

Original Research

Assessing the sustainability of agricultural water management of Upper Pampanga River Integrated Irrigation System (UPRIIS) in Nueva Ecija in the Philippines

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ABSTRACT:

A sustainable agricultural water management system is the key to agricultural productivity. The New Public Administration Model focuses on the performance measure of government institutions. This study is a measure of performance of Upper Pampanga River Integrated Irrigation System (UPRIIS) Division II in Talavera, Nueva Ecija in the Philippines. The study used a mixture of qualitative and quantitative methods of research. A researcher-made sustainability scaling, and paradigm was also used. The results of the study found that the management of agricultural water system of UPRIIS is: a) highly sustainable; b) the weighted mean scores in the four areas of organizational development border from high to very high sustainability; and c) farmers are very satisfied with the management of the system. The data were gathered using survey questionnaires filled out by 450 participants from 50 irrigators' associations. It is also recommended that other areas of agricultural water management such as the presence or absence of corruption, co-management and financial management should be studied in the future to determine the financial sustainability of agricultural water management completely.

Keywords:

Sustainable management of irrigation, Agricultural productivity, organization and management.

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INTRODUCTION

Agricultural water management is crucial to the sustainable agricultural productivity of any country. In Southern Europe, sustainable water management is linked to agricultural practices under the condition of climate change (Chartzoulakis and Bertaki, 2015). Sustainable water management can be achieved by adopting agricultural practices that are both environmental friendly and attuned to agricultural sector productivity. However, farmers are faced with many challenges that hindered agricultural productivity including poor governance (Ogalleh *et al.*, 2012). In some war-affected countries, like Iraq, agricultural water management is one of the government services neglected and deficient in terms of government support leading to salinity problem and irrigation infrastructure deterioration (Gee and Bauder, 1986).

In the United Kingdom, water and land resources used in water management are perceived as being managed inappropriately resulting in the performance evaluation at three areas of water management namely: planning, evaluation, and operation (Smout and Gorantiwar, 2006). In Zimbabwe, irrigation water quality and soil quality were studied to determine their impact on agricultural productivity. The results indicated that the groundwater sample provides chemical causing salinity of the soils adversely affecting agricultural productivity (Chemura, 2014).

Efficient agricultural water management is not only a tool to achieve agricultural productivity but also a means towards realizing social justice measured in terms of equal access to opportunity to quality water resources (Mateos *et al.*, 2002). In the Philippines, a study conducted in Porac Irrigation Management System, analyzed the response of main canal network and the systems capability to deliver crop water and make use of computer models to assist the water management in the preparation of irrigation schedules and improve crop productivity (Weller, 1991).

The United Nations defined sustainability as the ability of the present generation to enjoy the use and benefits of the present at the same time to ensure that such benefits can be preserved for the use of future generation (Pearce *et al.*, 2013; Davenport and Prusak, (1998). In building a sustainable institution, it is believed that empowerment of the common people is necessary (Rowlands, 1995). Empowered institution means allowing the internal stakeholders to have access to vital information and make informed decision indispensable to strengthening the organization (Lusthaus *et al.*, 1995). Empowerment, therefore, is an element of sustainability (Richards and Hall, 2000). Participatory water management scheme in the UPRIIS II was a product of a study conducted by Yoshinaga (2016) submitted to the management of Upper Pampanga River Integrated Irrigation System (UPRIIS). The main objective of the study is to come up with a bundle of recommendations on how to make irrigation water management sustainable. The findings pointed out to the neglected conditions of the irrigation facilities. A large part of the irrigation canals are associated to the low canal embankment and silted canal bottom due to containing silty soil from the river. Some are also described as having scoured inlet and outlet of canal structure without measuring device showing the level of agricultural water running in the irrigation canals (Yoshinaga, 2016).

On the part of the farmer's behaviour, many of them are described by the report as non-cooperative, and insensitive to the conditions of facilities. They were also found to be committing illegal pumping irrigation, water intake by cutting canal embankment and unauthorized in taking of agricultural water from irrigation canal by using the bamboo tube. The findings of the study recommended that to improve water management and irrigation facilities farmers should be encouraged to adopt the rotational and irrigational method and capacity building for efficient utilization of rainwater during the wet season through training programs and actual experi-

ences. Finally, it was suggested by the study that the management help the farmers organize themselves and establish the Irrigators Association which would serve as partners of the UPRIIS management in managing agricultural water.

Towards a participatory and sustainable agricultural water management, the 1987 Philippine Constitution, mandates the recognition of farmers groups to take part in the planning organization and management of government program. Moreover, the government pledges that it will provide support to agriculture in all areas of management (Leon, 2005). The rationale points to the fact that sustainability of the management of agricultural water depends to a great extent on the perceptions of farmers in any governance arrangements (Ahmad, 2009). Since then the role of farmers or Irrigators Association in the control of agricultural water became imperative in the UPRIIS operation.

The construction of Pantabangan dam as a means to improve agricultural water management

In the early part of the year 1970's, the farm workers in the province of Nueva Ecija greatly depended on rain-fed farming (Lasco *et al.*, 2008). As the irrigation system then was not fully developed, El Niño phenomenon, brought about devastating effects to agricultural productivity resulting in rice shortage (Tawang and Ahmad, 2002.). Because of this, the government came up with the decision to develop and create a plan to help the farmers to improve their farming techniques. With this as an intention, the government started the construction of a huge multi-purpose dam located in the municipality of Pantabangan, Nueva Ecija. One of its purposes is the arrangement and construction of agricultural waterways leading to agricultural lands thereby supplying agricultural water to farmers of the province (Gusyev *et al.*, 2015).

The construction of an earth-fill embankment Pantabangan dam began in June 1971 and was completed in the year 1976. As water impounding system, the

Pantabangan dam waters supplied the agricultural needs of the province via the river ways of Carranglan, Canili, and Diayo rivers. Recently, another dam supplying water to Pantabangan was constructed. It is known to farmers as the Casecnan dam, providing water from Cagayan and Taan rivers to Pantabangan dam. All waters saved during the rainy season were temporarily stored at Pantabangan and properly flow out via the Upper Pampanga River Basin (UPRB), the biggest river of Philippines. This serves as the water supplier for the irrigation of almost 102,000 hectares of farmlands in five (5) different cities and 20 municipalities in the province of Nueva Ecija and towns of Bulacan, Tarlac and Pampanga.

After the completion of the said project known as Upper Pampanga River Project (UPRP), in 1976 the Upper Pampanga River Irrigation Integrated System (UPRIIS) was created and up to now is known as one of the biggest suppliers of irrigation water not only in Nueva Ecija but also nationwide. It is divided into five (5) divisions; located and situated at different municipalities and cities of Nueva Ecija. The first division managing agricultural water in the city of Munoz, the second division having management jurisdiction is at Talavera, Nueva Ecija, the third division is located at the city of Cabanatuan, the fourth management division is in the city of Gapan, and the fifth division is found in Guimba Nueva Ecija.

The study focused on the management of agricultural water in the second division of Talavera in Nueva Ecija. Other than the five divisions an office was created which later on known as the Dam Reservoir Division (DRD) located at the municipality of Pantabangan. These divisions play a vital role in supplying irrigated agricultural water and flood control system providing hydropower electricity in the entire province of Nueva Ecija. Presently, the National Irrigation Administration (NIA) continuously constructed and provide an arrangement of water canals in the municipalities of Guimba, Talugtug, Cuyapo, Nampicuan and

Anao and Victoria located in the nearby province of Tarlac.

Studies showed that agricultural water management is indeed a key factor in agricultural productivity (Kijne *et al.*, 2003). It has economic, social and even political repercussions. However, studies on the water management assessment showed a tendency to evaluate water management system on the point of view of water management operators. Moreover, efficiency in operation is measured through an agency team or project-based water irrigation impact measurement. Most of them are also inclined to analyze sustainability using parameters that are set by the agency and collated making the conclusion and findings that are bias in the eyes and minds of the stakeholder farmer- beneficiaries. The agricultural water management performance measure covers different parameters that can be tested using scientific based tools or laboratory experiment, e.g., leaching, drainage, and water salinization. Nonetheless, the measurement of sustainability in agricultural water management is seldom treated as necessary in the agricultural water management if not perceived as entirely difficult to measure (Chmura *et al.*, 1987).

The new public management model introduced a new era of public sector performance measure where efficiency and sustainability are measured based on the outcomes. The performance measure is based on how the primary objectives of the model are realized. The major features of the NPM Model are as follows: a) responsiveness to the needs of the public; b) managerial accountability; c) efficiency and effectiveness; d) consultative decision making, and e) adopting a customer-focused strategy (Broadbent and Guthrie, 1992). The change in public administration model created the need to refocus public sector concerns. Among them are along the line of performance management reporting and sustainability issues (Lapsley and Pettigrew, 1994).

The present study measures the sustainability of water management in UPRIIS Division II using the

stakeholders' evaluation perspectives prominent under the New Public Governance Era. The paper adheres to participatory water management and its sustainability as measured through direct community participation in the management of irrigation system. It is also intended to measure the level of satisfaction and degree of participation of the irrigator's association in the management of agricultural water management of UPRIIS particularly in the second division of Nueva Ecija. This study is used to identify the basis of performance and as a "lens" of farmer beneficiaries, and showed the rating of UPRIIS II in the following sub-variables: a) level of community participation in organizational development initiatives; and degree of satisfaction to the existing water management operation of UPRIIS II. All are managerial imperatives where sustainability is measured using qualitative parameters and from the perspectives of the community. To fill out the knowledge gap the study, therefore, posed the following questions, to wit:

How the farmer beneficiaries participate in the current agricultural water management of UPRIIS in terms of :

1.1 Organizational development initiative towards water management

1.1.1 Formation of irrigators association

1.1.2 Capacity building

1.1.3 Information dissemination

1.1.4 Attendance to organizational training and seminar

1.1.5 Policy consultation

How the perception of farmer beneficiaries on water services management of Upper Pampanga river be described in terms of:

2.1 Timeliness of delivery

2.2 Responsiveness to request

2.3 Quality of maintenance and operation

3. What is the level of satisfaction of farmer beneficiaries on the agricultural water management of UPRIIS?

4. Based on the findings, what recommendations may be provided to improve the system of irrigation and agricultural water management in UPRIIS?

METHODOLOGY

This study used a mixture of qualitative and quantitative methods of research. Major part of this study is descriptive, and the interpretation and analysis of data gathered are solely based on observational, focus group discussion and distribution of survey questionnaires. This method is useful not only to describe the existing organizational system and condition, but also to assess the actual condition of the agency about its capacity to sustain participatory agricultural water management. Data were gathered through survey questionnaires written in English and translated in the vernacular through the help of the Institutional Development Division (IDD) of NIA-UPRIIS, Division II. The existing irrigator's association in coordination of other agencies was tapped to do the interview and submit report checklist to the division office for further evaluation. The field research for farmer's satisfaction survey was conducted on January 18, 19, 25 and 26, 2017. Another set of farmer's satisfaction survey was conducted on January 3, 4, 5 and 11, 2017. The participants in the study were 450 farmers/respondents belonging to 50 Irrigators Association. From the 50 IAs, the researcher selected nine members per association using random sampling method. The other Irrigator's associations refused to participate. Only 50 of the 89 irrigators associations allowed themselves to be interviewed and answered the questionnaires.

The survey questionnaire has three major parts; the first part is designed for the demographic profile of the participants while the second part contains statements intended to measure the organizational initiatives of member-participants (Irrigators Associations) towards sustainable agricultural water management. This includes the capacity building initiatives of the UPRIIS II from the members themselves as the end users of water management programs. Moreover, the last part is the measurement of the level of satisfaction of the beneficiaries of agricultural water management.

The survey questionnaires were supported and reinforced by personal observation, informal interview of the participants and UPRIIS management. The triangulation of data was done to minimize inaccuracies and bias responses to the questions solicited from survey questionnaires. The findings are the bases of researcher recommendations for the increased sustainability of the agricultural water management of UPRIIS II.

Study area

This study will focus more on one division of NIA-UPRIIS. The NIA-UPRIIS Division II located at Poblacion, Talavera Nueva Ecija with a total firmed up service area of 23,162.96 hectares. Its service areas are at the municipalities of Aliaga, Talavera, Llanera, Rizal and Gen. Natividad including small areas/barangays of Cabanatuan city (as shown in Figure 2). In general, the NIA-UPRIIS Division II composed of five systems and these are Murcon Creek Irrigation System, Pampanga River Irrigation System, Rizal Munich Area, Lower Talavera River Irrigation System and Vaca Creek Irrigation System. The total length of the main canal for Division II are 63,317.00 Km, while the total length of laterals and sub-laterals are 315,666.00 Km. The type of crops grown in this area is dominated by rice, onions and other vegetables. The area is shown in Figure 1 using Google map;

The NIA-UPRIIS Division II serves a total of 79 Irrigator's Associations that serve as active partners of NIA not just in the development and management of irrigation canals but also in ensuring the provision of agricultural water that directly distributed to the farmlands. The layout of NIA UPRIIS Division II is provided in Figure 2 below:

Data analysis

The study adopts the following organizational development and sustainability paradigm. The paradigm shows the interface between the major components of sustainability. The study argues that the four thematic components of sustainability are capacity building, de-

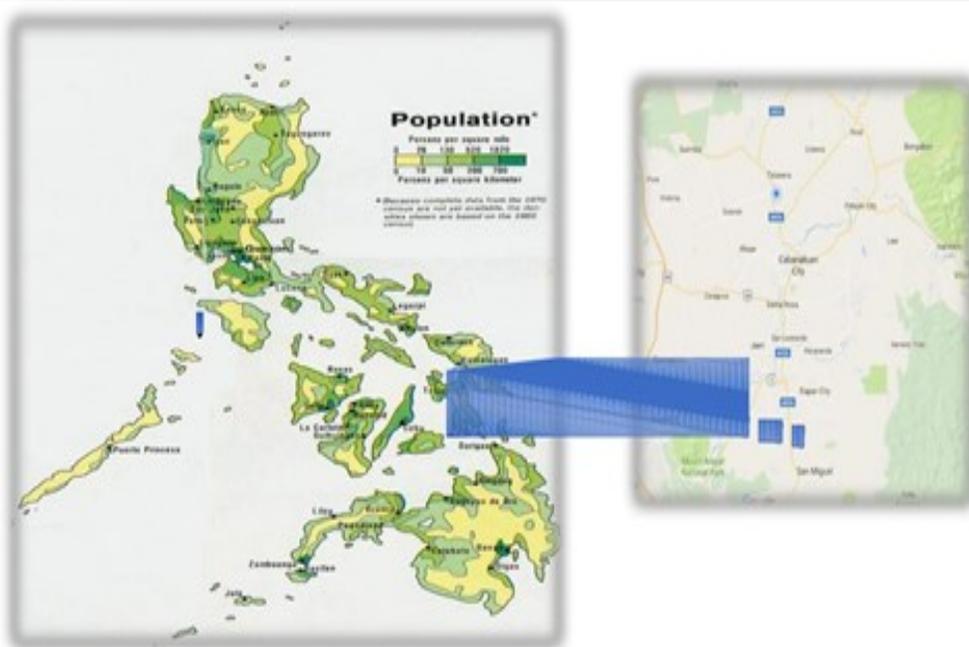


Figure 1. Google Map showing UPRIS Service Area (Source: Google Map: NIA-UPRISS, 2015)

velopment initiatives, policy consultation and satisfaction of members of the organization. The four components of organizational sustainability are measured based on each thematic area. Area I consists of meetings where programs are agreed upon, and development direction is laid down. Area II is capacity building instru-

mental to the strengthening of the members as human resources. Notice that financial resources are not included considering the public nature of the system. Area III is the consultation and implementation of desired policy. Area IV member satisfaction with the operation of the organization and the shared identification of the

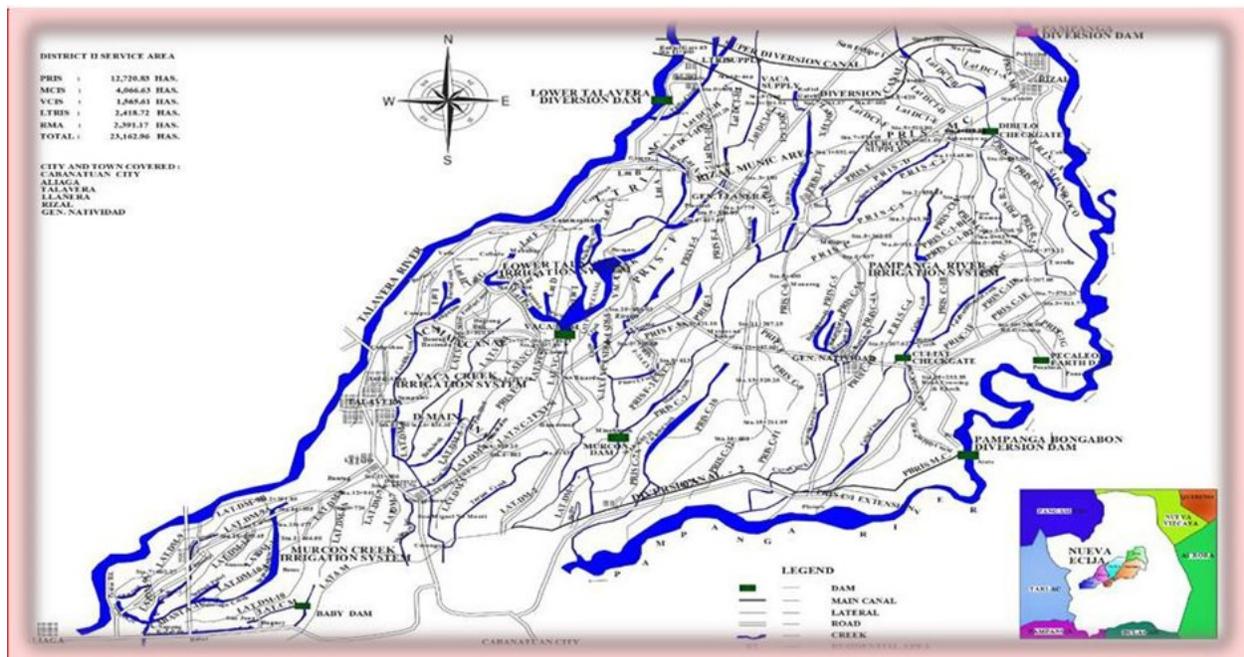


Figure 2. General layout of NIA-UPRIIS, Division II (NIA-UPRISS, 2015)



Figure 3. Organizational sustainability paradigm

members of the organization. The presence of the four components of the organization is described using the Organizational Sustainability Index. The Figure 3 for sustainability of UPRIS Division II is shown above, to wit;

The farmer's evaluation of the performance of the management is done through the following Likert scaling: 1.00 to 1.79 Strongly Disagree; 1.80 to 2.59 Disagree; 2.60 to 3.39 Moderately Agree; 3.40 to 4.19 Agree; 4.20 to 5.00 Strongly Agree. Meanwhile, the sustainability of agricultural water management system is measured using the following Likert Scaling.

RESULTS AND DISCUSSION

Sustainability of agricultural water management is not only measured through scientific experiments and the use of elaborate measurement tools. Ordinarily, the viability of a system rests on the support and initiatives of a group which serves as an integral part of the general system in the organizational functioning (Lewis and Sugai, 1999). As shown in Table 1, farmers beneficiaries rated the Irrigator's Association as Strongly Agree for the organizational development initiatives on the water management. The other measures of initiative towards water management have the scores from 4.92 to 4.96 having the same verbal interpretation. All development initiatives emanate from the assembly or meeting. When it comes to attendance to meetings and discussion of development initiatives, the Irrigators Associations are rated high by the farmer beneficiaries. The mean composite average of 4.94 (Table 2) represents the initi-

Sustainability index	
Weighted mean	Verbal description
1-1.79	Not sustainable
1.8-2.59	Slightly sustainable
2.6-3.39	Moderately sustainable
3.4-4.19	Sustainable
4.20-5.00	Highly sustainable

atives of Irrigators Association members to develop their organizations to serve as the support system to agricultural water management. Table 1 presents the perception of participants to develop a strong irrigators association.

Capacity Building is a major component of sustainability (Briones, 2009). A strong and well-equipped organization may fall on its knees if the mem-

Table 1. Organizational development initiatives on water management

S. No	Organizational meetings	Weighted mean	Adjectival rating
1	Formation of existing irrigator's associations helped to preserve and protect the existing irrigation facilities.	4.95	Strongly Agree
2	Meetings are held regularly.	4.95	Strongly Agree
3	Farmers and irrigators association members attended the meetings.	4.93	Strongly Agree
4	Notice to a meeting is received before the scheduled meeting.	4.93	Strongly Agree
5	Attendance is mandatory for members of Irrigators Association.	4.92	Strongly Agree
6	Attendance to the meeting is a moral obligation to the preservation of existing irrigation facilities.	4.96	Strongly Agree
7	Overall Weighted Mean	4.94	Strongly Agree

Table 2. Capacity building for water management

S. No	Capacity building	Weighted mean	Adjectival rating
1	Seminars are well attended by the farmers.	4.96	Strongly Agree
2	There is a frequent and regular seminar.	4.94	Strongly Agree
3	Seminars and training are sponsored by UPRIIS for the irrigators association.	4.98	Strongly Agree
4	The training and seminars are on the water management and irrigation.	4.95	Strongly Agree
5	Attendance to training and seminars are mandatory to irrigators association.	5.00	Strongly Agree
6	Training and seminar are free for farmers and irrigators association.	5.00	Strongly Agree
7	It is a moral obligation of members to attend and inform other members with regards to continuous development on irrigation, operation and maintenance.	4.97	Strongly Agree
8	Overall Weighted Mean	4.97	Strongly Agree

bers and officers are not willing to retool and relearn on matters that are vital to effective and efficient management of agricultural water. In terms of organizational and individual development and capacity improvement, almost all the participant farmers believed that the management of UPRIIS Division II is providing the necessary skills to improve not only the management of the system but also of the farmer's ability to utilize efficiently the agricultural water. The range of responses showed that they strongly "agreed" on the presence and availability of capacity building seminars for members. The composite average of 4.97 verbally described as "strongly agreed" reflects the willingness of the UP-

RIIS.

Division II to empower and capacitate the farmer beneficiaries through frequent seminars and training about the use and saving of agricultural water (Briones, 2009). Moreover, for the farmers to get more out of the available agricultural water. Table 2 shows the participants rating of UPRIIS Division II in so far as the capacity management of farmers is concerned.

The results of survey questionnaires showed the highest rating given to the mandatory attendance for the seminar and the free of charge on capacity building programme. The two fives (5) are verbally described as equivalent to "strongly agree"; creates an impression of the desire of the system to encourage holistic development of the agricultural water management including its relation to the ability of the farmer beneficiaries. The need for sustainability is provided by the ability of the members to manage and take advantage of the capacity building seminars and training (Sobeck and Agius, 2007) sponsored by the UPRIIS II to the farmer beneficiaries. After triangulating the data, the following records of seminars are sponsored by the UPRIIS II.

Consultation for policy formulation

The strength of a strong organization rests on the participatory decision making and policy formulation (Ananda, 2007). A participatory approach to management of agricultural water is highlighted by frequent consultations for policy formulation (Giordano and Shah, 2014). A policy made out of the consensus of those who will be affected increases the chances of successful operation as the people who made the policy is deemed to acquire ownership of the policy and will become personally accountable for the observance and implementation of the policy. This finding is supported by the finding of Gabriel and Gutierrez, (2017), where organizational performance is positively correlated to people's participation. It is, therefore, safe to infer that when there is peoples participation in policy making, the greater the chance to implement the policy. If there

Table 3. Consultation for policy formulation

S. No	Consultation for policy formulation	Weighted mean	Adjectival rating
1	Active participation with regards to policy consultation.	4.96	Strongly Agree
2	Consultations are held regularly.	4.97	Strongly Agree
3	Policies on water distributions are reasonably explained.	4.95	Strongly Agree
4	Policies are well disseminated before implementation.	4.96	Strongly Agree
5	Policies are the product of consultation.	4.96	Strongly Agree
6	Overall Weighted Mean	4.96	Strongly Agree

Legend: 1.00 to 1.79 - Strongly Disagree; 1.80 to 2.59 - Disagree; 2.60 to 3.39 - Moderately Agree; 3.40 to 4.19 - Agree; 4.20 to 5.00 - Strongly Agree

is a greater chance to implement the policy which the members themselves made, the greater the degree of sustainability. The sustainability in the management of agricultural water increases as the participation of farmer beneficiaries increases. Though bereft of statistical computation on the matter, the data in Table 3 showed that regular holding of policy meeting for consultation is given the highest rating of 4.97 verbally described as “Strongly Agree”. Strongly agreeing “to the effect that before a policy is made and implemented, consultations are held, and the new rule is a product of the expressed will of the members of Irrigators Associations. The Table 3 below showed the answers as ranging from a perfect 5 to 4.95 in terms of the willingness of UPRIIS management to consult before a policy is made and eventually implemented.

Information dissemination

The importance of information in the organization cannot be undermined. Many organizations failed because of the inability of the managers to manage data and use them for the development and sustainability of

the operation. In terms of information and dissemination variables, 4.98 is the highest score of the participants while 4.91 is the lowest. The other scores are ranging from 4.95 to 4.96 which means that the participants are "strongly agreeing" to the ability of the UPRIIS Division II to manage information for knowledge dissemination. However, noteworthy is the relatively low score for "website" as a means to distribute information usable to farmer beneficiaries. The low score of 4.91 means that some of the participants believed that the use of modern technology like the internet is not totally availed by the UPRIIS II. Information technology is the fastest, most reliable and easily retrievable means to disseminate information (Bawan *et al.*, 2017) In the case of UPRIIS Division II, the means is not totally availed off. However, by checking the NIA website, one would realize that the management also availed the Information technology for information dissemination. Many of the activities and announcements of the website are new and latest which means that the management also considers the use of technology for the improvement of

Table 4. Information and dissemination for water management

S. No	Information dissemination	Weighted mean	Adjectival rating
1	Information on water management is regular.	4.98	Strongly Agree
2	Information is disseminated to the farmer beneficiaries.	4.96	Strongly Agree
3	Farmer beneficiaries are given information flyers on the irrigation facilities.	4.95	Strongly Agree
4	There is an existing website for the farmers irrigation facilities.	4.91	Strongly Agree
5	Overall Weighted Mean	4.95	Strongly Agree

Legend: 1.00 to 1.79 - Strongly Disagree; 1.80 to 2.59 - Disagree; 2.60 to 3.39 - Moderately Agree; 3.40 to 4.19 - Agree; 4.20 to 5.00 - Strongly Agree

Table 5. Summary Table for water management

S. No	Organizational development initiative towards water management	Weighted mean	Adjectival rating
1	Frequency of meetings	4.94	Strongly Agree
2	Capacity building	4.97	Strongly Agree
3	Consultation for policy formulation	4.96	Strongly Agree
4	Information dissemination	4.95	Strongly Agree
5	Composite Weighted Mean	4.95	Strongly Agree

Legend: 1.00 to 1.79 - Strongly Disagree; 1.80 to 2.59 - Disagree; 2.60 to 3.39 - Moderately Agree; 3.40 to 4.19 - Agree; to 5.00 - Strongly Agree

agricultural water management. It also contains pictures and documents about the office operation and functions. However, no policies of the office are posted and discussed. The information and information dissemination are given on Table 4.

The summary of Table 5 for measuring the sustainability of agricultural water management is presented before. On an average, the verbal description is "strongly disagree" this means that regarding the four measures organizational initiatives and on the point of view of the participant's farmer beneficiaries, the UPRIIS II management is inclined to maintain participatory agricultural water management by establishing an institution supported by the majority of members. The satisfaction of the farmer beneficiaries is measured in terms of timeliness of delivery, responsiveness to a service request by the farmer beneficiaries and quality of training provided by UPRIIS II management. The Likert scaling used in the tables for our better understanding.

The farmer beneficiaries level of satisfaction on the water management of NIA-UPRIIS, Division II

The timeliness of the delivery of services is the hall mark of a responsive, efficient and sustainable public organization. The government institutions in general, and in this jurisdiction is commonly judged as inept,

corrupt and slow in delivery of services (Brillantes and Fernandez, 2011) making the people distrust in institutions of the government. In the sustainable management of government resources, not only accountability in terms of client responsiveness is important but also transparency that would make the government accountable to the ordinary people. This is true both in the national and global administrative environment (Gabriel, 2017). In the case of Irrigators Association (IA) and based from the responses of Irrigators Associations, the participants are very satisfied in the management of agricultural water as shown by an average of 4.94 level of satisfaction equivalently interpreted as "very satisfied". The sub-variables measured are also crucial for the accurate measurement of sustainability. They are the timely delivery of service, timely observance of the crop season, and fairness in the distribution of agricultural water. The timeliness of distribution of irrigation water has the highest weighted mean score of 4.95 or very satisfied (Table 6).

Timeliness in the delivery of services is a measure of efficiency (Hatry, 2006). As the table shows, timeliness is seen by the stakeholders as one of the strengths of UPRIIS as it is rated a weighted mean of

Table 6. Timeliness of delivery on water management

S. No	Timeliness of delivery	Weighted mean	Adjectival rating
1	Compliance with the implementation of agreed cropping calendar.	4.94	Very satisfied
2	Timeliness of delivery and distribution of irrigation water.	4.95	Very satisfied
3	Equitability of delivery and distribution of irrigation water.	4.94	Very satisfied
4	Overall Weighted Mean	4.94	Very satisfied

Legend: 1.00 to 1.79 - Not at all Satisfied; 1.80 to 2.59 - lightly Satisfied; 2.60 to 3.39 - Moderately Satisfied; 3.40 to 4.19 - Satisfied; 4.20 to 5.00 - Very Satisfied

Table 7. Responsiveness to service request on water management

S. No	Responsiveness to service request	Weighted mean	Adjectival rating
1	Prompt action on the requests for rehabilitation/ construction of the project	4.89	Very satisfied
2	Prompt action on request for technical advisory/support services	4.93	Very satisfied
3	Prompt action on request for training and other capacity building programs.	4.91	Very satisfied
4	Overall Weighted Mean	4.91	Very satisfied

Legend: 1.00 to 1.79 - Not at all Satisfied; 1.80 to 2.59 - Slightly Satisfied; 2.60 to 3.39 - Moderately Satisfied; 3.40 to 4.19 - Satisfied; 4.20 to 5.00 - Very Satisfied

4.94 or very satisfied description. As a measure of efficiency creating a sense of satisfaction among beneficiaries, the performance of UPRIIS II in the management of agricultural water resources is supported by the testimonies of the members who were interviewed saying that the UPRIIS services most often come on time (Focus Group Discussion interview, January 2017). It is noteworthy that equity in the distribution of irrigation water is also given a high satisfaction rating by farmers group. A weighted mean of 4.94 is described as very satisfied. This result, in essence, creates an impression that social justice correlatively defined as access to the government service is promoted by the UPRIIS II. Especially in farming communities where absence or lack of agricultural water would cause grave social and economic distress to the farmers.

In general, responsiveness to the service request is a key feature of good governance and would help in the sustainability of the organization. In private corporation, this aspect of management is within the corporate responsibility concept. However, in government institu-

tion where profit is not the driving force towards efficiency in operation; responsiveness to the service request is very important to maintain the trust of the public, as it is by the dictum public office which is a public trust. Following is the Table 7 containing the responsiveness rating of the UPRIIS II

One of the problems besetting farmers about agricultural water supply, several decades back was the weak irrigation facilities leading to wastage of water supply. Table 8 shows the satisfaction ratings of the farmers on UPRIIS management regarding the quality of service including facilities and training provided to internal stake holders. The focus group discussion held on January 11, 2017, supports the data presented.

Regarding training provided by the system, the same satisfaction rate is given, and a very high weighted mean of 4.95 is computed. The findings supported by the quantity of training provided during the research period and the number of participants who were present during the training programs. The Table 9 shows the training held during the study period.

As one can infer, the scope of the training program is comprehensive and does not confine only to

Table 8. Quality of training provided on water management

S. No	Quality of training provided	Weighted mean	Adjectival rating
1	Quality of construction/ rehabilitation of irrigation facilities and structures.	4.92	Very satisfied
2	Quality of technical advisory/ support service provided.	4.96	Very satisfied
3	Quality of training and other capacity-building programs provided.	4.96	Very satisfied
4	Overall Weighted Mean	4.95	Very satisfied

Legend: 1.00 to 1.79 - Not at all Satisfied; 1.80 to 2.59 - Slightly Satisfied; 2.60 to 3.39 - Moderately Satisfied; 3.40 to 4.19 - Satisfied; 4.20 to 5.00 - Very Satisfied

Table 9. List of seminars sponsored in 2017

S. No	Name of seminars	Number of participants	Date conducted
1	Environmental Awareness Part 1	52	April 25, 2017
2	Environmental Awareness Part 1	50	April 26, 2017
3	Seminar on living, loving, caring and serving Irrigators Association Leaders	51	April 28, 2017
4	Seminar on living, loving, caring and serving Irrigators Association Leaders	50	June 6, 2017
5	Workshop on living, loving, caring and serving Irrigators Association Leaders	51	June 7 2017
6	Workshop on Records and Financial Management Level II	53	September 28-29 2017
7	Workshop on Records and Financial Management Level II	51	October 10-11 2017

agricultural water irrigation management. It includes the fundamental problems on the environment, climate change and its implications for agricultural productivity. The concept of sustainability is the key feature in sustainability practices and policies designed to benefit the future generations. According to Litten, (2005) sustainability is prominent when "A strong case has been made for the need of organizations and individuals to pursue economic, social, and environmental policies and practices that will reduce the risks associated with the present practices, which will be sustainable in the long run, and that will enhance the well-being of future generations".

CONCLUSION

Agricultural productivity is dependent on effective and efficient agricultural water management. The

concept of sustainable management system suggested that access to agricultural water can be preserved for future generations. The study showed that the sustainability of UPRIIS II is rated by the farmer beneficiaries as strongly agree. Moreover, the management as measured is rated as very much satisfied. The study showed the capacity of the present management to maintain the agricultural water for the benefit of the farmers. However, there are areas of management that have implications for its sustainability. The presence or absence of corruption in the management, financial status of the organization and the direct impact of management performance to the volume of harvests must also be considered to measure the financial sustainability of UPRIIS which this study failed to include.

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