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Perceived Effectiveness of BSWM's Institutional Support to Pilot Small Water Irrigation System Associations (SWISAs)

Angel, Estepanie A.* and Dayag, Dinah Marie C.**

Abstract

The objective of this study was to assess the perceived effectiveness of institutional support of the Bureau of Soils and Water Management (BSWM) to pilot Small Water Irrigation System Associations (SWISAs) in Luzon. SWISA is an association of organized farmer-beneficiaries of Small-Scale Irrigation Projects specifically for community-managed Small Water Impounding Project and Diversion Dam. Institutional support provided to SWISAs are facilitated by contracted CDOs assigned in regions. Correlational research design was used in the study. Of the 22 pilot SWISAs with 520 farmer members, 226 respondents were identified. The respondents were selected from the members of active pilot SWISAs with an operational irrigation system for at least three years. Based on the results of this study, as the level of participation of SWISA members in the organizational undertakings, operation and maintenance activities, and implementation of activity plans increases, the perception of effectiveness of BSWM's institutional support to pilot SWISAs also increases. Moreover, as the level of understanding of CDOs of their roles in conducting organizational and monitoring activities, capacity enhancement, and coordinating activities increases, the perception on the effectiveness of the provided extension support also increases. Hence, generating the actual needs of farmers and the continuous strengthening of extension staff are necessary for the effective implementation of institutional program.

Keywords: *perceived effectiveness, institutional support, irrigation system association*

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Introduction

In agriculture sector, institutional intervention is an integral part of government projects sustainability. In the case of community-managed irrigation systems, it has been held necessary more than ever to organize and empower water users through institutional development and capacity building to strengthen irrigators associations' capability to undertake their own development and effectively manage the operation of irrigation systems.

In the Philippines, since 1980's the Department of Agriculture-Bureau of Soils and Water Management (DA-BSWM) in partnership with the DA-Regional Field Offices (DA-RFOs) and Local Government Units (LGUs) have been implementing Small Scale Irrigation Projects (SSIPs) to augment water supply in upland areas. SSIPs are granted by the government and turned over to the farmer beneficiaries for their operation and maintenance. Among these SSIPs are rainwater harvesting facilities such as Small Water Impounding Project (SWIP) and water diverting structures like Diversion Dam (DD). SWIP and DD are community-managed, the farmer beneficiaries are organized into an association known as Small Water Irrigation System Association or SWISA. The institutional development which focuses on strengthening of SWISAs to ensure cohesion among water users and sustain the operation and maintenance of the irrigation system is mainly undertaken by the BSWM.

However, although SWISAs were capacitated on proper operation and maintenance (O&M) of irrigation facilities as well as on how to run the affairs of their association, the result of national inventory of SSIPs conducted in 2013 by the BSWM and DA-RFOs which aim to document and determine the status of the irrigation system and farmers' association showed that the number of active SWISAs were significantly declined. It was identified that the nonfunctioning of farmers' associations was generally caused by inconsistent monitoring and institutional support to farmers' associations. Also, according to the report, 50% of SWIPs and DDs needed major and minor rehabilitation. It was noted that these non-operational and partially operational SWIPs and DDs have inactive SWISAs. As ascertained by the study conducted by Contreras *et al*. (2013), one of the constraints that negatively influence operational status of irrigation infrastructures is institutional in nature, the weak and inactive farmers' associations.

Hence, the establishment of SWISA pilot sites was initiated in 2014. With the assistance of contracted Community Development Officers (CDOs) assigned in regions, selected pilot SWISAs were: (a) regularly monitored; (b) facilitated in conducting institutional activities (i.e., meetings, election of officers, O&M of system etc.); (c) guided in implementing and adoption of SWISA activity plans. Aside from these, assistance in requesting and acquiring interventions/supports (i.e., farm machineries, inputs, livelihood programs etc.) from other government agencies were provided to SWISAs.

The BSWM in partnership with SSIP implementers (i.e., DA-RFOs and LGUs) are continuously constructing SSIPs such as SWIPs and DDs nationwide. Several research have been conducted in evaluating the technical performance of SSIPs which focuses on the infrastructure development component of the government irrigation program. On the other hand, there were insufficient studies particularly on the extension support, education, and training services aspect relative to the implementation of SSIPs.

According to Harun and Ariff (2017), the success of institutional support is very much dependent on the targeted group, as such, the BSWM continuously provides interventions to SWISAs for them to

become a strong and viable organization. As of December 2020, a total of 77 SWISA Pilot Sites were established in 15 regions of the country (WRMD Yearend Report, 2020). However, no study has been conducted yet to assess the perceived effectiveness of BSWM's institutional support to these SWISA pilot sites.

This study is essential to assess the status of SWISAs farmer members after establishment as pilot sites to determine the effectiveness of institutional development interventions to strengthen and make the SWISAs a viable farmers' association. This study also is geared in evaluating the level of participation of SWISA members and their perception on the role of CDOs and how this variables affect the perceived effectiveness of the established SWISAs. The assessment may contribute to the planning and policy making of SSIP implementing agencies on institutional development and capacity building for project sustainability.

Materials and Methods

The study was conducted from July to December 2022 to selected pilot SWISAs in Luzon covering Cordillera Administrative Region, Ilocos Region, Cagayan Valley Region, Central Luzon, CALABARZON, MiMaRoPa, and Bicol Region. The respondents were selected based on BSWM's inventory as of December 2020. Stratified random sampling was applied in selecting respondents of the study. From the list of established pilot SWISAs in Luzon, 22 active pilot SWISAs with operational irrigation systems for at least 3 years were selected with a total farmer members of 520. Using Cochran's Formula, with 5% margin of error, 226 farmer-respondents were identified.

Initially, the researcher coordinated with the BSWM-Water Resources Management Division pertaining to the conduct of the study and data collection. The researcher requested the assistance of CDOs assigned regions in acquiring data and documents relative to the established SWISA pilot sites. Prior to the conduct of data collection, communication letters requesting permission were sent to Regional SWISA Presidents in CAR and Regions I to V. With the assistance of CDOs, Barangay Officials and individual SWISA Presidents were briefed regarding the conduct of the study. The participants' involvements were voluntary, and they were assured that the data gathered would be treated as confidential and to be used for research purposes only.

Correlational research design was used in the study. The survey questionnaire was validated among 30 SWISA farmers who shared the same characteristics but were not included as respondents of the study. The results of the Cronbach's Alpha test were as follows: level of participation of SWISA farmer members - 0.930; role of assigned CDO – 0.933; and perceived effectiveness of BSWM's institutional support to pilot SWISAs – 0.952, suggesting that the items have strong internal consistency which means it is considered acceptable. The validated survey questionnaire was used in gathering data. The five-point Likert Scale was used in determining the perceived level of participation of SWISA farmer members, role of assigned CDOs, and perceived effectiveness of the BSWM's institutional support to pilot SWISAs. The data were quantified and interpreted using statistical techniques which includes percentages, frequencies, means, standard deviations, and Pearson's Product Moment Correlation.

Results and Discussion

Socio-Demographic of SWISA Farmer Members

The socio-demographic characteristics of SWISA farmer members of SWISA was presented in Table 1. Majority (53.1%) of the respondents were middle-aged adults belonging to the age range of 36 to 55 years old. This indicates that respondents are in their physically abled stage to carry out strenuous farm work. The result is relatively close to the findings of Palis (2020) that most of the farmers in the Philippines were middle-aged with ages ranging from 50-59 years. Farmer members were dominated by men (181 or 80%). The same finding is revealed in the study of Torres et. al (2014) where association or cooperative farmer members in Luzon were dominated by men. However, although majority of members were males, it was noted in the study that women occupy key positions in the association, hence, they are involved in governing the association.

Also, majority of SWISA members were married with 88.5%. Likewise, in the recent study of Pintor *et al*. (2023) majority of the farmer members of irrigators association in Negros Occidental were also married comprising 64.5%. A high portion of SWISA farmers were high school graduates with 35.8%. This is supported in the study of Briones (2017) in the Philippine Institute for Developmental Studies that majority of agricultural workers (farmers) in the Philippines have finished at least secondary school. With SWISA farmer members' level of education, it is a good indicator that they can adopt new information and technology.

Table 1

Socio-Demographic Characteristics of SWISA Farmers

Category	Frequency	Percentage
Age		
Young adult (18-35)	21	9.3
Middle-aged adults (36-55)	120	53.1
Older adults (56 and above)	85	37.6
Sex		
Male	181	80.1
Female	45	19.9
Civil Status		
Single	16	7.1
Married	200	88.5
Separated	2	0.9
Widow/Widower	8	3.5
Educational Attainment		
No formal education	3	1.3
Elementary undergraduate	24	10.6
Elementary graduate	52	23.0
High school undergraduate	33	14.6
High school graduate	81	35.8
College undergraduate	10	4.4
College graduate	18	8.0
Others	5	2.2

*n=226

Level of Participation of SWISA Farmer Members

The SWISA farmer members level of participation in terms of organizational, and operation and maintenance (O&M) activities is presented in Table 2. SWISA farmer members *always* participate in the regular cleaning of canals and clearing of debris in the dam (mean=4.52; SD=0.60) and minor repairs of dam (mean=4.48; SD=0.70). As stated by SWISA Officers, they perform regular system work maintenance or '*bayanihan*' and they imposed penalties to non-participating members. This suggests that aside from understanding their roles, SWISA members also recognize the importance of system maintenance and enforcement of fines when they neglect participating in their activities. The same was observed by Chen *et al*. (2023) in China wherein imposing penalties among farmers resulted to a significant positive effect on their behavior and willingness to participate in the program.

Table 2

SWISA Farmer Members' Level of Participation in Terms of Organizational and O&M Activities

Organizational and O&M activities	Mean	Standard Deviation	Verbal Description
I attend regular and assembly meetings	4.50	0.69	Always
I pay operation and maintenance fee, dues and other fees regularly and timely	4.38	0.63	Always
I participate in regular cleaning of canals and clearing of debris in the dam	4.52	0.60	Always
I participate in minor repairs of dam	4.48	0.70	Always
I participate in the maintenance activities being conducted in the watershed area such as tree planting	4.01	0.81	0ften
Weighted Mean	**4.38**	**0.69**	**Always**

Legend: 4.21-5.00 Always 3.41-4.20 Often
2.61-3.40 Sometimes 1.81-2.60 Seldom
1.00-1.80 Never

On the other hand, respondents *often* participate in the maintenance activities in the watershed area (mean=4.01; SD=0.81) since landowners of the watershed area are non-members and involving them in watershed management have been a challenge for SWISAs. The same issue was determined by Rola *et al*. (2004) in implementing watershed management program in Lantapan, Bukidnon. This implies the need for stakeholders' consultation with the assistance of national and local government agencies (i.e. DA, DENR, LGUs) for the implementation of development activities in the watershed area.

In terms of SWISA farmers participation in the implementation of activity plans (Table 3), farmer members *always* take part in decision-making (mean=4.63; SD=0.66), preparation of plans (mean=4.59; SD=0.71), and on consultation meetings (mean=4.56; SD=0.73). This means that prior to the implementation of SWISA activity plans, it is properly coordinated and consulted with the farmer members. As it has been observed, the farmers' involvement in all stages of implementation resulted to a more functional irrigation systems than without consultation and participation of water-users (NIA, 2023).

However, they *often* follow the implementation of Watershed Management Plan (mean=4.06; SD=0.80). This resulted by the often conduct of watershed maintenance activities by farmers due to private land ownership of watershed areas by non-members of SWISA. Similarly, farmers *often* follow

the Cropping Calendar Plan (mean=4.18; SD=0.72) due to unpredictable rainfall and extreme weather events. This situation was also observed in the study of Peñalba *et al*. (2012) in Batangas, Rizal and Quezon wherein all small-scale irrigators associations stated that the onset of rainy season relative to their usual cropping calendar has changed (either delayed or advanced), hence, they adjust their cropping period.

Table 3

SWISA Farmer Members' Level of Participation in Terms of Implementation of Activity Plans

Implementation of activity plans	Mean	Standard Deviation	Verbal Description
As SWISA members, we are involved during the consultation meetings with BSWM prior to the development of SWISA plans	4.56	0.73	Always
We participate in the preparation of plans	4.59	0.71	Always
We are involved in the decision-making	4.63	0.66	Always
Our suggestions on the implementation of plans are being solicited and considered	4.54	0.72	Always
I follow the schedule of land preparation every cropping season (Cropping Calendar Plan)	4.18	0.72	Often
I follow the crops to be planted during wet and dry season (Cropping Pattern Plan)	4.30	0.85	Always
I follow plan on efficient water distribution such as scheduling (Water Distribution Plan)	4.41	0.82	Always
I follow regulations and activities in maintaining and sustaining the efficient operation of the irrigation system (Maintenance Plan)	4.49	0.69	Always
I follow plan in the management of watershed area (Watershed Management Plan)	4.06	0.80	Often
I follow the association's way in managing conflicts (Conflict Management Plan)	4.42	0.68	Always
Weighted Mean	**4.42**	**0.74**	**Always**

Legend: 4.21-5.00 Always 3.41-4.20 Often
2.61-3.40 Sometimes 1.81-2.60 Seldom
1.00-1.80 Never

Generally, high level of participation was observed in terms of organizational and O&M activities (weighted mean=4.38; SD=0.69) and implementation of activity plans (weighted mean=4.42; SD=0.74) as shown in Table 4. As inferred by Ros (2010) study in Cambodia, farmers' participation in association's management, enforcement of rules and irrigation O&M schemes is influenced by the benefits they obtained. Hence, SWISA farmers participate to take advantage of the associations' services and government interventions resulted with a grand mean of 4.40 (SD=0.72)

Role of Community Development Officers

In the implementation of institutional development programs to farmers/irrigators' associations, the role of BSWM's Community Development Officers (CDOs) is similar to NIA's Irrigation Development Officers such as to provide assistance in the organization and registration of farmer-beneficiaries of

irrigation projects; monitor associations' activities and projects; provide capacity building/training activities; and establish linkages with other agencies for other programs and services (NIA, 2023).

In this study, the roles of CDOs were measured using set parameters. Relative to organizational and monitoring activities, it was measured based on the CDOs roles in organizing farmer beneficiaries, facilitation of election of officers, registration of SWISA, regular monitoring (i.e., organizational activities, operation of irrigation system, financial status, O&M activities, water distribution) and determining the needs of SWISAs. In terms of capacity enhancement, it was assessed particularly on the conduct of Basic Leadership and Technical skills training, evaluation of training result, and following up of technical training output. As to coordination activities, it was gauged per CDOs assistance in the reporting of operational status of irrigation system and SWISAs concerns, collaboration with LGUs, coordination of activities/events, following up of requests, and linking SWISAs to other government agencies.

Regarding the roles of CDOs in the organizational and monitoring activities, it was noted in the study that CDOs prioritize registration of SWISAs after the organization of SSIP farmer beneficiaries. In monitoring the conduct of SWISA activities and status of irrigation system, CDOs regularly check not just the organizational undertakings but also the operational status of the irrigation system. While in checking the financial status and determining needed intervention of SWISA, the result suggests that these are periodically check by CDOs during field monitoring. It is evident that farmer members recognize CDOs' exemplary performance of their role in organizing and monitoring SWISAs. This is contrary to the conclusion of Sennuga *et al.* (2020) in which small holder farmers in Sub-Saharan African Communities have an unfavorable perception of the performance of agricultural extension agents.

As stated in the National SSIP Master Plan (BSWM, 2014), Community Development Officers shall facilitate the conduct of on-site training program to farmer beneficiaries to develop capacities of SWISAs on the O&M of their SSIPs, improve their leadership capability, and enhance their technical know-how on crop production. In this study, a high rating was observed on the role of CDOs in capacitating SWISA farmers. The result is contrary to the findings of Managanta (2020) in which extension workers in Indonesia have a weak role in increasing the competence of farmers.

It is clearly stipulated in the Republic Act No. 7607 known as the "Magna Carta of Small Farmers" that the extension workers of the Department of Agriculture shall serve as linkages between the small farmers and farmers' organizations. Hence, Community Development Officers of DA-BSWM undertake the role in coordinating the support and services needed by SWISAs. It was noted in the study that CDOs reports to BSWM their issues and concerns such as right of way (ROW) problem and water right conflicts. Based on the activity reports of Water Resources Management Division of BSWM, SWISAs' concerns on ROW and water rights were regularly reported by CDOs during the assessment on the Extension Support Education Training Services of the DA Rice Program. As to linking SWISAs to other government agencies for training and livelihoods, SWISA farmers stated that they have received more trainings on farm and irrigation management than livelihood seminars/programs. This implies the need for a strong partnership with DOLE, DSWD and other institutions in providing livelihood opportunities to SWISA farmers.

Table 4

SWISA Farmer Members' Perception on the Role of CDOs

Role of Community Development Officers	Weighted Mean	Standard Deviation	Verbal Description
Organizational and monitoring activities	4.62	0.55	Strongly Agree
Capacity enhancement	4.62	0.61	Strongly Agree
Coordinating activities	4.43	0.65	Strongly Agree
Grand Mean	**4.56**	**0.60**	**Strongly Agree**

Legend: 4.21-5.00 Strongly Agree 3.41-4.20 Agree
2.61-3.40 Neutral 1.81-2.60 Disagree
1.00-1.80 Strongly Disagree

Overall, as presented in Table 4, the roles undertaken by Community Development Officers in terms of organizational and monitoring activities (weighted mean=4.62; SD=0.55), capacity enhancement (weighted mean=4.62; SD=0.61) and coordinating activities (weighted mean=4.43; SD=0.65) were very satisfactorily perceived by the respondents with a grand mean of 4.56 (SD=0.60). This result is comparable to the findings of Saridewi *et al*. (2020) in Indonesia where farmers are generally very satisfied with the activities carried out by extension workers. Moreover, as cited in the study of Mwamakimbula (2014), the role of extension agents is affected mainly by the characteristics of their employing agency and the clientele they served. Given the result of this study, it implies that CDOs are supported and capacitated well by BSWM and trusted by SWISAs which resulted in the positive perception on their performance.

Perceived Effectiveness of BSWM's Institutional Support to Pilot SWISAs

In the study of Luyun and Elazegui (2020), one of the factors used in evaluating the effectiveness of government irrigation programs in the Philippines was the institutional aspect of performance of communal irrigation systems. In this study, perceived effectiveness of institutional support by farmer beneficiaries of SSIPs was measured according to the set parameters: (a) SWISA organizational, registration and monitoring; (b) trainings conducted; and (c) SWISA plan implementation.

The perceived effectiveness of SWISA organization, registration, and monitoring was rated by the respondents based on how effective is the BSWM's assistance in registering SWISA to SEC/DOLE/CDA to become a formal association and in availing government interventions or projects, and the regular monitoring in the continuous conduct of SWISA activities, sustaining efficient operation of the irrigation system and assessing the needs of SWISAs.

The BSWM's assistance in registering SWISA to SEC/DOLE/CDA to be a formal association and in availing government interventions were highly rated by the respondents. The result of the study confirms the claim below.

As cited by a SWISA farmer,

> *"Dahil sa SWISA, maraming tulong ang naipaabot sa amin ng gobyerno. Nagkaroon kami ng SWIP at concrete canal na nagpataas ng aming ani at nabigyan din kami ng mga makinarya para mapadali ang aming pagsasaka, sa tulong 'yan ng DA at BSWM*

> (Because of SWISA, we have received various government interventions. We are granted with government projects such as SWIP and concrete canal, and farm machineries through DA and BSWM)".

In terms of trainings conducted, its effectiveness were evaluated based on how effective are the Technical Skills Training in enhancing your knowledge on good farming practices, Basic Leadership Skills Training in increasing the active participation of members to SWISA activities, technical training in increasing yield through learned proper land preparation and irrigation, institutional training in building good relationship among SWISA officers and members, leadership training in capacitating SWISA Officers on how to perform their duties and responsibilities, and institutional development trainings in achieving the goals of SWISA to become strong and viable organization.

The results on the effectiveness of farmers' trainings implied that it not just improves the institutional but also the technical aspects of SWISAs. Likewise, in the study of Noor and Dola (2011) in Malaysia majority of the respondents agreed that training programs are useful and made them a better farmers. But for the leadership training, the result suggests that more in-depth training on the roles of SWISA officers is needed.

The effectiveness of SWISA plans implemented was assessed by rating how effective are the Cropping Pattern and Calendar Plan in the timely preparation of field and seed material, Water Distribution Plan in the proper and equal distribution of water to the fields, Maintenance Plan in sustaining irrigation system operation, Watershed Management Plan in maintaining or rehabilitating the watershed area, and Conflict Management Plan in managing and resolving conflicts accordingly and more quickly.

Based on the result, effectiveness of the Maintenance Plan, Water Distribution Plan, and Cropping Pattern and Calendar Plans were the most highly rated plans by the respondents. These three (3) SWISA plans are interrelated with each other. The crops to plant and the dates of planting as reflected in the Cropping Pattern and Calendar Plan is the basis of irrigation schedule as specified on the agreed Water Distribution Plan, and to attain said plans the proper maintenance of irrigation system is needed, hence, the development of Maintenance Plan. This accounts to the high rating generated on these plans.

Additionally, as to Maintenance Plan which has the highest rating suggests that it is useful in undertaking maintenance activities and identifying maintenance requirement of the irrigation system. Also, with this plan irrigation system design lifetime will be achieved (Enciso-Medina *et al*., 2011). This implies that with the proper implementation of Maintenance Plan, SWISA farmers will be able to continuously generate benefits from their SWIP/DD, and the irrigation system will probably live out its projected period of use (25 years). However, lowest rating was observed in the implementation of Watershed Management Plan, as found out in the study of Luyun and Dulce (2020), the irrigators associations have none or limited role in the watershed management of communal irrigation systems.

The perceived effectiveness of BSWM institutional support to pilot SWISAs is shown in Table 5. Result shows that SWISA organization, registration, and monitoring are perceived by the respondents as *extremely effective* with a weighted mean of 4.61 (SD=0.62). With the noted assistance of assigned CDOs in the regions, SWISA farmers were able to regularly conduct association's activities and maintain the operational status of their irrigation system. This highlights the importance and effectiveness of constant monitoring and focused institutional development of BSWM to pilot SWISAs.

Table 5

Perceived Effectiveness of BSWM Institutional Support to Pilot SWISAs

Category	Weighted Mean	Standard Deviation	Verbal Description
SWISA organization, registration and monitoring	4.61	0.62	Extremely Effective
Trainings conducted	4.63	0.62	Extremely Effective
SWISA plans implementation	4.49	0.75	Extremely Effective
Grand Mean	**4.58**	**0.66**	**Extremely Effective**

Legend: 4.21-5.00 Extremely Effective; 3.41-4.20 Very Effective; 2.61-3.40 Moderately Effective; 1.81-2.60 Slightly Effective; 1.00-1.80 Not at all effective

It is evident as shown in Table 5, that farmer members are satisfied with the trainings provided rated as *extremely effective* (weighted mean=4.63; SD=0.62). The result of the study signifies that the aim of BSWM in providing quality and sustainable trainings are met. As inferred in the study of Miiro *et al*. (2014), rural service providers who build capacity of local organizations can consider the aspect of high satisfaction rating of farmer members to government support (in this case BSWM institutional training support) to pursue certain strategic human level organizational outcomes by manipulating transfer system factors such as providing feedback and supportive resources to help trainees.

Concerning the SWISA plans implemented, it can be derived, as has been claimed earlier, that the farmer members are satisfied as to how plans were transformed to actual implementation with a weighted mean of 4.49 (SD=0.75).

Overall, SWISA farmer members perceived BSWMs institutional support as *extremely effective* with a grand mean value of 4.58 (SD=0.66). The result of the farmer respondents' assessment conforms to the findings of Luyun & Elazegui (2020) wherein majority of members of irrigators association in Luzon rated excellent on the assistance they received. This strengthened the position of BSWM that the institutional support was carefully planned before bringing it to the SWISA farmer members.

Relationship between Level of Participation of SWISA Farmer Members and Perceived Effectiveness of the BSWM's Institutional Support to Pilot SWISAs

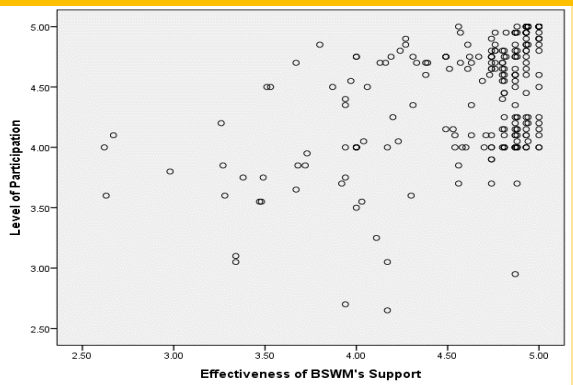
The result of the study shows that there is a highly significant relationship *(p*-value=0.001*)* between the level of participation and perceived effectiveness of BSWM's institutional support. Result shows a low positive correlation (*r*=0.447) between the two variables. The coefficient of determinants (r^2=0.200) suggests that 20% of the variability of the effectiveness of BSWM's institutional support can be explained by the level of participation. The correlation observed between the level of participation and perceived effectiveness of BSWM institutional support implies that the objectives of BSWM in this area were achieved, thus, its programs and activities are responsive and proactive to the needs of its clientele.

Figure 1 shows that as the level of participation increases, the perception on the effectiveness of support also increases. It, therefore, suggests that the level of participation sets the perceived effectiveness of institutional support. This claim is supported by the study of Paje (2021) suggesting that

to yield positive effects of institutional support, every member should take part in all the programs and projects implemented.

Figure 1

Scatter Plot for the Relationship of Level of Participation and Perceived Effectiveness of BSWM's Institutional Support

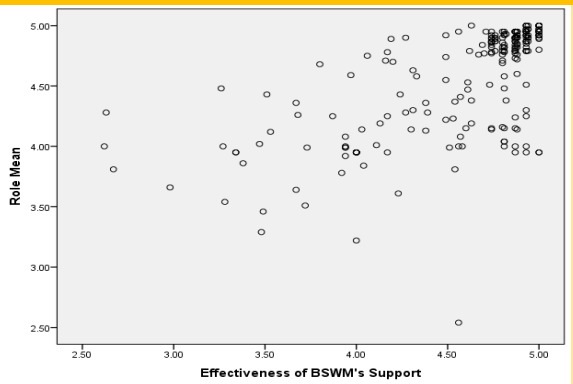


Relationship between Roles of Community Development Officers and Perceived Effectiveness of the BSWM's Institutional Support to Pilot SWISAs

Revealed further in the study that there is a highly significant and positive relationship (*p*-value=0.001; *r*=0.642) between the roles of CDOs and perceived effectiveness of BSWM's institutional support. The coefficient of 0.642 suggests a moderate correlation while the coefficient of determinants (r^2=0.413) implies that 41.3% of the variance in the perceived effectiveness of BSWM's institutional support can be explained by the level of CDOs understanding of their roles.

Figure 2

Scatter Plot for the Relationship Roles of CDOs and Perceived Effectiveness of BSWM's Institutional Support



Also, the finding shows that as the CDOs' level of understanding of their roles increases, the perception on the effectiveness of support also increases (Figure 2). Thus, the higher the performance

rating of CDOs in undertaking their roles to SWISAs the higher the perceived effectiveness of the extension support provided.

The result supported the findings of Sarker & Itohara (2009) in Bangladesh, wherein the credibility of extension workers in performing their roles had a significant relationship with the effectiveness of the extension services. In this regard, the highly significant relationship observed between the roles of CDOs and effectiveness of institutional support implies that SWISA farmer members are satisfied with the work of CDOs which yielded positive perception on the BSWM's program.

Conclusion

The result showed that there is a high level of participation among SWISA farmer members which is attributed to the benefits and advantages they gained from the associations' services and government interventions. The respondents highly rated the hired CDOs assigned in regions in undertaking their roles signifying that they are well capacitated in providing extension services to SWISAs. With the foregoing findings, the BSWM's institutional support yielded positive perception among SWISA farmers in Luzon and considered the extension program as highly effective.

Moreover, based on the results of this study, as the level of participation of SWISA members in the organizational undertakings, operation and maintenance activities, and implementation of activity plans increases, the perception of effectiveness of BSWM's institutional support to pilot SWISAs also increases. Revealed further in the study that as the level of understanding of CDOs of their roles in conducting organizational and monitoring activities, capacity enhancement, and coordinating activities increases, the perception on the effectiveness of the provided extension support also increases.

Recommendations

It is evident the result of the study that the role of contracted CDOs in the regions is significant in the attainment of BSWM's goal on institutional supports to SWISAs, hence, it is recommended that the BSWM may continue to strengthen CDOs to further facilitate the programs extended to SWISAs. Moreover, to ensure the continuity of the extension program and services of experienced and capacitated extension staff towards the sustainability of irrigation infrastructures, SSIP implementers (i.e., BSWM, DA-RFOs, and LGUs) may provide security of tenure for CDOs.

With the perceived effectiveness of the institutional support, the DA and BSWM may conduct surveys, focused group discussions, and interviews to SSIP farmer beneficiaries to generate actual needs in the continuation of activities and allocate funds for the expansion of the program. Noting the effectiveness of BSWM's extension support in Luzon, further studies may be made in other regions of the country to determine how SWISA farmers in the Visayas and Mindanao perceived the effectiveness of the institutional development program.

References

Briones, R. M. (2017). *Characterization of agricultural workers in the Philippines* (No. 2017-31). PIDS Discussion Paper Series.

Chen S.W., Huang S.W., Chen J., Huang K.Y., He Y. (2023). Effects of incentives and penalties on farmers' willingness and behavior to separate domestic waste-analysis of farm household heterogeneity based on chain multiple intermediary effects. *Sustainability.*15 (7):5958. https://doi.org/10.3390/su15075958

Contreras, S., Sandoval, T., & Tejada, S. (2013). Rainwater harvesting, its prospects and challenges in the uplands of Talugtog, Nueva Ecija, Philippines*. International Soil and Water Conservation Research*. Volume 1, Issue 3, Pages 56-67.

Enciso-Medina, J., Multer, W. L., & Lamm, F. R. (2011). Management, maintenance, and water quality effects on the long-term performance of subsurface drip irrigation systems. *Applied engineering in agriculture*, *27*(6), 969-978.

Harun, R., & Ariff, E. (2017). The role of institutional support in Malaysia's paddy and rice industry. *FFTC Agricultural Policy Articles.*

Luyun, R. & Elazegui, D. (2020). Assessing the resurgent irrigation development program of the Philippines: Communal irrigation systems component (No. 2020-02). *Philippine Institute for Development Studies.* Discussion Paper Series.

Managanta, A. A. (2020). The role of agricultural extension in increasing competence and income rice farmers. *Indonesian Journal of Agricultural Research*, 3(2), 77-88.

Miiro, R., Matsiko, F., & Mazur, R. (2014). Training and Farmers' Organizations' Performance. *Journal of Agricultural Education and Extension.* 20. 65-78.

Mwamakimbula, A. M. (2014). Assessment of the factors impacting agricultural extension training programs in Tanzania: a descriptive study (Doctoral dissertation, Iowa State University). doi: https://doi.org/10.31274/etd-180810-3778.

National Irrigation Administration (2023). Institutional Development Program. Retrieved February 28, 2023 from https://www.nia.gov.ph.

Noor, K. B. M., & Dola, K. (2011). Investigating training impact on farmers' perception and performance. *International Journal of Humanities and Social Science*, *1*(6), 145-152.

Paje, M. S. (2021). The Determinants and impacts of farmer association membership in Albay, Philippines. *Cornell University*. doi: https://doi.org/10.7298/6hd8-xf91.

Palis, F. G. (2020). Aging Filipino Rice Farmers and Their Aspirations for their Children. *Philippine Journal of Science*, 149(2), 351-361.

Peñalba, L. (2012). Awareness Raising and Capacity Building on Alternative Water Management for Communal Irrigator's Association in the Philippines. *Asia-Pacific Network for Global Change Research Publication*. Project Reference No. CBA2011-18NSY-Peñalba.

Pintor, L., Mondejar, C., Bello, G., Ativo, A., & Ningal, N. (2023). Water governance and food security of the irrigators association in Bago City, Negros Occidental, Philippines. *Environmental Challenges*, 11, 100687.

Raby, N. (2000). Participatory Irrigation Management in the Philippines: National Irrigation Systems. Article on published book: *Case Studies in Participatory.*

Rola, Agnes C.; Suminguit, Vel J.; Sumbalan, Antonio T. (2004) : Realities of the Watershed Management Approach: The Manupali Watershed Experience, PIDS Discussion Paper Series, No. 2004-23, Philippine Institute for Development Studies (PIDS), Makati City

Ros, B. (2010). Participatory irrigation management and the factors that influence the success of farmer water use communities: a case study in Cambodia: a dissertation presented in partial fulfilment of the requirements for the degree of Master of Applied Science in Environmental Management at Massey University, New Zealand (Doctoral dissertation, Massey University).

Saridewi, T., Ilhami, W. & Junaidi, E. (2020). Farming productivity, farmers' perception, and satisfaction to agricultural extension worker in Garut Regency. In *IOP Conference Series: Earth and Environmental Science* (Vol. 518, No. 1, p. 012050). IOP Publishing.

Sarker, M. A., & Itohara, Y. (2009). Farmers' perception about the extension services and extension workers: the case of organic agriculture extension program by PROSHIKA. *American Journal of Agricultural and Biological Sciences*, *4*(4), 332-337.

Torres, C. S., Daya, R. A., Osalla, M. T. B., & Gopela, J. N. (2014). Adoption and uptake pathways of gm/biotech crops by small-scale, resource-poor farmers in the Philippines. *Philippine Journal of Crop Science.*