, siltation problems, problems with irrigation structures, and water theft, successful IAs as defined above generally have adequate and dependable sources of water supply, high cropping intensity, high collection efficiency, and adequate funding.

Less successful IAs are characterized by inadequate water in the dry seasons, more problems with irrigation main canal and control structures, low collection efficiencies, and severe funding problems.

Table 47.1. CIS IA Profile, Cropping Information and Financial Aspects by "Success"

Classification	No. of IA sample	Ave. No. of Members	Ave. Irrig. Wet	Ave. Irrig. Dry	Ave. Cropping Intensity 1	Ave. Cropping Intensity 2	Ave. No. of Farmers-Landowner-operator (%)	Ave. of No. of Farmers-Tenant (%)	Ave. of No. of Farmers-lessees (%)	Ave. of Others (%)
Not Successful	28	121	129	117	160	179	64	36	10	81
Successful	18	118	165	117	171	181	62	42	7	62
Insufficient Data	20	122	134	109	169	187	64	47	4	
Average for All Sample/Total	66	120	140	114	166	182	64	41	7	68

Sources: CIS KII

Notes: Cropping intensity 1 = (Wet actual + Dry actual irrig)/FUSA

Cropping intensity 2 = (Wet actual + Dry actual irrig)/Wet actual (except in cases where actual dry season irrigated is bigger)

Table 47.1. CIS IA Profile, Cropping Information and Financial Aspects by "Success"

Classification	No. of Crops Irrigated: Rice Only	No. of Crops Irrigated: Rice & Other Crops	Ave. Amount of Loan	Ave. Equity	Ave. Rate of Remittance (Peso/year)	Ave. Amortization Rate (Php/Year)
Not Successful	19	9	7407343	916495	96500	91994
Successful	11	7	8111770	1133333	86088	231525
Insufficient Data	13	7	34760000	208333	42333	28400
Average for All Sample/Total	43	23	11037753	861598	89051	114802

Sources: CIS KII

Notes: Cropping intensity 1 = (Wet actual + Dry actual irrig)/FUSA

Cropping intensity 2 = (Wet actual + Dry actual irrig)/Wet actual (except in cases where actual dry season irrigated is bigger)

Table 47.2. Problems/concerns of CIS IAs by "Success"

Classification	No. of IA sample	No. of IAs with inadequate water supply in dry season	No. of IAs with flooding problem during wet season	No. of IAs with Irrigation Headwork Problems (damaged, deteriorated, lacking)	No. of IAs with Irrigation Main Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Lateral Canal Problems (damaged, deteriorated, unlined)	No. of IAs with Irrigation Control Structure Problems (damaged, deteriorated, lacking, unlined)	No. of IAs with Siltation, Solid Waste, Informal Settlers & Water Quality Problems	No. of IAs with problems due to lack of facilities, infrastructure (FMRs), canal extensions, drainage, storage, pipelines, STWs, solar drier & etc.	No. of IAs with problems due to damaged/lack of Machineries & Equipment (ex. Backhoes, pumps, pipes & etc.)
Not Successful	28	15	3	9	6	18	9	10	8	7
Successful	18	7	3	6	3	12	1	11	11	3
Insufficient Data	20	13	5	7	7	13	5	7	7	3
Total	66	35	11	22	16	43	15	28	26	13

Sources: CIS KII

Table 47.3. NIA's CIS Functionality Survey rating, IA's own Financial Strength rating, IA's performance rating of ISF collection and Collection Efficiency by "Success"

Classification	No. of IA sample	Ave. Collection Efficiency (%)	IA Functionality Survey Rating (No Data)	IA Functionality Survey Rating (Poor - Satisfactory)	IA Functionality Survey Rating (Very Satisfactory - Outstanding)	IA's Financial Strength Rating (no data)	IA's Financial Strength Rating (0 - 2, weak)	IA's Financial Strength Rating (3-4, strong)	IA's Performance Rating of Collection of ISF (no data)	IA's Performance Rating of Collection of ISF (0-2, weak)
Not Successful	28	71		17	11	1	15	12	1	16
Successful	18	93			18			18	2	3
Insufficient Data	20	80	12	3	5	2	10	8	11	5
Average for All Sample/Total	66	80	12	20	34	3	25	38	14	24

Sources: CIS KII

Note: Not Successful - IAs having FS of poor to satisfactory, financial strength rating of 0 -2, collection efficiency below of 0 to 64% and/or ISF collection rating of 0-2

Successful - IAs having FS of very satisfactory to outstanding, financial strength rating of 3 -4, collection efficiency of at least 65% and/or ISF collection rating of 3-4

Classification	IA's Performance Rating of Collection of ISF (3-4, strong)	IA's Collection Efficiency (No Data)	IA's Collection Efficiency (0 - 64%, weak)	IA's Collection Efficiency (65% - 100%, strong)	No. of IAs by "Success" (insufficient data)	No. of IAs by "Success" (Not Successful)	No. of IAs by "Success" (Successful)
Not Successful	11		9	19		28	
Successful	13	2	1	15			18
Insufficient Data	4	10	3	7	20		
Average for All Sample/Total	28	12	13	41	20	28	18

Sources: CIS KII

Note: Not Successful - IAs having FS of poor to satisfactory, financial strength rating of 0 -2, collection efficiency below of 0 to 64% and/or ISF collection rating of 0-2

Successful - IAs having FS of very satisfactory to outstanding, financial strength rating of 3 -4, collection efficiency of at least 65% and/or ISF collection rating of 3-4

Table 47.4. CIS IA's Performance Ratings of their water distribution and delivery service by "Success"

Classification	No. of IA sample	Flexibility Index Rating - (3-4, flexible)	Reliability Index Rating - (3-4, reliable)	Equitability Index Rating - (3-4, equitable)	Adequacy of Service Delivery Rating - (3-4, adequate service)
Not Successful	28	22	21	24	14
Successful	18	16	18	18	11
Insufficient Data	20	15	16	20	6
Total	66	53	55	62	31

Sources: CIS KII

Table 47.5 CIS IA's Average SA, Converted Area, Permanently Non-Restorable Area, FUSA, Operational & Non-operational SA by "Success"

Classification	No. of IA sample	Service Area	Converted Area	Permanently Non-Restorable Area	Firmed Up Service Area	Operational SA	Non-Operational SA
Not Successful	28	201	1	4	196	168	29
Successful	18	179	0	0	179	165	14
Insufficient Data	20	163	0	15	148	106	43
Average for All Sample/Total	66	185	0	6	179	151	28

Sources: NIA-SMD Inventory data, 2014.

Table 47.6 CIS IA's Average Irrigated and Benefited Area by "Success"

Classification	No. of IA sample	Irrigated Wet Area (ha.)	Irrigated Dry Area (ha.)	Irrigated Ratooning / QTA Area (ha.)	Irrigated Third Crop Area (ha.)	Benefited Wet Area (ha.)	Benefited Dry Area (ha.)	Benefited Ratooning / QTA Area (ha.)	Benefited Third Crop Area (ha.)
Not Successful	28	136	149	2	7	134	149	2	7
Successful	18	139	145	8	2	139	145	8	2
Insufficient Data	20	102	103	0	0	101	103	0	0
Average for All Sample/Total	66	128	136	3	4	127	136	3	4

Sources: NIA-SMD Inventory data, 2014.

Table 47.7 CIS IA's Average Cropping Intensities, Average Yield and Farmer Beneficiaries by "Success"

Classification	No. of IA sample	Cropping Intensity 1	Cropping Intensity 2	Yield Wet	Yield Dry	Yield Ratooning / QTA	Yield Third Crop	Farmer Beneficiaries
Not Successful	28	157	186	80	88	1	3	124
Successful	18	166	182	80	85	1	4	120
Insufficient Data	20	158	193	76	77	0	0	105
Average for All Sample/Total	66	160	187	79	85	1	3	118

Sources: NIA-SMD Inventory data, 2014.

Notes: Cropping intensity 1 = (Wet actual + Dry actual irrig)/FUSA

Cropping intensity 2 = (Wet actual + Dry actual irrig)/Wet actual (except in cases where actual dry season irrigated is bigger)

Technical Assessment[10]

There are technical issues/problems that generally confront the IAs and the performance of their CIS (**Tables 48** to **50**). Most run-of-the-river type dams are quite old, with exposed rock cores, damaged spillways, and with sediments almost at the crest level. Most of the sluice gates and intake gates usually made of steel are now replaced with flashboards, sand bags, or stones and in some relatively larger CIS with defective lifting mechanisms. These problems also contribute to increased sedimentation. On a positive note, most CIS that were visited have concrete-lined main canals with some up to the laterals. In general, the good conditions of the lined and unlined canal networks are due to the IAs having good O&M and cleanup mechanisms. In some cases, heavy siltation experienced is due to watershed degradation and requires major policy/governance solutions.

Structures found in CIS include cross regulators, check gates, drop structures, division boxes and farm turnouts. Some of which are well-maintained, while others have deteriorated with control structures not functioning well or as originally intended. For example, some cross or check regulators initially intended to measure discharges lack staff gages that measure water levels and have missing or uncalibrated rating curves. Other miscellaneous or appurtenant structures commonly found in all CIS are road and thresher crossings, end checks, and service roads, where most service roads are rough roads with most dams accessible only by walking or by motorcycles.

As in most irrigation systems, there are no specific drainage canals at the CIS. Normally, the downstream farm ditches receive the excess water from paddies, which in turn would be used to irrigate downstream areas in some CIS. With water distribution downstream being from paddy to paddy, not having an individual farm ditch for each paddy, result in large application losses.

Sedimentation is one of the main problems that cause canal deterioration and decrease in water yield in dry seasons. Identified sources of sediments are (a) sidehills, (b) drainage/creeks, (c) side slopes of irrigation canals, and (d) catchments. Lahar is the major source of sediments for some CIS in Pampanga. Several operational lapses (e.g. full opening of intake gates and closing of sluice gates to maximize water intake even during high sediment inflows), contribute to increased sedimentation. For example, defective lifting mechanisms or the replacement of steel sluice gates permanently by flashboard or concrete maximize water inflow into the system but also effectively increase sediment inflows. Given the high sedimentation rate, IAs regularly clean the canals, especially since CIS canals are smaller and more manageable compared to NIS. Thus, the IAs rated low silt level and undesired seepage grade in their canals. .

One of the major reasons for low performance by irrigation systems is the lack of water during dry seasons. The sources of water for the CIS visited are lakes, rivers, creeks, springs, ground water, runoff, or a combination of these sources. Some rivers are large and have adequate flows that can irrigate even during the dry seasons, while some rivers have very low dry season flows. Most creeks have adequate flows for small areas during wet seasons but are either very low or have no flow during dry seasons. Only 22 of the 66 surveyed CIS (33%) have river sources capable of

[10] This section is drawn from Luyun (2015) Final Report.

providing irrigation during dry seasons. Eight rivers have published historical records that showed low dependable flows. Four of these rivers are very large and can provide water for large NIS, thus, irrigation is assured at least 80% of the time with only siltation and hardware problems remaining. However, water source is a major problem for majority of the CIS that tap water from less dependable small rivers, creeks, springs, and runoffs.

Groundwater remains a viable option, especially for areas where the surface water sources (i.e. creeks) have low dependable discharges during the dry seasons, and are underlain by good shallow aquifers. Despite having to use STW pumps and engines that lead to additional fuel costs, groundwater is reliable even in intense drought periods or El Niño episodes, and farmers have control of irrigation schedules and flows. In times of water shortages or when the area to be irrigated is higher from the source, STWs and LLPs (3"x 3" or 4"x 4" centrifugal pumps) are commonly used. They are usually driven by 8 – 12 Hp water-cooled diesel engines. With respect to rehabilitation, the rehabilitated areas averaged at about 140,000 ha per year from 2006-2013, which is double of the 1992-1996 rate. Despite massive efforts and funding, the increase in irrigation area is minimal at just about 40,000 ha per year.

In terms of water delivery performance, on average, the IAs appear to be satisfied given that their rating for their CIS are highly flexible, reliable, and equitable. Around 40% of the IAs practiced AWD technology.

The operation and maintenance of CIS is turned over to IAs upon project completion. Based on the KIIs, most of the IAs claim that they receive sufficient water at the right time. Moreover, the IAs rated themselves high in terms of water distribution, maintenance of canals, and control structures. However, improvements may be necessary since delays are still commonplace.

The expansion of irrigated agriculture, through the development of new areas or the rehabilitation of old ones, is necessary for food security. New irrigable areas come from small scale systems like CIS, STWs and SWIPs, all of which have low gestation periods, offer low investments, quite efficient, and are easy to manage.

Table 48 Summary of Observation for each CIS

Issues	Dangdangla CIS	San Jera Tanap A Dakkel CIS	Palompong CIS	Zanjera Bangisirt CIS	Der-ap Saoit CIS	Baay CIS	San Agel SRIP	Don Oftociano Sr. CIS	Sapid CIS	Nama CIS	Convento CIS	Ngayaoyaoan CIS	Gumarang CIS	Garab CIS	Naddungan CIS	Abaca CIS	Calusit CIS	Tappakan Baraccoit CIS	Masipi West IA CIS	Masipi East CIS	Viola PIS
Technical Issues																					
Siltation				■	■	■					■	■			■		■	■	■	■	
Seepage						■															
Lacking/incomplete Irrigation Facilities											■			■				■			
Canal related		■	■	■	■	■	■		■	■		■	■		■		■	■	■	■	
High operation cost of pump		■	■		■			■					■		■						
Control Structure			■	■	■							■									
Flooding	■																				
Shortage of Water Supply		■	■				■	■	■					■	■	■	■		■	■	
Informal Settlers/Solid Waste																					
Water Source		■			■				■						■	■	■				■
Farm-to-market/ Access Road																					
Irrigation Headwork												■					■			■	
Machineries & Equipment			■															■			
Structure Design							■						■					■	■		
Salt Intrusion																					
Calamities/Low Yield													■								
Pest Insfestation																					
Illegal Offtakes/Turnouts/Pumps												■					■				
Others							■														
Institutional Issues																					
ISF/Amortization Payment / Collection Efficiency										■			■								
Inadequate, Unclear or Absence of Policies, Ordinances or Regulations														■							
Implementation of Policies, Ordinances, Penalties or Regulation													■								
Funds																					■
Registration or Permit																					
Water Theft, Scheduling & Distribution				■													■				
Attendance in Maintenance Work & Meetings								■					■				■				
Environmental Issues																					
Mining																					

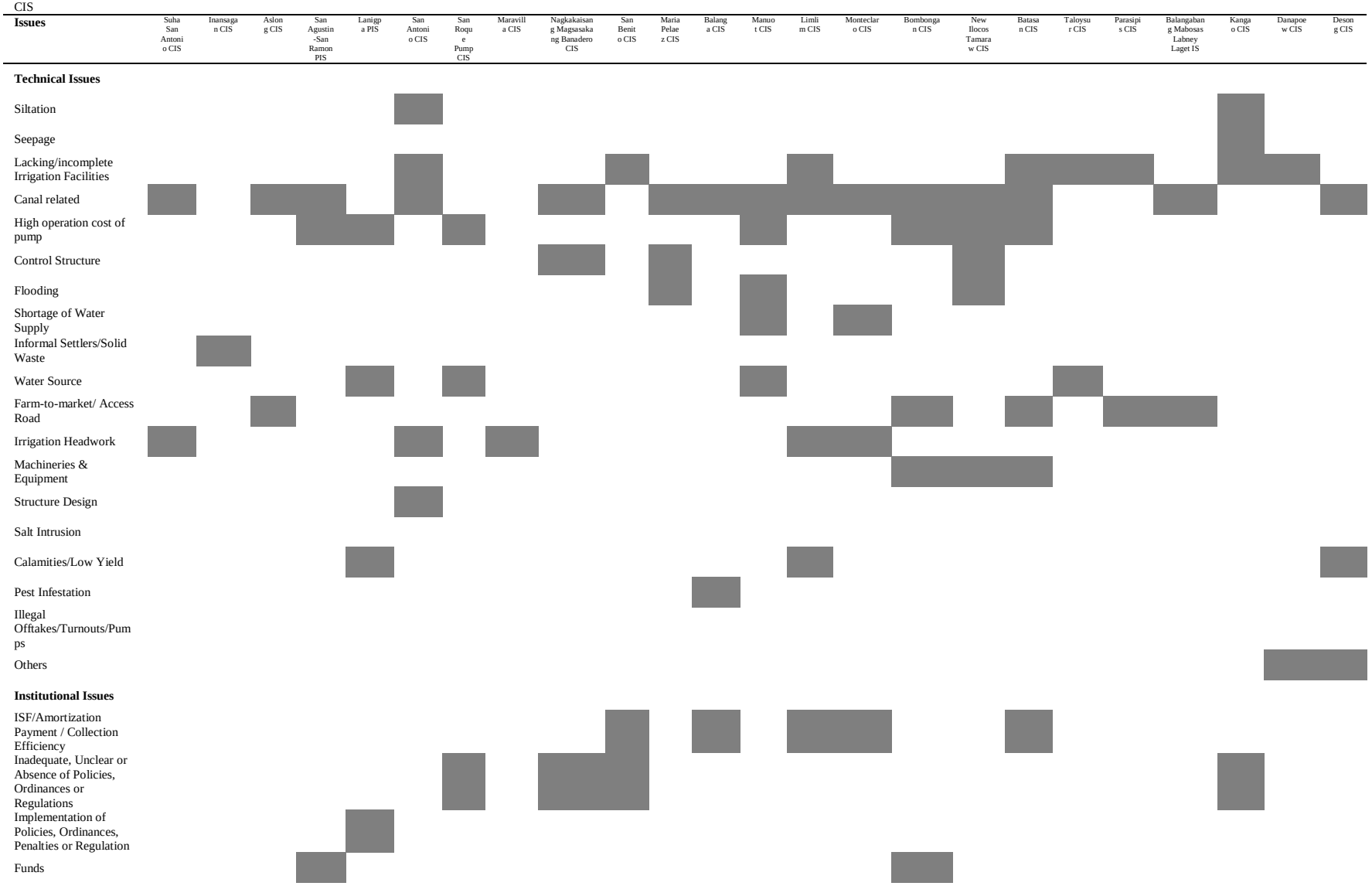
Source: CIS KII & Ocular Inspection Findings
Note: For more details, refer to Excel file.

Table 48 Summary of Observation for each CIS

Issues	Dangdangla CIS	San Jera Tanap A Dakkel CIS	Palompong CIS	Zanjera Bangisirt CIS	Der-ap Saoit CIS	Baay CIS	San Agel SRIP	Don Oftociano Sr. CIS	Sapid CIS	Nama CIS	Convento CIS	Ngayaoyaoan CIS	Gumarang CIS	Garab CIS	Naddungan CIS	Abaca CIS	Calusit CIS	Tappakan Baraccoit CIS	Masipi West IA CIS	Masipi East CIS	Viola PIS
Technical Issues																					
Siltation				■	■	■					■	■			■		■	■	■	■	
Seepage						■															
Lacking/incomplete Irrigation Facilities											■			■				■			
Canal related		■	■	■	■	■	■		■	■		■	■		■		■	■	■	■	
High operation cost of pump		■	■		■			■					■		■						
Control Structure			■	■	■							■									
Flooding	■																				
Shortage of Water Supply		■	■				■	■	■					■	■	■	■		■	■	
Informal Settlers/Solid Waste																					
Water Source		■			■				■						■	■	■				■
Farm-to-market/ Access Road																					
Irrigation Headwork												■					■			■	
Machineries & Equipment			■															■			
Structure Design							■						■					■	■		
Salt Intrusion																					
Calamities/Low Yield													■								
Pest Insfestation																					
Illegal Offtakes/Turnouts/Pumps												■					■				
Others							■														
Institutional Issues																					
ISF/Amortization Payment / Collection Efficiency										■			■								
Inadequate, Unclear or Absence of Policies, Ordinances or Regulations														■							
Implementation of Policies, Ordinances, Penalties or Regulation													■								
Funds																					■
Registration or Permit																					
Water Theft, Scheduling & Distribution				■													■				
Attendance in Maintenance Work & Meetings								■					■				■				
Environmental Issues																					
Mining																					

Source: CIS KII & Ocular Inspection Findings
Note: For more details, refer to Excel file.

Table 48 Summary of Observation for each CIS



Registration or Permit					
Water Theft, Scheduling & Distribution					
Attendance in Maintenance Work & Meetings					
Environmental Issues					
Mining					

Source: CIS KII & Ocular Inspection Findings
Note: For more details, refer to Excel file.

Table 49. Summary of Problems Encountered by the 66 Sample CIS in Luzon, 2015

Issues	Percentage of Total CIS Sample (%)
Technical Issues	
Siltation	38
Seepage	6
Lacking/incomplete Irrigation Facilities	20
Canal related	64
High operation cost of pump	21
Control Structure	21
Flooding	8
Shortage of Water Supply	30
Informal Settlers/Solid Waste	2
Water Source	23
Farm-to-market/ Access Road	9
Irrigation Headwork	21
Machineries & Equipment	11
Structure Design	11
Salt Intrusion	2
Calamities/Low Yield	11
Pest Infestation	2
Illegal Offtakes/Turnouts/Pumps	6
Others	5
Institutional Issues	
ISF/Amortization Payment / Collection Efficiency	20
Inadequate, Unclear or Absence of Policies, Ordinances or Regulations	17
Implementation of Policies, Ordinances, Penalties or Regulation	6
Funds	8
Registration or Permit	2
Water Theft, Scheduling & Distribution	9
Attendance in Maintenance Work & Meetings	17
Environmental Issues	
Mining	2

Source: CIS KII and Ocular Inspection, PIDS Irrigation Study team (2015).
Note: For more details, refer to Excel file.

Table 50.1. Deployment of Institutional Development Officers to communal irrigation systems in 11 selected Irrigation Management Offices.

IMO	No. of CIS/IAs	No. of IDOs
Pampanga	68	1 Sr. IDO for CIS and 1 Community Relation Assistant (CRA)
Nueva Ecija	60	7 IDOs with CRAs helping
Pangasinan	120	8 IDOs are assigned to CIS in 6 districts
Ilocos Norte	116	4 IDOs assigned to CIS; 5 IDOs to both CIS/NIS; two (2) farmers' Irrigators' organizers
Benguet	431	3 IDOs
Camarines Sur	152	2 IDOs for CARP and SRIP; 6 Research Assistant B position covering 5 districts
Nueva Vizcaya	217	4 IDOs are assigned CIS/IAs
Isabela	45	1 assigned to CIS project but there are many radiation projects
Cagayan	673	3 IDOs
Laguna	13	3 IDOs in 3 districts
Occidental Mindoro	32	5 IDOs

Source: Personal interviews of IA officials/members

Table 50.2. Source of funding of communal irrigation systems, 2014.

Sources	NIA	ARISP	CARP-IC	ARCDP	Others1	Total
No. of CIS	1029	8	30	26	69	1162
Amount (PhP)	603466957	28268012	19662121 7	103377093.7		931733 280
% Share	64.77	3.03	21.1	11.1		

Source: Seasonal Operational and Maintenance Report of Respective Irrigation Management Offices (as of 2013, 2014)
*Includes FSDC tie-up with NIA; CIDP, SIP, GAA, REGIP, RREIS, RREIS

Table 50.3. Cost payment schemes of irrigators associations in the 11 sample Irrigation Management Offices, 2014.

IMO	Amortizing	Non-Amortizing	Fully amortized	30% Equity paid	Dole Out	Others*
All (n=1467)						
No.	577	313	34	395	5	143
%	39.33	21.34	2.32	26.93	0.34	9.75

Source of basic data: IA Profile in respective Irrigation Management Offices (as of 2013, 2014)
*Non-functional systems, deferred, under construction

Table 50.4. Problems/issues and suggestions to address their concerns by the sample irrigators associations in 11 selected provinces.

Province	Operation and management of the system	Access to funds for rehabilitation	Access to production credit	Technical support from NIA, support services from DA	Access to water (quantity and timeliness)	Others*	Additional Pumps/STWs	Construction of Steel Gates	Canal Lining	Financial Subsidy /Farm Inputs/Roads	Siltation and Dredging/ Providing of Backhoe	Redesign/ Reroute/ Rehabilitate System/ Repair of Structures	Soil Analysis
Pampanga	0	1	2	0	0	2	1	0	3	2	0	4	0
Nueva Ecija	1	1	0	0	3	4	0	0	2	5	2	1	0
Pangasinan	2	1	1	0	4	0	0	0	3	1	1	1	0
Ilocos Norte	3	1	0	1	4	1	3	3	5	1	1	0	0
Camarines Sur	4	3	1	0	1	0	1	0	3	2	0	3	0
Benguet	1	1	2	1	1	0	0	0	0	2	0	5	0
Nueva Vizcaya	2	1	2	0	3	3	0	0	4	1	1	3	0
Isabela	3	3	4	3	5	2	1	0	3	1	1	5	0
Cagayan	3	3	1	1	6	1	3	0	4	0	2	1	1
Laguna	3	2	1	0	0	1	3	0	4	0	2	1	1
Occidental Mindoro	3	2	1	0	5	0	2	0	3	2	0	4	0
ALL													
No.	25	19	15	6	32	14	11	4	32	19	8	30	1
%	37.88	28.79	22.73	9.09	48.48	21.21	16.67	6.06	48.48	28.79	12.12	45.45	1.52

Source: Personal interviews of IA officials/members
*Others include pest and diseases, flooding, collection of fees, problems in the association, problems in the system
Note: For more details, refer to Excel file.

CONCLUSIONS

There is value in looking at sub-national trends given insights which cannot be inferred from national trends. Using secondary data from the Central and regional offices of NIA and the systems, complemented by key informant interviews and ocular inspections, this study establishes key institutional and technical constraints to improving performance of both national and communal irrigation systems.

Specifically, for national irrigation systems, we found the following:

- National and regional trends in NIS. Service area growth has slowed down in the last decade and growth has been concentrated in just four regions. Firmed up service area difference with service area indicate on average a land conversion rate or declared permanently non-restorable area of about 10%. Most NIS systems are diversion systems and the few operational pump systems available are in five regions (Regions 1, 2, 3, 5 and 13).

  Cropping intensity only slightly increased over the years. In fact wet season irrigation intensity appears to have largely slowed down. In Luzon, some increases in dry season irrigation intensities can be seen while wet season intensities appear to have stagnated. However, in Mindanao, similar increasing patterns for both wet and dry seasons irrigation intensities are observed.

  Collection efficiency has only noticeably improved in two (the rest of Region 2 and Region 4) regions only in Luzon and in MRIIS and slightly in UPRIIS while worst in Region 6. The Mindanao regions appear to have been performing better in terms of this indicator, consistent with the corresponding improvements in cropping intensity. Aside from this, possibly other factors maybe at play given dramatic performances in Regions 2 and 11 and in MRIIS and higher cropping intensities in the rest of Mindanao.

- NIS Cases: States and Patterns. Of the 22 NIS cases, six are from Ilocos, five from Cagayan (including 2 MRIIS), seven from Region 3 (including 3 UPRIIS), three from Regions 4a and 4b, and one from Region 5. The sample also included four pump systems.[11] Except for UPRIIS and MRIIS, the rest of the systems are diversion/gravity type.

  The performance of the NIS cases are analyzed in terms of size of IAs (defined as large, medium, small based on their FUSA), technology (diversion/gravity, pump, reservoir), location (upstream, midstream, downstream of the main canals), vintage (before 1965, 1965-80, 1981-2013), and by some measures of "success" which largely capture institutional and financial/economic aspects of irrigation system management by IAs/NIA. "Success" is measured similarly as NIA loosely defines it -- based on functionality ratings and active and functional IA organization, high collection efficiency and payment of ISF to NIA. These typologies capture various technical and institutional aspects of providing irrigation service by

[11] Part of UPRIIS and MRIIS systems are served by pumps.

national systems. Pump systems will have different challenges from reservoir and diversion systems. Size of IAs based on firmed-up service area will likely be correlated with complexity of design, and operation of physical structures and facilities, and the corresponding type of management. Vintage entails different technical and institutional concerns between relatively old vs. newer systems. "Successful" IAs entail institutional factors at play but also probably technical aspects contributing to such performance.

There is disparity between small and large IAs. The small IAs reported the highest incidence of inadequate water during dry seasons, flooding during wet season, high counts of canal problems especially lateral canals, and siltation/solid waste problems. The large systems/IAs indicated adequate water supply, least occurrence of siltation problems, lowest count of irrigation headwork and main canal problems, minimal occurrence of flooding and adequacy of budget. These IAs also have a high percentage of "successful" IAs compared with the small and medium size IAs. This apparent advantage of large IAs may be linked to their degree of influence by virtue of their size and ability to access funds which result in favorable physical states of their systems, which in turn led to their success.

Reservoir systems appear to have clear advantages over the other types of schemes. And while pumped systems are shown to be doing well, these systems are in fact heavily subsidized. The IA sample irrigated by diversion system (gravity) reported the highest count of inadequacy in water supply especially during the dry season. The IAs which used pump systems have the highest counts of siltation, lateral canals and institutional problems. Despite these concerns, these IAs reported adequacy and dependability of water supply even during dry season, no flooding problem, and higher collection efficiencies compared to the situation of IAs with diversion/gravity system. The IAs in reservoir systems claimed to be most successful of the three groups. This group reported adequate water supply, lowest count of siltation problems, largest percentage of financially strong IAs, very high IA functionality ratings and high collection efficiencies.

Downstream IAs are heavily disadvantaged over the rest of the IAs. The sample has the following characteristics: highest count of siltation and/or solid waste problems, highest count of lack of water supply, highest occurrence of flooding during wet seasons, highest count of damaged farm-to-market roads, highest percentage of financially weak IAs and lowest ratings of water delivery service in terms of adequacy and timeliness. The upstream IAs on the other hand, reported the least incidence of water supply problems, lowest count of solid waste and/or siltation problems, highest irrigation structure problems, highest count of lack of machineries and equipment and a high percentage of financially strong IAs. Irrigation canal problems were ranked first in the list of problems, and followed by institutional problems and then by calamities/pest infestation causing production problems.

Profiles of IAs and irrigation systems differ by vintage. This measure splits the sample into three periods which coincide with the distinct trends in irrigation investment and development. Interestingly, the pre-NIA systems are characterized as those with the least irrigation structure problems, concern for lack of machineries and equipment and inadequacy of water supply. However, the IAs in these systems have the lowest functionality ratings. Systems constructed

between 1965 to 1980 have the following attributes: highest count of poor headwork and control structures condition, highest concern of lack of machineries and equipment, highest count of financially weak IAs, highest count of lack of water supply, and highest incidence of damaged FMRs. Yet, these systems have the least siltation/solid waste problems relative to systems from the other periods. Prevalent problems in decreasing order include: inadequate of water during dry seasons, poor conditions of lateral canal and control structures. The IAs with systems built between 1981 and 2013 reported the highest count of main and lateral canal problems. They also have the highest incidence of siltation problems and the largest count of institutional problems. However, this group has the largest number of financially strong IAs, the highest count of "successful" IAs, the least occurrence of flooding, with adequate water supply and least damaged FMRs. This observation seems ironic as it implies that IAs can still be financially strong and "successful" despite technical and institutional problems.

Profiling IAs according to "success" or failure, indicates distinct differences between these groups. "Successful" IAs in the sample are characterized as those with adequate water supply, less institutional problems, adequate budget and facilities, machineries and equipment. However, these IAs experience higher incidence of siltation and problems with physical state of main canals, lateral canals and control structures. The hierarchy of problems of successful IAs are as follows in decreasing order: lateral canal condition problems, institutional problems, crop production problems due to calamities/pest infestations and damaged irrigation structures. The "less successful" IAs have the higher count of inadequate water during dry seasons, irrigation headwork problems, lack of facilities, machineries and equipment, with inadequate budget and lower IA functionality ratings, indicating poor management performance. In order of importance, inadequacy of water comes first, followed by institutional problems, and then by the lack of irrigation facilities/infrastructures, machineries and equipment.

Using an alternative approach to analyzing the sample NIS performance, the results show that irrigation performance has much to improve. This approach establishes an irrigation performance index (IPI) measured in terms of five aspects: financial, economic, institutional, technical and environmental factors. The *financial factors* include: 1) IAs rating of their financial strength – financial capability of the IA is critical in the organization's development; 2) collection efficiency – a higher collection efficiency means higher ISF shares by IAs and better incentive; and 3) collection delinquency – a higher delinquency decreases the performance index. Financially strong IAs can carry out better O&M and repairs so that irrigation systems can deliver good/sustainable irrigation service. The *economic factors* include average annual yields and gross profits of IA members which would be indicative of benefits that reach beneficiary farmers. Higher annual yields can lead to higher annual profits. Also, higher incomes can mean farmer members would be better able to pay ISF resulting in IAs financial strength. The *institutional component* includes: 1) effectiveness of policies; 2) flexibility index rating; 3) reliability index rating; and 4) satisfaction rating on farm to market road. The *technical component* indicators include canal structures ease of operability and canal structure's operability vs. design. Canal structure ease of operability pertains to the ease in operating irrigation structures such as check gates, turnout gates, etc. While canal structure operability vs design compares the original design of the irrigation system vs the actual use of the structure. The *environmental component* indicators include dissolve oxygen content and

acidity. Higher DO (i.e. > 6 ppm) and pH content (i.e. >5) mean better quality water. The pH found in most water samples show levels >7 which indicate alkaline conditions and potential sodicity problems if not addressed on time. The results of this analysis show that 58% of the sample IAs rated the irrigation performance as moderate. Only 12% of the sample rated performance as high and the rest, low performance.

For communal irrigation systems, we found the following:

This component provides preliminary evaluation of investments in CIS.

- National and Regional/Provincial Trends
  Service area has been growing but at a relatively very slow pace while firmed up service area has been closely following. Given the relatively stable difference between the SA and FUSA, land conversion or growth in permanently non-restorable area does not appear to be a concern. However, the trends in actual irrigated areas during the wet and dry seasons seem to have faltered in 2012. Wet and dry seasons irrigation intensities never reached the 80% mark and even declined by about 20% in 2012.

  With the rise in equity schemes, the amortization collection decreased and became a less significant source of income. Also, the fact that amortization collection efficiency drastically declined is a serious concern.

- Characterizing the sample CIS

  The 66 CIS are saddled with technical issues and problems that affect their performance. The sample CIS in this study have run-of-the-river type dams which are quite old, with exposed rock cores, damaged spillways, and sediments almost at the crest level. The sluice gates and intake gates which were initially made of steel have been replaced with flashboards, sand bags, or stones and in some relatively larger CIS, with defective lifting mechanisms. These problems contributed to the increase in sedimentation. However, most of the sample CIS have concrete-lined main canals and even laterals. The good conditions of these lined and unlined canal networks are said to be due to the IAs O&M efforts and cleanup mechanisms. Where heavy siltation is experienced due to watershed degradation, the solutions are simply beyond the IAs.

  The sample CIS are characterized according to size, technology, "success" or "failure" and by province. On size, three types are defined: small, medium, large. Based on technology, the CIS are classified as gravity or pump systems. To profile "successful" or "failed" CIS, "success" is defined in terms of three criteria: (1) NIA's functionality rating of very satisfactory to outstanding; (2) IA's own financial rating of 3 to 4, with 4 as very strong; and (3) IA's ISF collection performance rating of 3 to 4 with 4 as excellent and/or a collection rate of 65% and above. "Unsuccessful" or "less successful" IAs are defined as those which are not "successful." These categories capture various technical and institutional factors that influence CIS irrigation service.

The experience in small CIS exemplifies "small is beautiful." Compared to the other classes, the small CIS have the least incidence of inadequate water during dry seasons, siltation and solid waste problems. They also have less problems in irrigation structures and canals compared with the large systems and they reported the highest average cropping intensity and yield. However, they have the lowest collection efficiency and highest count of funding problem. Following the criteria above on "successful" CIS, the small systems have the highest percentage of "successful" IAs compared to the larger systems. The large CIS have the highest incidence of floods during the wet seasons. They also have the highest count of irrigation canal problems and water theft. But, they have the least funding problems.

Contrary to earlier findings, IAs using pump technology in the sample have more successful IAs despite the higher incidence of flooding and funding problems, and low cropping intensities. The disparity is likely due to their adequate water supply even during dry seasons, fewer problems with their irrigation canals and structures, and high collection efficiencies. The pump technology appears to be closely associated with better control of available water and the success of IAs.

The IAs irrigated by gravity have the highest cropping intensity and a low incidence of flooding, but they have more problems with irrigation canals and structures, more severe water shortages, and greater incidence of funding problems and water theft.

As to profile of "successful" IAs, they have adequate and dependable sources of water supply, high cropping intensity, high collection efficiency, and adequate funding. This success profile is obtained despite flooding, siltation, irrigation structures, and water theft problems. Less successful IAs are characterized by inadequate water in the dry season, more problems with irrigation main canal and control structures, low collection efficiencies, and severe funding problems. It is interesting to note that "IAs can still be successful despite physical and economic concerns. It seems that water availability is a key factor in high collection efficiency. This finding needs to be validated so NIA can use this result in formulating strategies to improve collection efficiency.

RECOMMENDATIONS

Based on the technical and institutional analyses carried out for national and communal irrigation systems, the following recommendations are in order.

<u>For National Irrigation Systems:</u>

- Given the new insights from sub-national trends which cannot be inferred from national trends, such level of analysis should be scaled up to cover more NIS in Visayas and Mindanao and better understand the situation on the ground and establish some patterns and trends which can be used to formulate relevant policy changes and actions.

- It appears that conversion of irrigated areas is a more serious concern in certain regions. If the rate of land conversion will continue to rise, estimates of design areas should properly take this into account.

- Given the dramatic slowdown in growth or stagnation of wet season irrigation intensity, it is high time that NIA gives attention to the need to invest in drainage and/or collaborate with DPWH to explicitly and more systematically address flooding problems in NIS systems which may require bigger technical/engineering solutions.

- As a first step, each NIS should clearly establish size of firmed-up service areas which are flooded during the wet season. For systems where there is a big difference between wet and dry season irrigable area, two FUSA measures should be recognized. This will have implications on the calculation of cropping intensity which uses FUSA as denominator.

- Collection efficiency improvements appear to correspond to improvements in cropping intensities. If this relationship can be confirmed, the strategy to improve collection efficiency should include improvement in cropping intensities which in turn will require improvement in irrigation service.

- Relative to the medium and large irrigators associations (IAs), the small IAs appear to have the disproportionate share of the problems. Given this disparity, the design of institutional interventions that take into account "size" of IAs according to membership. Special attention should be given to the needs of small IAs and appropriate interventions be designed.

- Irrigators Associations in reservoir systems claimed to be most "successful" based on many indicators when compared with those in diversion and pump systems. In considering types of projects to invest in, government will have to consider the trade-offs in investing more in reservoir types which will likely mean higher initial capital requirements vs. pumped systems. The later type may mean less initial investment but higher O&M after project completion and less likely to be sustainable to operate given volatility in oil prices.

- "Successful" IAs in the sample are characterized as those with adequate water supply, less institutional problems, adequate budget and facilities, machineries and equipment. If we take these factors as indicative of necessary requirements for "successful IAs," then at minimum, NIA's system design and eventually service areas should be matched with adequate water. This finding makes necessary more firm and systematic assessment of adequacy and reliability of water that will be available to farmers when an NIS system operates.

- The issue of equity in the delivery of service remains a major concern given the heavily disadvantaged downstream IAs – with inadequate water during the dry season and more water than they need during the wet season. NIA has to come up with a better strategy of addressing this aspect of equity as part of improving quality of irrigation service.

  If use of pumps is to be taken as a way to partly address equity concerns especially during dry seasons, the lack of policy on treatment of use of pumps within NIS systems has to be

addressed. The use of discount needs to be evaluated and made an official policy rather than leaving too much discretion on the water masters or institutional development officers in the field.

- Performance of irrigators associations using functionality ratings differ by vintage -- pre-NIA systems, 1965-80 and 1981 to 2013 – indicating that contrary to expectations, functionality of "older" IAs maybe more problematic. If functionality ratings can be validated, there may be a strong case for revisiting the institutionalization program. "Old" IAs appear to need more retraining/reorienting/strengthening so they can keep up and become more effective organizations.

- Again, appropriate institutionalization policy has to be designed according to the specific needs of different types of IAs. Irrigators associations in the early NIA years appear to be mostly financially weak. Given this, the capacity building strategy for IAs should explicitly include ways to improve financial strengths and that intervention for IAs should consider not only size (in terms of membership) but also vintage. IAs with systems built between 1981 and 2013 appear to need in addition, more engineering/technical solutions. These observations should be confirmed by further evaluations given two possible scenarios –more recent systems are not built as strongly or we have simply more intense weather and climate contributing to more rapid deterioration or damage to the systems. If the latter would be the case, this finding will provide a strong support for more deliberate climate change resilient systems in terms of design and structures.

- Using an alternative approach to analyzing the sample NIS, the results show that the composite performance has much to improve. This approach establishes an irrigation performance index in terms of five aspects: financial, economic, institutional, technical and environmental factors. If the results can be confirmed, addressing specific aspects of performance with respect to the five areas can lead to possible marked improvement. Given this potential usefulness of the analysis, this approach should be scaled-up to cover more IAs and national systems to validate the initial observations and at the same time refine the measure to be more useful.

<u>For Communal Irrigation Systems:</u>

- Service area has been growing at a very slow pace and prelimnary investigation shows that a good number of CIS are already in elevations beyond the 3% slope. This initial finding warrants scaling up of the characterization to cover more IMOs to get a better sense of the location and distribution of the over 9000 CIS nationwide.

- An assessment of the potential and economics of considering areas between 3% and 8% slopes for CIS expansion should be pursued. Using the GIS technology and some modeling, a more systematic identification of irrigable CIS areas should be carried out taking into account water availability, associated environmental damage/watershed degradation.

- The wet and dry seasons irrigation intensities which are generally below 80%, should be further investigated and understood by looking at trends in all provinces/IMOs and more systems. As a first step to this assessment, the FUSA has to be examined and the field work should be used to understand why the actual irrigated areas have been falling short in both seasons. The evaluation should be able to establish how much is truly "non-functional" area (which will therefore need repair/rehabilitation/restoration) vs. flooded during wet or with inadequate water during dry.

- With the rise in equity schemes, the amortization collection decreased and became a less significant source of income. However, the decline in amortization collection efficiency is a concern which should be addressed.

- Reservoir systems appear to coincide with most successful group of IAs. If this finding can be validated, consideration of this type of system may well justify the possibly higher investment needs compared to other types.

- The technical issues and problems affecting the CIS performance point to the need to revisit adherence to design and construction guidelines for new development and rehabilitation of CIS. Specifically, the assessment of dependable flow, catchment conditions, sediment discharges and potential of groundwater source be properly carried out. The trade-off between spending more on capital requirement during the development phase versus higher O&M expenditures after turnover be carefully weighed.

- If results can be validated by scaling up the evaluation to cover more CIS, appropriate government interventions can be designed according to the priority needs of IAs. NIA can use the results for targeting interventions and allocating the corresponding resources. Small IAs need more capacity building and funding while large IAs need more technical solutions.

- Lastly, while IAs can still be considered "successful" despite physical and economic concerns, it appears that water availability is a key factor in high collection efficiency. NIA's strategy to improve collection efficiency has to also include addressing the issue of water availability.

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ANNEX 1. SAMPLE NIS KEY INFORMANT INTERVIEWS

Ilocos Norte Irrigation System (Nueva Era, Bonga 2)[12]

IA	Profile	Issues and Concerns
Kadaklan Baldias IA - Nueva Era (upstream)	Crop: Rice Yield: 90 *[hyb]* (dry); 80 (wet) Total cost: P20,000 ISF: 2550 (dry); 1700 (wet); CE: 80% FUSA: 190	*Technical/Physical* - Constant repair of brush dams - There is a constant need to put up a brush dam in order to store water specially during dry season *Institutional/Socio-Economic/Political/Cultural* - Usual conflict is due to improper use of turnouts and scheduling of water distribution
Caniyogan-Balbalay-Kali Alakay-IA – Banna (downstream)	Crop: Rice and corn Yield: 80 (rice); 4 tons (corn) Total cost: P30,000; P20,000 (corn) CE: 70% FUSA: 181 Model 3	*Technical/Physical with Institutional/Political complexities* - Water supply is difficult in the area due to complex situations: *Initially, the IA constructed brush dams in order to store water. However, due to a dike construction by the DPWH, the water that flows to the brush dam and eventually to the canal is blocked. *Constructed dike was too high that water can no longer flow through the irrigation canal *The design was contested but DPWH said that it was approved by the Mayor. While the Mayor cannot do anything because that the design was by DPWH. *Problem becomes complicated withwater source in a different municipality -Proposed to construct an impounding dam, 10 km upstream, which should go directly to Banna
San Nicolas-Laoag Bonga Pump 2	Crop: Rice and corn Yield: 10 tons/ha [hyb] (dry); 6 tons/ha (wet) Total cost: P45,000	*Technical/Physical* -During wet season, the canal is blocked by heavy siltation due to quarrying activities in the area. Therefore, a channeling canal of 3kms was constructed around for the water to flow. -The cost of excavation for desilting is P100k per excavation

[12] IA Profile does not include total planted area thus cannot compute for CI.

	ISF: 7000 (dry); 4000 (wet) CE: 80% FUSA: 250 Stage 3 special case	-A river channeling project was proposed worth P20 million but the budget was reduced to P7 million. Since the cost was reduced, it was instead used to restore canals. -Although the restoration of the canal is good, it was inappropriate and farmers would opt to have used it to purchase a back hoe for excavation use instead. -IA is willing to pay for the purchase of heavy equipment (back hoe) even under an amortization scheme -Dilapidation of canals and turnouts are also aggravated by the heavy siltation from the river -The heavy siltation is due to quarrying. It would have been best to implement a designated zone for quarrying *Institutional/Socio-Economic/Political/Cultural* -High prices of inputs while low prices of harvest *Initiative/Success stories* -IA is under a tripartite agreement with NIA and LGU *NIA does the construction and repair; LGU manages the collection and fund disbursement; and IA does the operation

Banaoang Pump Irrigation System

IA	Profile	Issues and Concerns
Paing-Taguipuro IA (upstream)	Crop: Rice and corn Yield: 100 (dry); 110 (wet) Total cost: P35,000 ISF: 6375 (dry); 4250 (wet) CE: 85% FUSA: 230 Total Planted Area: 69 CI: 30% Model 1	*Technical/Physical* - Some main canals are not lined - Personal STW pumps are used as back up for times with low water supply - Cost of pump operation is P15,000 *Institutional/Socio-Economic/Political/Cultural* - Low trading price of rice - Typical conflict issue is due to lack of water management knowledge within members
Cabusligan (midstream)	Crop: Rice Yield: 100 (dry); 200 (wet) Total cost: P30,000 CE: 70% Model 1	*Technical/Physical* - Uses 5hp surface pump in elevated areas which costs P60,000 per unit - New hybrid variety has low yield
Capangdanan (midstream)	Crop: Rice Yield: 100 (dry); 120 (wet) Total cost: P30,000 CE: 80% Model 1	
VSPC IA, San Hera De Magsinggal IA, Western Magsinggal IA, Pansaca IA (downstream)	Crop: Rice Yield: 4.5 tons (dry); 5.5 tons (wet) Total cost: P40,000 ISF: 6375 (dry); 4250 (wet) CE: 80% FUSA: 525 Total Planted Area: 216 CI: 42% IMT Model 1	*Technical/Physical* - Need to fix farm to market roads especially during wet season. - Main canal is beginning to be silted which lessens the availability of water - Siltation comes from the river source - Propose to have adequate heavy equipment due to usual dredging needs *Institutional/Socio-Economic/Political/Cultural* - Since the irrigation facility is new, no ordinances are still intended for the

		protection of the facilities i.e. no throwing of waste. - Many farmers are still traditional and do not want to pay the ISF and do not follow the cropping calendar. - Low trading price of rice - Farmers cannot comply with the requirements of NFA therefore they are discouraged to sell in NFA - Sikat saka is not availed by members as of the moment due to requirements

Ambayoan-Dipalo River Irrigation System (2 NIS)[13]

IA	Profile	Issues and Concerns
Salud-San Eugenio (upstream)	Crop: Rice Yield: 40-45 cav/ha Total cost: P25,000 CE: 70% Model 2	*Technical/Physical* - Structures were destroyed during 2014 typhoon - Need construction of good farm-to-market roads - Lining of canals - There are canals that have become shallow due to siltation - Some members use a low lift pump that was provided by LGU
Main Canal Ambayoan Saranay IA (midstream)	Crop: Rice and corn Yield: 80(dry); 100 (wet) Total cost: P30,000 – P35,000 ISF: 2550 (dry); 1700 (wet); 1530 (other crops aside from rice) CE: 70% Model 2	*Technical/Physical* - Low water supply during dry season - NIS and CIS shares the intake to get water with only 25% goes to NIS and 75% goes to CIS - Complete the intake construction of Ambayoan - Concretize canals - Replace old steel gates and regulators - Concretize farm-to-market roads
Kaps Ambayoan IA (downstream)	Crop: Rice and corn Yield: 50 (w/o pump); 138 (w/ pump) – Rice 100 (w/o pump); 170 (w/ pump) Total Cost: P40,000 (w/o pump) – P 70,000 (w/ pump) ISF: 1750 w/ 10% discount for those who used pump CE: 59% Model 1	*Technical/Physical* - Water schedule is too tight (2days and 2nights only) - Members use pump since no other sources of water apart from irrigation - Another major reason is the construction of the ARIIP main canal. The construction traversed trough the laterals which eventually block the pathway of water from main canal to the lateral. - During wet season, the farms are flooded because the ARIIP main canal also blocks the drainage water.

[13] No secondary data for IA profile.

		- Heavy siltation also comes from the unfinished area of the ARIIP - The construction of ARIIP is on hold as of the moment. - Best to provide STW pumps to farmers as supplement for irrigation - Propose to restore intake of Ambayoan river. *Institutional/Socio-Economic/Political/Cultural* - Cannot successfully complete 2nd cropping because at the same time, upstream farmers already go to 3rd cropping wherein they consume the water intended supposedly for downstream's 2nd crops - Due to tight scheduling, IAs requests for extension of water delivery. This brings a chain reaction wherein the last of the farmers can no longer benefit from the irrigation - NIA's implementation of water delivery schedule is poor. - Water master is not doing its job. In 5 schedules of water delivery, not once did the water master monitor and assisted in the distribution.
SMD – Samahang Magsasaka ng Gonzalo (upstream)	Crop: Rice and corn Yield: 90 (dry); 120 (wet); Total cost: P30,000 – P35,000 ISF: 1700 CE: 70-95% Model 2	*Technical/Physical* - Low water supply during dry season due to alternate rotation - Intake in dam should be increased - Availability of back hoe
Carsan Kudungo dungo IA - San Quintin (downstream)	Crop: Rice and corn Yield: 80-90 (dry) – rice; 100 cav/ha (dry) – corn; 70-80 (wet) Total cost: P20,000 (rice) – P30,000 (corn) ISF: 1700 (wet only) CE: 50% Type 2	*Technical/Physical* - Main dam in Dipalo is highly silted since the earthquake of 1990 - All canals are highly silted which blocks the water to flow - No check structures (steel gate, culvert, regulator, etc.) - NIA has inadequate heavy equipment

Magat River Integrated Irrigation System (Div II & Div IV)[14]

IA	Profile	Issues and Concerns
Bagong Silang IA (upstream) Div 2	Crop: Rice Yield: 120 (dry); 110 (wet) Total cost: P30,000 ISF: 2975 (dry); 2125 (wet) CE: 85%	*Technical/Physical* - Earth canals are damaged by carabaos when they dip in the water. This eventually causes siltation. - Needs heavy equipment (back hoe and dump truck) for the constant need to repair the canals *Institutional/Socio-Economic/Political/Cultural* - Low buying of rice while high prices of input
FIA D-2 members IA (midstream) Div 2	Crop: Rice Yield: 130 (dry); 120 (wet) Total cost: P30,000 ISF: 2975 (dry); 2125 (wet) CE: 60%	*Technical/Physical* - Lateral canals need to be rehabilitated - Earth canals have to be lined
New Life IA (downstream) Div 2	Crop: Rice Yield: 130 (dry); 120 (wet) Total cost: P60,000 ISF: 2975 (dry); 2125 (wet) CE: 62%	*Technical/Physical* - In low water supplies, members borrow pumps in NIA and DA. Borrowing of pump is on a first come first serve basis. The members will provide for the gasoline. - The total cost of the unit is P14,000 - Labor cost in the area is too high (5000-6000 per ha), which forces the farmers to do "seed-throwing" instead which is an inefficient way of planting - Canals are eroded and highly silted therefore, best to concretize the main canal. - Concretize the farm-to-market roads *Institutional/Socio-Economic/Political/Cultural* - Water schedules were not followed by some members

[14] No secondary data yet for IA Profile.

Victoria, San Mateo IA (upstream) Div 2	Crop: Rice Yield: 129 (dry); 129 (wet) Total cost: P30,000 ISF: 2975 (dry); 2125 (wet) CE: 85%	*Technical/Physical* - Canals are eroded and damaged - Request for additional concrete roads for all IAs
Der-An IA (midstream)	Crop: Rice Yield: 150 (dry); 100 (wet) Total cost: P45,000 ISF: 2975 (dry); 2125 (wet) CE: 60%	*Technical/Physical* - Lateral canals need to be rehabilitated - Earth canals have to be lined - NIA's equipment are inadequate to service the system. This leads to longer response time of NIA to address the farmers' concerns *Institutional/Socio-Economic/Political/Cultural* - Need regulation on prohibition of animals in the canals
Victory IA (downstream)	Crop: Rice Yield: 100 (wet); 100 (dry) Total cost: P45,000 ISF: 2975 (dry); 2125 (wet) CE: 62%	*Technical/Physical* - Canals are silted and damaged due to carabaos - Incomplete lining of canals. NIA's efforts are not sufficient due to financial constraints

Solana Pump Irrigation System[15]

IA	Profile	Issues and Concerns
Muhara IA – (upstream)	Crop: Rice Yield: 90-100 (dry); 45-50 (wet) Total cost: P20,000 - 30,000 ISF: 6375/ha with 25% discount for those who re-pumped CE: 57-87% Model 1	*Technical/Physical* - Elevation of canal is lower than paddies therefore, surface pumps are needed to draw water - Sediments clog the main canal thus constant clearing is needed - Domestic and commercial solid and liquid wastes are thrown towards the irrigation canals - Water is very limited due to high cost of pump operation (29 million) due to high electricity prices - Irrigation equipment and facilities are damaged when operation is left with farmers - 5 in 2 scheme greatly decreased the yield of farmers
Northern Solana Rice Producer IA (midstream)	Crop: Rice Yield: 120-150 *[hyb]* (dry); 100-130 *[hyb]* (wet) Total cost: P30,000 – P35,000 ISF: 6500/ha CE: 80% Model 1	*Technical/Physical* - Rat infestation during dry season - Implementation of AWD is not effective - Concreting of farm-to-market roads - Installation of steel gates and regulator - Desilting of canals
NWSFIA (downstream)	Crop: Rice Yield: 100 (dry); 80 (wet) Total Cost: P40,000 ISF:6375/ha Model 1	*Technical/Physical* - Earth canals need to be lined - Drainage rehabilitation - Due to high level of canal, surface pumps are used. Surface pump costs P20,000 per unit - Pest infestations (eel, rat, tungro)

[15] No secondary data for IA profile.

Magapit Pump Irrigation System[16]

IA	Profile	Issues and Concerns
Lal-lo IA (upstream)	Crop: Rice Yield: 120 (dry); 80-100 (wet) Total cost: P35,000 - 40,000 ISF: 3187.50 normally but 2550 for those who re-pumped CE: 98% Model 1	*Technical/Physical* - Silted canals drainage - Drainage water cannot get through since elevation of drainage is lower than the river - Paddies are flooded during wet season due to overflow of river - Herbicides of upland farmers go through lowland paddies - Upland farming contributes to siltation - Canals are heavily silted which also results to clogged drainage - There are salt water intrusion in times of calamities - The root cause of siltation is the Cagayan river, therefore dredging the river is the immediate solution
Camalap IA (midstream)	Crop: Rice Yield: 120 (dry); 60(wet) Total cost: P30,000 – P35,000 ISF: 3187.50 CE: 94% Model 1	*Technical/Physical* - There are illegal turnouts - During wet season, there are areas that are not plantable - River is fully silted therefore the silt flows to the canals during rainy season - Pest infestation - Presence of illegal settlers along canals *Institutional/Socio-Economic/Political/Cultural* - Some members do not follow the water schedule. They open the gate during night time.

[16] No secondary data for IA profile.

Zigiran-Dadan IA (downstream)	Crop: Rice Yield: 120 (dry); 75 (wet) Total Cost: P40,000 ISF: 3187.50 normally but 2550 for those who re-pumped CE: 65-75% Model 1	*Technical/Physical* - Earth canals need to be lined - Heavy siltation - Inadequate heavy equipment to address siltation - Need to rehabilitate canals - Implement ordinances for irrigation - Need buster pump to pump water from drainage canal

Visitacion Irrigation System[17]

IA	Profile	Issues and Concerns
Dagupan IA – USUAC sector (upstream)	Crop: Rice Yield: 200 (dry); 150 (wet) Total cost: P35,000 ISF: 2500 (dry); 1500 (wet) CE: 100% Model 1	*Technical/Physical* - There is a corner area of an irrigation canal which is very near the river. The water flow has to be carefully regulated because strong flow might damage the canal. Overflow of the canal will lead to merging of water between river and irrigation. This redirects the irrigation water to the river instead of going to the farm area. - There is a link canal from other alternative sources but a check structure has to be installed to prevent too much water gushing in - Farm to market road are damaged and have not been rehabilitated for the last 3 years. - Farm roads are currently under DA. Previously, maintenance of the road is fine under NIA - Proposed to have an impounding dam to avoid water shortage - More investment on heavy equipment as it is urgently needed *Initiatives/Success Stories* - The IA implements strict rules and regulation. There is a penalty of P500 per violation. - Not planting on the intended cropping calendar is also a violation. Therefore, when farmers do not plant, they will still have to pay P500. Otherwise, no water for next cropping and penalty will be doubled if violation will reach another cropping season.

[17] No secondary data for IA profile.

		- Revenues from penalties usually reach 8000 per year - Revenue from collection incentive is 4000 per year
Dagupan IA – CABISIA sector (midstream)	Crop: Rice Yield: 180 ca/ha Total cost: P30,000 ISF: 2550 (dry); 1700 (wet) CE: 70-100% Model 1	*Technical/Physical* - Farm-to-market roads have deteriorated - Needs mini dam or impounding dam to store water for dry season - Some private owners don't allow NIA to dredge portions of drainage.
Dagupan IA – KAVISYA sector (downstream)	Crop: Rice Yield: 100 (dry); 70 (wet) Total cost: P30,000 ISF: 2550 (dry); 1700 (wet) CE: 80-100% Model 1	*Technical/Physical* - Difficulty in water delivery due to canals not being lined - Heavy siltation of canals - Damaged roads and difficult access - Needs heavy equipment (backhoe) - There's a need to use surface pumps for water to reach the area - Surface pump operation cost is P8000 per cropping

Pampanga Delta River Irrigation System

IA	Profile	Issues and Concerns
Sto. Nino Candating IA *(Upstream)*	Crop: Rice Yield: 100-110 (dry); 70-80 (wet) CE: 94% FUSA: 220 ha Program Area: 220 ha Total Area Planted: 158.10 ha CI: 72% IMT Model 2	*Technical/Physical* - Most laterals are earth canals - Experienced pest infestation in 2013 due to 5 in 2 - LGU promised a backhoe but have not materialized
Magcasaup IA *(Midstream)*	Crop: Rice Yield: 80-100 (dry); 60-70 (wet) Total cost: PhP50,000 ISF: 2550 (dry); 1700 (wet) CE: 91-100% FUSA: 99.30 ha Program Area: 99.30 ha Total Area Planted: 128.07 ha CI: 129% IMT Model 2	*Institutional/Socio-Economic/Political/Cultural* - Farmers only get break-even thus cannot pay the ISF - No provisions or ordinance in the by-laws which holds the officer accountable
San Carlos-Sta.Rita-San Pedro IA *(downstream)*	Crop: Rice Yield: 80-100 (dry); 50-60 (wet) Total cost: P20,000 ISF: 2550 (dry); 1700 (wet) CE: 60% FUSA: 162.60 ha Program Area: 162.60 ha Total Area Planted: 154.35 CI: 95% IMT Model 2	*Technical/Physical* - There is double pumping of water from drainage - Pump operating cost is P3000 - Need to improve irrigation facilities - Rehabilitation of damaged canals - NIA has no adequate funds for implementation of projects *Institutional/Socio-Economic/Political/Cultural* - Conflict arises due to difficulty in convincing members to pay the ISF

		- Reshuffling of management affects prioritization of programs which leads to delay or cancellation - Funds should go directly to NIA, not to other channels, since farmers have strong linkage with NIA *Initiatives/Success stories* - Improvements were made through lining and desilting of canals funded by congressmen and politicians.

Tarlac Groundwater Irrigation System (TGIS)[18]

IA	Profile	Issues and Concerns
TG 86 ISC	Crop: Rice Yield: 80-90 (dry); 0 (wet) Pump cost: 2 drums of diesel per hectare; 1 cavan per hectare (operator's salary)	*Technical/Physical* - Most areas are flooded during wet season thus, one cropping only - For non-cropping season, farmers go to other areas to do farming labor - Usual conflict is due to distribution schedule *Institutional/Socio-Economic/Political/Cultural* Difficulty in renewing cooperative registration due to administrative requirements
TG 09 Kalibuan ISC	Crop: Rice Yield: 100-130/170*[hyb]* (dry); 90 (wet) Total cost: P40,000 per hectare *[hyb]* Pump cost: 200 liters per hectare; P50 per hectare (operator's salary); P150 per member for maintenance and repair of pump	*Technical/Physical* - Visit and support from NIA declined since 2005 due to cost constraints. Further declined due to Rationalization Plan *Institutional/Socio-Economic/Political/Cultural* - Farmers tend to be resistant to change such as using hybrid and organic farming. - Values of farmers have to be influenced to be adaptable to change and new technology *Initiatives/Success stories* - There is an additional income to the IA by using the pump to supply domestic water to households
GT 125 ISC	Crop: Rice and yellow corn Yield: 100-150 [hyb] (dry); 80-100 (wet) Total cost: P30,000 – P35,000 [hyb] Pump cost: 7% of total revenue (rice); 5% of total revenue (corn)	*Initiatives/Success stories* - One of the most successful irrigation cooperatives. - They were able to complete the payment of the amortization of the pump to NIA. - Used the pump to provide irrigation water to other groups which have insufficient water. - The success of the cooperative was able to construct an additional 300 meters of lined canal, renovate the pump house, and maintain the pump condition

[18] No IA profile from IS.

	CE: 100%	

Tarlac-San Miguel-O'Donnel River Irrigation System (TASMORIS – 2 NIS)[19]

IA	Profile	Issues and Concerns
Maliwalo IA – (Lateral IA)	Crop: Rice, mongo Yield: 140 (dry); 110 (wet) ISF: 2500 (dry); 1500 (wet) CE: 70%	*Technical/Physical* - Solid waste management on canals - Need to use pump as supplement during dry season - Cost of unit of pump is P15,000 - Irrigation canal must be desilted and cleared of trash
Himala IA – (midstream)	Crop: Rice, mongo Yield: 100 (dry); 90(wet) ISF: 2500 (dry); 1700 (wet) CE: 90% Model 1	*Technical/Physical* - Insufficient water during dry season - Need to construct an additional impounding dam for water storage - water should be continuous and without rotation schedule - Invest in more heavy equipment (backhoe)

[19] No secondary data IA profile from IS.

Upper Pampanga River Integrated Irrigation System (Div II, Div III, Div IV)[20]

IA	Profile	Issues and Concerns
LTRIS FIA UPRIIS DIV 2	Crop: Rice Yield: 130-150;180-200 *[hyb]* (dry); 80-90 (wet) Total cost: P25,000, P28000 *[hyb]* ISF: 2975 (dry); 2125 (wet) CE: 84% FUSA: 2282.41 ha Program Area: 2279.02 ha Total Planted Area: 2279.02 ha CI: 100% IMT Model 2	*Technical/Physical* - Previously, support from NIA is very good. However, it drastically decreased as of 2006 - Target improvements are: to restore approximately 100 hectares in addition; modify check structures; improve canal linings to reduce loss - Some members use surface pumps which increases their cost from P3000 – P5000 - Usual conflict is due to distribution of water - High prevailing prices of inputs while selling prices of harvest is low
Biyaya-Radar IA (upstream) UPRIIS DIV 3	Crop: Rice Yield: 120-130 *[hyb]* (dry); 80-100 (wet) Total cost: P20000 – P30000 ISF: 2975 (dry); 2125 (wet) CE: 48-50% FUSA: 453.23 Program Area: 453.23 Total Planted Area: 330.52 CI: 100% IMT Model 2	*Technical/Physical* - Rehabilitation of canal, lining of canal, desilting - Total service area of IA is 400 hectares, however 100 has have already been converted to commercial area - There are idle lands but are still counted within the IA's area, which affects their collection efficiency and incentives *Institutional/Socio-Economic/Political/Cultural* - Commercialization increased the value of the land from P300000 to P5million, which encourages owners to sell instead of farm - Informal settlers along the canal is a main problem due to solid waste
Makabilog-Maynabo-	Crop: Rice	*Initiatives/Success stories*

[20] According to O&M Report. The formula used is Irrigated Area/Service Area x 100. Other systems compute CI = Planted Area/Program Area x 100.

Tambo IA (midstream) UPRIIS DIV 3	Yield: 100-120 [hyb] (dry); 80 (wet) Total cost: P50,000 ISF: P2550 (dry); P1700 (wet) CE: 100% FUSA: 112.58 Program Area: 112.58 Total Planted Area: 103.58 CI: 100% IMT Model 1	- The IA became profitable since they were able to acquire farm assets (thresher, flat bed drier, harvester, tractor, rice mill). It started by a flatbed drier through a grant in which they had it rented to others for a price - The IA was also able to build its own office due to the profit
Flume (downstream) UPRIIS DIV 3	Crop: Rice Yield: 130 [hyb] (dry); 80(wet) Total cost: P60000 (dry) – P30000 (wet) ISF: 2975 (dry); 2125 (wet) CE: 84% FUSA: 342.23 Program Area: 342.23 Total Planted Area: 329.73 CI: 100% IMT Model 1	*Technical/Physical* - Low production only during calamity times (i.e. Xanti, 2013)
Mapamasa IA (upstream) UPRIIS DIV 4	Crop: Rice Yield: 120-150 [hyb] (dry); 80-100 (wet) Total cost: P50,000 (dry) – P30,000 (wet) ISF: 2975 (dry); 2125 (wet) CE: 84% FUSA: 231.27 Total Planted Area: 228.55 CI: 99%	*Technical/Physical* - Farmers experience delay and occasional shortage of water - Earth canals are very prone to damage and siltation - Declining water supply due to heavy siltation of Penaranda river - Heavy siltation is due to poor watershed management - Water source is too far (Pantabangan dam), thus even if the dam is full, the water is still few for the area since it has to travel a very long distance before it reaches the division

	Type 4	- Highly recommend to continue the proposed Balintingon dam where it could store water near Division 4 area *Initiatives/Success stories:* - members patronize sikat saka - early payors of ISF have 10% discount
Penaranda IA (downstream) UPRIIS DIV 4	Crop: Rice Yield: 120 (dry); 110 (wet) Total cost: P50,000 CE: 100% FUSA: 228.79 Total Planted Area: 228.79 CI: 100% Model 4	*Technical/Physical* - A pump is used to service a part of the elevated area - Cost of maintenance and repair for the pump is P22,000 annually; Cost of operation reaches P211,000; operator of pump is given P7000 per month; BOD that maintains the pump is given P3000 per month - Need to concretize farm-to-market roads - Need to desilt and line the canals - Earth canals are very prone to damage which also contributes to siltation

Angat-Maasim River Irrigation System[21]

IA	Profile	Issues and Concerns
MASACPI IA (upstream)	Crop: Rice Yield: 120 (dry); 98 (wet) Total cost: P50,000 (dry) – P30,000 (wet) ISF: 2550 (dry); 1800 (wet) CE: 63% Type 4	*Technical/Physical* - Needs a structure that will regulate water release to reduce efficiency loss - Convert earth canals to line canals - Members normally use 8hp surface pumps which will cost around P90,000 for the entire assembly - Concretize farm-to-market road - Main concern is to have adequate equipment for continuous rehabilitation *Institutional/Socio-Economic/Political/Cultural* - Usual cause of conflict is when upstream members block the path of water which affects downstream water supply - 1% penalty for not paying ISF is too lenient and low *Initiatives/Success stories:* - members patronize sikat saka - early payors of ISF have 10% discount
Bagbaguin-Manatal IA (midstream)	Crop: Rice Yield: 140 (dry); 100 (wet) ISF: 2550 (dry); 1700 (wet) CE: 82%	*Technical/Physical* - Embankment is damaged and main canal is heavily silted

[21] No secondary data IA profile from IS.

Balayungan RIS

IA	Profile	Issues and Concerns
Bucal Pasong Malainen Luma IA (upstream)	Crop: Rice Yield: 100 (dry); 80 (wet); 60 (3rd) Total cost: P30,000-P40,000 ISF: 4000 (dry); 2000 (wet and 3rd cropping) CE: 77% Model 1	*Technical/Physical* - Farm to market road *Institutional/Socio-Economic/Political/Cultural* - Low buying price of crops - Stealing of water
Balite Munti IA (midstream)	Crop: Rice Yield: 80 (dry); 70 (wet) Total cost: P30,000 ISF: 2500 (dry); 2200 (wet) CE: 60% Model 1	*Technical/Physical* - Farm to market road - Need to construct a water impounding facility for sufficient water supply *Institutional/Socio-Economic/Political/Cultural* - Occurrence of stealing of water
Malaking Pilapil/ Magabe C - IA (downstream)	Crop: Rice Yield: 80 (dry); 75 (wet) Total cost: P30,000-P40,000 ISF: 5600 (dry); 3600 (wet) CE: 70% Model 1	*Technical/Physical* - Farm to market road *Institutional/Socio-Economic/Political/Cultural* - Incidence of water stealing - Not following the water schedule - Not paying ISF

Caguray Irrigation System[22]

IA	Profile	Issues and Concerns
Purnaga Magsaysay IA (upstream)	Crop: Rice, onion, ginger Yield: 130(dry); 80 (wet) Total cost: P42,000 ISF: 2550 (dry); 1700 (wet) CE: 60% Model 1	*Technical/Physical* - Canals should be cemented and cleaned - There is a small impounding dam but cannot be used because farmers steals the equipment - Due to low water supply, members resort to the use of STW which costs P30,000 per unit - Water supply is really inadequate, thus propose to have groundwater extraction instead - Install steel gates and regulators
Bugtong Buri Olima IA (midstream)	Crop: Rice, corn, onion, garlic Yield: 80 (dry); 60 (wet) – rice; 20 tons/ha (onion); 60 ca/ha (corn) Total cost: P30,000 ISF: 2550 (dry); 1700 (wet) CE: 90% (wet only) *dry 0% Type 2	*Technical/Physical* - Very low water supply from source - Most uses STW due to low water supply - Cost of pump per unit is P30,000 - Water scheduling is not properly implemented. Scheduling is implemented even wet season - Proposed to have a water impounding project to store water - Constant need for a heavy equipment for desilting purposes
Gamot Bolo Nicolas IA (downstream)	Crop: Rice Yield: 100 (wet); 50 ca/ha (dry) – but not all can do 2nd crop. Only those with pump Pump operating cost: P3000 ISF: 1700 (wet only) Model 1	*Technical/Physical* - Very low water supply - Canals are heavily silted since majority are earth canals, even in the main canal - Earth canals are damaged by carabaos when they dip in the water *Institutional/Socio-Economic/Political/Cultural* - There is a pending check dam initiated by LGU since 2013 but construction have not been completed until the present

[22] No secondary data for IA profile.

		- Ordinance in preventing carabaos in the irrigation canals not properly implemented

Libmanan-Cabusao Pump Irrigation System[23]

IA	Profile	Issues and Concerns
Labao-Boguites IS (upstream)	Crop: Rice Yield: 100 (dry); 80 (wet) Total cost: P30,000 ISF: 2550 CE: 52%	*Technical/Physical* - Low water supply - Only 2 out of 4 pumps are currently used - Need to use 6hp pump in order to pump the water from the canal - Construct dam for gravity irrigation instead of pump
BPC IA and PNPC IA (downstream)	Crop: Rice Yield: 80 (dry); 60 (wet) Total cost: P30,000 ISF: 2550 (dry); 1700 (wet) CE: 45% Model 2	*Technical/Physical* - Insufficient supply of water - Canals are on a lower level of elevation vs farms - Seawater comes in the drainage during high tide - Due to insufficiency of water, most farmers depends on rainfall instead of irrigation - Insufficiency in water could be remedied by using 4 pumps at the same time - Farmers are having no interest to participate in irrigation maintenance and operation activities due to water service

[23] No secondary data for IA profile.

ANNEX 2. SAMPLE CIS IN SELECTED IMO/PROVINCES KEY INFORMANT INTERVIEWS

Benguet (Kalinga-Ifugao-Mt Province IMO)

IA	Profile	Issues and Concerns
Taloysur IA *(Baw-ak Taloysur, Tuba)*	SA/FUSA: 30 has./30 has. CI: 200% CE: 100% ISF Rate/Amortization: 0 Equity: grant thru Balikatan Sagip Patubig Program Crop: Various Veggies & Flowers Yield/ha: Various yield Production Cost/Ha.: Various Veggies & Flowers - P56 K to P500 K (wet & dry) Type of System: Gravity No. of members:44 Tenure Status:100%-landowners Project Cost & Source of Fund: P2.5 Mn under Balikatan Sagip Patubig Program Undergone rehab/extensions, cost & source of fund: Yes, IA repaired damaged pipes with varying cost from P20 K to P100 K per repair using IA's own fund Other modes of supplementary irrig: none	Physical/Technical - Protection of their water source by making the area as eco park - Additional pipe extension to increase service area - Livelihood programs Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective, conflicts happen rarely): 4 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3-frequent, 4 – always effective): 4 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 4 (upstream to downstream) - With water permit? Yes Financial - Sources of funds/income: IA's ISF of P500/member/year - Expenditure Items: M&OE & water rights fee

		- Assistance from NIA/other agencies: LGU gave grant through Balikatan Sagip Patubig Program (P2.5 Mn) Governance - Participation of Officers/BOD & members: Officers/BOD – 100%, Members – 90%
Parasipis PIS Integrated Service Association*(Tabaan Norte, Tuba)*	SA/FUSA: 133 has./125 has. CI: 176% CE: already paid off equity ISF Rate/Amortization: 0 Equity: already paid off the 30% equity of P3 Mn by rendering labor & cash payments Crop: Rice, Various veggies & fruits Yield/ha: Rice – 40-50 (wet), 30-40 (dry); Various veggies & fruits - various yields Production Cost/Ha.: various veggies & fruit - P15 K to P80 K (wet & dry) Type of System: Gravity No. of members:173 Tenure Status:100%-landowners Project Cost & Source of Fund: P3 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: Yes, IA repaired damaged pipes with varying cost using IA's own fund	Physical/Technical - Access roads in their fields - Extensions of lateral pipes to irrigate more areas Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3-frequent, 4 – always effective): 4 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 2 (upstream to downstream) - With water permit? Yes Financial - Sources of funds/income: IA's Annual Due of P50/member - Expenditure Items: M&OE & water rights fee

	Other modes of supplementary irrigation: none	- Assistance from NIA/other agencies: LGU gave P200 K for rehab Governance - Participation of Officers/BOD and members: Officers/BOD – 100%, Members – 90%
Balangabang Mabosas Labney Laget Farmer's IA*(Tabaan Norte, Tuba)*	SA/FUSA: 168 has./168 has. CI: 182% CE: already paid off equity ISF Rate/Amortization: 0 Equity: already paid off the 30% equity of P1.2 Mn by rendering labor & cash payments Crop: Various veggies & root crop Yield/ha: various yields Production Cost/Ha.: various veggies & root crop - P40 K to P160 K (wet & dry) Type of System: Gravity No. of members: 48 Tenure Status:100%-landowners Project Cost & Source of Fund: P1.2 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: Yes, IA repaired damaged pipes with varying cost using IA's own fund	Physical/Technical - Concreting of their existing access roads - Construction of additional access roads - Rehabilitation of old pipe systems Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 4 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 2 (upstream to downstream) - With water permit? Yes Financial - Sources of funds/income: IA's Annual Due of P250/member - Expenditure Items: M&OE & water rights fee - Assistance from NIA/other agencies: DSWD gave P3 K for food during repair works, LGU gave P200 K for rehab Governance

	Other modes of supplementary irrigation: none	- Participation of Officers/BOD and members: 90%

Ilocos Norte IMO

IA	Profile	Issues and Concerns
Dangdanglas IA *(Baruyen, Bangui)*	SA/FUSA: 15 has./15 has. CI: 200% CE: 30% ISF Rate/Amortization: 0 Equity: paid off equity Crop: Rice, Corn & Onion Yield/ha: Rice – 15-25 (wet), 20-30 (dry); Corn – 6,800 kg, Onion – 10,400 kg (dry) Production Cost/Ha.: Rice - P27,000 per season, Corn – P20,000, Onion – P80,000 Type of System: Gravity No. of members:35 Tenure Status: 74%-landowners, 26%-tenants Project Cost & Source of Fund: P23 Mn by LGU (Senator Alvarez Project) Undergone rehabilitation/extensions, cost & source of fund: no Other modes of supplementary irrigation: none	Physical/Technical - Replace wooden control gates to steel gates Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 2 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 3 (downstream to upstream) - With water permit? Yes Financial - Sources of funds/income: IA's annual due of P900 plus/member - Expenditure Items: Salaries, M&OE & annual water permit - Assistance from NIA/other agencies: LGU gave P3,000 for roof of meeting place of IA Governance - Participation of Officers/BOD and members: 100%

Tanap A Dakkkel IA *(Baduang, Pagudpud)*	SA/FUSA: 435 has./435 has. CI: 169% CE: already paid off loan ISF Rate/Amortization: paid off loan Equity: 0 Crop: Rice Yield/ha: Rice – 100-150 (wet), 50-70 (dry) Production Cost/Ha.: Rice - P40,000 per season Type of System: Gravity No. of members:525 Tenure Status: 38%-landowners, 62%-tenants Project Cost & Source of Fund: By NIA Undergone rehabilitation/extensions, cost & source of fund: Yes, repaired damaged canal about 200 meters using IA fund Other modes of supplementary irrigation: none	Physical/Technical - Additional pump & STWs for dry season - Source of water - Canal lining Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 3 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 2 (upstream to downstream) - With water permit? No Financial - Sources of funds/income: IA's annual due of P100 /member - Expenditure Items: Salaries, M&OE - Assistance from NIA/other agencies: none Governance - Participation of Officers/BOD and members: Officers/BOD – 80%, Members – 70%

Palongpong IA *(Palompomg, Pagudpud)*	SA/FUSA: 35 has./35 has. CI: 100% CE: 70% ISF Rate/Amortization: 0 Equity: 0 Crop: Rice, Corn, Garlic Yield/ha: Rice – 120-140 (wet), Corn - 4500 (dry), Tomato - 6600 kg (dry) Production Cost/Ha.: Rice - P25,000 (wet), Corn – P18,000 (dry), Tomato – P30,000 (dry) Type of System: Gravity No. of members:100 Tenure Status: 80%-landowners, 20%-tenants Project Cost & Source of Fund: Grant by national government through Balikatan Sagip Patubig Program Undergone rehabilitation/extensions, cost & source of fund: none Other modes of supplementary irrigation: all SA pump from STW during dry season	Physical/Technical - Source of water - Rehabilitation of canals Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 2 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 0 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 2 (downstream to upstream) - With water permit? No Financial - Sources of funds/income: IA's ISF of 5 cents/m2 - Expenditure Items: Salaries, M&OE - Assistance from NIA/other agencies: National government paid the 30% equity of project cost Governance - Participation of Officers/BOD and members: 80%

Pangasinan IMO

IA	Profile	Issues and Concerns
San AngelSRIP IA *(San Angel, Rosales)*	SA/FUSA: 160 has./160 has. CI: 150% CE: 95% ISF Rate/Amortization: P20,000/year Equity: 0 Crop: Rice Yield/ha: Rice – 100-130 (wet),100-150 (dry) Production Cost/Ha.: Rice - P30,000 per season Type of System: Gravity No. of members: 150 Tenure Status: 33%-landowners, 66%-tenants, 1%-lessees Project Cost & Source of Fund: P150 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: no Other modes of supplementary irrigation: none	Physical/Technical - Water going through the spillway should be rerouted back to the dam Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 1 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 3 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 3 (downstream to upstream) - With water permit? Yes Financial - Sources of funds/income: IA's ISF of 4250/ha/cropping - Expenditure Items: Rehabilitation & M&OE- all fund collected less amortization; Amortization – P 20,000/year - Assistance from NIA/other agencies: none Governance - Participation of Officers/BOD and members: Officers/BOD - 10%, Members – 40%

Don Oftociano IA *(Umingan, Pangasinan)*	SA/FUSA: 85 has./72 has. CI: 150% CE: none (already paid off loan) ISF Rate/Amortization: 0 Equity: already paid off P1.2 Mn for 2 years Crop: Rice Yield/ha: Rice – 65-130 (wet),80-85 (dry) Production Cost/Ha.: Rice - P35,000-P40,000 per season Type of System: Gravity No. of members: 65 Tenure Status: 100%-landowners Project Cost & Source of Fund: P4 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: no Other modes of supplementary irrigation: 5 has. pump from STW during dry season	Physical/Technical - none Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 4 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 4 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 4 (downstream to upstream) - With water permit? Yes Financial - Sources of funds/income: IA's annual due of P100/member/year - Expenditure Items: M&OE - Assistance from NIA/other agencies: Municipal government allows them to borrow backhoe for free & provided temporarily 500 pumps during prolonged dry spell, DA provided 100 pumps & farm machineries Governance - Participation of Officers/BOD and members: Officers/BOD - 80%, Members – 90% - Problem in attendance during schedule maintenance work

Sapid Dam Farmer's IA *(Labayug, Sison)*	SA/FUSA: 50 has./50 has. CI: 150% CE: 90% ISF Rate/Amortization: P60,210.40/year Equity: 0 Crop: Rice, Peanuts & Corn Yield/ha: Rice – 60-100 (wet & dry), Peanuts – 6,800 kg, Corn – 6,800 kg Production Cost/Ha.: Rice - P33,333 per season, Peanut – P30,000, Corn – P20,000 Type of System: Gravity No. of members: 40 Tenure Status: 50%-landowners, 50%-tenants Project Cost & Source of Fund: P3 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: no Other modes of supplementary irrigation: 25 has. pump from STW during dry season	Physical/Technical - Lining of 200 meter main canal - Lack of water supply Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 3 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 2 (upstream to downstream) - With water permit? Yes Financial - Sources of funds/income: IA's ISF of P1,005/ha/cropping & annual due of P50/member - Expenditure Items: M&OE & Amortization - Assistance from NIA/other agencies: none Governance - Participation of Officers/BOD and members: Officers/BOD – 70%-80%, Members – 70%

Sinbicpa IA *(Nama, Pozorrubio)*	SA/FUSA: 235 has./235 has. CI: 150% CE: 30% ISF Rate/Amortization: P1,275/ha/year Equity: 0 Crop: Rice, Peanuts, Mongo & Corn Yield/ha: Rice – 70-130 (wet), 50-70 (dry); Peanuts – 6,800 kg; Mongo – 500 kg; Corn – 6,800 kg Production Cost/Ha.: Rice - P25,000 per season, Peanut – P30,000, Corn – P20,000 Type of System: Gravity No. of members: 256 Tenure Status: 90%-landowners, 10%-tenants Project Cost & Source of Fund: P9.1 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: no Other modes of supplementary irrigation: 10-15 has. pump from STW during dry season	Physical/Technical - Lining of all main & lateral canals Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 3 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 2 (upstream to downstream) - With water permit? Yes Financial - Sources of funds/income: IA's ISF/Amortization of & annual due of P50/member - Expenditure Items: Salaries, M&OE & Amortization - Assistance from NIA/other agencies: LGU gave P13,000 worth of fuel for backhoe clearing operation Governance - Participation of Officers/BOD and members: 50%

Cagayan (Cagayan-Batanes IMO)

IA	Profile	Issues and Concerns
Gumarang IA *(Marobbob, Amulong)*	SA/FUSA: 98 has./98 has. CI: 20% CE: 50% ISF Rate/Amortization: P55,000/year Equity: 0 Crop: Rice Yield/ha: Rice – 50-80 (wet), 90-100 (dry) Production Cost/Ha.: Rice - P20 K-P25 K (wet & dry) Type of System: Gravity No. of members: 90 Tenure Status: 100%-landowners Project Cost & Source of Fund: P3.5 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: Yes, NIA rehabilitated the system due to typhoon damage amounting to P11.1 Mn Other modes of supplementary irrigation: 2 has. pump from STW during dry season	Physical/Technical - Redesign the canal to elevate its water level - Their intake siphon should be relocated above ground for ease of performing the regular declogging activities - Rehabilitation of the 2 kilometer canal damaged by landslide to irrigate 88 has. more Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 2 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 1 (upstream to downstream) - With water permit? No Financial - Sources of funds/income: IA's ISF of P1,700/ha (wet), P2,550/ha (dry); annual due of P100/member - Expenditure Items: Amortization - Assistance from NIA/other agencies: none Governance - Participation of Officers/BOD and members: 80%

Garab IA *(Garab, Iguig)*	SA/FUSA: 160 has./160 has. CI: 131% CE: 80% ISF Rate/Amortization: no amount yet for amortization Equity: 0 Crop: Rice Yield/ha: Rice – 60-100 (both wet & dry) Production Cost/Ha.: Rice - P25 K (wet), P35 K (dry) Type of System: Gravity No. of members: 95 Tenure Status: 50%-landowners, 50% tenants Project Cost & Source of Fund: P8.7 Mn by DAR; P24.7 Mn improved by NIA Undergone rehabilitation/extensions, cost & source of fund: none Other modes of supplementary irrigation: 52.5 has. pump from STW and creek during dry season	Physical/Technical - Completion of the 3 kilometer mail canal to irrigate 55 has. more Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 2 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 2 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 2 (upstream to downstream) - With water permit? No Financial - Sources of funds/income: IA's ISF of P600/ha/cropping (will be increased upon turnover of project by NIA) - Expenditure Items: M&OE - Assistance from NIA/other agencies: none Governance - Participation of Officers/BOD and members: Officers/BOD – 70%, Members – 100%

Naddungan IA*(Naddungan, Gattaran)*	SA/FUSA: 120 has./120 has. CI: 150% CE: 70% ISF Rate/Amortization: P45 K/year Equity: P221 K/year (just recently transferred to equity) Crop: Rice Yield/ha: Rice – 60-100 (wet), 70-120 (dry) Production Cost/Ha.: Rice - P40,000 (both wet & dry) Type of System: Gravity No. of members: 117 Tenure Status: 90%-landowners, 10% tenants Project Cost & Source of Fund: P5 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: Yes, lining of 128 meter canal using IA's own fund Other modes of supplementary irrigation: 30 has. pump from the river during dry season	Physical/Technical . Protection of their watersheds . Regular dredging works in their intake due to high levels of siltation . Lining of 70% of canal to improve efficiency . Additional water pumps to help augment water supply during dry season Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 4 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 4 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 4 (downstream to upstream) - With water permit? No Financial - Sources of funds/income: IA's ISF of P1,500/ha/cropping - Expenditure Items: M&OE – P10 K; Representation, improvements, rehabilitation – P40 K, Equity – P221 K - Assistance from NIA/other agencies: DILG gave P100 K for canal lining Governance - Participation of Officers/BOD and members:Officers/BOD – 100%, Members – 90%

Isabela IMO

IA	Profile	Issues and Concerns
Casilagan Ballacong IA *(Casilagan, Ilagan)*	SA/FUSA: 170 has./170 has. CI: 123% CE: 70% ISF Rate/Amortization: P110,000/year Equity: 0 Crop: Rice Yield/ha: Rice – 200-220 (wet), 120-160 (dry) Production Cost/Ha.: Rice - P40,000 (wet & dry) Type of System: Gravity No. of members: 200 Tenure Status: 80%-landowners, 20%-lessees Project Cost & Source of Fund: P10 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: Yes, canal lining worth P2.4 Mn by NIA, repair of intake structure worth P3 Mn grant by BSPP Other modes of supplementary irrigation: 5 ha. pumps from the canal during dry season	Physical/Technical - Canal lining - Repair of their intake structure Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 2 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 4 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 2 (upstream to downstream) - With water permit? Yes Financial - Sources of funds/income: IA's ISF of P2,040/ha/cropping & annual due of P50/member/year - Expenditure Items: Salaries – 10% of collection, M&OE, Improvements & Amortization – 90% of collection - Assistance from NIA/other agencies: none Governance - Participation of Officers/BOD and members: 100%

Cumabao IA *(Cumabao, Tumauini)*	SA/FUSA: 160 has./160 has. CI: 188% CE: 98% ISF Rate/Amortization: P65,000/year Equity: 0 Crop: Rice Yield/ha: Rice – 80-120 (wet), 90-150 (dry) Production Cost/Ha.: Rice - P30,000 (wet & dry) Type of System: Gravity No. of members: 203 Tenure Status: 2%-landowners, 98%-tenants Project Cost & Source of Fund: P11.5 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: Yes, minor repairs due to typhoon damages using IA's fund Other modes of supplementary irrigation: 30 has. pump from the river, creek & mini catch dams during dry season	Physical/Technical - 5 kilometer extension canal to irrigate 30 has. more - Change unlined portion of the canal to concrete pipelines to lessen erosion and desiltation works Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 4 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 4 (upstream to downstream) - With water permit? Yes Financial - Sources of funds/income: IA's ISF of P2,550/ha/cropping & annual due of P85/member/year - Expenditure Items: Salaries, M&OE, Improvements, Rehabilitation – P236 K/year; Amortization – P65 K/year - Assistance from NIA/other agencies: LGU gave P400 K for repair of dam Governance - Participation of Officers/BOD and members: 100%

Cadarña IA *(Cabaruan, Naguilian)*	SA/FUSA: 96 has./96 has. CI: 146% CE: already paid off ISF Rate/Amortization: 0 Equity: already paid off 10% equity Crop: Rice Yield/ha: Rice – 60-120 (both wet & dry) Production Cost/Ha.: Rice - P30,000 (wet & dry) Type of System: Pump No. of members: 84 Tenure Status: 60%-landowners, 40%-tenants Project Cost & Source of Fund: P2.6 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: none Other modes of supplementary irrigation: none	Physical/Technical - Construction of a water impounding dam which will give them a reliable and cheaper source of water Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 0 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 2 - With water permit? Yes Financial - Sources of funds/income: none - Expenditure Items: pump M&OE - Assistance from NIA/other agencies: none Governance - Participation of Officers/BOD and members: Officers/BOD – 70%, Members – 80%

Nueva Vizcaya IMO

IA	Profile	Issues and Concerns
Paoac Barobbob La Torre IA (La Torre South, Bayombong)	SA/FUSA: 278 has./278 has. CI: 150% CE: already paid off ISF Rate/Amortization: 0 Equity: already paid off equity Crop: Rice Yield/ha: Rice – 40-80 (wet), 20-30 (dry) Production Cost/Ha.: Rice - P44,333.85 (wet & dry) Type of System: Gravity No. of members:278 Tenure Status:50%-landowners, 50%-tenants Project Cost & Source of Fund: P1 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: no Other modes of supplementary irrigation: 30 ha. pumps from drainage canal during dry season	Physical/Technical - Canal lining - Repair of dam - Source of water like water impounding projects Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 2 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 0 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 1 (upstream to downstream) - With water permit? Yes Financial - Sources of funds/income: Member's contributions if the need arises - Expenditure Items: M&OE - Assistance from NIA/other agencies: National Government gave P45 K for dam repair, NIA gave P66K for PE pipes and P288 K for water pumps Governance - Participation of Officers/BOD and members: Officers/BOD – 40%, Members – 30%

Duruarog IA *(Nagsabaran, Diadi)*	SA/FUSA: 60 has./45.5 has. CI: 178% CE: 80% ISF Rate/Amortization: P5,000/year Equity: 0 Crop: Rice Yield/ha: Rice – 90-120 (wet), 80-100 (dry) Production Cost/Ha.: Rice - P26,000 (wet & dry) Type of System: Gravity No. of members:30 Tenure Status:90%-landowners, 10%-tenants Project Cost & Source of Fund: P100 K by NIA Undergone rehabilitation/extensions, cost & source of fund: Yes, IA made 30 meter canal extension using their own fund of about P7,500. Other modes of supplementary irrigation: 2 ha. pumps from the river during dry season	Physical/Technical - 2 km canal lining Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 4 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 2 (upstream to downstream) - With water permit? Yes Financial - Sources of funds/income: IA's ISF of P1,275/ha/year & annual due of P200/member/year - Expenditure Items: Salaries, M&OE, Improvements & Amortization - Assistance from NIA/other agencies: National Government gave P180 K for rehab, LGU gave P400 K for repair of intake structure, Governor gave P24,000 worth of cement Governance - Participation of Officers/BOD and members: 100%

Buliwao IA *(Buliwao, Quezon)*	SA/FUSA: 73 has./73 has. CI: 142% CE: 60% ISF Rate/Amortization: P15,356/year Equity: 0 Crop: Rice Yield/ha: Rice – 70-100 (wet & dry) Production Cost/Ha.: Rice - P20,000 (wet & dry) Type of System: Gravity No. of members:50 Tenure Status: 30%-landowners, 50%-tenants, 20% - lessees Project Cost & Source of Fund: P909 K by NIA Undergone rehabilitation/extensions, cost & source of fund: none Other modes of supplementary irrigation: 10 ha. pumps from the river during dry season	Physical/Technical - Canal rehabilitation Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 0 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 3 (upstream to downstream & downstream to upstream) - With water permit? Yes Financial - Sources of funds/income: IA's ISF of P600/ha/year & annual due of P500/member/year - Expenditure Items: Amortization - Assistance from NIA/other agencies: Municipal Government gave P75 K for canal lining, LGU gave P20 K for canal lining, NIA gave project worth P500 K for canal lining which they will be paying thru amortization after turnover Governance - Participation of Officers/BOD and members: Officers/BOD – 30%, Members – rarely attends

Pampanga (Pampanga-Bataan IMO)

IA	Profile	Issues and Concerns
Sitio Ipil IA *(Gulap, Candaba)*	SA/FUSA: 30 has./20 has. CI: 175% CE: 95% ISF Rate/Amortization: P3000 (wet); P4000 (dry) Equity: 0 Crop: Rice& Corn Yield/ha: Rice – 60-100 (wet),13-40 (dry); Corn – 100,000 kg Production Cost/Ha.: P40,000 (wet); P18,000 (dry) Type of System: Pump No. of members: 17 Tenure Status: 100%-landowners Project Cost & Source of Fund: P1.7 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: No Other modes of supplementary irrigation: none Cost of O&M of Pump: P30,000-P40,000/cropping for 20has.	Physical/Technical - Replacement of old pumps - Lining of earth canals Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 4 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 2 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 3 (upstream to downstream) - With water permit? No Financial - Sources of funds/income: IA's ISF/Amortization - Expenditure Items: M&OE- P16,000-P20,000 & annual amortization – P60,000 - Assistance from NIA/other agencies: NIA gave P4,800 for replacement of pump parts in Jan. 2015 Governance - Participation of Officers/BOD and members: 90%

Sapa-San Vicente Pampanga IA *(Sto Nino, Sto. Tomas)*	SA/FUSA: 15 has./15 has. CI: 200% CE: 100% ISF Rate/Amortization: already paid-off but collects P1,000/ha/cropping for M&OE Equity: 0 Crop: Rice& Corn Yield/ha: Rice – 100 (wet),60 (dry); Corn – 6,800 kg Production Cost/Ha.: P15,000 (wet & dry) Type of System: Pump No. of members: 15 Tenure Status: 100%-landowners Project Cost & Source of Fund: P2 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: No Other modes of supplementary irrigation: none Cost of O&M of Pump: P15,000/year for 15 has.	Physical/Technical - Repair of old pumps - Additional farm machinery like combined harvester - canal extension of about 100 meters to irrigate 20 has. more Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 3 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 4 (upstream to downstream) - With water permit? Don't know Financial - Sources of funds/income: IA's ISF/Amortization - Expenditure Items: M&OE- P15,000/year - Assistance from NIA/other agencies: LGU gave P40,000 for repair of pump 4 years ago Governance - Participation of Officers/BOD and members: 100%

Anao Farmer's IA *(Anao, Mexico)*	SA/FUSA: 443 has./335 has. CI: 200% CE: 50% upon shifting to ISF from amortization ISF Rate/Amortization: P1700 (wet); P2550 (dry) Equity: 0 Crop: Rice& Corn Yield/ha: Rice – 100 (wet),115 (dry); Corn – 6,800 kg Production Cost/Ha.: P25,000 (wet & dry) Type of System: Gravity No. of members: 165 Tenure Status: 80%-landowners, 20%-lessees Project Cost & Source of Fund: P70 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: No Other modes of supplementary irrigation: 30% of SA pumps from STW during dry season Cost of O&M of Pump: P1,000/ha./cropping	Physical/Technical - lining of the 3.5 km earth canal and replacement of deteriorated steel gate of the 1st cross regulator Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 4 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 3 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 34(upstream to downstream) - With water permit? No Financial - Sources of funds/income: IA's ISF - Expenditure Items: Salaries & M&OE-P40,000/year; ISF – P 60,000/year - Assistance from NIA/other agencies: none Governance - Participation of Officers/BOD and members: Officers/BOD - 80%, Members – 30% (This is due to shift from amortization to ISF scheme which most members don't agree.)

Nueva Ecija (Bulacan-Aurora-Nueva Ecija IMO)

IA	Profile	Issues and Concerns
Cordero SSIS Active Farmer's Association *(Cordero, Lupao)*	SA/FUSA: 60.2 has./50 has. CI: 140% CE: 17% ISF Rate/Amortization: 0 Equity: P1.2 Mn paid at P14,000/ha/year for 2 years Crop: Rice& Corn Yield/ha: Rice – 75-80 (wet),75-80 (dry); Corn – 6,300 kg Production Cost/Ha.: P20,000 (wet), P18,000 (dry) Type of System: Gravity No. of members: 27 Tenure Status: 100%-landowners Project Cost & Source of Fund: P4.2 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: No Other modes of supplementary irrigation: 20 has. pump from STW during dry season Cost of O&M of Pump: P3,000/ha./year	Physical/Technical - 2 kilometer canal extension to irrigate 50 has. more - rehabilitation of dam - flat bed drier Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 1 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 1 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 2 (upstream to downstream) - With water permit? Yes Financial - Sources of funds/income: IA's equity repayment - Expenditure Items: Equity repayment - Assistance from NIA/other agencies: none - IA experienced difficulty on access to bank loans - 87% do not pay since they do not receive enough water Governance - Participation of Officers/BOD and members: 100%

Inasan IA *(Ligaya, Gabaldon)*	SA/FUSA: 150 has./150 has. CI: 167% CE: 75% ISF Rate/Amortization: P1000/ha/cropping Equity: 0 Crop: Rice Yield/ha: Rice – 100-160 (wet),100-160 (dry) Production Cost/Ha.: P25,000 (wet & dry) Type of System: Gravity No. of members: 206 Tenure Status: 25%-landowners, 75%-tenants Project Cost & Source of Fund: P5 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: Yes, repaired damaged dam amounting to P600 K given by LGU Other modes of supplementary irrigation: none	Physical/Technical - Lining of the 3 km earth canals - Government to give financial support & livelihood like livestock raising Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 4 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 4 (upstream to downstream) - With water permit? Yes Financial - Sources of funds/income: IA's ISF - Expenditure Items: Salaries & M&OE-P70,000/year; Amortization – P 30,000/year - Assistance from NIA/other agencies: none Governance - Participation of Officers/BOD and members: Officers/BOD - 100%, Members – 80%

Parang Bugnan IA *(Bugnan, Gabaldon)*	SA/FUSA: 160 has./160 has. CI: 200% CE: 95% ISF Rate/Amortization: P1000/ha/cropping Equity: 0 Crop: Rice& Onion Yield/ha: Rice – 80-90 (wet & dry),Onion – 10,400 kg (dry) Production Cost/Ha.: Rice - P15,000-P20,000 (wet & dry), Onion – P80,000 Type of System: Gravity No. of members: 100 Tenure Status: 85%-landowners, 25%-tenants Project Cost & Source of Fund: P325 K by NIA Undergone rehabilitation/extensions, cost & source of fund: Yes, repaired damaged dam due to typhoon amounting to P10 Mn by NIA Other modes of supplementary irrigation: none	Physical/Technical - Access roads - lining of earth canals - Additional intake siphon Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 3 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 3 (upstream to downstream) - With water permit? No Financial - Sources of funds/income: IA's ISF - Expenditure Items: M&OE- P35,000/year; Amortization – P 35,000/year - Assistance from NIA/other agencies: LGU gave P5 K for repair of dam and lends backhoe for free for desilting works Governance - Participation of Officers/BOD and members: Officers/BOD - 100%, Members – 80%

Laguna (Laguna-Rizal IMO)

IA	Profile	Issues and Concerns
San Roque Farmer's Association *(San Roque, Victoria)*	SA/FUSA: 200 has./200 has. CI: 100% CE: already paid off ISF Rate/Amortization: 0 Equity: 0 Crop: Rice Yield/ha: Rice – 90-120 (wet), 70-80 (dry) Production Cost/Ha.: Rice - P20,000 (wet), P30,000 (dry) Type of System: Pump No. of members: 100 Tenure Status: 30%-landowners, 70%-tenants Project Cost & Source of Fund: FAs individual funds Undergone rehabilitation/extensions, cost & source of fund: no Other modes of supplementary irrigation: none	Physical/Technical - Source of water like small water impounding project Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 2 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 4 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 1 - With water permit? No Financial - Sources of funds/income: none - Expenditure Items: pump M&OE - Assistance from NIA/other agencies: LGU gave seedlings worth P25 K Governance - Participation of Officers/BOD and members: Officers/BOD – 70%, Members – 100%

Maravilla Alipit Malinao IA *(Maravilla, Magdalena)*	SA/FUSA: 40 has./40 has. CI: 200% CE: 100% ISF Rate/Amortization: P80,000/year Equity: 0 Crop: Rice Yield/ha: Rice – 60-80 (wet & dry) Production Cost/Ha.: Rice - P25,000 (wet), P28,000 (dry) Type of System: Gravity No. of members: 34 Tenure Status: 10%-landowners, 90% tenants Project Cost & Source of Fund: P1.16 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: no Other modes of supplementary irrigation: none	Physical/Technical - Cementing of mini dam Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 4 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 4 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 4 (upstream to downstream) - With water permit? No Financial - Sources of funds/income: IA's ISF of P1,000/ha/cropping - Expenditure Items: Amortization - Assistance from NIA/other agencies: Mayor gave P300 K for payment of amortization Governance - Participation of Officers/BOD and members: 100%

Nagkakaisang Magsasakang Banadero IA *(Santisimo Rosario, San Pablo)*	SA/FUSA: 160 has./130 has. CI: 200% CE: 95% ISF Rate/Amortization: P897/ha/year to start in 2016 Equity: 0 Crop: Rice and vegetables Yield/ha: Rice – 70-130 (wet & dry), vegetables – various yields Production Cost/Ha.: Rice - P15,000 (both wet & dry); vegetables – various cost Type of System: Gravity No. of members: 80 Tenure Status: 10%-landowners, 90% tenants Project Cost & Source of Fund: P7 Mn under CARP of DA Undergone rehabilitation/extensions, cost & source of fund: no Other modes of supplementary irrigation: none	Physical/Technical - Lining of canal and cementing of turn outs - SLEX project would affect their service area by 70% - 80% Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 4 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 1 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 4 (upstream to downstream) - With water permit? No Financial - Sources of funds/income: IA's annual due of P50/ha/cropping - Expenditure Items: M&OE - Assistance from NIA/other agencies: DA rehabilitation of irrigation system (P7 Mn) Governance - Participation of Officers/BOD and members:Officers/BOD – 80%, Members – 60%

Occidental Mindoro IMO

IA	Profile	Issues and Concerns
Amaling-Manuot IA *(Manuot, Rizal)*	SA/FUSA: 535.15 has./535.15 has. CI: 159% CE: 90% ISF Rate/Amortization: P200,000/season Equity: 0 Crop: Rice Yield/ha: Rice – 100-180 (wet), 100-180 (dry) Production Cost/Ha.: Rice - P25,000 (wet), P35,000 (dry) Type of System: Gravity No. of members: 242 Tenure Status: 100%-landowners Project Cost & Source of Fund: P6 Mn under CARP Undergone rehabilitation/extensions, cost & source of fund: Yes, repair of river dike damaged by typhoon in 2012 using NIA's calamity fund Other modes of supplementary irrigation: 150 has. pump from STWs during dry season	Physical/Technical - Completion of the river dike needed for flood protection - Lining of canal - STWs for the 150 has. to augment water supply during dry season Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 4 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 3 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 3)downstream to upstream) - With water permit? Yes Financial - Sources of funds/income: IA's annual due of 2 cavans/ha/cropping & NFA's FAIR, IPAD & CDIF incentives - Expenditure Items: salaries, M&OE & repairs - Assistance from NIA/other agencies: DA gave P1 MN for Warehouse and P0.750 Mn for flat bed drier, Congresswoman Sato gave 249K for multipurpose drying payment

		Governance - Participation of Officers/BOD and members: Officers/BOD – 100%, Members – 100%
Barangay Rizal, Rizal Occidental Mindoro IA *(Rizal, Rizal)*	SA/FUSA: 600 has./600 has. CI: 192% CE: 50% ISF Rate/Amortization: none Equity: 0 Crop: Rice, corn, tobacco, mongo, onion, peanut & "camote" Yield/ha: Rice – 80-120 (wet), 90-130 (dry) Production Cost/Ha.: Rice - P30,000 (wet), P35,000 (dry) Type of System: Gravity No. of members: 300 Tenure Status: 30%-landowners, 70% tenants Project Cost & Source of Fund: no project yet Undergone rehabilitation/extensions, cost & source of fund: no Other modes of supplementary irrigation: 76 has. pump from STWs and small impounding holes during dry season	Physical/Technical - Completion of the stalled project - More canal extensions to increase SA - Canal lining for water service efficiency Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 4 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 3 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 3 (upstream to downstream) - With water permit? Yes Financial - Sources of funds/income: IA's ISF of P850/ha/cropping & NFA's FAIR, IPAD & CDIF incentives - Expenditure Items: 10% incentive of collectors, O&M and repairs - Assistance from NIA/other agencies: DA gave subsidized seedlings Governance - Participation of Officers/BOD and members: Officers/BOD – 100%, Members – 60%

Monteclaro IA *(Monteclaro, San Jose)*	SA/FUSA: 229 has./229 has. CI: 200% CE: 60% ISF Rate/Amortization: P100,000/ year Equity: 0 Crop: Rice, corn, onion & garlic Yield/ha: Rice – 80-120 (wet), 100-150 (dry) Production Cost/Ha.: Rice - P41,000 (both wet & dry) Type of System: Gravity No. of members: 104 Tenure Status: 100%-landowners Project Cost & Source of Fund: P6.2 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: Yes, repaired damaged siphon in 2011 using IA's own fund Other modes of supplementary irrigation: 50 has. pump from STWs, canal and river during dry season	Physical/Technical - Lining of 70% of their canal - Cementing of dam Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 2 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 3 (downstream to upstream) - With water permit? No Financial - Sources of funds/income: IA's ISF of P1000/ha/year & NFA's FAIR, IPAD & CDIF incentives - Expenditure Items: 10% incentive of collectors, M&OE & amortization - Assistance from NIA/other agencies: DA gave about P360 K of rice seeds Governance - Participation of Officers/BOD and members: Officers/BOD – 100%, Members – 70%

Camarines Sur IMO

IA	Profile	Issues and Concerns
Suha San Antonio IA *(San Antonio, Ocampo)*	SA/FUSA: 136 has./100 has. CI: 200% CE: 65% ISF Rate/Amortization: P72,000/year Equity: 0 Crop: Rice Yield/ha: Rice – 60-70 (wet), 80-100 (dry) Production Cost/Ha.: Rice - P25,000 (wet & dry) Type of System: Gravity No. of members:74 Tenure Status: 50%-landowners, 20%-tenants,30%- lessees Project Cost & Source of Fund: P5.1 Mn by NIA Undergone rehabilitation/extensions, cost & source of fund: none Other modes of supplementary irrigation: 3 has. pump from drainage during dry season	Physical/Technical - Canal lining - Repair of intake structure Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 3 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 3 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 3 (upstream to downstream) - With water permit? No Financial - Sources of funds/income: IA's ISF of P1,500/ha/cropping - Expenditure Items: Salaries – P6,425/month, M&OE – P77,100, Amortization - Assistance from NIA/other agencies: LGU gave P40 k for canal lining, DA granted P1.5 Mn for SWIP Governance - Participation of Officers/BOD and members: Officers/BOD – 100%, Members – 60%

Gubat-Lagonay IA *(Gubat, Lagonay)*	SA/FUSA: 50 has./45 has. CI: 147% CE: 100% ISF Rate/Amortization: already paid off amortization Equity: 0 Crop: Rice Yield/ha: Rice – 40-100 (both wet & dry) Production Cost/Ha.: Rice - P15,000 (wet & dry) Type of System: Gravity No. of members:59 Tenure Status: 40%-landowners, 50%-tenants,10%- lessees Project Cost & Source of Fund: P134 k by NIA Undergone rehabilitation/extensions, cost & source of fund: Yes, P2.72 Mn by NIA Other modes of supplementary irrigation: none	Physical/Technical - Canal lining - Access roads/ FRM - Canal extension to irrigate 5 has. more Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 4 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 4 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 4 (upstream to downstream) - With water permit? Yes Financial - Sources of funds/income: IA's ISF of P400/ha/cropping - Expenditure Items: Salaries & M&OE – P26,400 - Assistance from NIA/other agencies: LGU gave P500 k for canal lining, DA subsidized seedlings cost Governance - Participation of Officers/BOD and members: Officers/BOD – 50%, Members – 70%

San Isidro Bahay Aslong Palangon IA *(San Isidro, Libmanan)*	SA/FUSA: 250 has./250 has. CI: 200% CE: 60% ISF Rate/Amortization: P46,666/Year Equity: 0 Crop: Rice Yield/ha: Rice – 40-110 (wet), 20-95 (dry) Production Cost/Ha.: Rice - P30,000 (wet & dry) Type of System: Gravity No. of members:245 Tenure Status:70%-landowners, 20%-tenants,10%- lessees Project Cost & Source of Fund: P632 k by NIA Undergone rehabilitation/extensions, cost & source of fund: Yes, P34.3 Mn by NIA Other modes of supplementary irrigation: 1 ha. pumps from drainage canal during dry season	Physical/Technical - Lacking FMR or access roads - Canal lining of 6 km of lateral canals Institutional - Conflict resolution ability (0 – nothing done, 1 – not effective since conflicts are not resolved, 2 – not very effective as conflict happens occasionally, 3 – moderately successful as the conflict repeatedly happens, 4 – very effective such that conflicts happens rarely): 4 - IA's accountability provision effectiveness (0 – not effective, 1 – rarely, 2 – sometimes, 3- frequent, 4 – always effective): 3 - Water allocation or delivery service (0 – no water received, 1 – all do not receive sufficient water when needed, 2 – not all receive required water more often, 3 – all receive required volume but with occasional delay, 4 – all receive required volume at the right time): 4 (downstream to upstream) - With water permit? Yes Financial - Sources of funds/income: IA's ISF and annual due - Expenditure Items: Salaries – P152,400/year, M&OE – P18,000/year - Assistance from NIA/other agencies: Cong. Andaya granted P1 Mn for their bodega, LGU donated 60 bags of fertilizers and DA gave 500 bags of fertilizers Governance - Participation of Officers/BOD and members: Officers/BOD – 10%, Members – 80%