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Issues on communal irrigation systems in the Philippines

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Despite massive efforts and funding to support irrigation development, the increase in irrigated areas has been minimal in the Philippines (Luyun 2015; Inocencio et al. 2016). This is particularly true in Mindanao, where the development of irrigation systems lags relative to Luzon and Visayas (NIA 2017). To expand the irrigation base, new irrigable areas may be served by small-scale systems, such as the communal irrigation systems (CIS) (David 2003).

This *Policy Note* presents an assessment of select CIS in the Philippines. It specifically assessed 90 CIS from 11 provinces in Luzon (Bulacan-Aurora-Nueva Ecija, Pangasinan, Ilocos Norte, Pampanga-Bataan, Camarines Sur, Benguet, Nueva Vizcaya, Isabela, Cagayan-Batanes, Laguna, and Occidental Mindoro), four provinces in Visayas (Leyte, Iloilo, Capiz, and Bohol), and four provinces in Mindanao (North Cotabato, South Cotabato, Davao del Sur, and Bukidnon). Primary and secondary data were also collected through key informant interviews and focus group discussions among various irrigation management offices (IMOs).

Policy milestone for CIS

In 2018, President Duterte signed into law the Free Irrigation Service Act (FISA), providing a new policy milieu for CIS beneficiaries and managers. Under FISA, all farmers with landholdings of eight hectares and below are exempt from paying irrigation service fees. An amount of PHP 2 billion was provided in the budget of the National Irrigation Administration (NIA) as irrigation fee subsidy. Nonethless, this budget did not cover the operation and maintenance subsidy for CIS.

In line with NIA Memorandum Circular No. 13, series of 2017, NIA stopped collecting amortization and equity payments from farmers and irrigators' associations (IAs) for projects on CIS. However, all unpaid fees remain as liabilities of farmers and their association. With the new policy platform for CIS, providers of assistance, financial and otherwise, must address existing technical and institutional concerns not adequately addressed before. Moreover, there are emerging issues that call for action by decisionmakers.

Features of CIS

CIS operates through either gravity system, one in which water flows by gravity, or pump system, where water moves by mechanical action. Majority of the sampled CIS had gravity systems. In some provinces, such as Cagayan, Isabela, and Camarines Norte, however, there were more pump systems than gravity systems. There were also no pump irrigation systems in all the select provinces in Mindanao despite the fact that it has vast shallow aquifer systems. In terms of size, over 40 percent of the CIS in the 11 sample IMOs in Luzon and four sample IMOs in Visayas were small. With the presence of plantation farms in Mindanao, roughly 9 in every 10 CIS listed in the four sample IMOs had medium to large firmed-up service areas (FUSA). A summary of the profiles of the select CIS in terms of size of FUSA, type of technology, and operational status, is shown in Table 1.

Yields in CIS were lower by 30–40 percent than in the national irrigation systems because of the uncertainty in water supply in the small catchment areas where CIS is located (FAO 2011). Unreliable water supply is a major problem for majority of the CIS tapping water from less dependable small rivers and creeks or relying on springs and runoff. Only 29 of the 90 surveyed CIS (32%) had river sources capable of providing irrigation during dry seasons. Except for some large rivers, there were no historical records of the discharges of the river and creek sources for CIS to form as basis for sensible engineering designs. Historical flow records or at least synthetically generated flow data should be included in the feasibility analyses.

Many CIS were found to have service areas with slope greater than 3 percent. As such, there is a need to reevaluate the definition of potential irrigable areas for new irrigation development areas. It is recommended that all areas within 8-percent slope, after subtracting the built-up and other protected areas, should be considered as potential irrigable area for CIS. Equally important criteria should be the assessment of water supply sources, suitability of the soil to different crops, and comprehensive land use plans of the local government units (LGUs).

Lack of water supply was compounded by environmental problems, such as denuded watershed cover due to logging and *kaingin*, land use

Table 1. Frequency distribution of communal irrigation systems by size of firmed up service area, technology type, and operational status

CIS	Firmed up service area (in hectares)			Technology			Operational status		
	Small <50	Medium 50–100	Large >100	Gravity	Pump	Other[a]	≤50% operational	> 50% operational	Other[b]
Luzon (n = 1,606)									
Number	660	411	535	1,279	286	41	76	1,202	328
Percent	41.1	25.6	33.3	79.6	17.8	2.6	4.7	74.8	20.4
Visayas (n = 464)									
Number	216	148	100	401	58	5	54	364	46
Percent	46.6	31.9	21.6	86.4	12.5	1.1	11.6	78.4	9.9
Mindanao (n =176)									
Number	26	64	86	176	0	0	20	154	2
Percent	14.8	36.4	48.9	100	0	0	11.4	87.5	1.1

Notes: a,b - not classified
Source: Authors' compilation based on the records of sampled irrigation management offices of the National Irrigation Administration

Despite massive efforts and funding to support irrigation development, the increase in irrigated areas has been minimal in the Philippines. This is particularly true in Mindanao, where the development of irrigation systems lags relative to Luzon and Visayas. Photo: Roger Luyun

conversion, and quarrying. The CIS design manual specifically stated that there should be no river quarrying within one-kilometer upstream and one-kilometer downstream of the proposed diversion dam. In some cases, the storage capacity of the dam has already been reduced due to sedimentation. As such, sediment discharge estimation should be a prerequisite in feasibility studies and the provision of silt control devices should be included in the design for sediment-laden rivers.

There were several technical problems that confront IAs and the performance of their CIS. Most run-of-the-river type dams were old, some with exposed rock cores and steel supports, damaged spillways or sluiceways, and some with sediments almost at the crest level. Damaged sluice and intake gates were usually replaced with wooden flashboards or sandbags. Meanwhile, defective lifting mechanisms were either left open or fitted with chain blocks.

Control structures included simple cross regulators, check gates, drop structures, division boxes, and farm turnouts, most of which used wooden flashboards for water level control. No flow measurements were conducted. Most service roads were in bad conditions with some dams accessible only by walking or by motorcycles. Rehabilitation works have been performed through NIA's technical assistance and mostly needed to correct damaged dams, headworks, canals, and sedimentation.

Groundwater usage

The Philippines has about five million hectares of shallow aquifers, whose groundwater is usually tapped for irrigation using shallow tube wells (STWs). While using STW may incur additional fuel costs, groundwater is a reliable source even during intense El Niño episodes. Farmers also have control of irrigation schedules and flows, enabling some of them to increase cropping intensity or diversify into other

crops. The use of surface water and groundwater, also referred to as atomistic irrigation, has been found to have a much larger impact on poverty reduction in Southeast Asia than any irrigation government programs (Facon and Mukherji 2010).

In most of the CIS visited, farmers resorted to conjunctive use of STWs with their CIS especially during long dry periods. Some NIA IMOs had already installed standby STWs for periods of prolonged droughts. The practice of supplementing irrigation from surface sources with groundwater from STWs should be encouraged, especially in areas underlain by good shallow aquifers. It is also useful in areas where surface water sources have very low dependable discharges during the dry season.

Water delivery

While more IAs believed that they received the required volume of water at the right time, there were still frequent delays and inequitable flow distribution, which showed a need for improvement in the water management of all the CIS. The associations rated themselves high in terms of water distribution, and the maintenance of canals and control structures. In general, the good conditions of the lined and unlined canal networks were due to the associations themselves having good operation and maintenance, as well as clean-up mechanisms.

As in most irrigation systems, there were no specific drainage canals at CIS, leading to flooding problems in some systems during the rainy season. Water distribution was usually from paddy to paddy, with few farm ditches contributing to large application losses. Drainage should also be taken into consideration in the design criteria to avoid gross underestimation of on-farm water losses, which in turn result in the overestimation of design service areas.

In the construction or rehabilitation of CIS, the water source should be assessed in terms of dependable flow, catchment conditions, and sediment discharges. On the problem of water supply sources, there should be a concerted effort on the part of concerned government agencies and even the academe to identify potential sites for diversion dams and storage reservoirs. The shelved proposal for the institution of the National Water Resources Management Office under the Office of the President should be revived and reformulated. Related to this, water resources centers in select state colleges and universities should be instituted and tasked to continuously gather, analyze, and manage water resources data and build a hydrologic database.

Operation and maintenance

Generally, dams and control structures should be properly maintained and repaired to ensure proper water control and distribution. The dam storage area should be regularly cleared of sediments to increase storage capacity and thus extend irrigation even with diminished river flows. This should be part of regular operation and maintenance activities of the IAs. If heavy equipment is necessary, NIA should provide assistance to IAs.

Investments in CIS usually do not take into account the recurrent costs associated with operation and maintenance activities, considered a responsibility of the recipient of the system. Lack of funds delays routine maintenance, and cumulative neglect and design mistakes result in the need for more costly rehabilitation. Therefore, it is but logical to focus on the improvement of planning and budgeting of the operation and maintenance activities.

Rehabilitation works have been performed through NIA's technical assistance, mostly to correct damaged dams and headworks and for lining of canals and dredging

of sediments. With the recent availability of low-cost high density polyethylene pipes, the feasibility of using these materials for subsurface conveyance of irrigation to the fields should be carefully considered. The high initial cost may be counterbalanced by several factors, including less operation and management cost; increased planting areas given that the pipe is buried underground; less costs for right-of-way acquisitions; less seepage and percolation losses; easier control of water flow and command, easily adaptable to sprinkler systems; and crop diversification.

Irrigators' associations

NIA assesses the functionality of IAs based on five criteria, namely, operation and management (35%), financial standing (26%), discipline (29%), agri-support services (6%), and special features (4%). Functionality survey serves as basis for giving awards to these associations and helps NIA in identifying appropriate strategies to enhance their capabilities.

Around 75 percent of the IAs in the 11 sample IMOs in Luzon and 4 sample IMOs in Visayas had satisfactory to very satisfactory ratings. Around 20 percent had fair to poor rating, and less than 5 percent were outstanding in both regions. In Mindanao, around 16 percent of IAs in the four sample IMOs were outstanding while around 68 percent were satisfactory to very satisfactory, and over 14 percent had fair to poor rating.

FISA maintains the significant role of NIA in providing technical support to associations and in building their capacity to sustain their functionality. Thus, linkage between NIA and IAs should be sustained.

Institutional development program of NIA for IAs relies heavily on the role of institutional development officers. Despite their heavy workload, however, these officers are not getting adequate incentives, such as security of tenure and other benefits. Most often, they are hired on job order basis with wages drawn from CIS project budget. Regular funds should be allotted to this very important link between NIA and the associations.

CIS development remains dependent on government assistance. CIS projects were often in response to requests submitted by IAs, farmer organizations, and LGUs to NIA, which, in turn, taps sources for funding.

There was no distinct pattern based on size of FUSA on the performance of CIS and functionality of IAs. Crucial is the capacity of each association to harness its organizational capacity to build human, financial, and social capital, thus, the need for continuous capacity building. For instance, concerns on sustainability of CIS due to environmental problems may require enhancement of the association's capacity to establish linkages in watershed management programs. Their awareness and institutional networking are likewise crucial in enhancing CIS programs.

Implications of free irrigation service fee

Before the implementation of FISA, many IAs in the sampled IMOs were amortizing—39 percent in Luzon, 70 percent in Visayas, and 75 percent in Mindanao. Others already paid the 30–percent equity, and amortization payment is supposed to follow. The passage of FISA relieves the IAs from paying the cost of their CIS. Most of the sampled associations in Visayas and Mindanao stopped paying amortization but continued to collect fees from their members for the operation and management of their CIS. They now refer to this collection as irrigation management fee, ranging from PHP 700 to PHP 1,500 per hectare. There were some members, however, who were reluctant to pay any fee citing the implementation of FISA.

The associations appreciated the implementation of FISA because their loans were condoned, giving them

opportunity to reallocate funding to operation and management. However, about 50 percent of the IAs were worried that the they may have less funds for operation and management given that they can no longer collect from farmer-members.

FISA declared that operation and management cost shall be provided by the national government. Therefore, there should be clear guidelines or provisions on this. For example, in the case of national irrigation systems, an association gets a compensation of PHP 1,750 per month for maintenance activities, based on canal section for a maximum of six months in a year. For operations-related responsibilities, the association will be paid PHP 150 per hectare per cropping of irrigated and planted areas.

Meanwhile, the government needs to address the collection of back accounts, amortization, and equity payments from IAs. Ownership of CIS should also be clarified. Before FISA, certificate of CIS ownership was issued to an association when it has fully paid the chargeable cost incurred in the construction of the project. This implies that the CIS project was fully turned over to IAs. With FISA, the operation and management of CIS shall be handed over to their respective associations, referred to in the past as physical turnover. In the case of new projects, another concern is to whom should the water permit be issued.

Devolution of CIS to LGU was rarely implemented because of the apparent lack of interest of LGUs, low priority for irrigation, or lack of capacity to operate and manage CIS. With FISA, the provision that the equity requirement for CIS projects with LGU participation will be maintained with the concerned LGU may further dampen the interest of LGUs in engaging in CIS development.

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