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Philippines: PPP Options in Irrigation Sector:

Technical Assistance to the Philippines' Department of Agriculture for the Development of an Analytical Framework on Public-Private Partnership in the Irrigation Sector

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TECHNICAL ASSISTANCE TO THE PHILIPPINES' DEPARTMENT OF AGRICULTURE FOR THE DEVELOPMENT OF AN ANALYTICAL FRAMEWORK ON PUBLIC-PRIVATE PARTNERSHIP IN THE IRRIGATION SECTOR

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ADB	Asian Development Bank
AFD	Agence Française de Développement
AFMA	Agriculture and Fisheries Modernization Act
AO	Administrative Order
APT	Asset Privatization Trust
BOO	Build-Operate-Own
BOT	Build-Operate-Transfer
BLT	Build-Lease-Transfer
BT	Build-Transfer
CCT	Conditional Cash Transfer
CIS	Communal Irrigation System
CoP	Committee on Privatization
CORPLAN	Corporate Planning Services
DA	Department of Agriculture
DB	Design-Build (type of PPP model, other name for EPC)
DBP	Development Bank of the Philippines
DBO	Design-Build-Operate (type of PPP model, combining EPC and O&M contracts)
DBTO	Design-Build-Transfer-Operate (type of PPP model)
DENR	Department of Environment and Natural Resources
DOE	Department of Energy
DOF	Department of Finance
EO	Executive Order
EPC	Engineering Procurement Construction (type of PPP model)
EPIRA	Electricity and Power Industry Reform Act
ERB	Energy Regulatory Board
FSDC	Farm Systems Development Corporation
FSSP	Food Staples Sufficiency Program
GAA	General Appropriations Act
GOP	Government of the Philippines
HP	Hydropower
IA	Irrigators Association
ICO	Irrigation Community Organizer
I&D	Irrigation and Drainage
IFC	International Finance Corporation
IMO	Irrigation Management Office
IMT	Irrigation Management Transfer
IPP	Independent Power Producer
IRR	Implementing Rules and Regulations
ISF	Irrigation Service Fee

LBP	Land Bank of the Philippines
LGU	Local Government Unit
LLP	Low-Lift Pump
LRT	Light Rail Transit Authority
MIGA	Multilateral Investment Guarantee Agency (entity of the World Bank Group)
MWSS	Metropolitan Waterworks and Sewerage System
NEDA	National Economic and Development Authority
NFA	National Food Authority
NIA	National Irrigation Administration
NIS	National Irrigation System
NLEX	North Luzon Expressway
NPC	National Power Corporation
NWRB	National Water Resources Board
ODA	Official Development Assistance
O&M	Operation and Maintenance
OMM	Operation, Management and Maintenance
PD	Presidential Decree
PDEx	Philippines Dealing and Exchange Corporation
PIDP	Participatory Irrigation Development Project
PIM	Participatory Irrigation Management
PIS	Private Irrigation Systems
PPIAF	Public Private Infrastructure Advisory Facility
PPP	Public-Private Partnership
PROPARCO	Société de Promotion et de Participation pour la Coopération Economique
RA	Republic Act
ROO	Rehabilitate-Own-Operate
ROT	Rehabilitate-Operate-Transfer
SPV	Special Purpose Vehicle
STW	Shallow Tube Well
VAT	Value-Added Tax
WACC	Weighted Average Cost of Capital
WRIP	Water Resource and Irrigation Project
WTO	World Trade Organization

EXECUTIVE SUMMARY

This study proposes an analytical framework to determine the extent to which Public-Private Partnership (PPP) is a viable and effective business option for developing and modernizing the irrigation sector in the Philippines. It focuses on: (a) assessing and providing recommendations to address the policy, regulatory and institutional constraints that limit the recourse to PPP as a tool to support the development of the irrigation sector; and (b) if PPP is proven to be a viable option, develop the capacity within the Department of Agriculture (DA), National Irrigation Administration (NIA) and National Economic Development Authority (NEDA) PPP Center to identify and assess potential projects. The TA was meant primarily to produce a simple and practical analytical framework for the Government to build on, rather than a full-blown study on an irrigation PPP project.

Adopting the PPP scheme in irrigation will require specific answers to the following questions: (a) how PPP contractual arrangements can help to address the usual problems in public irrigation (e.g., maintenance problems due to budget restriction and decision making processes); (b) how PPP can ensure financial viability of the irrigation system; (c) how PPP can avoid political interference in setting irrigation fees; and (d) how PPP can increase the useful life of irrigation systems and break the vicious cycle of low collection of irrigation fees, poor maintenance, network degradation and expensive rehabilitation. The PPP scheme has to make the case that the financial costs of privately-funded projects are on a par with those of publicly-funded projects.

The advantages of private sector involvement arise from its ability to manage construction more efficiently, and to provide more effective operation and maintenance (O&M). Its ability to structure contracts where finance and performance are entwined to promote efficient outcomes is generally superior to standard public procurement. Publicly-funded projects are constrained by procurement, supervision and decision-making processes. Budgeting and appropriation of allocations are complex tasks that can reduce the ability of the public sector to react quickly and manage efficiently. In terms of O&M, the flexibility of the private service in setting wages to attract skilled staff is generally an efficiency factor which is a major challenge in the public sector.

PART I: COUNTRY CONTEXT

IRRIGATION IN THE PHILIPPINES

The Philippine Government's food self-sufficiency agenda is largely anchored on its irrigation program. As of October 2012, the total irrigation service area, counting out converted lands and permanently non-restorable areas, is 1.57 million hectares (NIA 2012). Of this total area, 45% are operated and managed as national irrigation systems (NIS), 32% as communal irrigation systems (CIS) and the rest are funded by other government agencies and private institutions/individuals. These systems are mainly irrigating rice and account for 74% of the 16.7 million tons of palay produced in 2011, and 77% of the 11.5 million tons produced in the first three quarters of 2012[1].

Irrigation development is led by the National Irrigation Administration (NIA) which is mandated to undertake comprehensive water resource projects, including flood control, drainage, land reclamation, domestic water supply, hydropower development, construction of roads and highways, and reforestation. NIA was created under Republic Act (RA) 3601 in 1963. The NIA Charter gave the agency an exclusive role in developing and managing large-scale irrigation schemes. NIA has

[1] Data from the DA's Bureau of Agricultural Statistics (BAS). 2012

broad powers in water mobilization and appropriation. The Republic Act states clearly that NIA is:

> *"(a) To investigate, study, improve, construct and administer all national irrigation systems in the Philippines;*
>
> *(b) To investigate all available and possible water resources in the country for the purpose of utilizing the same for irrigation, and to plan, design and construct the necessary projects to make the ten to twenty-year period following the approval of this Act as the Irrigation Age of the Republic of the Philippine*s."

LEGAL AND REGULATORY ENVIRONMENT FOR PPP

The present administration adopts PPP as one of its flagship programs. But PPPs have been around for over two decades. In the 1990s, the country had a number of significant PPP projects in infrastructure, facilitated by the passage of new Implementing Rules and Regulations (IRR) on Build-Operate-Transfer (BOT) investments. The use of PPP schemes is so widespread that projects usually provided by Government were carried out with private sector participation. In 1997, the Philippines privatized its largest water system by awarding two concession contracts to provide water to greater Metro Manila (MWSS). At about the same time, the Government entered into a joint venture for water supply in the Subic Bay free port area (ADB).

The liberalization of the telecommunications sector in 1993 brought in more players providing telephone, cellular and international gateway facilities. The country also made headway in bringing in the private sector in the construction, operation and management of several transport facilities. Specifically, private companies are operating two major international container terminals, and a number of toll roads have been constructed and operated by private firms. The success of the Manila North Tollways (i.e., North Luzon Expressway which connects Metro Manila to Central Luzon provinces) stands out.

In the irrigation sector, Section 34 of the Agricultural and Fisheries Modernization Act (AFMA) of 1997 also promotes BOT projects to accelerate development of new irrigation service areas. The AFMA further mandates the Government to guarantee payments to private partners in the event NIA defaults.

The first use of BOT related to irrigation was for the Casecnan Multipurpose Project. The project, however, was not about irrigation *per se*, but was more about dam and hydropower station construction. In the final contract, NIA was to pay the private partner for water deliveries of around 800,000,000 m^3 each year under a "take or pay" arrangement. The Government guaranteed this payment. NIA was also a party to a power purchase agreement with the private partner. In this manner, by leveraging the power purchase agreement and the take-or-pay contract for water delivery, the private partner was able to finance the project. The San Roque Multipurpose Project is another example of the use of BOT. The project was to construct a dam and hydropower generation unit. Once water was mobilized, opportunities for irrigation services were created. The irrigation project put forward by NIA is based on water made available by the hydropower project.

PPP FINANCING PRACTICES

There is no lack of knowledge and know-how in PPP financing in the Philippines. Financial institutions are experienced and ready to advise and arrange financing for the current pipeline of PPP projects. Financial markets and the financial position of major banks are able to finance domestically the requirements of PPP projects. The current liquidity is such that there is no need to access foreign funds.

The only weak point relates to the term of the loans that can be provided by the banking sector. At present, it would not be possible to have a firm commitment on long-term financing. This does not mean, however, that there is no solution. One way to address this would be to accept the resetting

of fees and tariffs, along with the renewal of the lines of credit.

INTEREST OF THE PRIVATE SECTOR

There is a keen interest from the private sector in entering PPP for hydropower purpose, including financing and constructing the supporting dams. However, there is a general lack of knowledge about irrigation service provision that breeds reluctance to consider a partnership in this sector - either for the construction or for operation and maintenance. But, when properly engaged, there is potential in bringing the private sector in these partnerships.

PART II: PROPOSED ANALYTICAL FRAMEWORK

THREE-STEP SELECTION PROCESS

In order to select the proper candidates for a PPP, an approach constituting three steps is proposed:

- Identification of the proper contractual arrangement(s);
- Screening of the potential projects from the inventory so as to extract a subset of the best candidates; and
- Analysis of the feasibility of candidate PPP projects.

Model Selection

Shown below are the usual models used, classified by origin of revenues, function and contribution to financing by the private partner:

Figure ES-1: PPP Transactions Models

Origin of revenues for private operator	Functions under responsability of private operator	Participation of private operator in investment functions (capital costs) ?	
		Yes	No
Services paid to the private operator **by the final users (farmers)** - Public Service Delegation (PSD)	Design	Concession; Divestiture	Lease / Affremage
	Construction		
	Transfer of infrastructures after completion of construction		
	Operation & Maintenance		
	Ownership of O&M assets		
	Ownership of infrastructures		
	Possible transfer of infrastructures after completion of PPP contract		
Services paid to the private operator by the **Public Authority**	Design	BOT; BOO	Manag. contract; O&M contract; EPC - DB; DBO = EPC + O&M contracts
	Construction/supervision of work		
	Management (staff of private operator in Public Entity)		
	Operation & Maintenance		
	Ownership of O&M assets		
	Transfer of infrastructures after completion of construction		
	Ownership of infrastructures		

Legend:
Differences between lease and affermage is in the rent paid to the Contracting Authority (lease fees: fixed rent / Affermage fees : varying on revenues collected from users)
BOT : Build Operate Transfer
BOO: Buid Operate Own
Manag. Contract : Management contract
O&M Contract : Operation & Maintenance contract
EPC / DB : Engineering Procurement Construction (also called Design Build)
DBO : Design Build Operate (contract with EPC + O&M together)

PPP Models

Based on the study's observations and analysis, it can be concluded that the private involvement in the provision of irrigation services in the Philippines *is currently a very risky proposition*. Once the infrastructure is completed and operational, the private partner cannot rely on user fees to recover costs as the irrigation service fee (ISF) is too low and poor recovery rate compounds the problem. However, three types of contract could be considered to support private sector involvement in the provision of irrigation services:

1. **O&M Management Contracts with Performance Incentives.** The private partner provides management services only. Financing and construction remain as the responsibility of the government. The private partner's obligation is to ensure "good operation and maintenance" as will be defined in the contract or in an O&M manual that will form part of the contract. The private partner is paid directly by the government agency for its services. Payment does not depend on the collection of user fees, although the private partner may also be entitled to receive a performance bonus based on the rate of fee collection. This contractual arrangement brings in managerial know-how in infrastructure O&M. The level of risks for both parties is low. They can respond to the need for innovations in O&M without entering into a long-term relationship. According to the NEDA PPP Center, this kind of contract can be used.

2. **Build-Transfer-Operate (BTO).** The contracts are defined in the revised R.A. as "a contractual arrangement whereby the public sector contracts out the building of an infrastructure facility to a private entity such that the contractor builds the facility on a turn-key basis, assuming cost overrun, delay and specified performance risks. Once the facility is commissioned satisfactorily, title is transferred to the implementing agency/LGU. The private entity, however, operates the facility on behalf of the implementing agency/LGU under an agreement." It means that the private partner can design, procure and construct the irrigation system and be paid for it when it transfers the completed facility to the contracting authority, after which the private partner will have the responsibility of operating the system. Payment can be done in installments.

3. **Rehabilitate-Transfer-Operate (RTO).** The contracts deal with the rehabilitation of an irrigation system under the same terms as BTO. These contracts have to be approved prior to the transaction. The current rehabilitation contracts under the implementing rules and regulations (IRR) are the ROT (rehabilitate-operate-and-transfer) and the ROO (rehabilitate-operate-and-own). These schemes, however, may face significant challenges in the irrigation projects as the payments to the private partner would be sourced from user fees.

Project Screening and Selection

The screening procedure is based on three steps. The first step is the elaboration of the objectives sought by the partnership, including the functions to be delegated to the private partner (e.g., fund sourcing, construction, O&M, introducing innovations, risk management). The second step is to translate this statement into selection criteria to be applied to the pool of potential projects, which is a straightforward process once the statement of objectives is adopted. The third step is to organize the pool of projects based on criteria that were derived from the statement of objectives. Projects without financing are to be selected for an in-depth analysis of feasibility under PPP. Final selection will be based on risk assessment, risk allocation and financial simulation.

Simplified Financial Appraisal

The main goal in developing a financial model is to test the feasibility of different PPP options. For instance, according to the analysis conducted under this study, BOT is not a feasible option for financing irrigation projects in the Philippines. Although sound, this conclusion could be proven using a simple financial appraisal model. Another concern is the level of public subsidy for investment costs which current limit is set at 50%. Based on international experiences, this level of support is insufficient.

A financial model has been developed to assess the feasibility of a PPP on the Ilaguen Project

which is proposed for PPP. The financial model are presented in detail in the appendices. The model has been used to test different scenarios of PPP arrangements based on the BOT principle, with cost recovery through user fee collection. Although generalization is to be done cautiously, many results are robust. This is due to the similarity shared by irrigation projects in terms of ISF and water distribution infrastructure.

The scenarios were selected to test different arrangements in PPP to supply irrigation services:

1. **Scenario 1** - considered a pure irrigation project where revenues come only from ISF collection. The IRR calculated by the model is negative.
2. **Scenario 2** - considered bundling irrigation and hydropower dam construction whose revenues come from two streams of income: ISF and power sales. The IRR on equity is at 8.7%, largely below the weighted average cost of capital (WACC) set at 15% which is in accordance to private sector practices in the Philippines.
3. **Scenario 3** - considered the financing of the dam and the hydropower through a PPP and delegated the irrigation scheme development and management to NIA. With a 20% IRR on equity, this option is acceptable. It means that hydropower could be realized in a PPP, and the irrigation network and O&M is to be supplied by NIA.
4. **Scenario 4** - based on the assumption that the costs of dam as “public good” are to be borne by Government (GAA appropriations) and financing through PPP of hydropower and irrigation services. The IRR on equity stands at 10% which is too low to sustain this option.
5. **Scenario 5** - based on Scenario 4 but with an unbundling between hydropower and irrigation services. The hydropower revenues are used to cover the losses in irrigation but under a different PPP contract. Unbundling allows a strict enforcement of hydropower generation rules in terms of flow releases and creates strong incentives for an efficient irrigation service. The simulation results are the same as Scenario 4.

PART III: TOWARDS IMPLEMENTING PPP IN THE PHILIPPINES IRRIGATION SECTOR

CONFRONTING POLICY ISSUES AND DILEMMAS

Various policies constrain the attractiveness of PPP in irrigation. The average rate of ISF collection has been only 50% from 1983 to 2008, and range from a low of 29% in 2000 to a high of 61% as of October 2012. The ISF rate is based on the size of irrigated land rather than on the volume of water used in the farm, thus providing an incentive to over-irrigate farms especially for those that have first access to water. This situation leaves those at the tail-end of the irrigation canal often with very limited or no water to irrigate their farms.

The current ISF rates which are in terms of cavans of paddy per hectare and valued at NFA support price are still the same rate established in 1974. The rates were revised in 1998 wherein beneficiaries with larger farms were made to pay 50% more, while those with less than two hectares were to pay half of the 1974 ISF level as per Administrative Order (AO) No. 17. This socialized ISF structure was met with resistance and deemed inequitable. This AO was superseded by Executive Order (EO) No. 197 which required increasing fees and charges by not less than 20% of the socialized ISF rate. The low level of ISF and low collection rate mean that NIA is far from financial sustainability.

The cropping intensity in NIS for wet and dry seasons has remained relatively low and static over the past two decades. Low cropping intensities suggest that feasibility assessments were overly optimistic and projected service areas were larger than can be irrigated; that NIS water management is inefficient; or that inadequately funded or deferred routine maintenance diminishes the quality of irrigation service. Reliance on gravity irrigation reduces the ability of farmers to switch from rice to high-value crops.

Irrigation projects give more attention to dam and diversion structure design, and less to

conveyance. While lining of canals is mostly considered in modernization proposals, there are other technologies such as piped distribution that can potentially improve the efficiency of water distribution. This gap has to be explicitly addressed by policy towards adoption of new techniques or innovations in distribution.

Water is a local good. It may be abundant and easy to access in some systems, but limited and costly to extract in others. A uniform ISF for all NIS does not reflect the variability in projects and cost of providing irrigation across systems, and differences in productivity. The water-scarce systems would be effectively subsidized and benefited by the lower ISF, while the water-abundant systems would be taxed or penalized.

The collection rate on ISF back accounts since 1980 has been relatively low and continuously declining from 5.5% to about 2% in 2012. As of December 2009, the accumulated back account sums up to PhP7.2 billion. Given this dismal collection performance, there were proposals for a one-time write off of back collectibles. This however may give the wrong signal to farmers and further erode collection efforts.

POLICY RECOMMENDATIONS AND ACTION PLAN

Successes in PPP in transportation, energy and urban water supply provide an opening for exploring PPP in irrigation. PPP can potentially finance expansion, enhance efficiency in construction and O&M, and facilitate modernization of irrigation. The irrigation sector faces the perennial problem of mobilizing finance and sustaining investments. Irrigation infrastructure requires huge capital investments, while budgetary resources are limited. This study presents alternative solutions, their implications, and recommendations on implementation. The options aim to allow the GOP to eventually break the vicious cycle of low ISF collection, poor O&M and low production, as well as provide more efficient and sustainable irrigation. These options cover financing of new and rehabilitation projects and making O&M sustainable. The course of action can begin with experiments and policy changes: changing the cost allocation of dams, expanding the role of IAs, using PPP in selected projects, considering a change in rice policy, or using social policy in order to increase ISF collection.

EXPERIMENTS

In pursuing PPP, it is important for the Government to clearly define its objectives and what it wants from the arrangement, and to analyze and engage stakeholders. Given the high economic and financial stake, it is better to begin with pilot projects to assess the potential of reforms in irrigation. Going full steam ahead, without understanding the buy-in and support of the most influential stakeholders, increases the likelihood of failure and loss of valuable resources. The experiments will help develop realistic and workable guidelines, assess the likely success of proposed options, identify logistical and operational problems and uncover potential ones, determine what resources (funds, materials, and staff) will be required, and convince stakeholders about the potential of PPP in delivering better irrigation service.

Under this track, there are several variations or mix of pilot activities that can be pursued: (a) NIA entering into a service contract; (b) PPP with innovative techniques for conveyance, distribution and collection; (c) measurement of actual O&M costs; (d) volumetric pricing; (e) high-value crop production; (f) PPP with agricultural extension services; and (g) expansion of the role of IAs. The best way to set up experiments is for DA to formally request NIA to draft a program. What would be of utmost importance is to monitor and analyze results. In this regard, DA can set up a committee of experts with members coming from the academe, engineering firms, private sector, and the ranks of prominent civil servants.

Irrigation service contract serves as first step towards introducing PPP and is the more common form of the few PPP projects on irrigation. Under this arrangement, a private contractor will be brought in to do one or more irrigation and drainage (I&D) functions (design,

operation and maintenance) through short-term, task-specific service contracts or longer, comprehensive management contracts. This arrangement will be appropriate where the IAs have begun to feel the benefits of managing at least part of their own water service but experience difficulty in fulfilling all operation, management and maintenance (OMM) functions without professional, technical support. Under an OMM contract, the private firm is paid a fee and some performance bonus. The private partner takes very little risk and in case of poor performance, will only lose the bonus.

Innovative techniques in conveyance and distribution should be pursued. While lining of canals can be expensive, the expected benefits in terms of increased efficiency of systems and water flow and supplies that reach farmers' fields may justify the additional costs. The same argument stands for experiments that test the use of buried pipes for water distribution.

Different modes of ISF collection can also be tested, e.g., use of prepaid cards, volumetric pricing, or water wholesaling rather than retailing. The volumetric studies of PIDP would be useful although probably will not represent a typical NIS so additional experiments within a pilot PPP may be necessary. These innovations, however, will have to be taken into account in connection with the modernization of existing systems.

ACTION PLAN

Increase the role of IA. The Philippines Development Plan 2011-2016 section on the development of irrigation states: "As part of a long-term strategy to ensure its efficient use, wholesaling of water at the resource at the head gate to IAs is expected to drastically cut down collection expenses. This would entail IAs paying only a single fee, with the IAs taking responsibility for collecting ISF from its members. Volumetric (volume-based) pricing at the head gate enhances accountability, since it provides: (a) greater contract assurances for service delivery by the water supplier/s to the IAs; and (b) incentive to properly maintain the distribution system, improve the equity of head- and tail-end distribution and conserve water resources. Pilot-testing of volumetric pricing has revealed constraints to implementation for open canals, as such, this will initially be introduced in NISs where secondary irrigation facilities or its components have been fully turned over to IAs through NIA's Irrigation Management Transfer (IMT) Program. In the interim, NIA may adopt and improve socially-acceptable demand-management strategies."

Redefine the role of NIA. The new allocation of costs for dams will allow progressive change in NIA, with an aim of transforming it into a more efficient organization, able to rely on its own income and continue the expansion of irrigation systems with less support from the Government. NIA will evolve as the main operator for dams and conveyance systems, to distribute water by volume to IAs at head gates, and supervise PPP contracts in the irrigation sector.

Policy reform. Changes in ISF policy should be based on the results of the experiments and in consultation with stakeholders and policy-makers.

INVESTMENT PROJECTS

PPP in Ilaguen. What is required from DA and specifically the unit in charge of PPP is to mobilize resources from the Australian fund set up at the PPP Center to hire transaction advisors to prepare the PPP project documentation. Preparing the transaction with the help of advisors is not a full-fledged commitment to proceed. The advisors will analyze more deeply than has been the case until now the feasibility of the PPP project. They will have to engage the private sector, with the help of the DA PPP unit to demonstrate that irrigation is and could be an attractive investment opportunity for the private sector, when this investment is conducted in a proper contractual arrangement with the Government.

PPP in Tumauini. The PPP project in Tumauini is a way to confirm the quality of the strategy developed under the Ilaguen scheme. It is easy to use the framework of Ilaguen in order to structure the Tumauini scheme, and to test the feasibility using the financial model. If the first transaction is successful, DA should consider organizing another bid for Tumauini.

1 INTRODUCTION

1.1 OBJECTIVE AND SCOPE

This study proposes an analytical framework to determine the extent to which Public-Private Partnership (PPP) is a viable and effective business option for developing and modernizing the irrigation sector. It focuses on: (a) assessing and providing recommendations to address the policy, regulatory and institutional constraints that limit the recourse to PPP as a tool for supporting the development of the irrigation sector; and (b) if PPP is proven to be a viable option, to develop the capacity within the Department of Agriculture (DA), national Irrigation Administration (NIA) and National Economic Development Authority (NEDA) PPP Center to identify and assess potential projects. The TA was meant primarily to produce a simple and practical analytical framework for the Government to build on, rather than to generate a full-blown study on an irrigation PPP project.

Specifically, the Terms of Reference (TOR) for the study covered the following tasks:

- Development of an Analytical Framework for Project Identification consisting of key parameters and factors that would be used in screening potential irrigation projects under a PPP Program, as well as in examining the different criteria to be considered by the Government in filtering and prioritizing candidate projects within a PPP Program. The Analytical Framework would need to take into consideration alternative PPP models taking into account variations in prevailing crops farmed, structure of land ownership, size of the irrigation schemes, classification of irrigation systems, as well as differences in legal, regulatory and institutional constraints.
- Preparation of a PPP for Irrigation Development Policy Paper that would provide recommendations to the Government on the institutional, regulatory, and legal reforms required for PPP projects to become bankable and scalable while allowing access to efficient management and development systems. It would focus on the strategic role that the private sector could play in terms of introducing new technologies in physical infrastructure rehabilitation and modernization, water service delivery and management, and project financing for irrigation development.
- Development of a Note on Financing Options for Irrigation PPP in the Philippines, including the potential role to be played by the national, bilateral and multilateral financial institutions in supporting the development of the irrigation sector in the Philippines through PPP. Issues concerned with guarantees and bundling will be examined in this context.
- Drafting of an Action Plan for a medium-term PPP Program for irrigation development in the Philippines, and based on the application of the Analytical Framework would consist of a pipeline of potentially bankable projects to be developed under a PPP Program and that would be proposed for subsequent full blown feasibility studies. This section of the TORs was scaled down due to budget constraints. A simplified roadmap to implement two PPPs will replace it.
- Conduct of a series of public consultations with key stakeholders to identify participation constraints to the PPP Program in irrigation and its overall acceptability in terms of improving water delivery services. These will be complemented by a series of seminars/workshops; learning and capacity building activities that would walk through policy makers, technical staff at the DA, NIA and NEDA PPP Center as well as the Federations of IAs on the implementation of PPP in irrigation.

1.2 ORGANIZATION OF THE REPORT

The report has three major parts:

- Part I (Country Context) reviews Philippines experience, policies, statistics, reforms and issues with regard to the irrigation sector (Chapter 2); PPP experience, financing practices and prospects in the Philippines (Chapter 3), and relevant international experience (Chapter 4).
- Part II (Proposed Analytical Framework) presents PPP transaction models appropriate for the country, given its particular needs and circumstances (Chapter 5). It then describes the process for selecting PPP models (Chapter 6); financing options (Chapter 7); the project screening methodology (Chapter 8); and project selection including the results of financial viability simulation on a selected irrigation project, risk assessment and allocation, value for money analysis, and tools for evaluating the financial viability and social benefits of proposed projects (Chapter 9).
- Part III (Towards Implementing PPP in the Irrigation Sector) discusses policy issues and dilemmas confronting PPP (Chapter 10); recommendations to overcome issues (Chapter 11); and outlines an action plan to operationalize PPP in the irrigation sector (Chapter 12).

PART I.

COUNTRY CONTEXT

2 PHILIPPINES IRRIGATION SECTOR

This section reviews the country's experience in providing irrigation services, and the pertinent laws, institutions, policies, and programs deemed responsible for bringing irrigation to the state that it is now in. It was noted that: (a) irrigation development and expansion currently rank very high in the program priorities of the national government, as irrigation is considered to be the most important factor in moving the country towards rice self-sufficiency; (b) the total area serviced by existing irrigation systems nationwide in 2011 was only about 50% of total irrigable area, and the Government is expected to face a funding gap of around PhP50 billion for irrigation development within the next ten years; (c) NIA's financial condition has been affected by low irrigation service fees (ISF), as well as poor collection thereof; (d) strategies to restore NIA back to financial health include assigning greater responsibility for the operation and maintenance (O&M) of irrigation facilities to Irrigators Associations (IAs), as well as organizational downsizing in NIA to reduce operating costs; and (e) the Agriculture and Fisheries Modernization Act (AFMA) directs the concerned government agencies to tap private sector investments to fast-track the development of irrigation systems through such schemes as Build-Operate-Transfer (BOT). These observations underscore the central role of irrigation in achieving national targets, and constraints that must be addressed for PPP to become a viable tool for sector financing.

2.1 PERTINENT LAWS AND INSTITUTIONS

The Philippines Government's Food Self-Sufficiency Program is anchored to its irrigation program. As of October 2012, the total irrigation service area, counting out converted lands and permanently non-restorable areas, was 1.57 million hectares (NIA 2012). Of this total area, 45% are operated and managed as National Irrigation Systems (NIS), 32% as Communal Irrigation Systems (CIS), and the rest as other government agency-assisted and private systems (NIA 2012). These systems are irrigating mainly rice, and account for 74% of the 16.7 million tons of palay produced in 2011, and 77% of the 11.5 million tons produced in the first three quarters of 2012[2].

Irrigation development is led by the National Irrigation Administration (NIA), which is mandated to undertake comprehensive water resource projects, including flood control, drainage, land reclamation, domestic water supply, hydropower development, construction of roads and highways, and reforestation. NIA was created under Republic Act (RA) 3601 in 1963. The NIA Charter gave the agency an exclusive role in developing and managing large-scale irrigation systems. The agency has broad powers in water mobilization and appropriation. The Republic Act states that NIA is:

> *"(a) To investigate, study, improve, construct and administer all national irrigation systems in the Philippines;*
>
> *(b) To investigate all available and possible water resources in the country for the purpose of utilizing the same for irrigation, and to plan, design and construct the necessary projects to make the ten to twenty-year period following the approval of this Act as the Irrigation Age*

2 DA's Bureau of Statistics (BAS). 2012.

of the Republic of the Philippines;"

Presidential Decree (PD) No.1 issued in 1972 integrated all irrigation activities under NIA, while PD 552 (1974) and PD 1702 (1980) increased NIA's capitalization and broadened its authority.

As noted above, low irrigation fees, as well as poor collection of fees, have been observed. In order to address the risk of unpaid fees, PD 552 states that:

"Unpaid irrigation fees or administration charges shall be preferred liens, first, upon the land benefited, and then on the crops raised thereon, which liens shall have preference over all other liens except for taxes on the land, and such preferred liens shall not be removed until all fees or administration charges are paid or the property is levied upon and sold by the National Irrigation Administration for the satisfaction thereof. Judicial actions for the collection of unpaid irrigation fees or charges, drainage fees or other charges which NIA is authorized to impose and collect, shall henceforth be governed by the provisions of the Rules of Court of the Philippines for similar actions, the provisions of other laws to the contrary notwithstanding".

NIA is authorized through PD 552 to design and construct "*multiple-purpose water resources projects designed primarily for irrigation, and secondarily for hydraulic power development and/or other uses such as flood control, drainage, land reclamation, domestic water supply, roads and highway construction and reforestation.*" In 1975, NIA's Charter was amended to authorize partial or full recovery of construction cost from beneficiaries of national and communal irrigation systems, as well as O&M costs through irrigation service fees for national systems. The amendment also specified that IAs contribute cash, labor or kind to construct, operate, maintain, and manage completed irrigation systems. This Participatory Irrigation Management (PIM) was pursued since the early 1980s and extended to NISs following the successful experience in CISs. Unlike in communal systems, however, NIA and the IAs jointly manage activities in the national systems.

2.2 KEY POLICIES

2.2.1 Self-sufficiency in rice

From its inception, irrigation policy was devoted to achieving self-sufficiency in rice. The Food Staples Sufficiency Program (FSSP) states: "*Irrigation is the most robust way to boost production. It allows more than one cropping, increasing the area planted to rice. A reliable water supply maximizes yields through the use of high-yielding rice varieties, efficient application of fertilizers, and crop management techniques*." In order to increase the supply of irrigation services, and in conformity with the Philippine Development Plan 2011-2016, the government frontloaded appropriations for new irrigation systems, substantially increasing the budget allocations of NIA.

2.2.2 Participatory irrigation management

The willingness to increase the role of farmers in the provision of irrigation services, correspondingly reduce the burden on Government, and empower farmers date back from the issuance of PD 552. Farmers were required to repay Government for the cost of constructing and rehabilitating their communal system. To implement this policy, NIA has to rely on a communal association able to manage the system, resolve conflicts, and collect fees. In this regard, NIA initiated a partnership with the Farm Systems Development Corporation (FSDC) to form communal associations and to develop (with other partners) a methodology and tools to strengthen said associations. In 1976, NIA set up two related pilot projects with assistance from the Ford Foundation. In support of the participatory process, the position of Irrigation Community Organizer (ICO) was created to work in close cooperation with technical staff to use productively insights from farmers.

The Magna Carta of Small Farmers (Republic Act 7607 of 1992) formalized the desired role of the IA. Section 13 stated that: "*The Government, through the National Irrigation Administration (NIA) and other concerned offices, continues to provide irrigation services, farmers' organizations shall be encouraged to spearhead the construction of irrigation systems. Towards this end, the Government shall encourage small farmers to join or form irrigators' associations. In addition, it shall promote participation of farmers to develop their capabilities to eventually assume the operation and maintenance of irrigation systems and the responsibility of collecting fees from the individual members and remitting an amount to the NIA*."

Participatory irrigation management became an assumed policy of NIA, the main driver being the need to increase ISF collection. Faced with a deteriorating financial situation, NIA relied intensively on incentives to IAs to increase the ISF collection. Currently, this policy relies on Irrigation Management Transfer (IMT) to contract IAs for the collection of ISF and for part of system operation and maintenance. Memorandum Circular No. 17 issued in 2011 provides guidance to project officers and institutional development officers in entering into a contractual arrangement with IAs. Four types of contracts are considered, depending on the capacity of the IA. Activities include:

- Basic maintenance services from the IA;
- Irrigation service fee collection by the IA, with up to 15% of the proceeds collected to be returned to the IA; and
- Devolution of functions and responsibilities to the IAs such as the operation and maintenance of the irrigation system.

The legal framework for IAs still limits their capacity to assume responsibilities in managing an irrigation system. For instance, their inability to offer collateral to access credit, and their lack of legal knowledge to be able to confidently contract with private firms, still hinder them from realizing their full potential. The latest project financed by the World Bank, the Participatory Irrigation Development Project (PIDP) aims to expand the number of IMT contracts; prepare IAs to assume greater responsibility in the maintenance of the irrigation system; and motivate them to exert greater effort in the collection of service fees.

2.2.3 Streamlining NIA

The third leg of the current policy aims to streamline the operations of NIA in accordance with Executive Order (EO) 366 enacted in 2004 to reduce redundancies in public services and agencies. In 2008, EO 718 set up precise deadlines for NIA to draft a rationalization plan for streamlining its operations and reducing staff. PIDP was used to finance part of the severance benefits. The rationale behind staff reduction is that the success of IMT would allow for a reduction in interventions required from NIA personnel, and thus reduce total O&M cost. By reducing staff and transferring O&M to IAs, the financial sustainability of NIA is expected to be restored.

2.3 STATUS OF IRRIGATION

The following tables present the situation of the irrigation sector in the Philippines as of December 2011. These tables come from the yearly report to the President prepared by NIA.

Table 2-1 below presents the potential irrigable area and the actual irrigated area by type of system:

- National Irrigation Systems (NIS) are jointly managed by NIA and IAs;
- Communal Irrigation Systems (CIS) are managed by the IAs; and
- Private Irrigation Systems (PIS) are developed and managed by farmers.

Table 2-1: Situation of Irrigation Areas (Dec. 2011)

Region	Estimated Total Irrigable Area a/	Service Area b/					Remaining Potential Area to be Developed
		National Irrigation System	Communal Irrigation System	Private Irrigation System	TOTAL	Irrigation Develop-ment (%)	
CAR	99,650	22,622	35,785	22,912	81,319	82	18,331
1	277,180	64,066	97,304	27,329	188,699	68	88,481
2	472,640	144,059	42,813	23,095	209,967	44	262,673
3	498,860	206,237	79,394	20,555	306,186	61	192,674
4-A	97,710	28,580	19,367	7,893	55,840	57	41,870
4-B	149,250	24,585	35,249	10,069	69,903	47	79,347
5	239,660	22,655	69,224	29,484	121,363	51	118,297
6	197,250	52,216	20,930	5,499	78,645	40	118,605
7	50,740	10,040	23,048	2,539	35,627	70	15,113
8	84,380	19,644	30,454	4,466	54,564	65	29,816
9	76,080	15,162	20,093	1,972	37,227	49	38,853
10	120,700	28,480	24,714	14,764	67,958	56	52,742
11	149,610	33,971	15,757	25,915	75,643	51	73,967
12	293,610	63,266	22,648	17,296	103,210	35	190,400
ARMM	156,720	17,520	7,306	225	25,051	16	131,669
CARAGA	162,300	30,354	21,719	3,316	55,389	34	106,911
TOTAL	**3,126,340**	**783,457**	**565,805**	**217,329**	**1,566,591**	50	**1,559,749**

Table 2-2 presents performance of NISs as measured by cropping intensity. The goal of providing irrigation is to allow farmers to have more than one crop per year. Cropping intensity measures the number of times per year that crops are planted. To calculate cropping intensity, the table uses the concept of "firmed-up service area", meaning the area that irrigation is able to support. The cropping intensity is calculated as the sum of the area cultivated during the wet season, the area cultivated during the dry season, and the third crop, divided by either the service area or the firmed up area.

Table 2-2: Cropping Intensity in Irrigated Areas (Dec. 2011)

REGION	NO. OF NIS	SERVICE AREA	FIRM-UP SERVICE AREA	IRRIGATED AREA (ha)									IRRIGATED CROPPING INTENSITY (%)	
				WET SEASON			DRY SEASON			THIRD CROP (QTA)				
				PROGRAM	ACTUAL	%	PROGRAM	ACTUAL	%	PROGRAM	ACTUAL	%	SERVICE AREA	FIRM-UP SERVICE AREA
CAR	3	22,622	22,622	16,648	14,587	87.62	16,437	15,228	92.64	100	73	73.00	132	132
1	25	64,066	46,366	36,736	32,722	89.07	28,042	27,564	98.30	564	604	107.09	95	131
2	21	144,059	134,875	120,840	113,592	94.00	126,287	119,747	2.91	-	-	-	162	173
3	23	206,237	171,808	150,753	150,664	99.94	151,942	150,603	99.12	39,105	5,678	14.52	148.83	178.66
4-A	33	28,580	20,449	15,783	15,278	96.80	13,531	13,378	98.87	120	-	-	100	140
4-B	12	24,585	18,726	16,115	15,688	97.35	13,742	13,950	101.51	-	-	-	121	158
5	18	22,655	20,407	17,703	17,464	98.65	17,420	16,948	126.69	2,935	-	-	152	169
6	12	52,216	44,716	41,551	39,907	96.04	34,826	32,757	94.06	4,428	3,653	82.50	146	171
7	3	10,040	8,025	8,025	6,565	81.81	7,383	6,617	89.62	-	-		131	164
8	17	19,644	18,544	16,845	16,691	99.09	16,815	16,651	99.02	290	-	-	170	180
9	4	15,162	14,267	13,567	13,436	99.03	12,974	12,974	100.00	1,100	-	-	174	185
10	6	28,480	20,592	19,359	19,041	98.36	19,357	19,031	98.32	3,400	2,109	62.03	141	195
11	9	33,971	31,398	30,102	30,061	99.86	30,102	29,781	98.93	-	-	-	176	191
12	13	63,266	59,368	53,227	52,232	98.13	51,614	51,769	100.30	1,781	4,131	231.95	171	182
13	8	30,354	21,357	18,578	17,544	94.43	18,558	17,240	92.90	-	-	-	115	163
ARMM	5	17,520	14,688	12,937	10,534	81.43	11,130	9,158	82.28	-	-	-	112	134
TOTAL	**212**	**783,457**	**668,208**	**588,769**	**566,006**	**96.13**	**570,160**	**553,396**	**97.06**	**53,823**	**16,248**	**30.19**	**145**	**170**

Table 2-3 below presents the accomplishments of NIA under its IMT program, particularly the number of contracts sealed between NIA and Irrigators Associations.

Table 2-3: Irrigation Management Transfer (Dec. 2011)

PARTICULARS	CY 2011 TARGET	ACTUAL *
I. IA Organization		
a. Number of IA Organized/Re-Organized	17	227
Area Covered, ha	3,781	29,271
Number of Farmers	4,203	36,841
b. IA Strengthening		
Number of IA	560	1,722
Area Covered, ha	120,895	173,922
Number of Farmers	114,283	247,968
c. Number of IA Registered w/ SEC	19	223
Area Covered, ha	4,226	32,052
Number of Farmers	4,315	22,549
II. O&M Contracting		
Number of IA	262	1,031
Area Covered, ha	110,855	116,487
Number of Farmers	100,261	148,024
III. Trainings/Workshop		
a. IA-Training (Participants)	19,230	75,145
b. Staff Training, Orientation Workshop (Participants)	2,975	17,010

* Many Ias have undergone re-organization, thus the high accomplishment.

2.4 IRRIGATION REFORM IMPETUS

NIA has been reformed twice. The first reform was brought about by PD 552. It aimed to restore financial sustainability to agency operations. The poor collection rate of irrigation service fees was a threat to its operations and investments. The second reform was much more ambitious. The Agriculture and Fisheries Modernization Act (AFMA) goal was to transform irrigated agriculture. AFMA was enacted in reaction to perceived key limitations in the pursuit of irrigation development.

2.4.1 Presidential Decree 552

PD 552 sought to arrest the deteriorating financial situation of NIA by increasing its capital, allowing it to receive management fees on all of its investments, and permitting it to borrow directly from international cooperation and development agencies for its operations. In terms of irrigation service fees collection, the agency also received renewed powers. The Presidential Decree allowed it to have priority lien on the land and crops of any farmer not paying irrigation fees. The PD directed the courts to enforce these regulations.

2.4.2 Agriculture and Fisheries Modernization Act (AFMA)

RA 8435 or AFMA (1997) further defined NIA's roles in agricultural development. Specifically, NIA is tasked with: (a) preservation and rehabilitation of watersheds to support the irrigation systems in coordination with other agencies, particularly the Department of Environment and Natural Resources (DENR) which has sole jurisdiction on these activities ; (b) research and development in the development of effective, appropriate and efficient irrigation and water management technologies; (c) for NIS, planning, design, development, rehabilitation and improvement, operation and maintenance of major irrigation structures including headwork’s and main canals, and gradual turnover of operation and maintenance (O&M) of secondary canals and on-farm facilities to IAs; (d) provision of technical assistance to local government units (LGUs) to complement the devolution of the planning, design, and management of CIS; (e) formulation and development of a plan for the promotion of a private sector-led development of minor irrigation systems; (f) encouraging the construction of irrigation facilities through other viable schemes like Build-Operate-Transfer (BOT), Build-Transfer (BT) and other schemes that will fast track the development of irrigation systems; and (g) review of irrigation service fee rates and recommendation of reasonable rates.

Basically, the Republic Act strengthens the pursuit of the participatory irrigation management policy, highlighting the importance of IMT and devolution of responsibilities to LGUs. By stressing the importance of modernizing irrigation systems, and diversification of crops out of rice, the Act is more innovative that previous legislation. In terms of provision of irrigation services, it emphasizes the importance of small irrigation systems and PPP. Finally, it calls for a review of irrigation service fee rates.

2.5 CURRENT ISSUES IN IRRIGATION

In this brief review of issues, four points have been developed: financial sustainability, innovation, backs accounts and low value crops.

2.5.1 Financial sustainability

Since AFMA recommended in 1997 a review of irrigation service fee, no progress has been achieved. The ISF is still largely below rates needed to support a “good level” of operation and maintenance. Secondly, the collection rate of the irrigation fee is still around 55% of collectibles each year. The low level of ISF and the poor recovery rate mean that NIA is far from financial sustainability. When the objectives of the current investment program are considered, derived from the Food Staples Sufficiency Program, the financing gap has been estimated at PhP50 billion for the next 10 years, as reported by the CORPLAN of NIA.

2.5.2 Innovations

The second issue relates to the lack of innovations in conveyance and distribution in irrigation systems under NIA. There is no case of buried pipes irrigation distribution system. There is no experience in using sprinklers[3] for irrigating rice fields. And there are very few advances in testing water-measuring devices. Even in institutional development, there is very little experimentation. For example, increased responsibility of IAs to more fully manage their systems has been very limited. Overall reliance on gravity irrigation reduces the ability of farmers to switch from rice to high-value crops, which need more frequent water application not allowed under the current design. The only case where farmers have a better control of the irrigation schedule is when they rely on underground water or pumped water.

2.5.3 Back accounts

Back accounts, i.e., collectibles that must be paid by farmers, are increasing just because the current ISF collection rate remains lower than 100%. This means that the debt owed by farmers to NIA is continuously increasing. There is no obvious solution to this problem. If the receivables are written off, then the current level of ISF collection could drop dramatically. To continue suing farmers in order to collect receivables is not feasible when the farmers are poor.

2.5.4 Irrigated agriculture and rice

The last point is related to the quasi-exclusive focus on rice production. Although, in view of the food crisis of 2008, the Government goal of attaining self-sufficiency in rice could be justified, there is a potential problem for farmers: irrigation systems designed for rice production do not possess the versatility needed to support rice farmers who may want to switch to other crops. The only way out of rice production would be for them to own a well in order to have a reliable source of water. A related issue is the level of ISF. Any revision in the policy regarding the price of rice will have a direct impact on the income of NIA. If the Government decides to liberalize rice trading, or to change its policy regarding public procurement of palay, the ISF level will be changed.

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3 There are very interesting results in using sprinklers instead of submersion in rice production. Cf. Australian agriculture web site.

3 PPP – THE PHILIPPINES EXPERIENCE

This section briefly presents the legal and regulatory environment for PPP projects in the Philippines, as well as some of the projects that have been implemented under the program, particularly those that have an irrigation component.

The information presented herein show that: (a) PPP has been around for quite some time in the country; (b) there have been several major infrastructure projects initiated and completed by the private sector using the BOT scheme; (c) no irrigation project has been constructed under PPP; and (d) the country's experience, so far, has been limited to introducing irrigation as a minor component of large hydro power projects funded under PPP. Moreover, private sector participation in the packaging, financing, construction and management of these irrigation systems were not substantial – indicating the private sector's lack of interest in developing projects that are designed purely for irrigation.

3.1 EVOLUTION OF THE LEGAL ENVIRONMENT

The present administration adopts PPP as one of its flagship programs. But PPP has been around for over two decades. In the 1990s, the country had a number of significant PPP projects in infrastructure, facilitated by the passage of the new Implementing Rules and Regulations (IRR) on BOT investments. Presidential Proclamation No. 50 (1986) created the Committee on Privatization (CoP) and the Asset Privatization Trust (APT) tasked with disposing of large government industrial and infrastructure enterprises which have been identified for privatization. This Proclamation supersedes PD 2012 and PD 2030 which provided for the disposition of non-productive government assets.

The RA 6957 of 1990 authorizes the financing, construction, operation and maintenance of infrastructure projects by the private sector. RA 7718 (1994) amended RA 6957 and defined Build-and Transfer (BT), Build-Lease-and-Transfer (BLT), Build-Operate-Transfer (BOT), Build-Own-and-Operate (BOO), Build-Transfer-and-Operate (BTO), Contract-Add-and-Operate (CAO), Develop-Operate-and-Transfer (DOT), Rehabilitate-Operate-and-Transfer (ROT), and Rehabilitate-Own-and-Operate (ROO). This amendment specifies eligible projects that can be partly or entirely financed, constructed and operated by the private sector. The projects include power, **water including irrigation**, telecommunication, transport, information technology, land reclamation, industrial and tourism estates, environmental and solid waste management related facilities, and other public works.

The amended law on PPP allows private partners to submit proposals for PPP. The Ninoy Aquino International Airport Terminal III was developed through a direct proposal. The law promotes competition through organized challenge by other private partners, which, in this specific case, involved a protracted dispute.

EO No. 298 (1996), on the other hand, provides for alternative or intermediate modes of privatization pursuant to Presidential Proclamation No. 50. The alternatives include joint venture, BOT schemes, management contract, service contract or operating agreement, lease-purchase, and securitization.

3.2 SIGNIFICANT EXPERIENCES IN PPP

The use of PPP schemes is so widespread in the Philippines that projects normally provided by the Government in the irrigation/water, energy and other sectors are carried out with private sector participation.

3.2.1 Irrigation and water resources

Section 34 of AFMA promotes BOT projects to accelerate development of new service areas. The Act mandates the Government to guarantee payments to private partners, in case of default by NIA.

3.2.1.1 Casecnan Multi-Purpose Project

The first use of BOT in the water sector was for the Casecnan Project. The project, however, was not irrigation *per se*, but more about dam and hydropower station construction. In the final contract, NIA was to pay the private partner for water deliveries of around 800,000,000 m³ each year under a "take or pay" contract. The Government guaranteed this payment. NIA was also party to a power purchase agreement with the private partner. In this manner, leveraging the power purchase agreement and the take-or-pay contract for water delivery, the private partner was able to finance the project.

What is interesting in this experience is that use of the concession law did not relate directly to irrigation services. The private partner did not finance, realize, manage or maintain the irrigation component of the project. It was NIA that implemented this component.

3.2.1.2 San Roque Multi-Purpose Project

This project is a perfect example on the use of BOT to deliver infrastructure services. Initially, the intent was to construct a dam and hydropower generation unit through PPP. Once water could be mobilized, opportunities for irrigation services were created. The irrigation project (Ilaguen) put forward by NIA for possible PPP is based on water made available by hydropower generation.

The main lesson that could be learned from the San Roque Project is simple: the most expensive component of irrigation is the reservoir. If it is possible to contract a private partner to build this infrastructure, and to finance it through the proceeds of electricity sales, PPP could accelerate the development of new irrigation service areas without tapping government funds.

For NIA, the implementation by a private partner of the most expensive component in the irrigation project could allow its staff to focus on conveyance and distribution networks, and on the agricultural practices of farmer-beneficiaries.

3.2.2 Power generation

The inclusion in this study of a review of the Philippines energy sector is justified by the importance of hydro power revenues in the economics of irrigation PPP. After briefly reviewing energy sector reform, the implications for irrigation PPP will be analyzed and presented below.

3.2.2.1 Energy sector reforms

The power industry is divided into generation, transmission, distribution and supply. Power generation used to be a monopoly of the National Power Corporation (NPC) but EO No. 215 opened up generation to private investors. A number of Independent Power Producers (IPPs) generated and sold electricity to NPC and other customers. Transmission of electricity to distributors and large industrial customers was the mandate of NPC, which was responsible for constructing the transmission grid highway interconnecting the main islands throughout the country. Distribution of electricity to end-consumers is performed by investor-owned electric utilities. In greater Metro Manila, distribution to households, commercial and industrial end-users is carried out by the Manila Electric Company (Meralco). Everywhere else, distribution is carried out by a few LGU-owned utilities and numerous electric cooperatives in their franchise areas at retail rates, regulated by the Energy Regulatory Board (ERB). A line agency (Department of Energy) sets policy directions for the industry while a government corporation (National Electrification Administration), provides financial and technical assistance to electric cooperatives.

RA 9136 or the comprehensive Electricity and Power Industry Reform Act (EPIRA) of 2001 embodies two key reforms: (a) restructuring of the electricity supply industry; and (b) privatization of NPC. Industry restructuring provides for the separation of the three power sectors. NPC privatization implies the sale of generation and transmission assets (i.e., power plants and transmission facilities) to private investors. These reforms were intended to increase competition and private sector investments in the power industry in order to reduce rates and improve services to end-users. The reforms allowed for an extension of private generation of energy and electricity from many sources of energy including geothermal as well as hydropower.

3.2.2.2 Implications for PPP in irrigation

Liberalization of power generation and creation of the wholesale electricity market make NIA reservoirs valuable assets. Instead of water being immediately allocated to NPC without any benefit for NIA, the new environment creates opportunities for NIA to increase its incomes and for the Government to reduce its subsidies to the irrigation sector.

The question is what is the best use of this income stream? If it is part of the global package for a PPP in irrigation, and if as expected the income derived from ISF is not sufficient to cover O&M, the private partner could neglect the irrigation component and focus exclusively on the profitable component of the package (i.e., hydropower generation). Another option would be to cover the hydropower station in a separate PPP, and use the revenues (lease, shares of the proceeds, water fees) to explicitly subsidize NIA. These options will be analyzed in Chapter 9: Project Selection Methodology.

3.2.3 Other sectors

In 1997, the Philippines privatized its largest water system by awarding two concession contracts for the provision of water to greater Metro Manila (MWSS). At about the same time, the Government entered into a joint venture agreement for the water supply system in the Subic Bay free port area (ADB).

The country also achieved headway in bringing in the private sector for the construction, operation and management of several transport facilities. Private companies are operating two major international container terminals, and a number of toll roads have been constructed and are being operated by private firms. The success of Manila North Tollways/North Luzon Expressway (which connects Metro Manila to Central Luzon provinces) stands out.

A private sector consortium has built one international airport. BOT and other variant schemes are used for the expansion and operation of the Light Rail Transport system within Metro Manila. Other projects with private sector participation include automation of passport processing, modernization of the electoral process, and computerization of alien registration.

3.3 PPP FINANCING PRACTICES

This section discusses country experiences in financing of PPP projects. It provides information on the sources of funds that are usually accessed by the private sector for project investments; the capabilities of local banks in project finance; and the level of private sector interest in large investments in hydropower facilities and water utilities, and in developing irrigation projects under the PPP program.

The study shows that: (a) PPP projects have been financed by local banks mostly through domestic loans; (b) local banks are highly knowledgeable and skilled in project appraisal and packaging loans for PPP projects; (c) although banks have enough resources for lending to PPP projects, there is overall reluctance to provide long-term loans (e.g., 10 years) in view of risks; and (d) there is, likewise, a general reluctance among the three large business corporations interviewed to invest in irrigation projects, except when irrigation is bundled as a component of hydropower projects, and only when the management of irrigation facilities and services will be handled by NIA.

There was, in any case, some indication of interest from one of the corporations towards learning more about investment prospects in irrigation, particularly on new technologies and practices that could reduce costs and risks.

3.3.1 Sources of investment funds

3.3.1.1 Bank loans

Universal banks dominate the financial landscape in the Philippines. All the specialized institutions (e.g., Development Bank of the Philippines, Land Bank of the Philippines) have received universal bank licenses. A crisis in the Philippines banking sector, largely due to an increase in non-performing loans in public institutions, led to a profound financial sector reform with an increased role for the Central Bank in supervising financial entities.

Deposits, instead of market notes and bonds, are the major source of funds for the banking sector, which explains why loans are the main and most important way of financing for the private sector.

In terms of maturity, banks are wary about providing long-term loans. The longest maturity goes from five to ten years, and usually includes a provision on mid-term loan “re-pricing”. For 10-year loans, the interest rate would be reset five years after the first instalment. This is explained by the difficulty faced by bankers in predicting inflation and future interest rates. The reform of the Central Bank is too recent to give full credibility to its inflation-targeting stance.

3.3.1.2 Corporate notes

Until recently, the main financial instrument issued was that of the Government in the form of Treasury Bonds and Bills which accounted for 99% of all transactions in the secondary capital market. An electronic dealer system for fixed income assets (Philippines Dealing and Exchange Corporation or PDEx) was established by the biggest banks to speed up transactions and to create a more liquid secondary market for these government instruments.

Major business groups recently resorted to issuing notes to borrow beyond the limit imposed by the Central Bank, which prevents banks from lending more than a share of their net worth to single borrowers to avoid too much concentration of risks. Moreover, additional borrowing constraints appear when the borrower is a significant shareholder of the bank. But since the Philippines business landscape is organized around conglomerates, these regulations effectively constrain business groups. This explains their willingness to rely on corporate notes.

According to the “Report on Economic and Financial Developments” for the last quarter of 2012,

private sector issuance of notes increased three-fold from the previous year and stands at 10% of total new issuances.

3.3.2 Risk assessment practices

Banks are not relying on agency rating. They have in-house rating divisions to assess counter-party risks and credit risks. Due to the dominant role played by banking loans in financing the economy, they have first-hand knowledge on business concerns.

3.3.3 Project finance

Project finance was introduced on a large-scale after the demise of the National Power Corporation (NPC) and the passage of EPIRA. The Power Sector Assets and Liabilities Management (PSALM) was mandated to dispose of NPC assets. Interested parties were asked to submit business plans to support their bids, usually with the help of investment banks set up as divisions within universal banks.

With the expansion of private generation of electricity, many business groups used the finance project to realize investments, setting up special purpose vehicles (SPV) and negotiating “non-recourse loans” with bankers (meaning that banks will not use the assets of business groups as guarantee in case of default).

Even if the first operations were concluded with the help of foreign partners, the techniques of project finance have been mastered by the investment banking units set up by universal banks. They are used to cash flow (instead of balance sheet) financing, setting up SPV, and organizing themselves as advisors, arrangers and book runners according to the requirement of projects to be financed. Moreover, the investment banking units know how to conduct due diligence and to structure PPP deals. In terms of using financial models and certifying them, they have first-hand experience. Finally, they have teamed up with foreign banks and lawyers to provide transaction advisory services. With the Government’s reliance on PPP to fill the gap in infrastructure investments, many of these units acquired first-hand experience in financing PPP. In particular, three banks have been analyzed in order to assess their know-how and abilities in conducting project finance.

Land Bank of the Philippines (LBP) is currently advising the DA on the PPP “Grain Central Project”. It has established a partnership with the International Finance Corporation (IFC), a member of the World Bank Group which deals with the private sector. A meeting conducted as part of this study involved a senior member of the investment banking unit set up to advice sponsors and the Government on PPP. During the meeting, many issues regarding project finance in the Philippines context were discussed as tenors, bonds market and consortia loans. The LBP has a thorough understanding of the needs of a major PPP transaction. At the Development Bank of the Philippines, the same level of proficiency was observed. Finally, the Philippine National Bank track record concerning project finance shows that the ability to organize transactions is quite common in the Philippines banking sector.

3.3.3.1 Types of project finance

The options available to finance a PPP project reflect the development of the financial markets in the Philippines:

- Syndicated bank loans are probably the easiest financial instruments to be mobilized for PPP. Banks are used to combining their forces in order to diversify risks and respond to the needs of big projects;
- Corporate notes can be considered, but seem unlikely in the case of an SPV. If the assets of sponsors do not back it up, an SPV would have difficulty attracting lenders and accessing needed amounts; and

- Long-term ODA lines of credits are available through local banks. They can provide long-term loans, but at a cost. In order to cover the exchange rate risk, the Treasury asks for a commission of 3% and if it has to provide a public guarantee, an additional spread of 1% is required.

As all income streams will be in Philippine Peso, the option of foreign borrowing has been dismissed.

3.3.3.2 PPP projects financed

The following examples show the breath of PPP experience in the Philippines. These transactions were prepared and financed by Philippine financial institutions, sometimes with the help of foreign partners. A simple enumeration of achievements is proof of the ability and know-how of the local financial sector. Most of them were set up as a SPV, and financing was provided in a non recourse way. The Power Purchase Agreements and the exchange risks guarantee provided by the Department of Finance (DOF) were sufficient to attract long-term funding, essentially from foreign sources.

Hydropower: It is certainly the sector with the most impressive achievements. The San Roque Dam and Hydropower Project is a US$400 million BOT. Casecnan is equally an impressive achievement although more controversial, due to the power and water purchase agreements signed by NIA and guaranteed by DOF.

Domestic water production and distribution: Manila Water and Maynilad were set up as concessions to correct deficiencies in public management of water distribution in Metro Manila. Their achievements are brought up as examples all over the region.

Mass transit transport: The LRT concession in Metro Manila has been a success and extensions are on the pipeline.

Toll roads: The most impressive achievement is this regard has been brought in by the Manila North Tollways Corporation. Its North Luzon Expressway (NLEX) that runs from Balintawak, Quezon City up to Sta. Ines, Pampanga has a total distance of 84 km with 15 exit points. This project was completed on schedule.

3.3.4 Key players' views

This section deals with the perspectives of potential private partners in irrigation and hydropower. When meetings related to this study were organized, the most important goal was to assess the willingness and preparedness of private sector operators to engage in PPP having an irrigation component. The experience shows that there is no such problem for a hydropower-based PPP. At the same time, the meetings were also used to confirm the assessments made on the ability of financial institutions to provide project finance.

A word about the workings of business groups in the Philippines: many companies are part of large family conglomerates with diversified holdings. To read their ability to engage in large projects based on their balance sheet alone is misleading. As members of large holdings, they can draw on the whole group's capacities in finance, management and technical know-how.

3.3.4.1 Ayala Energy Corporation

This is an affiliate of the Ayala Group and established to manage the latter's energy assets acquired after the demise of NPC. It has been active in setting up new operations in energy generation, either from renewable or conventional (gas and coal-based) sources.

In terms of project finance knowledge, the company has set up many SPVs to manage its assets.

Financing has been done with banks on a cash flow (rather than balance sheet) basis. The company shows experience in modern project finance. In regard to irrigation investment or participation in an irrigation-based PPP, the company expressed reservation as they are not knowledgeable about irrigation issues and are aware of the political sensitivity in the irrigation sector. Even after receiving more details as to how issues would be managed, the reluctance remained. On the other hand, the company is eager to participate in hydropower projects, either through the BOT or the BOO mode.

3.3.4.2 Manila Water Corporation

This corporation is an affiliate of the Ayala Group and is a private partner for water distribution in Metro Manila. It has extensive coverage (more than six million customers) and deals with bulk water sourcing, water treatment and distribution. It is also in charge of developing used water collection and treatment (sewerage). (Water distribution is a concession of the public entity in charge of water distribution in Metro Manila with the Metropolitan Waterworks and Sewerage System/MWSS regulating and supervising the concession).

In terms of project finance experience, this corporation has set up new entities for the distribution of water all over the Philippines, building on the know-how it has gained from its concession in Metro Manila. The standard model of the concession, with the use of an SPV and cash flow financing, has been applied by the corporation in its expansion. According to its management, there is no problem in using project finance with the help of financial institutions in the Philippines.

Manila Water appears to be a natural candidate for managing irrigation systems. International experience shows that many water utilities consider irrigation as a natural expansion of their activities; this was the reason for holding a discussion with this company. Unfortunately, its first reaction to irrigation concessions and PPP was not encouraging. It considers expansion in its core competency as its most important path. It is committed to finance the creation and extension of the sewerage system in Metro Manila, which by itself is a huge endeavour. Also, it has no experience or knowledge in irrigation.

If Manila Water is to be attracted to provide irrigation services, it has to be actively engaged by transaction advisors. Visits to irrigation systems and NIA offices should be organized. There could be a high payoff in attracting such a corporation to invest in irrigation services.

3.3.4.3 SN I ABOITIZ Power Inc.

This is a partnership between Aboitiz Power which is a prominent Filipino business group and the SN Power which is the international venture of Statkraft, a leading renewable energy operator. The company acquired energy assets from PSALM following the demise of NPC. It currently manages the hydropower unit at Magat Dam. It also has an agreement with NIA to share in the maintenance cost of the dam.

The company is knowledgeable about PPP policy and opportunities. It has first-hand experience in project finance and is keen to expand business by entering new partnerships in the hydropower sector. The company is considering options in regard to the development program of NIA, including the Ilaguen Project was discussed extensively during the meeting organized for this study.

Initially, management was reluctant to consider an investment or partnership in irrigation. It voiced preference for an operation whereby NIA would manage the irrigation part, even as the company is ready to consider a BTO model for the construction of the dam, irrigation facility and hydropower unit in Ilaguen. For the hydropower unit, it prefers a BOT or a BOO arrangement.

During the meeting, many questions about irrigation were discussed, e.g., new technologies in conveyance and distribution of water; new techniques for payment collection (e.g., prepaid cards); and the role that could be played by the IAs. At the end of the discussion, management was much less reluctant to consider an O&M contract in irrigation, as part of a wider project.

It is important to direct transaction advisors to engage properly with the private sector that may be interested in power generation, in order to expand their interest to irrigation. There is clearly a lack of knowledge about irrigation issues that makes the private sector reluctant to invest in this sector. This lack of knowledge has to be addressed by promoting visits and presentations to engage the private sector positively and to dispel prejudices related to providing irrigation services.

3.3.5 Summary of observations

Expertise on project finance: There is no lack of knowledge and know-how on PPP financing in the Philippines. Financial institutions are experienced and ready to advise and arrange financing for the pipeline of PPP projects currently planned.

Domestic financing capacity: Financial markets, and the position of major banks, are able to finance the requirements of PPP projects. The current liquidity is such that there is no need to access foreign funds. The only weak point relates to the term of the loans that can be supplied by the banking sector. For the time being, it would not be possible to draw firm commitment on long-term finance. This does not mean however that there is no solution, and one way to address this would be to accept the resetting of fees and tariffs, along with the renewal of lines of credit.

Interest in hydropower and dams: There is keen interest from the private sector in PPP for hydropower purposes, even when they will finance and construct the supporting dams.

Interest in irrigation: There is a general lack of knowledge about irrigation service provision that breeds reluctance to consider a partnership in this sector, either for construction or O&M. But when properly engaged, there is potential in bringing the private sector into such partnership.

3.4 PROSPECTS FOR IRRIGATION

3.4.1 PPP in irrigation

All the previous examples of PPP in the irrigation sector were concerned about dams and hydropower plants. One explanation could be the legal constraints facing a PPP solely for irrigation: AFMA Section 30 is ambiguous. It states that "*The National Irrigation Administration (NIA) shall continue to plan, design, develop, rehabilitate, and improve the NISs. It shall continue to maintain and operate the major irrigation structures including the head works and main canals. In addition, the NIA is mandated to gradually turn over operation and maintenance of the National Irrigation System's secondary canals and on-farm facilities to Irrigators' Associations.*"

The first statement reaffirms the NIA Charter in regard to irrigation development which focuses on NISs. However, the second sentence which provides that NIA must turn over O&M to the IAs triggers a number of questions that need to be further clarified, i.e., does this mandate preclude any third party from being engaged for O&M in the secondary canals of NISs?; does it mean that NIA cannot enter into a contractual arrangement with a private partner to operate and maintain an NIS? Even Section 33, which specifies BOT as a way to fast-track development of irrigation systems does not reduce the ambiguity. It states clearly that PPP is for construction purposes and not for O&M.

3.4.2 PPP in irrigation – key issues

Adopting the PPP scheme in irrigation will require specific answers to the following questions as to how PPP can: (a) help to address the usual problems in publicly-funded irrigation; (b) ensure financial viability; (c) avoid political interference in setting irrigation fees; and (d) increase the useful life of an irrigation system and break the vicious cycle of low collection of irrigation fees, poor maintenance, system degradation, and expensive rehabilitation. PPP has to make the case that the cost of a privately-funded project is at par with one funded publicly.

The advantages of private sector involvement arise from the ability to manage the construction phase more efficiently, and to provide more effective O&M. Its ability to structure contracts where finance and performance are entwined to promote efficient outcomes is generally superior to standard public procurement. Publicly-funded projects face constraints in procurement, supervision and decision-making processes. Budgeting and appropriation are complex tasks that can reduce the ability of the public sector to react quickly and to manage efficiently. In terms of O&M, the flexibility of the private sector in setting wages to attract skilled staff is generally an efficiency factor which is a major challenge in the public sector.

Efficiency gains do not come without risks. The use of PPP can create obligations to the delegating authority far in excess of the benefits of the initial contract. If the contractual obligations are not properly written, sometimes the private partner can derive excessive benefit. This could happen in the initial contract during the negotiation of amendments and addendum. The power purchase agreements signed between NPC and the private sector led to heavy losses for the public partner.

One criticism of PPP, from the point of view of public officials, is that it is more expensive than publicly-funded projects because financial charges and profit are added to investment and O&M cost. In fact, strictly speaking, appropriations from the central budget are directly used to realize the investment, without taking into account from the point of view of the users, any financial cost. In reality, appropriations result from taxation or borrowing, which are both expensive. In the majority of infrastructure projects realized through PPP, subsidy or concessional lending was provided to the private partner in order to fill the viability gap that reduces the advantage of public finance. Even with the higher cost of financing, project finance can reduce overall costs of the infrastructure by managing risks more precisely. For example, through the engineering procurement construction (EPC) type of procurement contract and high penalties for delays, a PPP can be competitive with a project managed by the public sector. In order to provide efficient solutions and competitive

finance, PPP has to be tailored to the problems and to the context in which they are to be applied. There is no turnkey, fit-all solution in irrigation for structuring a PPP.

To prepare the contractual arrangement that defines a PPP, technical, financial, managerial and legal constraints have to be identified to select the proper model. Beyond understanding sector issues and opportunities, people in charge of preparing the PPP contract must have a good understanding of legal and regulatory constraints and rules, type of contract arrangements permitted, and public incentives to promote PPP. Good knowledge on the requirements of project finance is needed such as the length of maturity of debts and obligations, guarantees needed by financial institutions, and credit rating of prospective partners.

In the case of irrigation services, it is important to consider the opportunity of hydropower generation whenever the investment program includes a dam. The services provided by dams are diverse and inter-connected, thus making it difficult to allocate costs to the different components (flood protection, water needs of households and industries, hydropower generation and irrigation). If the project is realized to irrigate a new service area, any benefit for joint production is a pure upside. The difference between the cost of the turbine needed for hydropower and the price of electricity produced and sold is equal to the rent produced by the dam. It can be allocated to reduce the cost of irrigation, or it is possible to consider that the true cost of the irrigation services include the total cost of the dam. The choice made in separating costs and benefits in joint production will have a big impact on the project and on the users.

These considerations explain that in order to identify options for PPP in irrigation, a review of irrigation sector features and policies, an analysis of the regulatory framework for PPP, and a good understanding of hydropower projects are needed.

4 RELEVANT INTERNATIONAL EXPERIENCE

There are some operational experiences as described below that can guide development of PPP in the irrigation sector to lower the financial burden of Government. Table 4-1 below summarizes the relevant Information.

- **Guerdane Project (Morocco):** The PPP is Public Service Delegation of Irrigation & Drainage Services. The concession of 30 years was signed in 2004. The private operator is responsible for financing 50% of total investment, design, construction of a 10,000-hectare pressurized irrigation, and 30 years of O&M. State subsidies are limited in the initial investment, and the private operator covers O&M costs and makes a profit from irrigation fees. The beneficiaries are commercial farmers with experience in using underground water for irrigation and who have access to export markets for citrus production. For the out-grower system, the Government is developing specific agreements between agribusiness companies and smallholders (*contrats d'agrégations*).

- **Megech Project (Ethiopia):** This involves construction of a 4,000-hectare irrigation scheme for smallholder farmers with no previous experience in irrigation activities. The PPP covers two contracts: (a) construction; and (b) management including supervision of construction and O&M functions. There is no private investment in construction.

- **Olmos Project (Peru):** The Project is under construction with two different contracts: (a) bulk water provision; and (b) development of an irrigation network of more than 3,800 hectares with pressurized distribution. "Take or pay" for water delivered at the outlet is paid by the public party. "Take or pay" for irrigation water is paid by farmers. There is no subsidy for operation.

- **Pontal Project (Brazil):** This concession of 25 years includes construction and O&M in a 7,700- hectare area. The private operator was initially required to be a Joint Venture between an agribusiness company and a construction and O&M company. The private operator was obliged to dedicate at least 25% of the area to smallholders. After many delays, the authorities are now considering separating the provision of irrigation services from the agricultural development component.

- **West Delta Project (Egypt):** The concession is similar to Guerdane but with a duration of 20 years and a higher public contribution for investments (85%). This project was recently cancelled.

- **BRL[4] Project (France):** Established in 1955, BRL (Regional Development Authority) was created to promote the socio-economic development of the Languedoc Roussillon Region in Southern France. It has developed a large and complex system of water infrastructure to convey water for irrigation, tourism and domestic use. It also supports the regional authorities and farmers' associations on infrastructure operation and development (financial and technical studies) and agriculture development (agriculture extension, capacity building, and institutional development). BRL owns, manages and operates under a concession contract of 75 years hydraulic infrastructure consisting of six dams, 125 pumping stations, 8,000 kilometers of buried pipes, and 105 kilometers of canals covering 130,000 hectares The BRL Holding Company has developed a lease contract with a subsidiary. Through the infrastructure, the subsidiary distributes 130 million m^3 of water per year for agriculture (60,000 hectares of irrigated land), domestic and industrial use.

Below are the important lessons learned from the above projects:

4 BRL refers to the region Bas Rhône Languedoc, where the concession is located.

- **Avoid complexity.** The separation of contracts is better than a bundled approach as in the case of Pontal Project which was delayed, while Olmos Project which was recently launched is more advanced. The separation of contracts makes the structuring and bidding process easier to conduct because there will be no conflict in objectives or in the indicators to be used to award the bid. When the PPP contract is simplified, it is easy to define criteria for awarding the bid and indicators of performance. On the contrary, if there is a need for more complicated indicators (as is the case of a PPP with multiple objectives), the processes of structuring the deal, awarding the bid, and preparing the contracts are more complex and prone to conflict.

- **Heterogeneity of Farmers.** The complexity of the PPP design could be increased by the heterogeneity of farmers (i.e., co-existence of commercial farmers with subsistence-oriented farmers) and the divergence of interest such as: (a) the commercial farmers would be interested by an improved (and more expensive) quality of irrigation and drainage services contrary to (b) the other water users who may prefer to go on with cheap and poor public services.

- **Greenfield and Brownfield.** PPP in irrigation faces more resistance and additional complexity when applied to irrigation schemes under operation (brownfield). In Morocco, the public promoter has faced resistance in extrapolating the successful experience of Guerdane (a greenfield or new irrigation scheme) to the other large scale existing irrigation schemes of the Kingdom (e.g., Gharb, Loukkos, Tadla, Moulouya, Doukkala). This situation is likely to happen in Brazil with the Nilo Coelho irrigation scheme already under operation.

- **Perception of risks.** The resistance from different stakeholders comes with their own specific perception of risks: (a) the farmers would be concerned of increase of irrigation fees, loss of flexibility in relation to fee payment, etc.; (b) the current operator staff would fear for loss of employment; and (c) the local political leaders would be concerned of privatization of public assets and water services with the arrival of a private operator.

Table 4-1: Main Features of International Experience on PPP in Irrigation

Name of Project	Stage/Phase	Area and General Design	Breakdown of Investment Functions	Transaction Model	Inclusion of Hydraulic & Agricultural Functions in the PPP Contract
Guerdane (Morocco)	On-going PPP contract since 2004.	10,000 hectares of pressurized system for drip.	50% of hydraulic assets financed by private, 45% by public and 5% by farmers.	Concession of 30 years with DBTO functions done by the private partner. No subsidy for operation, full recovery costs for private partner including profit.	No inclusion. Agricultural functions are on separate contracts of "aggregations".
Megech (Ethiopia)	Project under construction.	4,000 hectares for gravity irrigation.	No investment from the private entity. Private entity does not take the risk linked to irrigation fee collection. Payment of fees is based on key performance indicators.	A construction contract plus a second contract for management including: a. Review of the detailed scheme design. b. Supervision of the separate construction contract. c. Long term O&M of the scheme.	No inclusion (probably separate contracts or services provided by a public entity).
Olmos (Peru)	On-going contracts signed in 2004 for bulk water at the tunnel outlet, and in 2010 for irrigation services.	New irrigation scheme of 38,000 hectares with pressurized system for large plots (1,000 hectares). Beneficiaries are commercial agribusiness companies.	47% of hydraulic assets financed by private and 53% by public.	Two separate concession contracts: 20 years for bulk water at the trans-Andean tunnel outlet, and 25 years for irrigation and drainage services. "Take or pay" for water paid by public party delivered at the outlet of the tunnel. "Take or pay" for the irrigation services paid by farmers. No subsidy for operation.	No inclusion. Large plots of land (1,000 hectares) are sold to agri-business companies.

Name of Project	Stage/Phase	Area and General Design	Breakdown of Investment Functions	Transaction Model	Inclusion of Hydraulic & Agricultural Functions in the PPP Contract
Pontal (Brazil)	First bids submitted in August 2010.	7,700 hectares for commercial crops (fruits).	Public subsidies are fixed (US$50 M). Private entity will cover the remaining 50% (US$50 M).	Concession of 25 years with DBTO functions plus land allocation done by the private entity. Private entity must include an agribusiness company in the consortium. Private entity has a deadline of 6 years to finalize construction and start production.	Yes. The tender requires that the private entity has to dedicate at least 25% of irrigable land to small farmers, integrated to the production chain of agribusiness companies.
West Delta (Egypt)	Project under preparation. PPP documents being discussed with pre-qualified companies.	36,000 hectares on pressurized system.	Public subsidy is a fixed amount (US$175 M or 85% of construction costs). The private entity will cover the remaining 15%.	Concession of 20 years with DBO functions done by the private entity. No subsidy for operation. Full recovery of costs for private entity (including profit).	No inclusion.
BRL (France)	On-going since 1955.	130,000 hectares of pressurized system for drip, sprinkler and center pivot.	Initial public investments through a newly created Regional Development Company.	Concession of 75 years between the contracting authority (Region) and the holding company. Mixed company with private shareholders. Lease contract between Holding (BRL) and subsidiary (BRL e).	No inclusion. Done at the beginning of the BRL creation but not anymore now.
Additional projects:					

Name of Project	Stage/Phase	Area and General Design	Breakdown of Investment Functions	Transaction Model	Inclusion of Hydraulic & Agricultural Functions in the PPP Contract
Azemmour (Morocco)	Project under preparation.	4,000 hectares of pressurized system for drip irrigation.	Part of the hydraulic assets financed by private entity. The other part will be subsidized by the government. Farmers will pay a subscription right and right to access. They will also pay for plot investments.	Concession of 30 years with DBTO functions done by the private entity. No subsidy for operation, full recovery costs for private entity including profit.	The private sector will advice on irrigation material at field level; management of irrigation; water saving. Agricultural functions are under separate contracts of “aggregation” (out growers).
Majes II (Peru)	Contract signed in 2010 but still not enforced due to conflict about water resource between regions.	New irrigation scheme of 38,500 hectares of pressurized system for large plots (400 hectares).	51.1% of hydraulic assets financed by private and 48.9% by public.	Concession for construction and O&M of 20 years. Take or pay for the irrigation services paid by farmers. No subsidy for operation.	No inclusion. Large plots of land (400 hectares) are sold to agribusiness companies.
Convento Viejo (Chile)	Contract signed in 2005.	Increase of storage capacity of an existing dam and new irrigation scheme (19,000 new hectares and increased water supply for 27,000 hectares).	Based on Private Finance Initiative modality.	Concession for construction and O&M for 25 years.	No inclusion.

PART II.

PROPOSED ANALYTICAL FRAMEWORK

In order to select the proper candidates for a PPP, an approach constituting three steps is proposed:

- Identification of the appropriate contractual arrangement(s) to be used;
- Screening of potential projects from the inventory in order to extract a subset of potential candidates; and
- Analysis of the feasibility of PPP project development for the selected subset.

Model selection

The identification of the appropriate contractual arrangement to be used in PPP is to be based on a combination of SWOT analysis and the goals assigned to the partnership. Risk analysis for irrigation projects complements the identification of the models. These are selected once found legally feasible to be used in PPP.

Project screening

Appropriate screening of potential projects is conducted through a multiple criteria analysis of the potential projects inventory. This screening is oriented by the objectives sought by the partnership.

Project selection

The most important tool for conducting project analysis in PPP is the financial model. It is used to find out if the partnership is sound financially from the point of view of the private partner, and to evaluate the extent of public commitments required if the return on equity is insufficient. Financial models for PPP arrangements are refined during the phase of transaction preparation. More details are included in terms of tax treatment, cash flows and costs. At the identification phase, simplified models are the norm.

Another tool for project analysis, constructed generally after receiving financial proposals, is the value-for-money analysis, sometimes called “public-sector comparator”. Value-for-money analysis compares the costs and benefits of the PPP candidate with the public provision of the same project. It is the final test of the public benefits to be derived from resorting to PPP, instead of realizing the infrastructure through line agencies of the government using public procurement.

Value-for-money analysis is sensitive to the allocation of risks between the private and public partners. For example, a public-managed project generally incurs cost overruns because it is restricted by public procurement rules. The private partner can use insurance or strict contracts to guarantee against cost overruns and delays. If it is possible to quantify the probability of a cost overrun in relation to projected costs, it is possible to construct an estimate of the expected value of this cost. This expected value is added to the project cost in the public sector comparator. When the data needed to estimate expected values are scarce, usually a qualitative comparison gives better results. The procedure for project selection is discussed in more detail in Chapter 9 (Project Selection Methodology).

5 PPP TRANSACTION MODELS

This section informs the reader about the various types of contractual arrangements that may be entered into between government agencies and private entities under a PPP. It also presents the basic features of PPP models for irrigation projects that have been adopted in other countries. As noted previously, the most important lesson to be learned from the experience of other countries is to avoid complex contracts (i.e., contracts with multiple objectives). It is better to break a large contract into several smaller, separate contracts. Complex contracts entail complex operational procedures and relationships, which increase the likelihood of delays in project implementation and conflict between the contracting parties.

Figure 5-1 below illustrates the diversity of PPP arrangements that can be designed according to three main criteria, which will help identify the most suitable models to address issues at hand:

- The different functions that the private partner will take responsibility for through the PPP contract (e.g., design, construction).
- The source of revenues for the private operator (to be paid by the final users or by the contracting authority).
- The contribution (possibly none) of the private partner to the capital expenditure (CAPEX) of the project.

The diversity of options is important. The contracting authority can require the private partner to: (a) finance infrastructure (i.e., provide funds to pay for infrastructure cost through equity and loans); (b) design such (e.g., prepare alternatives to provide the services, use innovative technologies and approaches in the construction phase); and/or (c) manage and maintain the infrastructure (e.g., define the organizational structure, staff requirements, incentives and salary package, operational procedures and manuals, maintenance manual). In terms of revenues, the private partner could rely on user fees, on payments from the public contracting authority, or on funds made available by the Government as payment or as subsidy to the operator for providing the service.

The contribution of the private partner to CAPEX can range from 0 to 100%. The level of risk borne by the private operator can vary widely from one case to another and from one model to another. The higher the risk, the higher should be the return to be offered to the private partner as incentive by the contracting authority; and the higher the return, the higher will be the cost to the final users. The contracting authority, with the help of transaction advisors, has to find the correct trade-off by allocating risks to the party most able to bear these to reduce the burden on final users. For instance, if the contracting authority has the power to change the nature of the service provided through a legislative or regulatory act, then the private partner has to be protected from such a move. The private partner can insure itself from the occurrence of such an event, or the contracting authority can provide a formal commitment to avoid such a change**.** Both actions have the same result, but the first one will increase the cost of providing the service, while the second will have no effect on costs.

Figure 5-1: PPP Transaction Models

Origin of revenues for private operator	Functions under responsability of private operator	Participation of private operator in investment functions (capital costs) ?	
		Yes	No
Services paid to the private operator **by the final users (farmers)** - Public Service Delegation (PSD)	Design	Concession	Lease / Affremage
	Construction		
	Transfer of infrastructures after completion of construction		
	Operation & Maintenance		
	Ownership of O&M assets		
	Ownership of infrastructures	Divestiture	
	Possible transfer of infrastructures after completion of PPP contract		
Services paid to the private operator by the **Public Authority**	Design	BOT	Manag. contract
	Construction/supervision of work		
	Management (staff of private operator in Public Entity)		
	Operation & Maintenance		O&M contract
	Ownership of O&M assets		EPC - DB
	Transfer of infrastructures after completion of construction	BOO	DBO = EPC + O&M contracts
	Ownership of infrastructures		

Legend:

Differences between lease and affermage is in the rent paid to the Contracting Authority (lease fees: fixed rent / Affermage fees : varying on revenues collected from users)

BOT : Build Operate Transfer

BOO: Buid Operate Own

Manag. Contract : Management contract

O&M Contract : Operation & Maintenance contract

EPC / DB : Engineering Procurement Construction (also called Design Build)

DBO : Design Build Operate (contract with EPC + O&M together)

6 PPP MODEL SELECTION

This section presents PPP models considered to be most appropriate for irrigation projects in the Philippines, in light of: (a) in-country experience in the execution of PPP projects; (b) the current situation of irrigation systems; (c) the political, social, economic and technological environment; and (d) experience of other countries in private sector-led irrigation systems development.

Three PPP models or contractual arrangements are recommended for irrigation projects: (a) Build-Operate-Transfer (BOT), when the income stream derived from hydropower generation is high enough to cover potential losses in providing irrigation services; (b) Build-Transfer-Operate (BTO), when the expected income stream from electricity sales and irrigation service fees are not sufficient to pay back the debt to be incurred by the private partner even when a substantial part of project cost is borne by the public partner (e.g., grants to cover 50% of capital expenditures, right of way, fiscal expenditures); and (c) Management Contracts (with performance incentives), when the knowledge and expertise of private entities is needed to improve the operation and maintenance of existing or new irrigation systems.

6.1 INVENTORY OF POTENTIAL PROJECTS

Irrigation systems are either public or privately funded. LGUs have to finance CISs (communal systems), while the national government finances the development of NISs (national systems) through NIA. The list of prospective projects to be realized by NIA for the next two years is provided in Annex C. These projects were validated by NIA CORPLAN to have PPP potential.

The three models for developing irrigation systems are river diversion, storage or reservoir, and pump irrigation. Diversion projects draw water directly from rivers. Reservoir projects involve the construction of dams to store water for release when needed; these are usually multi-purpose projects and include functions such as power generation, flood protection, domestic water provision, fishery and recreation.

In terms of projects to be considered for PPP, the usual distinction is:

- Brownfield projects - involves existing systems and facilities; and
- Greenfield projects – involves new/to be constructed systems and facilities and operations.

In regard to irrigation, a useful distinction to be added is between multi-purpose projects, which include hydropower or other uses and irrigation-only projects.

6.2 SWOT ANALYSIS AND MODEL SELECTION

SWOT analysis can be used to identify needs that could be addressed/fulfilled by a private partner in irrigation, such as finance, construction, O&M, marketing, and cost cutting/reduction. Table 6-1 below presents the strengths and weaknesses, and also the threats and opportunities in irrigation.

Table 6-1: Strengths and weaknesses, threats and opportunities in irrigation

Strengths	**Weaknesses**
• Good IMT model • Knowledgeable government-owned and controlled corporation (GOCC) • Simple and low cost irrigation infrastructure • Knowledgeable farmers in IAs, production techniques and irrigation • Simple ISF adjustment mechanism (indexed to the price support of rice)	• Over-extended service area • Tailers without irrigation • ISF does not cover O&M costs • Low recovery rate of ISF • No innovation in irrigation networks • No protection from urbanization for irrigated perimeters • Very few non-rice experiences • Very few private provision and support • Dam costs borne by irrigation sector, without any contribution for flood protection or drinking water security (cost allocation biased against irrigation)
Threats	**Opportunities**
• Contagion on ISF non payments • Change in rice policy • Financial crisis in public finance • Water allocation conflicts	• Increasing recognition of Philippine fruits in the world markets (mangoes, bananas, etc.) • Self sufficiency policy in basic food staples • Expansion of the PPP model with a huge reward for the first operators • Untapped irrigation potential in “Greenfield” irrigation • National firms knowledgeable on PPP in power generation and water distribution • Developed financial markets to support PPP

The most important factors in the SWOT analysis in regard to PPP are: (a) low recovery rate and level of ISF; (b) cost allocation in multi-purpose projects; and (c) over-reliance on rice production. These factors feed threats to the sustainability of investments by NIA. The low ISF recovery rate could create a contagion and reduce incomes needed to cover O&M costs. Over-reliance on rice production reduces the scope for innovation in conveyance and distribution systems, and increases the need for proper and regular maintenance to lengthen the useful life of irrigation systems.

6.3 IMPLICATION FOR PPP MODELS

Once the needs to justify the involvement of a private partner have been identified and agreed upon by stakeholders, a risk analysis must be conducted to assess the willingness and capacity of the private sector to bear such risks. The assessment of private sector willingness to support risks in irrigation-related projects must be confirmed through direct consultation with potentially interested private partners. At this stage, common sense and the experience of transaction advisors are mobilized in order to define the PPP models.

6.4 WHAT IS NEEDED FROM THE PRIVATE SECTOR?

The private partner should bring in knowledge on how to modernize irrigation systems either in Brownfield or Greenfield projects. In particular, modernization should cover conveyance and distribution, water measurement, and introduction of institutional innovations to manage the relationship with farmers and Irrigators Association.

Managerial efficiency is also expected from the private partner in order to reduce O&M cost, and to ensure that the useful life of the irrigation system is extended. Currently, irrigation systems are rehabilitated or restored every 17 years, based on a rough estimate. The area rehabilitated during the last 17 years is equal to the total service area managed by NIA. More efficient and less costly provision of maintenance services by the private partner should translate to increasing the useful life of the irrigation system, roughly translated to lengthening of the rehabilitation cycle.

Finally, the private sector partner could provide additional financing to the investment program of NIA. Additional finance could increase the speed of development of the new service area (although current appropriations for increased investments by NIA are at a very high level, as irrigation development is the most potent lever to be used in attaining rice self-sufficiency).

Two constraints loom large as potential obstacles to the use of PPP in irrigation in the Philippines:

- The first is that there is no income stream sufficient to support project finance for irrigation. The level and the rate of collection of ISF would not be sufficient to pay for O&M costs, the loans that were incurred, and the required return on equity to attract private sector interest. Usually, in the typical PPP project with a high enough user fee (and rate of collection), top priority is given to repayment of loans. This is done through an agreement among all parties on priorities with respect to the allocation or use of service fees that would be collected. When collections are not sufficient to cover the cost of the service provided, these financial techniques cannot be brought in and consequently, public appropriations or subsidies would be required to sustain the project.
- The second constraint is on the legal feasibility. PPP is essentially a contractual arrangement. In order to draft the contract(s), legal advisers have to make sure that provisions are legal and not subject to legal risks. In the case of irrigation, it would mean that the PPP model to be used is in conformity with the PPP law and laws governing the development and administration of irrigation systems in the country.

6.5 WHAT COULD BE DELEGATED IN TERMS OF FUNCTIONS?

Based in the list of needs identified in the previous section, the functions to be delegated to the private partner can include:

- ***Finance***: the private partner should finance the investment needed to realize a Greenfield-type project; rehabilitate a Brownfield-type project; and build the hydropower station, if required;
- ***Construction***: the private partner should manage the construction of the infrastructure needed to operate the irrigation system and the hydropower station;
- ***Operation and maintenance***: the private partner should manage and maintain the irrigation system; and

- ***Agricultural services***[5]: in order to maximize benefits from irrigation, there may be instances where it may be necessary to provide extension and technical support to farmers. In such cases, technical support services to farmers should be included in the contractual arrangement defining the PPP.

6.6 MODELS TO BE USED

Based on previous observations and analysis, it can be concluded that private involvement in the provision of irrigation services in the Philippines is a very risky proposition. Throughout the entire project management process, many difficulties have to be dealt with successfully (e.g., legal hurdles, engineering and construction risks, political interference). Moreover, once the infrastructure is completed and operational, the private partner cannot rely on user fees to recover costs - the ISF is too low and poor recovery rate compounds the problem (61% in 2012).

This is not to say, however, that private sector knowledge and skills could not be made available to improve operational efficiency and reduce the cost of service provision. These needs should be fulfilled for the sake of the farmers and the Government. It only means that the contractual arrangement should rely on a structure different from the traditional BOT contract.

The following section presents the types of models that respond to these many constraints. Several remaining issues are also discussed in the suceeding sections in order to provide more detail about the recommended models or contractual arrangements, such as the payment mechanism for recovering costs, responsibilities of the contracting authority, and the role of NIA. It should be emphasized, though, that what are presented here are “polar models”. During the PPP planning and design phase, it is possible that hybrid models will be considered, using/combining parts of these polar models.

6.6.1 Polar models for PPP

The original BOT law (RA 6957) was extensively amended by RA 7718. The IRR was revised to spur the use of PPP by government agencies to accelerate the provision of infrastructure. RA 7718 and its revised IRR define many contractual arrangements that can be used directly while also allowing the President to approve new types of contractual arrangements. This means that the range of PPP contracts that have been adopted in the country can be expanded using internationally-accepted practices in PPP.

- **Management Contracts** - O&M with performances incentives falls under this category. Under this model, the private partner provides only management services. Financing and construction remain to be the responsibility of the public partner. The private partner’s obligation is to ensure “good operation and maintenance” as defined in the contract or in an O&M Manual that will form part of the contract. The private partner is paid directly by the public agency for its services. Payment does not depend on the collection of user fees, although the private partner may also receive a performance bonus based on the collection rate of user fees.

  This kind of contractual arrangement brings in managerial know-how in O&M of infrastructure. The level of risks for both partners is low. They can respond to the need to introduce innovations in O&M without entering into a long-term relationship. According to the legal opinion of the NEDA PPP Center, this type of contract can be used.

- **Build-Transfer-Operate (BOT) Models** - are defined in the revised RA as “a contractual arrangement whereby the public sector contracts out the building of an infrastructure facility to a private entity such that the contractor builds the facility on a turn-key basis, assuming cost

5 This option needs more elaboration. Many public agencies are active in delivering extension services and their agreement and a legal opinion would be needed prior to implementation. In accordance with lessons learned from international experiences (Section 4), this should be implemented under a separate PPP.

overrun, delay and specified performance risks. Once the facility is commissioned satisfactorily, title is transferred to the implementing agency/LGU. The private entity, however, operates the facility on behalf of the implementing agency/LGU under an agreement." This means that under BTO, the private partner can design, procure and construct the irrigation system and be paid for it when the completed facility is transferred to the contracting authority, after which the private partner will have the responsibility of operating the facility.

- **Rehabilitate-Transfer-Operate Models -** deal with the rehabilitation of an irrigation system under the same terms as BTO contracts which have to be approved prior to the transaction. Rehabilitation contracts named in the IRR are the ROT (rehabilitate-operate-and-transfer) and the ROO (rehabilitate-operate-and-own). ROT and ROO are not particularly appropriate for irrigation projects in that the payments to the private partner, as stipulated in the IRR, will be sourced from user fees[6].

6.6.2 Cost recovery methods

The IRR of RA 7718 clarifies the conditions of payments to be made to the private partner. Section 12.16.b states that for projects undertaken through BTO arrangement - the project proponent may be repaid by either of the following two options:

- First Option - the agency/LGU provides amortization as may be appropriate and reasonable. Tolls, fees, rentals and charges that the project proponent may collect while operating the facility on behalf of the agency/LGU may be applied directly to the amortization. Moreover, the facility operator may be repaid by the agency/LGU through a management fee as may be incorporated in the management contract entered between the agency/LGU and the project proponent; and
- Second Option - the project proponent may be allowed to directly collect tolls, fees, rentals and charges for a fixed term. Under BTO, the private partner is paid for the construction by the public partner, based on an agreed amortization plan, and for the O&M according to the terms set in the management contract. The private partner can also collect user fees, which can be directly applied to the amortization, aside from the payments that will be made by the public partner.

This is a direct application of the principle of "risk allocation between partners". The public partner assumes commercial risks, while the private partner assumes construction and the operational risks. This is the risk allocation needed to reconcile the benefits of private involvement in irrigation services provision with the reluctance of the private sector to bear the commercial risk of collecting fees from farmers. The precise terms under which a hydropower facility is to be built and operated can be arranged under the same BTO arrangement, or differently (e.g., BOT, joint venture, or a simple management contract). Due to the fact that this business will generate a stream of income that will enable a private partner to recover costs, it is easier to construct a mutually beneficial arrangement.

6 Build-Lease-Transfer and Build-Transfer were not considered because these are simply procurement contracts and do not address the issue of management efficiency. Under these contracts, the infrastructure is returned to the public party once constructed or rehabilitated. The main difference compared to a public procurement is in the modality of payment, as it is possible to pay in installments.

6.6.3 Contracting authority

The NIA charter is clear. Section 2 of RA 3601 states that: "*The NIA shall have the following powers and objectives: (a) To investigate, study, improve, construct and administer all national irrigation systems in the Philippines…"* As the sole provider of public irrigation services, the sole beneficiary of public subsidy for irrigation from the GAA, and the owner of eminent domain and right-of-way powers for the purpose of irrigation projects, NIA is the only choice as contracting authority.

6.6.3.1 Role of NIA in PPP

NIA as the contracting authority will have to organize the whole process of PPP award as defined in the IRR for Republican Act 7718. It will be in-charge of supervising the contract, making sure that the private partner is fulfilling its obligations. NIA will finance payment of amortization and management fees to the private partner. Finally, it could support the private partner through other services to be contracted such as equipment rental, institutional development support and technical support.

6.6.3.2 Hydropower generation contract

In the case of a Greenfield or Brownfield project with the addition of hydropower, the contracting authority has to decide on how to contract the provision of irrigation service. It can be done outside the contract for the construction of the hydropower facility, or within it. In the former, NIA will be able to define precisely the constraints to water flow release to make sure that the priority will be given to irrigation. It will also be able to adjust the income stream to the contracting parties (based on the risk that NIA is willing to take). The arrangement could take the form of a lease contract where the private partner assumes all the risks. Alternatively, it could also take the form: (a) of an O&M contract with performance-based incentives where NIA will receive the highest possible financial return by taking on all the risks; or (b) of a joint venture whereby both parties share in the risks. If done within the contract for the hydropower facility, there could be potential conflict between the flow releases for hydropower generation and for irrigation services.

6.6.3.3 High-value crops

The Guerdane Project which has a high level of private financing is one of the successful PPP initiatives. This Moroccan experience is however different given the Philippine context. In this project, the demand for PPP came from the citrus producers when they realized that the rate of abstraction from the aquifer was not sustainable and threatened their groves. The PPP project did not instigate farmers to shift to high-value crops. It was the high-value crops producers who created the PPP by asking the Government to solve the problem and accepting to pay high ISF for the water.

The same point is valid when we consider an out-growing scheme where a private partner would contract farmers to produce high-value crops and would apply to NIA or DA to provide a public irrigation system supporting outgrowing operations. According to investigations conducted under this study, there is no similar situation in the Philippines, where farmers require a public irrigation facility, eventually to be realized through PPP. Even if such a situation existed, the Government would have to increase the ISF rate to enable private investors to fully recover costs. (Further discussion on this issue in Chapter 10: Confronting Policy Issues and Dilemmas). As adequacy of irrigation for rice and staples production is the main concern of the Philippine Government, and because there is no demand for such a scheme, a PPP for irrigation based on high-value crops farms similar to Guerdane Project was discarded in this study.

7 FINANCING OPTIONS AND MODELS OF PPP

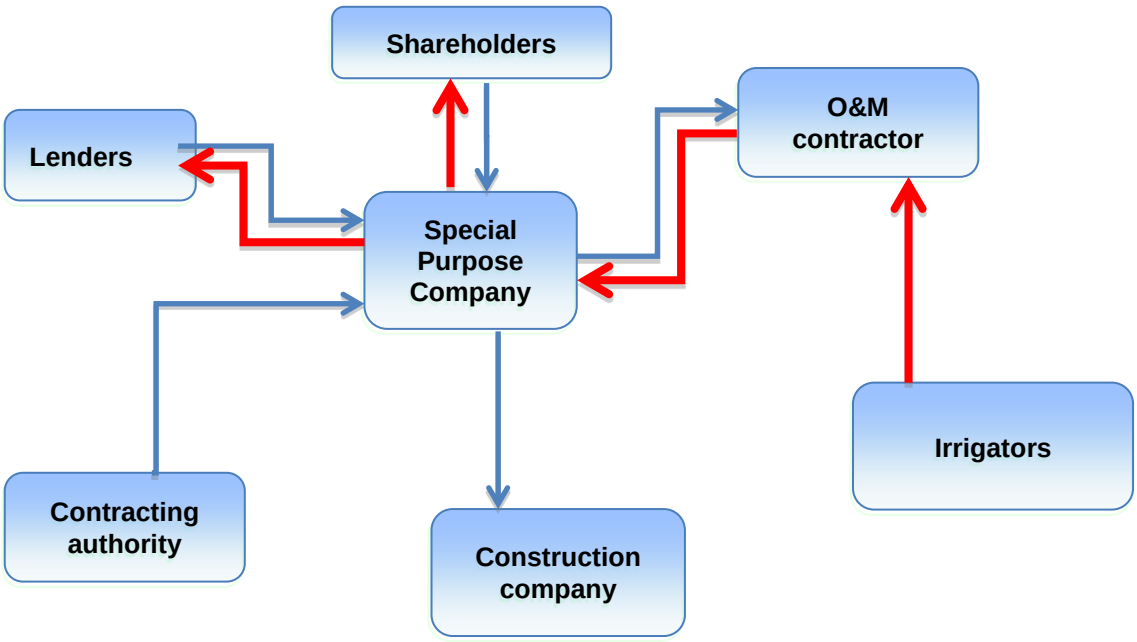
Details of financing arrangements inherent in the recommended PPP models (particularly the respective roles and responsibilities of the main contracting parties) are discussed in this section and can be summarized as follows:

- In standard BOT projects, the private partner will look for and negotiate funding from interested lenders. The Government will support the project through a grant from the viability gap fund.
- In a standard BTO project, the private partner will have to raise the funds needed for the project, but with full guarantee from the government. It will be paid by the public partner in instalments for building the infrastructure.

For the operation and maintenance contract, the private partner will receive a fee and bonuses indexed on performance.

7.1 STANDARD BOT FINANCE STRUCTURE

Figure 7-1: Standard BOT Finance Structure



The sponsors (usually the shareholders of the special-purpose company) are not financed directly by the lenders. It is only the special purpose vehicle that has a credit agreement with lenders. This is to permit non-recourse financing of the project, meaning that the lenders do not use the assets of the sponsors as a guarantee in case of default. The only assets that are to be used for this purpose are those of the SPV. In the credit agreement, the lenders receive priority in the use of the cash flow generated by the project. The loans are based on this stream of income.

The blue/thinner lines in Fig. 7-1 above depict payments of equity, loans, grants and amounts due to the contractor and to the firm in-charge of O&M. The red/bolder lines show income payment, irrigation service fee, capital repayment and interest on loans, and dividend payment to shareholders. The rational for such a structure is to avoid contamination of the loans by the sponsors (if the sponsors have financial problems, loans to the SPV are protected), or to protect the assets of the sponsors in case of trouble in the SPV business plan. In project finance language, the assets of the sponsors and the loans of the bankers are “ring-fenced”. Structuring project

financing in this manner presents many benefits. The leverage or "gearing"[7] can be as high as permitted by the cash flow stream. The lenders are not so concerned on the credit of sponsors, and are more interested in the intrinsic profitability of the business plan.

All the functions of the SPV are externalized. The construction is done through an EPC contract, limiting exposure to the risk of cost overrun and delay. O&M is subcontracted to control precisely the exposure of the SPV to operational risks. The whole project is subjected to an in-depth risk analysis, to identify specifically what could go wrong and to design proper risk allocation or mitigation measures. The main purpose of all these measures is to protect the expected cash flow of the SPV from any risk identified, because at the core, this cash flow stream is the main asset on which the project is financed and realized. From the point of view of the lenders, even if it appears more expensive to manage and operate through a subcontract instead of directly through the SPV, this solution presents fewer risks to the expected cash flow and as such is preferred.

Two other features are crucial in project finance:

- First, a financial model is used throughout the transaction to assess the cash flow stream and to test the profitability of the project and the feasibility of the schedule of amortization of the different loans. Due to the sensitivity of the project to the quality of financial modelling, the model is prepared by the sponsor and audited by the lead arranger[8]. The financial model used during financial negotiations is generally more precise and detailed than the one used to test project feasibility at the initial stage. In some cases, the lead arranger asks that the financial model be certified by a specialized firm prior to considering the business plan for funding.
- The second crucial feature in project finance is the role played by legal covenants and contracts. All the obligations and rights of the sponsors, the bankers, the construction firm, the O&M firm, and the insurances are structured and delineated by the many legal advisors to the transaction. As there is no lien on the assets of the sponsors, the lending banks have to take all precautions to assure priority rights on the cash flow. These rights are specified in the contractual arrangement linking the bankers and the sponsors. For this purpose, a special bank called "agent bank" is designated to manage all the accounts of the SPV. The entire income of the SPV goes into the main account managed by the agent bank and is used according to the following priorities: (a) O&M costs; (b) taxes; (c) amortization of loans; and (d) dividends. By using this "waterfall"[9] account, the lending banks protect their right to be paid back before shareholders collect any dividend.

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7 Refers to the ratio debt/equity, i.e., the higher the gearing, the higher the risks for the bankers and the higher the return on equity. A high gearing allows realizing more easily the project.

8 The "lead arranger" refers to the main banker or the one to arrange the loans.

9 This label comes from the image of cash flow as a river with a waterfall diverting cash according to the situation. The more upstream you are, the higher is your right to divert. Those downstream only have residual rights.

7.1.1 Financial needs of BOT/concession project

Financial needs will be mainly composed of capital expenditure needs plus some miscellaneous financing. The CAPEX includes the cost of the turnkey contract, development costs, and the value-added tax (VAT) on direct investments. Usually, financing would cover the above costs plus a provision for unexpected changes in construction. Technically, the turnkey contract would be financed by a long-term senior loan. VAT would be covered by a loan to be paid back from the VAT collected on the sale of electricity. The maturity of this loan will be related to the construction duration and the level of sales needed to pay back the VAT on investment costs. Finally, the financial line to cover costs changes would be a standby facility. In terms of working capital, the lenders could provide an additional facility to finance any cash deficit arising from the cash collection cycle.

7.1.2 Role of private partner

In a concession scheme, the private partner (sponsor) is responsible for producing a business plan and financial model to be submitted to potential lenders. The private partner is also responsible for preparing the offer in case of open bidding. The private partner will choose the contractor for the turnkey contract and the O&M team; and negotiate the terms of their involvement in the project, in order to finalize financial projections in the model. All the agreements would be conditional on the award of the concession. The private partner acting as the leader of the sponsor group will conduct the negotiations with the public party. Once awarded the concession, the private partner will be in-charge of finalizing the contractual arrangements with the public party, the lenders, the contractor, the O&M team, and the insurers - thereby transforming conditional commitments into obligations. All these contractual arrangements would be based on the conditional agreements sealed prior to the award.

7.1.3 Role of line agency

The line agency is critical in preparing the award of the concession. It should carry out the technical feasibility study; structure the concession; and prepare the documentation for the request for bidding. For this purpose, the agency will hire an engineering consulting firm for the feasibility study and transaction advisors for the preparation of the deal[10]. Usually, the line agency takes charge of permits and licenses required to realize the infrastructure (e.g., environmental agreement, construction permit). Lastly, the agency will introduce the project in order to mobilize public financial support mandated in Section 13.3 of the revised IRR on the PPP law. Technically under a concession contract, the line agency is not committed financially.

7.1.4 Role of government

The government has to approve the project and to fulfill its obligations in terms of grants, right-of-way and other incentives.

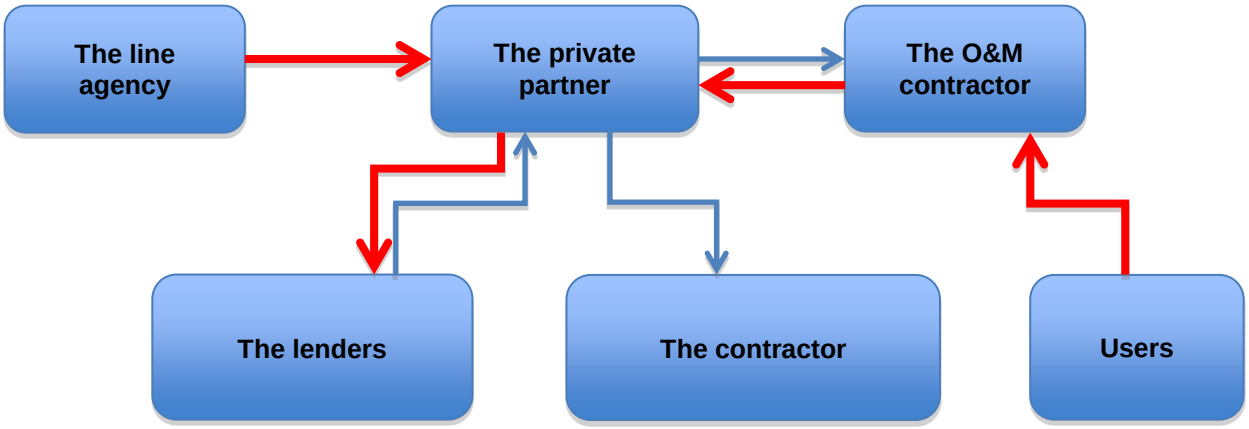
[10] The line agency can rely on the “PPP Center” in order to select and monitor the work of transaction advisors. It can also tap the Project Development and Monitoring Facility (PDMF) of the PPP Center to finance the Feasibility Study (FS) and the transaction advisors to structure the project for PPP.

7.1.5 Role of ODA

Official development assistance (ODA) could provide a variety of support to a concession project. Usually, multi-lateral agencies limit their lending to the Government. But many of them have private development branches that can provide equity for concessions, such as the International Finance Corporation (IFC) of the World Bank, and PROPARCO of the Agence Francaise de development (AFD). ODA can provide loans to finance the grants provided by the Government to support the concession. It can also provide advisory services and grant funds to hire advisors.

7.2 STANDARD BTO FINANCE STRUCTURE

Figure 7-2: Standard BTO Finance Structure



The line agency awards the contract for financing, constructing and operating the infrastructure. The private partner will hire the services of the contractor, using an EPC contract. The private partner would have previously negotiated the terms of the financing with the lenders. The private partner will supervise the commissioning of the infrastructure, and once satisfied with the work of the contractor, will turn it back to the line agency. It can either operate or contract a firm to do the operation and maintenance.

There is no need for an SPV under this scheme. The private partner can use its balance sheet to guarantee loans. Risk is limited as the line agency will pay for amortization from public appropriations. The second remark is related to reasons that could justify such an arrangement from the point of view of the line agency. The whole arrangement is plainly a delegation from the line agency to the private partner for organizing infrastructure procurement. The following are the benefits/advantages of such arrangement as compared to the more traditional agency procurement: (a) can apply project finance techniques to the procurement of infrastructure to reduce risks faced by the agency in terms of cost overrun and delay; and (b) can smoothen expenditures over many budget cycles through the payment of amortization instead of the full cost of infrastructure. The private sector partner is expected to bring in managerial know-how to reduce O&M cost. To ascertain the benefits of BTO, the line agency could mandate a value-for-money analysis (to be undertaken by the transaction advisor).

7.2.1 Financial needs

The financial needs are similar to those identified in the concession case, i.e., the private partner will have to finance the turnkey contract, VAT on construction, and eventual changes in construction. The main difference is for the line agency which will have to secure appropriations to pay for amortizations to the private partner. The stream of income from users could be easily completed to finance the O&M contract.

7.2.2 Role of line agency

Apart from its financial contribution, the line agency will conduct the preparation and the award of the BTO. The process will be quite similar to the one needed for the concession. The main difference will come from the supervision of the commissioning process prior to the acceptance of the transfer from the private partner. The line agency will be responsible for the supervision of the O&M contract. Specifically, it will be asked to make sure that O&M are at par with best practices – or at least better than the minimum standards stipulated in the contract. Payments will be different in each situation.

7.2.3 Role of private partner

The private partner will procure the construction through an EPC contract. It will select the best way to provide for O&M and will take full responsibility for the presentation of its submission in response to the request for bidding. It will also negotiate with the public partner and will close (finalize) the financial deal.

7.2.4 Role of government

The Government will approve contracts and make sure that appropriations are available for the payment of the amortization.

7.2.5 Role of ODA

Official development assistance could provide financing of the appropriations, as it is sovereign lending.

8 PROJECT SCREENING METHODOLOGY

A simple screening process is presented in this section. The purpose of screening is to identify the project(s) that best meet the desired project characteristics, or have the best chances of meeting PPP investment requirements. Projects that pass the screening criteria are then subjected to a more detailed appraisal process to determine whether they really could satisfy PPP investment requirements.

In this section, the tools needed to screen potential projects to be included as candidates for PPP are discussed. These tools should be applied to the inventory of NIA pipeline projects in order to identify which projects should be subjected to more in-depth analysis.

8.1 SCREENING METHODOLOGY

The inventory of potential projects comes from the corporate plan of NIA for 2010-2020. It is assumed that in the case of rehabilitation projects, the usual indicators collected by NIA are available, viz., size of the service area, cropping intensity, viability index, ISF collection, IA numbers and status, yield and cropping patterns, and farm size distribution. The methodology proposed is to have the projects in the inventory pass through several criteria, which are the desired characteristics of a PPP project. The desired characteristics are determined by the main objectives of the project.

The first step in screening therefore would focus on the statement of objectives for setting up a PPP project for irrigation[11]. The objectives statement is used to select the criteria to be used for sorting and classifying the inventory of potential projects. For example, if the main objective of the PPP project is to benchmark O&M costs, what is required for screening is to select representative irrigation schemes. On the other hand, if the PPP project is to test innovations in water conveyance and distribution methods, then hydrological considerations would be more important than farm size representativeness.

After weeding out those projects that do not match the screening criteria, the projects that remain will become the subset of potential PPP projects that will be subjected to more detailed appraisal. In the following sections the Screening Toolbox will be applied to an O&M project, a rehabilitation project, and a Greenfield project.

[11] The initial Terms of Reference for this study stipulated that the analytical framework will be applied to all the projects identified by NIA. Unfortunately, budget constraints did not allow a systematic application of the toolbox on all the projects of NIA.

8.2 SCREENING TOOLBOX

The screening procedure consists of three successive steps. The first one elaborates the objectives sought by the partnership. This statement of objectives should be easily translated into functions to be delegated to the private partner (e.g., finance, construction, O&M, introduction of innovations, risk management). Although qualitative and process-oriented, this is the most important step. It requires an understanding of PPP contractual arrangements, an appreciation of the contributions that can be provided by private partners, and a realistic assessment of the advantages and shortcomings of public provision of the same services. The line agency can use brainstorming and organized debates in order to state precisely what is expected from the PPP. It can be useful to support this process with the engagement of a management expert knowledgeable on PPP.

Once the statement of objectives is adopted, the second step is to translate this statement into selection criteria to be applied to the pool of potential projects. If for example, the statement of objectives is centered on overcoming financial constraints to new investments, the first criterion to be applied to the pool of potential projects is degree of preparedness. Do they have an approved and recent feasibility study? Are they eligible for funding from the development partners of NIA?

The third step is to organize the pool of projects in tables based on the criteria that were derived from the statement of objectives. To continue the example of financial constraints, the pool of projects will be organized according to the status of their main funding source (GAA, international development banks, special projects fund, or not yet financed). The last group (not yet financed) is to be subjected to in-depth feasibility analysis for possible financing through PPP.

8.3 SCREENING BROWNFIELD PROJECTS FOR O&M BENCHMARKING

Assume that the statement of objective for PPP is: “To seek a private partner in order to analyze and replicate management practices in O&M”. In this case, NIA’s objective is to benchmark internal O&M procedures by bringing in a private partner that will be asked to manage an irrigation system. The contractual arrangement that will support such a project falls under the category of “management contracts with performance incentives”. In order to make the most out of the experiment, NIA has to expand the pool of potential projects by including representative irrigation systems that are either being ran properly or not needing any major rehabilitation or restoration work.

The database to be generated will include the usual indicators on yield, farm size distribution, service area, cropping intensity, number and status of IMT contracts, number of IAs, and recovery rate for ISF. It will also take into account water availability and distribution. After creating the database, an automated search function should be used to look for representative irrigation systems (i.e., those whose individual mean values are closest to the group mean values). This is what has been done for the IMT study of the World Bank.

One last consideration is the size of the project. Transaction costs for PPP are high. The contractual arrangement is crafted by a multi-disciplinary team composed of lawyers, financial specialists, transaction advisors, and technical experts in the field of irrigation. It is meaningless to mobilize such a team for a small transaction, except when it is used as a model to be replicated.

The screening process is also a good ground for developing the indicators of performance to be used in the contract. Typically, in a management contract with performance incentives, the objectives are stated in terms of cropping intensity, ISF collection rate, and average yield. The most difficult part will be to specify performance standards related to the maintenance of the irrigation system. Usually, what is required from the private partner is to prepare a manual of maintenance procedures to be approved and applied by the contracting authority. Monitoring the progress, quality and cost-efficiency of maintenance work is done by an independent expert who reviews the report on maintenance prepared by the private partner with on-site verification. Usually, the

contracting party would also join the expert in conducting a visual inspection of the irrigation system.

8.4 SCREENING BROWNFIELD PROJECTS FOR REHABILITATION AND/OR RESTORATION

A more simple screening process is needed for a rehabilitation project. Assume that the statement of objective is: “NIA is willing to experiment the rehabilitation of an irrigation system through a PPP”. The set of potential projects to be considered will be composed of all the pipeline projects concerned with rehabilitation and/or restoration. In terms of screening, the projects that have firm funding through the GAA or commitment by a development partner of NIA are to be eliminated. The criteria to be used for screening are standard. Does the project have a feasibility study, recent or recently updated? What is the size of the project? Can it support the cost of transaction related to the preparation of the PPP contract? This process should create a subset of projects to be considered for a PPP transaction.

8.5 SCREENING GREENFIELD PROJECTS

If the statement of objective is: “To mobilize a private partner to finance and build a Greenfield project for NIA”, the screening process would be very close to the one used in the previous example for rehabilitation projects. The list of Greenfield projects is to be extracted from the NIA pipeline or projects. Thereafter, they will be sorted using the following criteria:

- Feasibility study availability and accuracy;
- Service area;
- Water rights and potential for bulk water sales;
- Potential for hydropower development; and
- Organization of farmers into Irrigators Associations.

Once selected, the subset of potential Greenfield projects will have to be analyzed in-depth to select the best potential candidate(s) for PPP investment.

9 PROJECT SELECTION METHODOLOGY

The selection of projects is the third and final step in the selection process. At this stage, the model of PPP contractual arrangement has been identified; and the list of possible candidate projects has been screened and reduced to a subset of potentially feasible candidates for PPP. Selecting the candidate does not mean that the project is ready to be implemented. It does mean that an in-depth screening has been conducted and concluded that the project could be considered for PPP transaction. Once the project is retained, the contracting authority will have to hire the services of a transaction advisor to prepare the documentation required for the request for bidding, and to structure the award process according to prevailing rules and regulations. The transaction advisor will act as a general advisor to the agency.

9.1 PROJECT REVIEW

The methodology begins with the review of the project to be analyzed. In order to conduct the feasibility study on the PPP project, the analyst should have an in-depth knowledge of the project, its features, components, environmental context, costs and benefits and timetable for implementation.

9.2 RISKS ANALYSIS AND ALLOCATION

Based on previous analysis and assessment of the project, done from the point of view of the private partner as well as that of the line agency, risks will be identified. For each risk, mitigation policies and measures will also need to be identified. Finally, based on the mitigation policies and measures and on the incentives that will be specified in the contract, an initial risk allocation table will be prepared to define who between the contracting parties will bear the identified risks.

The rule of thumb is to allocate risks to the party best able to bear it. But the allocation should also consider the power of the contract in risk allocation. If the private partner assumes fully the risk of cost overruns, said partner has a strong incentive to control the pace of construction. Thus, for each risk, the allocation should consider the contracting parties' respective risk-bearing capacity and impact on incentives that will be written into the contract.

9.3 RISKS MITIGATION AND ALLOCATION

Risk allocation is important in defining the cost of services to be provided, i.e., the more risks are put on the private partner, the higher will be the cost for providing the services. Otherwise, the private operator would have to provide for the risks, either through insurance or an increase in tariff. It is sometimes a better policy for the delegating authority to bear directly part of the risks to reduce the cost of the services, and to limit impact on the final users. It is also justified for the delegating authority to bear risks related directly to its functions as a public entity (e.g., permits delivery, use of public land, changes in legislation).

9.3.1 Commercial risks

Demand and other commercial risks refer to risks that use of the service is lower than expected, or that revenues are not collected as expected. Demand risk and its allocation will differ according to the type of good or service or the type of contractual arrangement. In a hydropower facility, the operator or the private partner will bear risks in accordance with the arrangement defining their relationship with the contracting authority. In the case of a joint venture, demand risk is shared in proportion to ownership; for O&M contracts, demand risk will be borne by the contracting authority. Finally, in the case of a BOT, demand risk will be wholly assumed by the private partner.

Demand risk for irrigation services is different. The marginal productivity of irrigation is higher than the ISF. That means that demand risk is essentially the risk of non-supply of water to farmers located at the tail-end of the irrigation system. For both types of contracts (i.e., BTO and O&M), the risk will be borne by the contracting authority. This allocation is based on the high risk of non-payment by farmers, and less on the usual grounds for demand risk. When the contractual arrangement regarding the management of the system has a performance-based component where the level of cost recovery of the ISF is a condition for payment of incentives, the risk is partly shared. Commercial risk on hydropower projects will be borne according to the type of PPP contract.

9.3.2 Water supply risks

These will be shared when the water is used for power generation in proportion to ownership in the SPV that operates the hydropower station. In the case of a joint venture, the risk is shared in proportion to ownership. In the case of a management contract, the risk is fully borne by the contracting authority. In irrigation projects, this risk will be borne totally by the contracting authority.

9.3.3 Construction and operation risks

- **Site risks:** These are associated with the availability and quality of the project site, such as the cost and timing of acquiring the site, needed permits or assuring right-of-way for a road, the effects of geological or other site conditions, and the cost of meeting environmental standards. These risks are allocated to the contracting authority that delivers the permits and have better access to the services of land authorities and national agencies.
- **Design, construction and commissioning risks:** These pertain to construction taking longer or costing more than expected, or design or construction quality failing to meet project requirements. In O&M contracts, these risks are allocated to the contracting authority that will procure the works and probably not from the private operator. For BTO, these risks will be borne by the private partner as it will be better able to bear the risk through the use of an EPC (Engineering, Procurement and Construction) contract with a general contractor. In this type of contract, the contractor is committed and obliged to deliver the infrastructure on time and without cost overrun. In case of default, stiff penalties are levied. The EPC contractor is obliged to meet minimum standards of performance guaranteed by performance bonds. The use of an EPC contract by the private partner allows said partner to bear the design, construction and commissioning risks by transferring these risks to the general contractor.
- **Operations risks:** These are linked to risks to successful operations, including the risk of service interruption or asset availability, the risk that a network interface does not work as expected, or that the cost of operating and maintaining the asset is different from what was expected. These risks are to be borne by the contractor.

- **Taxation and political risks:** These will be borne by the contracting authority in all the contractual arrangements being considered. When policies or laws are changed, the private partner does not have control and so cannot be held responsible. These risks could be mitigated by means of insurance. For example, a foreign investor in a socialist country may insure his business to protect it against nationalization, or against government policies that may bar him from repatriating back to his home country part or all of his investments. Usually, it is during final negotiation that these risks are allocated.
- **Natural disaster and *force majeure* risks:** These could be covered by insurance. If the premium required is deemed too high, and the Government has special provisions for dealing with such risks, the contracting party could bear it. If not, the private partner would require insurance to continue on with the project. The notion of *force majeure* is different if the contractual arrangement obligates the private partner to supply the service. When an external event prevents the supply of service, the question of responsibility in regard to obligations is raised. *Force majeure* is invoked if the external event is out of the private partner's control (e.g., typhoon, revolution, major flood). The definition of *force majeure* is included in negotiations over the terms of the contract. Usually, the private partner wishes to expand its meaning while the contracting authority reduces it.

9.3.4 Summary of risks

Table 9-1 below presents a summary of risks as discussed above.

Table 9-1: Summary of Risks

Risk	Description	Allocation
Commercial	The risk that operating revenues differ from expected revenues. Commercial risk is often broken down into: • Demand risk, when customers use the service less than expected. • Payment risk (fees collection), when customers do not pay the expected fees, or pay their bills later than expected.	If the PPP involves a private operator taking over the operations of a service for which there is well-established demand and payment capacity, this may be borne completely by the private operator. If the PPP is for a food security-oriented project with uncertain demand, serving customers whose payment capacity has not been tested, or if demand and payment risks are high, these risks may be shared between the public party and private operator or borne completely by the public party.
Water supply	The risk can come from competition on resource allocation between irrigation and hydropower production.	To be borne totally by the contracting authority for irrigation services.
Site	The risk of site selection, cost and timing of acquiring the site, needed permits or assuring right-of-way for a road, the effects of geological or other site conditions, and the cost of meeting environmental standards.	To be assumed by the contracting authority because it delivers the permits and has better control on access to public land and national agencies.
Construction & Design	The risk that quantities or prices of inputs are higher than planned or that construction takes longer than estimated. Design project and cost estimation have mistakes.	To be assumed by the party in-charge of construction and design.
Operational	The risk that the infrastructure provided or service delivered: • Has higher O&M costs than expected. • Is interrupted or ceased because of a fault of the operator. • Failed to meet original specifications.	Usually assumed by the private operator because it has responsibility for operating the facility to provide the service. However, where inputs (water /electricity) are controlled by the Government, the latter may take on risks related to the provision of these inputs. In this case, water and energy availability must be secured and guaranteed by the public party.

Risk	Description	Allocation
Political	The risk that legal or political changes will negatively impact on the project. Examples include risks of political decision re water fees/electricity tariff, inability to repatriate dividends, or inconvertibility of foreign exchange.	Usually borne by the private operator. Some government or multilateral agencies offer insurance against these types of risks, such as Political Risk Insurance offered by the U.S. government.
Financial	The risk of the project failing to obtain financing, or that financing terms will differ from forecasts.	If the project requires government funds to be financially viable, the Government may need to bear some degree of financial risk. If the project is financially viable on its own, the private operator should be able to obtain financing with little difficulty, and financial risk is borne by the private operator.
Exchange Rate	The risk that variability in foreign exchange rates will affect project profitability. This risk is high when project inflows are in a different currency than project outflows, such as debt repayments or input purchases.	May be shared between private operator and the public party, or consumers, through indexation of prices. Where government policy has a significant impact on exchange rates, the private party may have to bear a larger share of the exchange rate risk.
Regulatory	The risk that changes in regulations affecting the PPP's sector will affect project cash flows. Includes tariff risk, where tariff is government-controlled – the risk that tariffs will not be upheld or enforced at a cost-recovery level	Usually borne by private operator, unless tightly specified in contract. However, the PPP contract may also include penalties to the government for not adjusting tariffs as specified.
Land Acquisition	The risk that the project developer will not be able to acquire the necessary land, or that it costs more than expected	If the land on which the project will be developed is owned or otherwise controlled by the government, the public party may bear this risk. If land will be acquired from other private-sector parties in the real estate market, this risk may be assumed by the private operator.
***Force Majeure* and natural risks**	The risk of events beyond the control of either party. *Force majeure* risks can be categorized as "insurable" and "uninsurable". Acts of nature, such as earthquakes, floods or droughts are typically insurable. Some political events, such as acts of terrorism or wars, are typically uninsurable.	If the risks are insurable, they are usually assumed by the private operator who may obtain an insurance policy to mitigate its exposure to these risks. If the risks are uninsurable, they are usually assumed by the public party.
Sovereign or political	The risk that legal or political changes negatively impact the project. Examples include the risks of expropriation, inability to repatriate dividends, or inconvertibility of foreign exchange.	Usually borne by the private operator. Some government or multilateral agencies offer insurance against these types of risks, such as Political Risk Insurance offered by the US.

9.4 SIMPLIFIED FINANCIAL APPRAISAL

The main goal in developing a financial model is to test the feasibility of different options for PPP. For instance, according to the analysis previously conducted, BOT is not an option for irrigation services in the Philippines context. This conclusion could be tested and proven with the use of a simple financial appraisal model. Another question concerns the level of public support to subsidize investment costs for irrigation projects conducted through a PPP. The current limit is set at 50% for all sectors, but international experience shows how insufficient this level of support is.

Case Project: Ilaguen Multipurpose Irrigation and Power Project
(Refer to Annexes A and B)

To do the simplified financial appraisal, a financial model has been developed to assess the feasibility of a PPP on the Ilaguen Project which is intended to irrigate rice lands. The project and the financial model are presented in detail in Annexes A and B, respectively. The model was used to test different scenarios of potential PPPs arrangements based on the BOT principle, with cost recovery through user fee collection. Although generalization of the results obtained is to be done cautiously, many results are robust. This is due to the similarities shared by the schemes, in terms of ISF and conveyance and distribution infrastructure.

Five scenarios were selected to test many different arrangements in PPP to supply irrigation services. The first considers a pure irrigation project where revenues come only from ISF collection. The second is a bundled irrigation and hydropower dam construction whose revenues come from two streams of income: ISF and power sales. The third scenario tests financing of the dam and the hydropower through a PPP and delegates irrigation development and management to NIA. The fourth scenario is based on the assumption that dam costs are to be borne by Government and will test the feasibility of financing hydropower and irrigation services through a PPP. Finally, the fifth scenario is based on the fourth scenario but with an unbundling between hydropower and irrigation services. The hydropower revenues are used to cover losses in irrigation but under a different PPP contract. Unbundling allows strict enforcement of hydropower generation rules in terms of flow releases, and creates strong incentives for an efficient irrigation service.

In all the models, the IRR on equity is used to test feasibility. This indicator is compared to a weighted average cost of capital (WACC) of 15% in order to test the willingness of the private sector to invest in the PPP. These scenarios allow eliminating PPP models that would not be of much interest to PPP investors.

9.4.1 Scenario 1: Pure irrigation

The first scenario assumes that revenues from the irrigation project will come only from ISF collections. It is a very important scenario in that it links the promotion of private contribution to irrigation development with current ISF policy. However, without a substantial increase in the level of ISF, this option is not feasible. It is impossible to increase the ISF locally for any particular project. The ISF policy is a national policy, and any change will impact on all NISs. The IRR calculated by the model is negative. The first conclusion is that BOT in the usual mode, where the user fee is used to pay the private partner, is not a feasible option.

9.4.2 Scenario 2: Irrigation including dam, with hydropower generation

In this scenario, the BOT will consist of the development and management of both the irrigation system and hydropower generation. It is a BOT ++. This is most promising in attracting the private sector to invest in irrigation development. What is expected is that the income stream from electricity sales could subsidize losses in irrigation services operation. The results are sensitive to the average selling price of electricity and to the power produced by the turbine. In the case of the Ilaguen Project, the power produced is limited. It does not have the head of the San Roque dam. In terms of selling prices for electricity produced, the best option would be to consider "feed in" tariff, which is guaranteed, in accordance with RA 9513 (Renewable Energy Act of 2008).

The results are clear in this case. The addition of the income stream from electricity sales would not be enough to make a BOT project feasible. This result, however, cannot be applied to all cases because in projects where power generation potential is higher, the combination of irrigation services losses and hydropower generation profits can result in a feasible BOT project in irrigation.

However, the above solution entails some risks. If the private partner is driven by revenues from hydropower generation, irrigation services could suffer. And this is particularly true because there is a conflict of objectives between the running of the hydropower station and managing an irrigation network**.** For hydropower, what is critical is to be able to produce when the demand is at its peak - meaning releasing high flows for a limited time. On the contrary, irrigation needs are on low flows for long periods of time. The IRR on equity is at 8.7%, largely below the WACC. It confirms that this option will not be of particular interest to PPP investors.

9.4.3 Scenario 3: Hydropower and dams (PPP); irrigation (NIA)

This scenario is based on the assumption of privatizing benefits and socializing losses. NIA would manage irrigation and the private partner would construct and manage the dam and the hydropower station. With a 20% IRR on equity, this option is valid. It means that HP could be realized in a PPP, while the irrigation system and its O&M are to be supplied by NIA.

9.4.4 Scenario 4: Dam as public good; irrigation financed by hydropower bundling

The scenario is the first one to consider that the dam is a “public good” to be financed out of GAA appropriations. In this case, it is possible to bundle irrigation and hydropower, and to engage a private partner in a BOT contractual arrangement**.** Although this solution could be feasible in another context, for the multi-purpose project of Ilaguen, the large size of the irrigation service area (30,000 hectares) *vis-à-vis* a small amount of energy to be produced, cannot provide a viable and bankable solution. The IRR on equity stands at 10%, much too low to sustain this option.

9.4.5 Scenario 5: Dam as public good; PPP on energy; location rent to finance irrigation

This last scenario is similar to the previous one in that the dam is a public good. The difference is in the treatment of hydropower generation. Instead of bundling irrigation services and hydropower, hydropower generation is treated separately. A special BOT covers the construction and operation of the hydropower plant. Only the lease paid by the private partner is used to reduce the implicit subsidy provided to NIA to manage the irrigation system. The figures are equivalent. The benefit of such an arrangement is to separate completely irrigation services from the management of the hydropower plant, solving any potential conflict of interest when these services are bundled. The results are the same as in the Scenario 4, i.e., the IRR on equity is too low.

9.5 VALUE-FOR-MONEY ANALYSIS

Value-for-money analysis is a tool used to measure and compare benefits that can be derived from producing a good or service by private enterprise as against a public institution producing the same good or service. The sponsors of the PPP project thus have to prove that it is more cost efficient to build infrastructure through PPP than through public procurement. In order to do that, two techniques are used.

The first one calculates the cost of the infrastructure over its economic life, adding to the cost of the initial investment, those of O&M during its useful life, and finally adding the cost of dismantling it. The net present value of the lifelong costs of the two options is compared to decide if it is more worthwhile to acquire the desired good or service through public procurement or through PPP.

The second technique relies on a shorter time frame. The analyst is to compare the costs of provision between the two competing options, taking into account project risks and their mitigation. For instance, public procurement of a large infrastructure is known to regularly incur overruns and delays. If the public partner manages suddenly changes its procurement procedures, so as to reduce overruns, comparing the initial estimates for the investment is not accurate and will unduly be biased towards public provision. To correct this, the expected value of cost overruns is estimated and then added to the initial investment cost estimates. And then the net present value of the corrected investment streams is compared to help decide as to how to proceed.

In order to compute the expected value of cost overruns, what is needed is probabilistic distribution. Generally, the Gamma function is used to fit the data sets available on the performance of public procurement (differences between the investment costs at feasibility study stage, ex ante, and the real costs incurred, ex post). Although technically satisfying, the results are mostly obtained through assumptions made by the analyst regarding the statistical fit, discount rate, and other parameters. Many transaction advisors are reluctant to rely too much on such techniques. Although time-consuming, many countries (e.g., United Kingdom, France) made value-for-money analysis an obligation of the contracting authority, in order to avoid PPP proposals that are too costly in comparison to public procurement. Assumptions on delays and costs overruns are constructed from mandatory reports on significant public expenditures[12].

9.5.1 Advantages of PPP

Generally, there are three sources of efficiencies:

- **Reduction of cost overruns:** An increase in cost reduces expected benefits from the project. Therefore, as much as possible, hidden costs associated with cost overruns in public procurement have to be quantified. As already seen, the use of EPC contracts in PPP arrangements by private partners limits exposure to the risk of cost overruns.
- **Reduction of delays in delivery:** Delays in the provision of the services increase costs and reduce benefits. For example, the cost of a one-year delay in the completion of an irrigation system is equivalent to the expected value of the production or benefits that were supposed to be generated had there been no delay.
- **Increased management efficiency:** Whenever a private operator takes over a previously public entity, there is usually a reduction in operating costs as a result of more efficient management. In the case of British water distribution entities, the British regulator observed that costs under private management were 80% less than those under public management.

[12] Public procurement regulations in numerous countries make it mandatory for the public party to the procurement to report in detail the differences between the initial contract and the fulfillment of the contract, with emphasis on delays and cost overruns. These reports can be collated to establish a data base on cost overruns and delays, to be used in value-for-money analysis.

9.5.2 Hidden costs of public provision

For both techniques (lifelong costing and the estimation of the costs of public procurement), the estimation needs to be based on actual and credible figures.

Costs overruns: These are estimated from the database of past projects, if such a database exists. Two factors should be estimated: the probability of occurrence of costs overruns and their level, as related to the initial cost estimates of the project. Once data are collected, it is possible to derive the expected value of cost overruns in a representative project. The expected value is the best statistical estimator of what would happen in new projects. That means that it has to be added to the initial contract value to enable a meaningful comparison between the cost of public procurement and that of PPP.

Delays: The estimates of expected delays in a publicly procured project are similarly derived, using the same techniques as those for cost overruns. Once estimated, these are valued either by taking into account costs accrued due to the delay (using the current discount rate on the cost of the project), or by estimating foregone production. In this case, the analyst has to compute the value of all production that could have been made possible by the infrastructure if it were completed on time. For example, for an irrigation system, if the delay is such that this planting season is lost, the estimated lost net value of production should be added to the production cost. In any case, these costs would have to be added to the initial estimate of the project in order to make a meaningful comparison with the PPP option.

Managerial efficiencies: The estimates of efficiencies are also very difficult to make when there are no records from which to draw the numbers. Using international comparison is prone to error due to differences in productivity in different environments. Using the results of PPP projects in the sector is also questionable. The productivity gains of Manila Water cannot just be extrapolated to other PPP projects without any basis. Being too optimistic about the superiority of private sector over public sector management is just as biased as believing that there is no real difference between the two. The only way to avoid bias would be to compile regularly the data on productivity gains that may be generated by PPP projects.

9.5.3 Actual application of value-for-money analysis

The use of value-for-money analysis depends on the data that support it. If there are credible data on cost overruns and delays in public procurement, it is possible to construct an informed calculation of these costs and use it for value-for-money analysis. Otherwise, the exercise of providing for such analysis is purely and simply based on initial assumptions and perhaps on the prejudices of the practitioners. Project analysts should be wary about optimistic projections that are not based on hard and verifiable data.

PART III.

TOWARDS IMPLEMENTING PPP IN THE PHILIPPINES IRRIGATION SECTOR

10 CONFRONTING POLICY ISSUES AND DILEMMAS

Various policies constrain the attractiveness of PPP in irrigation. A recent private sector assessment indicates that the "country's policy environment is characterized by unclear policy and regulatory frameworks; cumbersome and bureaucratic processes that lack transparency, competition and preparation, and high cost of doing businesses" (Paderanga 2011). These factors are discouraging the private sector from engaging in PPP projects. For the agriculture sector, the challenge may be more complex due to perceived high business, political and social risks. There are in addition water-specific and climate-related risks which may require government guarantees. This section presents key irrigation and agriculture-related policy issues and why these can be seen as impediments to PPP in irrigation. Towards the end of this report (Chapter 11), policy recommendations are presented that would require difficult decisions to make irrigation PPP bankable and scalable while allowing access to efficient management and development systems.

10.1 ISF ISSUES

The premise in this study is that there is no fundamental role for a private partner without a change in ISF policy. If the ISF level (multiplied by the collection rate) is not able to cover at least O&M costs and part of investment costs, the private sector contribution in infrastructure development will be limited. So, part of the policy recommendations is directed to ISF.

10.1.1 Collection issue

On average, the rate of ISF collection has been only 50% from 1983 to 2008, and ranged from a low of 29% in 2000 to a high of 61% as of October 2012 (David and Inocencio 2012, NIA 2012). The O&M budget at the field level is funded by irrigation fees collected. The level of expenditures for O&M is determined by the irrigation service fee collection rate or efficiency. With a collection rate below 100%, O&M will always be inadequate and the systems cannot be sustainably run. With weak enforcement of ISF collection, there is a risk of contagion and an increasing number of non-paying farmers. One possible indication is the apparent long-term decline in benefited area relative to irrigated area: from an average of 95% in the late 1960s to 90% in recent years.

In addition, with ISF collection not enough to even fully cover O&M, no ISF funds can be made available for investments for extension or major repair. In practice, it is the national government (through Presidential Orders) that sets the ISF (Shepley, et al. 2000). NIA does not have the authority and effective enforcement power to set rates to discharge its mandate. The weak enforcement of fines and penalties and the lack of authority and difficulty to suspend services for non-payment of ISF will have to be addressed if the irrigation sector is to attract private sector participation. Also, the focus on viability is diverting a lot of resources to collection efforts.

10.1.2 ISF base issue: area vs. volume

With ISF payment based on size of irrigated land rather than on the volume of water used on the farm, there is an incentive to over irrigate for farms that have first access to water. Farms at the tail-end often end up with no water. The ability of the NIS to deliver sufficient irrigation water over the whole service area during the dry season has been declining over time. The average irrigation intensity (wet and dry season irrigated area/service area) for all NISs in 2008 was just 149%. This ratio would have been lower if we consider the average from 1967 to 2008 at 132% (David and Inocencio 2012). Overall, service areas are much higher than what can be actually irrigated and the area-based ISF policy does not provide the right incentives to make water available for tail-end farms.

10.1.3 Productivity gains and water savings

NIS cropping intensities for the wet and dry seasons have remained relatively low and static over the past two decades. Low cropping intensities with respect to NIS service areas suggest that either feasibility assessments were overly optimistic and service areas were more extended than can be irrigated, or that NIS water management is inefficient, or that routine maintenance has been inadequately funded or deferred with an impact on the quality of the irrigation service.

The low benefited area efficiencies (around 62%) suggest that inefficient water management and distribution may be one of the most important factors accounting for the low NIS cropping intensity (David and Inocencio 2012). This means that it is possible to increase yield through better management of water distribution. A reduction in abstraction upstream allows more irrigated area at the tail end of the canal, and higher yield, cropping intensity and production. It has also the merit of increasing ISF collectibles. On the same ground, if upstream abstraction is controlled, farmers will be inclined to adopt water saving techniques such as alternate wet and dry rice production. On the contrary, if the ISF base is not corrected, farmers located upstream, near the head gates and the turnouts will not have any incentive to adopt water saving techniques.

10.1.4 Modernization issue

In irrigation projects, more attention is given to dam and diversion structure design and less on conveyance. Currently, only lining of canals is considered in modernization proposals. However, there are other technologies such as piped distribution that can potentially improve efficiency. This gap has to be explicitly addressed by policy towards adoption of new techniques or innovations in water distribution.

A related issue with respect to improving efficiency and equity in distribution, specifically in connection with the promotion of volumetric pricing, is that water use will have to be measured at different points of the NIS structure – whether at head gate, turnout, or field level. A policy shift towards metering can potentially extend the irrigated area and reach tail-end farms by encouraging proper use of water and less wastage. Without measuring water use, water savings cannot be properly estimated. If water use of head-end users will be underestimated, then there is a risk of under-investing in increasing water supplies. On the other hand, if the ability of head-end farms to control and over use water is overestimated, then water investment requirements will likely be overestimated. Thus, there is a strong case for more precise measurement of water use in order to correspondingly adjust the water investment needs for instance in terms of reservoir size and use of piped conveyance.

10.1.5 ISF level

Current ISF rates in terms of cavans of paddy per hectare, valued at NFA support prices, are still the same rates established in 1974. This rate was revised in 1998 to redistribute the subsidy given to irrigation beneficiaries, with larger farms asked to pay 50% more while those with less than two

hectares have to pay half of the 1974 ISF level (Administrative Order/AO 17). This socialized ISF was met with resistance and deemed inequitable. This AO has been superseded by Executive Order/EO 197, which required increasing NIA rates of fees and charges by not less than 20% of the socialized ISF rate.

The 1974 rate while indexed to paddy support price is shown as not an appropriate long-term ISF level for two reasons. In 1975, productivity per hectare was 37% lower while agricultural commodity prices were only 20% compared to their 1998-1999 levels (Shipley, et al. 2000). In addition, the state of the national systems three or four decades ago must have required much less in O&M than they do today with deferred maintenance and the shortening of the rehabilitation cycle while facing increased service areas to irrigate. Even if a 100% collection rate of ISF is assumed, it will not be enough to cover the sustainable O&M needs at the systems level (Shipley, et al 2000). There are no actual expenditure records of sustainable maintenance levels. Yet, NIA is mandated to collect ISF to cover the full costs of O&M and some capital recovery.

10.1.6 National nature of ISF

Water is a local good. It may be abundant and easy to access in some systems but limited and costly to extract in others. A uniform ISF for all NIS does not reflect variability in projects, cost of providing irrigation across systems and productivity. The water-scarce systems would be effectively subsidized and benefited by the lower ISF, while the water-abundant systems would be taxed or penalized. A clear policy on ISF rates reflecting the local nature of water and differences in project costs and productivity could be considered. It will allow to apply on a project-by-project basis the calculation of O&M costs and to charge farmers accordingly. It will suppress the implicit cross-subsidy between systems based on the actual ISF. Finally, it will establish a stronger ground for developing PPP with more balanced risk allocation between the private and the public partners, by empowering the private partner to collect ISF to support O&M costs, without cross-subsidies between systems.

10.1.7 Back collectibles and liens

The collection rate on ISF back accounts[13] (back account collection/back accounts) since 1980 has been relatively low and continuously declining from 5.5% to about 2% in 2012 (Panella 2004; Shepley *et. al.* 2000, NIA various years). As of December 2009, the accumulated back account sums up to PhP7.2 billion. Given this dismal collection performance, there were proposals for a one-time write off of back collectibles. This may however provide the wrong signal to farmers and further erode collection efforts.

Liens on land act as a guarantee for payment of water debt. When the farmer sells his land, the payment will be made to NIA as priority. The same is true for inherited land. This is a strong incentive to provide ISF payments to NIA, when coupled with penalties for late payments. While NIA has the authority to impose liens on farm lands in case of non-payment or delinquencies, however, given the slow judicial process, imposition of property liens with NIA as the beneficiary renders the policy less valuable. How will this issue be resolved? How can NIA recover what it is supposed to receive? Will suing farmers resolve the problem and be aggressively pursued? Or allow sale of lands so NIA can collect? The policy on collection of payment for back dues would be less attractive to any private sector investor if it will only be given secondary claim after NIA.

10.2 WATER RIGHTS

The National Water Resources Board (NWRB) granted NIA the exclusive right to utilize specific volumes of water for the NIS. While there are no issues related to water rights in most NIS, competing use is an issue in systems where there are other users of water. The risk of water being diverted to domestic uses over irrigation without consideration of proper compensation has to be addressed. In the case of Angat dam, during the El Nino in 1997, water was diverted to Metro Manila domestic users without compensation for the foregone incomes of farmers in Bulacan and Pampanga. Up to now, the debate is still in establishing the correct amount of compensation. The claim for compensation against MWSS has been a very slow process while NIA could have used the funds for water supply augmentation projects. In cases where claims between government corporations which may be both receiving GAA funds for investment requirements, how much incentive is there for NIA to pursue its claims? Also, while NIA had forgone ISF because of the diversion of water, what about the compensation for farmers who had to forego planting for a season? This issue will need to be resolved since such uncertainty will not be attractive to any private partner, which will be in the same position as NIA. A clear water rights policy for irrigation use that allows proper compensation by government or sale to domestic users in times of water scarcity will be attractive to a private partner.

This concern on competing uses also applies between irrigation and hydropower users. In times of water crisis, domestic and municipal purposes are given priority. Otherwise, rights established first in time prevail. Between the hydropower and irrigation users, priorities will need to be clearly articulated for normal and drought conditions. Other related issues will have to be resolved - will it be necessary to protect environmental needs; how will rights be allocated to new users; what preconditions are necessary so that trading of water rights can be considered; and what methods will be used to resolve conflicts between users.

[13] Past due receivables

10.3 RICE SELF-SUFFICIENCY

Aiming for self-sufficiency in food particularly rice as a policy may have hidden costs. If resources are abundant, allocation for different crops and programs will not be a problem. Where resources are limited, efforts toward rice self-sufficiency can take away resources for other crops. Increasing paddy yield to 5.0 tons/hectare from the current average of 3.68 tons/hectare can be achieved by expanding irrigated areas and restoring and maintaining the capacity of currently irrigated areas (and other techniques which span mechanization and post-harvest needs; support for seeds, fertilizer and other inputs; and research and extension).

Programs for rice supply and price stabilization have proved costly, increasing the losses and borrowings of the NFA. The Aquino Administration has import restrictions that maintain high levels of protection for rice intended to support the rice self-sufficiency program. However, the higher domestic rice prices that result from protection means welfare losses because of higher prices and lower consumption of rice. This reduction of consumer welfare is estimated at about PhP72 billion a year from 2000 to 2005, and PhP116 billion a year from 2006 to 2009 while the gains to producers amounted to only 23% and 47% of consumer losses, respectively (Habito*, et. al.* 2011).

NFA has been operating with increasing losses, which are covered by the national government general appropriations and guaranteed commercial borrowings. Its outstanding loans have ballooned from some PhP47 billion in 2005 to PhP176 billion in 2010. And yet in terms of impact, NFA has been able to buy only up to 5% of paddy production annually over the last 10 years, while its support price has been within 0.98% to 1.25% of average farm gate prices. These considerations are true whenever a government intends to protect domestic production to attain self-sufficiency, or to boost the yield or simply to transfer income to farmers.

In regard to irrigation, the goal of self-sufficiency led NIA to develop low-cost irrigation systems, with almost no flexibility to allow farmers to produce other high-value added crops. The most durable cost of the rice self-sufficiency program will result from the inflexibility of irrigation systems. If the policy changes, the systems will be refitted with a huge cost so that these can be used for a different cropping pattern.

10.4 SUSTAINABLE INVESTMENT

With poor collection of ISF, proper maintenance often had to be deferred resulting in degraded systems and poor performance. Inadequate irrigation service in turn results in low productivity and non-payment of ISF. This vicious cycle has to be broken if irrigation is to be provided sustainably. ISF collection will have to be improved and the ISF rate structure may have to be increased.

Other factors that affect sustainability are natural disasters. The country is visited by an average of 20 typhoons every year, which may partially or fully damage NIS head and conveyance structures. These typhoons contribute to shortening the system rehabilitation cycle. Some kind of public insurance will be needed to cover this risk where there is none at the moment. This risk makes a case for investing in broadening technical options. For instance, to address this concern, buried pipes for the conveyance system may be considered but this would entail even higher investment costs.

The short average interval between NIS original construction and rehabilitation indicates that the rehabilitation cycle is becoming shorter. Shepley, *et. al.* (2000) estimated the average period between construction and the first rehabilitation to be about 19 years based on data for 49 NIS, compared to the world-wide norm of 25-30 years. David and Inocencio (2012) show that this period has been decreasing over time with 32 years before NIA (based on data for 51 NIS), to an average of 18 years between 1965-1980 (data for 41 NIS) and nine years from 1981-1995 (data on 49 NIS).

10.5 PPP ISSUES

10.5.1 Contracting party

The Section 30 of AFMA mandates that NIA will plan, design, develop, rehabilitate and improve NISs, and provides for a gradual turnover of O&M for secondary canals and on-farm facilities specifically to IAs. Section 32 provides for DA's role in promoting private sector-led development but of minor irrigation systems such as shallow tube wells, low lift pumps and inundation systems. Also, Section 33 states that the Government shall encourage construction of irrigation facilities through viable schemes such as BOT and BT, among others, to fast track development of irrigation systems and that national government shall issue the needed payment guarantee for BOT projects in order to attract private participants.

In irrigation PPP, who will be the contracting party? Is it NIA or the DA or national government? Other than construction and finance, what else can be delegated to private sector partners other than the IAs? Specifically, the AFMA provisions do not specify for delegation of NIS O&M to private sector other than IAs.

In connection with delegation of mandate, another consideration is the provision of agricultural support services. Irrigation is not all civil engineering. Yield could and should be improved beyond current levels. Complementary activities can be incorporated into PPP schemes or continued to be done independently by other DA units. The question is whether providing complementary support services within a PPP arrangement will be more efficient and will result in higher yield.

Another relevant question has to do with the roles and rights of the IAs, being the first private partners in PPP. Clearly, IAs can benefit from technical support of engineering firms while NIA can continue its capability-building task intended to enable independent and successful management of NIS O&M.

In the case of projects with hydropower component, what should NIA be delegating? Or should NIA focus exclusively on its irrigation role? In case of engagement in mini hydropower, how should NIA use the rent? Specifically, should NIA use the rent to subsidize its irrigation function or for watershed protection?

AFMA is clear on the national government's stand on watershed protection. To ensure prevention of further destruction, how should watershed management be considered in PPP contracts? Specifically, further degradation of watersheds and the inability to provide environmental protection services will result in a decline in future water supplies. NIA has a clear stake in ensuring that future water supplies will be sustained – this is the business value in watershed management. How can NIA/DA take a more proactive role without intruding into the turf of DENR?

The most important issue in PPP in irrigation has to do with finance. Currently, there is limited scope in financing investments. Except for hydropower projects, there is practically no private sector and financial institution expressing interest in financing irrigation. Also, there has been not much effort on the part of Government to engage these sectors to create awareness on PPP options and modalities.

10.5.2 Legal issues

AFMA provides that the O&M of NIS be delegated to IAs. This is one foreseen legal limitation to the delegation that NIA can pursue. Will delegation to other private partners be possible without changing the law? In addition, if and when certain mandates of NIA will be delegated, the private partners will be facing other limitations. Specifically, in the delegation of O&M and collection of ISF, in case of collection problems, property lines are for the sole benefit of NIA. How will this concern be addressed to give the private partner more incentive to take on possible delegation of O&M? How will a third party enforce the policy on ISF payment? A private partner will require some legal security to make their involvement in irrigation attractive.

Section 2.2 in the IRR for RA 6957 allows for at least 50% recovery of the project cost or an effective maximum subsidy of 50%. This provision puts a cap in public subsidy for projects engaging private sector. One concern in this regard is whether government would be open to making changes in the BOT law provision that limits risk-sharing or subsidies. A more basic question is how can recovery of investments and O&M costs be pursued in irrigation projects? Can government not redefine the investment component as any other infrastructure project, which is a social endeavour?

11 RECOMMENDATIONS TO OVERCOME POLICY ISSUES

The irrigation sector faces the perennial problem of mobilizing finance and sustaining investments. Irrigation infrastructure requires huge capital investments while budgetary resources are limited. This section presents some alternatives, their implications, and recommendations on how alternative solutions might be implemented. Specifically, options for Government to eventually break out of a vicious cycle and provide potentially more efficient and sustainable irrigation service are presented. These options cover financing of new and rehabilitation projects and making O&M sustainable.

The successes in PPP in transportation, energy and urban water supply provide an opening for exploring its use in irrigation. PPP can potentially provide financing for expansion, efficiencies in construction and O&M, and modernization of irrigation systems. This study proposes the following courses of actions in pursuing PPP projects for irrigation: (a) begin with experiments; (b) use the dam nexus as entry point; (c) use an expanded role of IAs as entry point; (d) use of PPP; (e) use the rice policy as entry point; and (f) use social policy as entry point.

11.1 EXPERIMENTS

In pursuing the PPP option, it is important for Government to clearly define its objectives and what it wants from the arrangement, and to analyze and engage stakeholders. However, given the large economic and financial stakes, it is better to begin with pilot projects in order to assess the potential of reforms in irrigation. Experiments should be conducted. Going full ahead with reforms without much understanding and the buy-in and support of the most influential and important stakeholders increases the likelihood of failure and loss of valuable resources.

Experiments will help develop realistic and workable guidelines, assess the likely success of proposed options, identify logistical and operational problems and uncover potential ones, determine what resources (funds, materials, staff) will be required, and convince other stakeholders of the potential of PPP in delivering better irrigation service.

Under this track, there are several variations or mix of activities that can be pursued: (a) NIA in a service contract; (b) PPP with innovative techniques in conveyance, distribution and collection; (c) pilot scheme to measure actual O&M costs; (d) pilot PPP-IA project with volumetric pricing; (e) pilot PPP in high value crops; (f) PPP with agricultural extension services; and (g) expansion of the role of IAs.

Irrigation service contract serves as first step towards introducing a PPP and is the more common form of the few PPP projects on irrigation in existence. Under this arrangement, a private contractor will be brought in to do one or more irrigation and drainage functions (design, operation and maintenance) through short-term, task-specific service contracts or longer and comprehensive management contracts. This arrangement will be appropriate where IAs have begun to feel the benefits of managing at least part of their own water service but experience difficulty in fulfilling all operation, management and maintenance (OMM) functions without professional, technical support. Under an OMM contract, the private firm is paid a fee and some performance bonus. The private partner takes very little risk and in case of poor performance, will only lose the bonus.

Innovative techniques in conveyance and distribution should be developed through experiments. While lining of canals can be expensive, the expected benefits in terms of increased efficiency of systems and water flow and supplies that reach farmers' fields may justify the additional costs. The same arguments stand for experiments that test the use of buried pipes for water distribution.

Different modes of collection can also be tested, e.g., use of prepaid cards, use of volumetric

pricing, or water wholesaling rather than retailing. The volumetric study under PIDP should be useful although probably will not represent a typical NIS system so additional experiments within pilot PPP projects may be necessary. These innovations, however, will have to be taken into account in the modernization of existing systems.

A pilot project on agricultural extension services will help gauge the potential of PPP in enhancing extension services delivery. This can include land area development, management of production, support to input supply, processing and marketing. This option can be beneficial to both private partner and farmers. Below is the sample arrangement developed for an irrigation scheme in Malawi.

Table 11-1 : PPP Options According to Services Provided by the Private Partner

Functions for supporting services to agricultural production	Services provided by agribusiness companies				Services done by other service providers
	With farm land acquired by agribusiness company from the local community and / or from Governement			Without farm land acquired (contract farming)	
	1- Sugar Cane Chain Value (Illovo proposal)		2- Other chain value	3- Other chain value	4- All chain value
	With Community Trust	With Small Growers Association			
Irrigable areas development for smallhoders and outgrowers					
Areas for Commercial crops	Full development by the Agribusiness Company		Agribusiness / beneficiaries / Public / Donors ?	Agribusiness / beneficiaries / Public / Donors ?	Beneficiaries / Public / Donors ?
Areas for Irrigated Food Crops	Bulk water assets by Agribusiness company / On-field investments by Govt & Donors				
Management of production in smallholders land	Agribusiness company	Smallholders organization	Smallholders in general	Smallholders in general	Smallholders in general
Support to inputs supply					
Irrigation services	-	Smallholders Organization / Agribusiness company	Agribusiness company or Private operator for O&M	Agribusiness company or Private operator for O&M	Private providers, NGO, farmers apex organizations, etc.
Other inputs supply	-	Smallholders organization	Agribusiness company	Agribusiness company	
Extension services	-	Agribusiness company			
Support to processing & marketing	-	Agribusiness company			

Source: BRLi. 2011. Public Private Partnership Options Study and Awareness Raising for Irrigation Investment in Malawi. Final report submitted to the World Bank, Ministry of Irrigation and Water Development, and Privatization Commission. February.

The table below shows the options that can be pursued and what NIA/DA can ask private sector to provide. Options 1 and 2 are with a concession for irrigation services. Options 3 and 4 are on a lease/affermage arrangement for irrigation services with no financing function for the private partner. In these options, the private partner will take the demand and payment risks because its revenues will come from the irrigation fees collected from farmers. Options 5 and 6 are on O&M (or management) contract arrangements for irrigation services with no financing function for the private no risk of demand because its revenues will come from the contracting authority who will take the demand and payment risks.

Table 11-2: PPP Options According to the Functions Devolved to the Private Partner

Potential Functions under responsability of private operator	Options for PPP transaction models					
	1- Concession on Irrigation services + supporting services in agriculture	2- Concession on Irrigation services	3- Lease / Affermage contract + supportings services in agriculture	4- Lease / Affermage contract	5- Supervision and O&M contract for irrigation services + supporting services in agriculture	6- Supervision and O&M contract
A. Irrigation services						
1. Final design and construction						
Final Design and preparation of bidding documents for construction	**Private**	**Private**	Public or Private (in another contract)	Public or Private (in another contract)	Public or Private (in another contract)	Public or Private (in another contract)
Construction	**Private**	**Private**	Private (in another contract)	Private (in another contract)	Private (in another contract)	Private (in another contract)
2. Supervision of construction	**Private**	**Private**	Private (in another contract)	Private (in another contract)	**Private**	**Private**
3. Financing of capital costs	**Private / Public / Beneficiaries**	**Private / Public / Beneficiaries**	Private (?) / Public / beneficiaries	Private (?) / Public / beneficiaries	Public / beneficiaries	Public / beneficiaries
4. Operation and maintenance of Irrigation and Drainage assets						
Transfer of main infrastructures after completion of construction	**Private**	**Private**	Private (in another contract)	Private (in another contract)	Private (in another contract)	Private (in another contract)
Operation & Maintenance	**Private**	**Private**	**Private**	**Private**	**Private**	**Private**
Renewal (and / or renewal fund to contribute)	**Private / Public**	**Private / Public**	Public	Public	Public	Public
B. Supporting services for agricultural production (non-irrigation services) for smallholders and outgrowers						
Irrigable areas development	**Private / Public**	Public or Private (in another contract)	**Public / Private**	Public or Private (in another contract)	**Public / Private**	Public or Private (in another contract)
Support to inputs supply	**Private**		**Private**		**Private**	
Extension services	**Private**		**Private**		**Private**	
Support to processing & marketing	**Private**		**Private**		**Private**	
Comments	*Similar to Brazilian initiatives*	*Similar to Moroccan and Egyptian initiatives*	-	-	-	*Similar to Ethiopian initiative*

Source: BRLi. 2011. Public Private Partnership Options Study and Awareness Raising for Irrigation Investment in Malawi. Final report submitted to the World Bank, Ministry of Irrigation and Water Development, and Privatization Commission. February.

Under the concession options (1 and 2), more risks are transferred to the private partner but the ISF could be higher. The government finance will be higher for the lease contracts (3 and 4) so the impact on the national budget will be bigger.

In a DBOF option, the private partner takes all functions of design, build, operate and (most of) finance, bearing a higher level of risk including investment-related risks. The farmers pay ISF to the private investor. The government subsidy can cover part of the total project cost.

In the above experiments, it is possible to expand the roles of the IAs. Specifically, more delegation of the mandate and give more extensive role in rehabilitation; and a bigger share in ISF.

11.2 DAM NEXUS AS ENTRY POINT

PPP should not be seen as substitute for government investment but rather as a complement. A PPP contract may require Government to make available similar amounts to finance a project. PPP provides an alternative source of finance to traditional government borrowing. In this track, the Government will have to re-examine its policy on cost recovery. If the cost of dams is included in costs to be recovered from farmers, a high ISF will have to be charged to make the project attractive to private investors. One option to consider is to exclude the cost of dams from the irrigation cost. In this case, the cost of dams will be treated as a general public infrastructure. This is especially the case with multi-purpose dams that will benefit not just farmers but other water users as well. Another option to consider is to fully subsidize dams and reservoirs but share the costs with the LGU and/or water districts. In the case of hydropower, NIA can collect the full value of the benefits from its users while remaining in the business of administering national irrigation systems.

The idea is simply to pave the way for the adjustment of irrigation service fees, based on O&M costs and partial capital recovery (say 30%). In such a setting, the Government will subsidize the dam and will set the ISF equal to O&M costs and 30% of the total cost of the infrastructure

(conveyance and distribution) for 15 years. The period of 15 years is used merely to illustrate the period within which to recover the capital investment. What is important is that the cost of the dam is excluded from the cost recovery process, thus lowering the water fees that will be paid by the farmers. The benefit is to rely on sound principles in re-setting the ISF and to adapt the ISF to local conditions.

The benefits to PPP will be to avoid the cross-subsidy on O&M and to set precisely the contribution of the farmers to capital cost, and accordingly the subsidy from the Government. This design allows for a transparent and targeted subsidy that incentivizes the private operator to maintain service quality. Subsidies are transparent, well-targeted and create incentives for the private operator to maintain service quality.

11.3 EXPANDED ROLE OF IA AS ENTRY POINT

NIA's IMT program is a work in progress. Devolution of the irrigation mandate to IAs can take different forms. The current IMT model is an incomplete devolution because NIA is still managing a major part of the system. Giving an expanded role to IAs may lead to systems that are more responsive to farmers' needs, or make them become financially sustainable. One track the NIA can pursue is expanding the role of IAs beyond what is currently being done.

Specifically, NIA can make the IAs accountable for the rehabilitation of existing systems. Also, IAs can be empowered in their relationship with non-paying members. Progressive transfer of rehabilitation responsibilities can be facilitated. There can be a condition that only the best IAs will benefit from a matching grant fund for IAs. A progressive reduction in the share of costs may have to be considered.

With the expansion of IA roles, NIA will have to focus on its smaller, higher-level role of supervising the devolution, management of headwork (dams and head canals), volumetric charges to IAs at the head gate, and capacity building and technical support to IAs. With this track, further downsizing, reallocation, and retraining of personnel will have to be done. IAs will take care of transferred[14] assets, collect water fees to cover their O&M costs, and manage water efficiently and equitably. The empowered IAs will become real service providers for their members, and can even hire professional personnel. Two conditions were found to contribute to the success of this option: financial support for asset rehabilitation, if not done before transfer; and technical support in O&M. As a transition arrangement, IAs may need to hire professional support.

11.4 PPP AS ENTRY POINT

In order to increase the technical abilities of IA in the devolution process, a mandatory alliance between a private partner and the IA can be made. A management contract can be drawn between NIA and the private partner. In this case, the transfer will be more rapid than a transfer based on a training program for IAs staffs.

In order to realize such a transfer, NIA could finance the operation of the private partner for the first few years and could select it through open bidding. Once the period of full subsidy is over, a reduction in the contribution from NIA would allow a progressive transfer to the IA that is being assisted by the private partner.

11.5 RICE POLICY AS ENTRY POINT

[14] Not transferring of property but only the attribution of the assets to the IA in order for the organization to fulfill its obligations.

The Government manages a complex rice policy. On one hand, it protects farmers from cheap imports through tariffs. On the other hand, it mandates NFA to import in order to reduce the costs to certain urban consumers. The combined costs of supporting the income of farmers and subsidizing consumers is very high and prone to dysfunctions such as rice smuggling, or inefficient marketing of the local production.

The same result could be obtained with a different policy. Instead of protecting the farmers from cheap import to increase their income and their incentives to produce, the Government could rely on direct payment based on the area planted and suppress the tariffs on imported rice. In this case, the income of farmers will be composed of the direct payment and the value of their production (with a lower price). If the direct payment is calculated to compensate for the reduction in the value of production, the net effect of this policy on the income of farmers is nil. Consumers will benefit from this policy; they will have access to cheap imported rice or to competitive local rice. Direct payments based on acreage are entirely legal in regards to World Trade Organization (WTO) agreements.

From the point of view of irrigation policy, the adoption of a direct payment policy will make it easier to collect ISF. In order to do that, the Government could condition eligibility to the direct payment program upon payment of ISF. Or, in national irrigation systems, the Government can deduct the ISF from the direct payment. So, a shift in the support policy for rice can increase the collection rate of the ISF and make a PPP easier to implement.

11.6 SOCIAL POLICY AS ENTRY POINT

When confronted with the low level of ISF collection, officials tend to support non-enforcement on social grounds. The farmers are too poor to be able to pay the ISF. In this case, it is better to adopt an explicit exemption for poor farmers than accepting a poor collection rate with its fatal effect on the quality of irrigation service.

This policy could be applied at the IA level, with a general assembly approbation of the farmers to be exempted and a partial increase in the ISF to recover for the loss in revenue. The policy could be applied by NIA on a poverty assessment to be done by a special committee composed of social departments, DA, LGUs and NIA.

An alternative would be to use the Conditional Cash Transfer (CCT) program of the Government wherein the Government gives cash to the poor with specific conditions in return. With this transfer in place, all users will pay the ISF while the poorest will receive benefits from the CCT program. If they do not pay their ISF, CCT benefits will be cut off.

11.7 CONCLUSIONS ON POLICY PROPOSALS

Policy decisions are not easily made, at least in a democratic setting. Many legal reforms come from compromises between different and opposing needs, goals, and interests. These compromises result from debates in and out of Congress. Even when the compromise is in opposition to conventional economic wisdom, it is always prudent to be very “humble” when proposing changes. The exact conditions and considerations that led to compromises in the setting of important policies are usually not documented or publicly known.

The conditions that set the ISF policy are very complex, drawing from considerations on equity, solidarity, independence and sovereignty, as well as poverty reduction and income support for small farmers. The impact on NIA in terms of financial sustainability has been taken into account by policy-makers who decided that the benefits outweigh the costs. In presenting different options for reform of the ISF, it is expected that these proposed policy reforms will need to be debated and their benefits and costs reassessed by policy-makers. It is important, however, to introduce new ideas in this debate based on lessons learned from international experiences on developing

reforms for the irrigation sector.

The use of experiments in irrigation sector schemes, whether technical or managerial, is proposed in order to provide more substance to the reform process. It is probably the best option available – amending the ISF, whether to switch to volume-based pricing, or adjust it upwards, or to set it project-by-project according to a general rule (O&M+ 30% of investment costs excluding the dam, for example[15]) will take time and need a dialogue with stakeholders and public debate on the issue. In the meantime, the conduct of experiments within a PPP project or directly by NIA could generate valuable lessons and insights on the reform agenda.

Specifically, the experiments should analyze several methods in cost recovery and techniques in water distribution and measurement. This section of the study provided some details on the kind of experiments needed to support ISF reform mandated by the AFMA.

Some legal questions were raised in regard to the ability of NIA to undertake PPP projects, particularly the issue on the turnover to IAs and the interpretation of the NIA Charter. The Government legal counsel must clarify these points prior to any final commitment. An alternative would be to obtain a legal opinion from the PPP Center.

[15] Used in Morocco to relate ISF to costs.

12 ACTION PLAN

The action plan is organized in two sections.

- Implementation of the policy proposals, specifically on the reform of the ISF; and
- Development of the road map which is composed of the program of experiments advocated in the policy paper and the two PPP projects to be launched (Ilaguen and Tumauini). This section draws from the entire mission; the analysis of the irrigation sector and the legal and regulatory environment for PPP; the analytical framework on selecting projects; the policy paper proposals; and interviews with stakeholders in order to present a feasible project to implement. The detailed presentation of the project is in Annex A.

In the Inception Report, as well as in the methodological proposal, the two projects should have been studied at the action planning phase. However, the similarity between the two projects is such that it will be repetitive to study both of them in detail. Analyzing the second one and structuring it as a PPP project should be considered, therefore, as an application of the toolbox developed in this study.

12.1 IMPLEMENTATION ISSUES ON POLICY NOTE PROPOSALS

Instead of considering a full-fledged reform of the ISF, which is basically a political issue, this section will present a way to increase the role of IAs and to continue the streamlining and restructuring of NIA.

12.1.1 Increase the role of IA

The Philippine Development Plan 2011–2016 section on the development of irrigation states (page 145): *"As part of a long-term strategy to ensure its efficient use, wholesaling of water resource at the head gate to IAs is expected to drastically cut down collection expenses. This would entail IAs paying only a single fee, with the IAs taking responsibility for collecting ISF from its members. Volumetric (volume-based) pricing at the head gate enhances accountability, since it provides: (a) greater contract assurances for service delivery by the water supplier/s to the IAs; and (b) incentive to properly maintain the distribution system, improve the equity of head- and tail-end distribution and conserve water resources. Pilot-testing of volumetric pricing has revealed constraints to implementation for open canals, as such; therefore, this will initially be introduced in NISs where secondary irrigation facilities or its components have been fully turned over to IAs through the IMT program. In the interim, NIA may adopt and improve socially-acceptable demand-management strategies"*

This extract validates the policy proposition for switching to volumetric pricing at the head gate and for turning over to IAs all the management and maintenance of the laterals. If already done, it means that irrigation management transfer contracts for pump irrigation schemes have been signed with extensive transfer of responsibilities to the farmers. The best option consists on an experimental transfer of responsibility with volumetric pricing being tested under the same pilot project. In order to reduce resistance, the fee per cubic meter should be set in such a manner that the fee as computed using volumetric pricing will still be equivalent to the ISF. This can be done by dividing the ISF by the estimated volume of water used per hectare.

12.1.2 Redefine the role of NIA

Once adopted, the new allocation of costs for dams would allow a progressive change in NIA, with an aim of transforming the agency into a more efficient organization, able to rely on its own income and to continue the expansion of irrigation systems with less support from the Government. NIA would then evolve as the main operator of dams and conveyances systems, to distribute water by volume to IAs at head gates and a supervisor of the PPP contracts in the irrigation sector. In order to attain this goal, NIA should support a move toward volumetric pricing, based on local conditions, and set in reference to O&M plus a fixed part of irrigation costs. This will support undertaking of PPP projects as concessions (BOT) to reduce the level of appropriations needed from the Government.

The revenues derived from hydropower concessions (leases) could complement the income from water sales to financially sustain NIA. At the end of this process, NIA would be in charge of regulating PPP contracts in the irrigation sector, manage part of the national irrigation systems, and operate and maintain some dams and their main canals. Reliance on the private sector to supply, operate and maintain part of NISs, with revenues from hydropower leases and increased quality of services brought about by a better system of checks and balances (the regulation of PPP contracts), will bring an end to the vicious circle of poor maintenance, low quality of service, low recovery rate of the ISF, and deferred maintenance and rehabilitation that are dependent on Congressional appropriations.

12.1.3 The experiments

The policy paper considered experiments as an interesting approach to prepare the ground for reform in the irrigation sector. These experiments deal with all the issues identified in the policy paper: the ISF base, the ISF level, measurement of water delivered to laterals, increased role of IAs in distributing irrigation water, collection of irrigation fees, and maintenance of part of irrigation systems. One important question is on the role of PPP in these experiments. *Do we need to rely on a private partner in order to realize them and to monitor results?* The success of the World Bank project on IMT shows that NIA could conduct these experiments directly, without conditioning them by a PPP.

12.2 ROADMAP

The following roadmap is organized around three sets of actions.

- How to implement the experiments;
- Policy reform; and
- Investment projects, specifically the Ilaguen multi-purpose system of dams, hydropower generation and irrigation water distribution, and the Tumauini project.

12.2.1 Implementation of experiments

The best way to set up these experiments is for the DA to formally request NIA to draft a program for undertaking the experiments. What would be of utmost importance is to monitor and analyze the results. In this regard, the DA could set up a committee of experts to help monitor the experiments. Such experts could come from the academe, engineering firms, and prominent civil servants.

12.2.2 Policy reform

In terms of policy reform, the agenda is more complex. Changes on the ISF policy should be based on the results of the proposed experiments and on consultations with stakeholders and policy-makers. There is no need for additional analytical work. There have already been numerous studies done on the subject with similar conclusions. The most pressing question is to convince stakeholders and policy-makers that a reform of the ISF would be beneficial to farmers. If the DA is willing to champion the reform process, an interesting approach would be to commit a white paper presenting the arguments and the benefits expected from the reform.

12.2.3 Investments projects

PPP IN ILAGUEN

For PPP in Ilaguen, what is required from the DA and specifically the unit in charge of PPP is to mobilize resources from the Australian fund set up at the PPP Center to hire transaction advisors to prepare the PPP project documentation. Preparing the transaction with the help of advisors is not a full-fledged commitment to proceed. The transaction advisors will analyze the feasibility of the PPP project more deeply than has been the case until now. They will have to engage the private sector, with the help of the DA PPP unit to demonstrate that irrigation is and could be an attractive investment opportunity for the private sector, when this investment is conducted under an appropriate contractual arrangement with the Government.

PPP IN TUMAUINI

The PPP project in Tumauini is a way to confirm the quality of the strategy developed in the Ilaguen scheme. It is easy to use the framework of Ilaguen in order to structure the Tumauini scheme, and to test the feasibility using the financial model. If the first transaction is successful, DA should consider organizing another bid for Tumauini.

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APPENDICES

Annex A.

The Ilaguen Multi-Purpose Irrigation and Power Project

PPP PROJECT OF ILAGUEN

PROJECT DESCRIPTION

The multipurpose irrigation and power project is located in the province of Isabela in Northern Luzon and within the watershed of the Sierra Madre Mountains. The first studies were conducted in 1983, for irrigation, and thereafter for hydropower by the National Power Corporation (NPC).

The main features of the project includes: (a) construction of the dam (89-meter high) across the Ilaguen River; (b) construction of the after bay dam 19 kilometers downstream of the high dam; (c) construction of a catch dam some 14 kilometers along the proposed connecting canal from the after – bay dam; and (d) the development of the irrigation network to irrigate about 30,000 hectares of rice land.

Goals and rationale for the PPP

The following are the goals to a PPP for this project: (a) lower the financial contribution of the government in providing irrigation services; (b) use private sector expertise in setting up and managing a hydropower station; (c) benefit from the private sector's expertise in the management and maintenance of irrigation infrastructure in two ways: (i) direct benefit that comes from good services at an optimal cost; and (ii) benchmark the private sector provision of irrigation services to analyze improvements to be brought in to NIA services.

The private sector will provide to the partnership the financial services, construction services and operation and maintenance services for the irrigation and the hydropower components. As a by-product and through its reports, its performances will be used as a benchmark to improve on irrigation services directly provided by NIA services.

Investments

The investments include the construction of the dam, the installation of the hydropower station, the development of the conveyance and distribution system for irrigation and costs of developing the project and resettling the project affected families. In part, the distribution system for irrigation is rehabilitation and not a new project.

The investments are to be realized over a period of six years. The total costs are estimated to be around PhP22 billion.

Operation and maintenance

Operation and maintenance will be realized by the private partner on the system of dams, the main canal, the hydropower station and the irrigation network. Each of these subsystems needs specific operation and maintenance, and the contractual arrangement will cover differently each subsystem.

The dams

The private partner will apply the manual of procedures on the operation of the dams system, in regard to the management of flood events. It will set up sensors in order to collect data on the dam resistance and adaptation. The terms of reference used in the bidding will present the manual of procedures and the measurement system to be implemented. Usually, engineering firms in charge of designing dams have to provide manual of procedures and a scheme for measurement system.

The hydropower

The private partner will be fully in charge of setting the proper procedures of operation and maintenance of the hydropower. The private partner would have to respect water allocation procedures and priorities in producing power, including respect to security procedures. All other considerations are irrelevant in the PPP contract, as the private partner will bear all risks of financing and operating the hydropower station.

Irrigation network

This is the difficult part of the contractual arrangement. The private operator is to provide the maintenance of irrigation network, but it is always possible to postpone maintenance operation and save expenses. It is difficult to follow on the maintenance of an irrigation network because some of the operations have effects which are not easily observable.

The organization of a proper contractual arrangement on the maintenance of a gravity irrigation network is demanding. Usually, the private partner will be contractually obliged to provide a manual of procedures for the maintenance of the irrigation network after one year of operation. It will also be obliged to provide a computer-based system to follow all the operations of maintenance (small, important, regular or impromptu) using geocode to identify the precise elements that have been repaired. The maintenance is divided in small and regular operations, planned well in advance and bigger repairs. For the last ones, the decision to commit resources is taken jointly between the public and private partners.

An independent expert is hired by the contracting authority for the task of assessing quality of maintenance on the infrastructure every six months. This expert will act as an arbiter in case of disagreement on the quality of the maintenance.

In terms of operating the irrigation network (e.g., distributing water and collecting fees), the private operator will produce a manual of operation and ideally a computerized system for the accounts. The private operator would have to rely on the Irrigators Association for maintaining and collecting the ISF, as prescribed under the IMT contracts.

Relation with the NIA regional offices

The private partner will report regularly to NIA offices. Their support is expected.

Risks identification and allocation

The main risks were identified in Part II (Analytical Framework), thus this aspect will be brief to avoid repetition.

In terms of commercial risks, the private partner will assume those related to energy sales and production. The public partner will cover those related to irrigation.

In terms of water supply, the risks on hydropower generation will be borne by the private partner, the public partner will take charge of the irrigation implication.

In terms of construction risks, all are to be borne by the private partner. The permits will be provided by the contracting authority.

The contracting authority will assume the natural catastrophes risks, those related to a change of law and change of policies (ISF, rice support price). The private partner will take into account indigenous people right and local government units' regulations.

CONTRACT ARRANGEMENT

In accordance to the results of the analysis conducted in the first chapters of this report, the project for a PPP for this particular investment has been structured in two parts:

- For the hydropower station, the proposed option is a concession where the private partner will finance, design, construct, operate, maintain and market the power generation under conditions of priority given to domestic water and irrigation needs. The concession will be constructed in such a way that a lease will be paid to the contracting authority. This lease will be one of the most important indicators in attributing the concession (it means that candidates to the concession will submit lease propositions and the highest offer would be retained).

- The rest of the investment is to be constructed and operated under the BTO contractual arrangement, where the private partner will be in charge of design, finance, construction, operation and maintenance and the public contracting authority will pay amortization and a fee for operating and maintaining the infrastructure. This solution is preferred to a more classical BOT in that risk allocation is on par with the ability to bear it. The political uncertainty in ISF level and collection rate could not be borne by the private partner at a reasonable cost.

ASSESSMENT OF FINANCIAL VIABILITY

A financial model has been developed in order to assess different options of structuring the PPP. The full results have been presented in the analytical framework section of this report. The description of the financial model is included in the annex. So, the section will deal essentially with the main features of the PPP financial flows.

The main results are quite clear. It would be almost impossible to construct, operate and maintain the whole system (dams, conveyance, distribution of irrigation water, hydropower generation) on the expected cash flow generated by electricity sales and ISF collection, even when the subsidy on capital expenditures is at its maximum of 50% of investment costs.

These results explain why a concession on the hydropower generation with the payment of a lease is combined with BTO to structure the PPP. In this case, it is easy to allocate the amount collected from the hydropower generation to reduce the cost of the amortizations paid by the contracting authority in the BTO contract.

The management contract will be paid partly from the ISF collected.

Annex B.

The Financial Model

PRESENTATION OF THE FINANCIAL MODEL

INTRODUCTION

The objectives of financial modelling were clear and modest. It has been constructed to answer questions on the feasibility of a BOT in order to construct, operate and maintain a multi-purpose project in the Philippine context.

The investment would include a dam, a hydropower unit and conveyance and distribution for an irrigation system. Other costs include resettlement costs and development costs, spent prior to the beginning of the project.

The model analyzes the cash flows and the dividends in order to assess internal rate of returns for the project and for the shareholders.

The presentation of the model will simply present the different sheets of the Excel spreadsheet, emphasizing the most important relations.

THE DIFFERENT SHEETS OF THE SPREADSHEET

Sensitivities

It contains the parameters used to conduct the sensitivity analysis. The most important factors are changes in CAPEX, tariffs and financing conditions. It is the only place where changes are allowed to conduct simulations. These changes are to be expressed as per cent change from the actual value used.

Assumptions

These contain all the parameters used in the modelling effort. The time frame of the project construction and operation, capital expenditures, operational expenditures, financing conditions, tax treatment, output pricing and repayment schedule for the senior debt are all presented for eventual updating/changing.

ASSUMPTIONS SHEET

	Fonte	Units	
CURRENCY			Mios Pesos
Pesos		Pesos ('000)	☑ Pesos
US Dollars		$ ('000)	☐ $
TIMING			
Starting date			01-janv-14
Ending date			31-déc-64
Concession Maturity		Year	51,0
Operation Date Maturity		Year	50,0
INFLATION			
Annual Rate			2,0%
CONSTRUCTION PERIOD			
Maturity		Year	6,0
Investments			
Starting date			01-janv-14
Ending date			31-déc-19
Maturity 1st Sestion			6,0
CAPEX			
Investments			
Dam		Mios Pesos	2 570
HP		Mios Pesos	1 328
Irrigation		Mios Pesos	10 340
TOTAL		**Mios Pesos**	**14 238**
Design and other costs		**Mios Pesos**	**4 482**
Resetllement		**Mios Pesos**	**1 426**
TOTAL CAPEX		**Mios Pesos**	**20 146**
Total Capex		**Mios Pesos**	**20 146**
DEPRECIATION			
Investments			
Starting date			01-janv-20
VAT			
Grant Rate		%	0%
Capex Rate		%	0%
Opex Rate		%	0%
Concession fee Rate		%	0%
Water revenues Rate		%	0%
Energy revenues Rate		%	0%

OPERATING PHASE

Starting Date		01-janv-20
Irrigation services		
Opex		
1. Personnel		
Staff		15
Annul Cost	Mios Pesos	6
2. Water System Opex		
Annul Cost	Mios Pesos	6
3. Maintenance		
Capex percentage	%	3,0%
4. Other Services	Mios Pesos	3
5. General Expenses		
Maitenance and Personnel %	%	5,0%

Revenues

Service area	ha	30 000
first year operation		01-janv-20
Irrigated area (Wet and dry)	ha	54 000
ISF 2013	Pesos/ha	5 100
ISF 2020	Pesos/ha	5 975
Rice Price support 2013	Pesos/ kg	17
Rice price support 2020	Pesos/ kg	20
Tarif 2013 15 Peso/kg	Pesos/ha	4 335
Tarif 2020 (increase 2 % per Anum)	Pesos/ha	5 079
Total revenue 2020	Mios Pesos	130

ENERGY SALE

Tariff annual Escalation	%	1,5%
1° Escalation	anno	*2021*
Start-up year		*2020*
Start-up capacity	%	80%
Tariff 1		
Tariff 31-12-2012	Pesos ('000000)/G	5
Tariff 31-12-2020	Pesos ('000000)/G	6
Energy sold	GWh/year	168,00
Interest on accumulated cash		*2%*
Power plant opex	Mios Pesos	29
Energy Autority Fee	Mios Pesos	2
Water Autority Fee	Mios Pesos	2

TAXATION		
Corporation Tax Rate	%_	15,0%
Corporate Tax Rate	%	0,00%
WORKING CAPITAL		
Average water receipts time	gg.	120
Average energy receipts time	gg.	60
Average opex payment time (no personnel)	gg.	60
Average Exiting Water System payment time	gg.	60
Average Autority Water fee payment time	gg.	60
Average Power Plant opex payment time	gg.	60
PUBLIC GRANT		
Amount	**Mios Pesos**	**10 073**
Drawdown modality		Public Installments
Investments		
TOTAL CAPEX	Mios Pesos	20 146
%		50%
1° Section Grant amount	**Mios Pesos**	**10 073**
First drawdown		01-janv-14
First drawdown		01-janv-20
EQUITY		
Amount	**Mios Pesos**	**5 344**
Drawdown modality		*Pro-quota*
% of financial deficit		12,00%
SENIOR FACILITY		
Amount	**Mios Pesos**	**6 746**
Average Loan Life		**14,92**
Availability		**6**
Starting date	Year	01-janv-14
Ending date		01-janv-20
Repayment Period	Year	
Starting date		02-janv-20
Ending date		
Interest		variable ra
Base Rate		7,00%
Margin		1,50%
Annual Interest Rate		8,50%
Annual Depreciation Rate		2,00%
Withholding Tax		0,25%
Financial fee		
Commitment fee		0,70%
Arrangement fee		1,00%

Summary

This sheet contains the most important factors and the results of the simulations. It is used to simplify the presentation of the results.

Capex

Presents the capital expenditure program per year, after escalation of the initial estimates.

Capex Analysis

Calculates the Capex figures after escalating their prices by the inflation index of the assumptions sheet.

Energy revenue

Calculate the income stream of the hydropower sales, once the price of the Megawatt escalated. It reflects the most important assumption of the model, the electricity sale price. In the model, this price had been set at PhP5 million for 2013. These are in line with the indications of the WESM and of the mean buying price of Meralco.

Water revenue

This is the irrigation service revenue. They are calculated by setting the cropping intensities (dividing the serviced area in wet and dry season), and by calculating the irrigation service fee on the basis of the current support price, escalated up to the beginning of the irrigation in 2020 (no change in the irrigation service fee has been postulated). Finally, an ISF recovery rate is fixed. The IAs' share for collecting the ISF is deducted. These steps give irrigation revenue per hectare and per year. This figure is multiplied by the service area to give yearly revenue from irrigation services.

Depreciation

A linear depreciation is calculated on the investments during the operating phase of the concession (50 years). The useful life of the dam and of the hydropower is over 50 years. For the conveyance the same assumption is used. For the distribution network, the maintenance cost has been set at 5% in order to avoid rehabilitation phases. In other terms, the private partner with increase the level of maintenance expenditure up to 5% of the investment cost in order to avoid rehabilitation cycle.

Grant

This presents the disbursement of the grant given to the private partner according to Section 13.3 of the IRR on PPPs. It is distributed during the time of the construction.

OPEX

The staff for irrigation service has been set at 16, with an aggregate cost of PhP15 million per year. The maintenance cost is 5% of the CAPEX for irrigation. The other costs are 5% of the total maintenance and salaries.

For the hydropower station, OPEX were set at 2% of the CAPEX.

Work_cap

Working capital requirement has been calculated with an average payment for the location service of 120 days. For all other payment, receivables or payables accounts, 60 days were used.

Sources and Uses

Sources and Uses is a sheet to control and ensure that the use of cash is equal to the sources of cash every year. It is used to control that Capex is paid for by equity and debt.

Debt

This estimates the level of the senior debt needed by financing the net financial cash flow. It analyses the reimbursements according to the schedule set in the assumption sheet.

Equity

It is basically the amount of money brought in by the private partner as equity. Calculated in order to have a 25% debt-to-equity ratio. The sheet is also used to calculate the dividends streams (full allocation of the cash flow available, once the debt is paid for and the reported cash is positive).

Profit and Loss

The profit and loss statement is very standard.

EBITDA = revenues – OPEX

EBIT = EBITDA – depreciation

EBT = EBIT – financial costs

Earnings = EBT – taxes

Earnings are the increased or decreased cash available at the end of the exercise.

Cash Flow

The analysis of the cash flow of the project is central for the modelling.

The table below has been extracted from the financial model. It presents the cash flow sheet. Note the columns between the years 2017 and 2061 have been masked for the lay-out.

CASH FLOW STATEMENT

		01-janv-14	*01-janv-15*	*01-janv-16*	*01-janv-17*	*01-janv-61*	*01-janv-62*	*01-janv-63*	*01-janv-64*
		31-déc-14	*31-déc-15*	*31-déc-16*	*31-déc-17*	*31-déc-61*	*31-déc-62*	*31-déc-63*	*31-déc-64*
Year		2014	2015	2016	2017	2061	2062	2063	2064
Progr.		1	2	3	4	48	49	50	51
Total Reveunes	Mios Pesos	0	0	0	0	2 560	2 602	2 644	2 687
Total Opex	Mios Pesos	0	0	0	0	(450)	(452)	(453)	(455)
EBITDA	**Mios Pesos**	**0**	**0**	**0**	**0**	**2 110**	**2 150**	**2 191**	**2 233**
EBITDA	Mios Pesos	0	0	0	0	2 110	2 150	2 191	2 233
OPERATING CASH FLOW (Gross)	**Mios Pesos**	**0**	**0**	**0**	**0**	**2 110**	**2 150**	**2 191**	**2 233**
Total Capex	Mios Pesos	(1 948)	(2 660)	(2 417)	(2 085)	0	0	0	0
Net Variation in WC	Mios Pesos	0	0	0	0	(7)	(6)	(7)	(6)
DSRA Constitution	Mios Pesos	0	0	0	0	0	0	0	0
OPERATING CASH FLOW (Net)	**Mios Pesos**	**(1 948)**	**(2 660)**	**(2 417)**	**(2 085)**	**2 103**	**2 144**	**2 185**	**2 227**
EQUITY and GRANT									
Equity	Mios Pesos	487	665	604	521	0	0	0	0
Public Grants	Mios Pesos	974	1 330	1 208	1 043	0	0	0	0
TOTAL EQUITY and GRANT		**1 461**	**1 995**	**1 813**	**1 564**	**0**	**0**	**0**	**0**
FINANCIAL CASH FLOW (gross)		**(487)**	**(665)**	**(604)**	**(521)**	**2 103**	**2 144**	**2 185**	**2 227**
Interest and Financial Costs									
SENIOR FACILITY	Mios Pesos	(141)	(87)	(151)	(215)	0	0	0	0
Interest	Mios Pesos	(28)	(87)	(151)	(215)	0	0	0	0
Financial Fees	Mios Pesos	(112)	0	0	0	0	0	0	0
Total Interest and Financial Costs	**Mios Pesos**	**(141)**	**(87)**	**(151)**	**(215)**	**0**	**0**	**0**	**0**
SENIOR FACILITY									
Drawdown	Mios Pesos	628	752	756	736	0	0	0	0
Repayment	Mios Pesos	0	0	0	0	0	0	0	0
Cash Flow available for Equity	**Mios Pesos**	**0**	**0**	**0**	**0**	**2 103**	**2 144**	**2 185**	**2 227**
Cash Analysis									
Cash bop	Mios Pesos	0	0	0	0	1 778	1 813	1 849	1 886
Build up	Mios Pesos	0	0	0	0	2 103	2 144	2 185	2 227
Dividend	Mios Pesos	0	0	0	0	(2 103)	(2 144)	(2 185)	(2 227)
Interest Income	Mios Pesos	0	0	0	0	36	36	37	38
Cash eop	**Mios Pesos**	**0**	**0**	**0**	**0**	**1 813**	**1 849**	**1 886**	**1 924**
Dividend	**Mios Pesos**	**0**	**0**	**0**	**0**	**(2 103)**	**(2 144)**	**(2 185)**	**(2 227)**
Free Cash Flow	**Mios Pesos**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Interest income	**Mios Pesos**								
Cash Flow	**Mios Pesos**	**0**	**0**	**0**	**0**	**921**	**921**	**921**	**921**

IRR

Calculate the IRR on the project cash flow and on the Equity/dividend stream.

IRR SHEET

Starting			*01-janv-14*	*01-janv-15*	*01-janv-16*	*01-janv-17*	*01-janv-18*	*01-janv-19*	*01-janv-20*	*01-janv-21*	*01-janv-22*	*01-janv-23*	*01-janv-62*	*01-janv-63*	*01-janv-64*
Ending			*31-déc-14*	*31-déc-15*	*31-déc-16*	*31-déc-17*	*31-déc-18*	*31-déc-19*	*31-déc-20*	*31-déc-21*	*31-déc-22*	*31-déc-23*	*31-déc-62*	*31-déc-63*	*31-déc-64*
Year			2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2062	2063	2064
Progr.			1	2	3	4	5	6	7	8	9	10	49	50	51
Unlevered IRR	**8,83%**														
Total Capex		Mios Pesos	(1 948)	(2 660)	(2 417)	(2 085)	(5 566)	(6 698)	0	0	0	0	0	0	0
Total Reveunes		Mios Pesos	0	0	0	0	0	0	1 066	1 346	1 368	1 390	2 602	2 644	2 687
Total Opex		Mios Pesos	0	0	0	0	0	0	(406)	(407)	(408)	(408)	(452)	(453)	(455)
EBITDA		Mios Pesos	0	0	0	0	0	0	659	939	960	981	2 150	2 191	2 233
Net Variation in WC		Mios Pesos	0	0	0	0	0	0	(106)	(46)	(3)	(3)	(6)	(7)	(6)
Public Grants		Mios Pesos	974	1 330	1 208	1 043	2 783	3 349	-	-	-	-	-	-	-
Project Cash Flow		**Mios Pesos**	**(974)**	**(1 330)**	**(1 208)**	**(1 043)**	**(2 783)**	**(3 349)**	**553**	**893**	**957**	**978**	**2 144**	**2 185**	**2 227**

Concession Maturity	50	49	48	47	46	45	44	43	42	41	32	33	34
Final Maturity	31-déc-63												
Unlevered IRR	**8,83%**												

Starting			*01-janv-14*	*01-janv-15*	*01-janv-16*	*01-janv-17*	*01-janv-18*	*01-janv-19*	*01-janv-20*	*01-janv-21*	*01-janv-22*	*01-janv-23*	*01-janv-62*	*01-janv-63*	*01-janv-64*
Ending			*31-déc-14*	*31-déc-15*	*31-déc-16*	*31-déc-17*	*31-déc-18*	*31-déc-19*	*31-déc-20*	*31-déc-21*	*31-déc-22*	*31-déc-23*	*31-déc-62*	*31-déc-63*	*31-déc-64*
Year			2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2062	2063	2064
Progr.			1	2	3	4	5	6	7	8	9	10	49	50	51
EQUITY IRR	**8,67%**														
Equity	5 344	Mios Pesos	487	665	604	521	1 391	1 675	0	0	0	0	0	0	0
Cash to equity	24 286	Mios Pesos	0	0	0	0	0	0	(302)	6	113	102	2 144	2 185	2 227
Cash flow to Equity	**18 943**		**(487)**	**(665)**	**(604)**	**(521)**	**(1 391)**	**(1 675)**	**(302)**	**6**	**113**	**102**	**2 144**	**2 185**	**2 227**
EQUITY IRR		**8,67%**													
Equity			**487**	**665**	**604**	**521**	**1 391**	**1 675**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Dividend		**23 366**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2 144**	**2 185**	**2 227**
Free Cash Flow	***At maturity***	**921**	**0**	**0**	**0**	**0**	**0**	**0**	**(302)**	**6**	**113**	**102**	**0**	**0**	**0**

Annex C.

Inventory of Planned Irrigation Projects (As of December 2012)

DEPARTMENT KEY PROGRAM AND PROJECTS

Department: **NATIONAL IRRIGATION ADMINISTRATION**

Key Programs/Projects (1)	Description of Program/Project Objectives (2)	Department FY 2011 Actual Accomplishment (3)		Department FY 2012 Targets/ Milestone (4)	Total Program/ Project Budget (P'000) (5)		Program/Project Budget for FY 2012 (6)	Responsible Bureaus/Delivery Units (7)
KRA 3 - Rapid, Inclusive and Sustained Economic Growth								
A. FOREIGN ASSISTED PROJECT								
1 Agno River Integrated IP	Construction of Re-regulating pond, canal network, service roads, drainage canal and farmdithes.	New (ha)	4 846	7 000	**Total**	**11 225 532**	**2 343 347**	ARIIP-PMO
		Resto (ha)	1 554		PC	6 924 312	1 102 977	
		Rehab (ha)	-		LP	4 301 220	1 240 370	
		Farmer Beneficiaries	-	4 670				
2 Adopting to Climate Change Impact through the Construction of Water Impounding Facilities in the Phil. (PASA SRIP)	Construction of a 34 m high zoned earthfill dam, with crest length of 209 m, a reservor capacity of 3.90 mcm of water, irrigation and drainage facilities.	New (ha)	-	-	**Total**	**694 960**	**82 935**	SRIP-PMO
		Resto (ha)	-	-	PC	694 960	82 935	
		Rehab (ha)	-	-	LP	-	-	
		Farmer Beneficiaries	-					
3 Casecnan Multi-purpose Irrigation Project-IC, Phase II	Construction of the remaining 33 km Super Diversion Canal (SDC), irrigation facilities, full development of CIS/SWIP and rehabilitation of downstream portion of UPRIIS.	New (ha)	-		**Total**	**7 244 145**	**9 215**	CMIPP-PMO
		Resto (ha)	-	-	PC	1 811 038	9 215	
		Rehab (ha)	-	-	LP	5 433 107	-	
		Farmer Beneficiaries	-	-				
4 Jalaur River Multipurpose Project Stage II	Construction of a 141 m high earthfill & rock fill dam, power plant, 3 catch dams, irrigation and drainage facilites and service roads to generate 11.5 MW hydro-electric power.	New (ha)	-	-	**Total**	**11 212 120**	**9 215**	NIA-Region 6
		Resto (ha)	-	-	PC	2 261 550	9 215	
		Rehab (ha)	-	-	LP	8 950 570	-	
		Farmer Beneficiaries	-	-				
5 Modification of Malinao Dam Project	Upgrade the existing Malinao dam by increasing the height of dam crest and spillway by about two meters in order to accommodate the surplus water from Wahig River.	New (ha)	-	-	**Total**	**655 305**	**45 630**	NIA-Region 7
		Resto (ha)	-	-	PC	363 759	45 630	
		Rehab (ha)	-	-	LP	291 546	-	
		Farmer Beneficiaries	-					
6 Help for Catubig Agricultural Advancement Project	Construction of dams, canal network, drainage and farm level facilities and service roads.	New (ha)	500	800	**Total**	**3 214 239**	**192 607**	HCAAP-PMO
		Resto (ha)	-	-	PC	1 432 287	102 607	
		Rehab (ha)	-	-	LP	1 781 952	90 000	
		Farmer Beneficiaries	-	530				

	Key Programs/Projects (1)	Description of Program/Project Objectives (2)	Department FY 2011 Actual Accomplishment (3)		Department FY 2012 Targets/ Milestone (4)	Total Program/ Project Budget (P'000) (5)		Program/Project Budget for FY 2012 (6)	Responsible Bureaus/Delivery Units (7)
7	Umayam River Irrigation Project	Construction of 4.3 m high dam & 173 m long rubble masonry diversion dam, headworks, irrigation facilities & drainage facilities, service and access roads.	New (ha)	-	-	Total	1 700 884	82 935	Umayam-PMO
			Resto (ha)	-	-	PC	1 700 884	82 935	
			Rehab (ha)	-	-	LP	-	-	
			Farmer Beneficiaries	-					
8	Malitubog-Maridagao IP-Stage II	Development of Lower Malitubog & Pagalungan extension areas. Lower area will be served by main canal of Upper Malitubog area while Pagalungan extension will be served by extending Lateral A of Upper Malitubog	New (ha)	530	-	Total	6 148 911	479 350	NIA-Region 12
			Resto (ha)	-	-	PC	1 492 036	391 350	
			Rehab (ha)	-	-	LP	4 656 875	88 000	
			Farmer Beneficiaries	-	-				
9	Participatory Irrigation Development Project, Phase I	Major restoration, rehabilitation and cosntruction of irrigation facilities in 58 existing NISs, augmentation of water supply, institutional strengthening, development of appropriate technilogies.	New (ha)	-	470	Total	5 111 704	798 154	PIDP-PMO
			Resto (ha)	2 167	8 347	PC	1 945 401	168 860	
			Rehab (ha)	-	-	LP	3 166 303	629 294	
			Farmer Beneficiaries	-	5 880				
10	National Irrigation Sector Rehab. & Improvement Project (NISRIP)	The project aims to strengthen the irrigation sector and to increase rice production through rehabilitation of irrigation facilities, institutional development, & irrigation management transfer.	New (ha)	-	-	Total	4 297 050	109 215	C.O.
			Resto (ha)	-	-	PC	477 240	9 215	
			Rehab (ha)	-	-	LP	3 819 810	100 000	
			Farmer Beneficiaries	-	-				
11	Chico River Pump Irrigation Project	The project involves installation of 4 pumps, pump houses transmission lines, irrigation & drainage facilities, service and access roads	New (ha)	-	-	Total	876 000	9 215	NIA-Region 2
			Resto (ha)	-	-	PC	876 000	9 215	
			Rehab (ha)	-	-	LP	-	-	
			Farmer Beneficiaries	-	-				
12	Tumauini Reservoir Project	Construction of an 81.0 m storage dam across the Tumauini River, new irrigation & drainage facilities and rehabilitation of the existing NIS.	New (ha)	-	-	Total	3 546 000	9 215	NIA-Region 2
			Resto (ha)	-	-	PC	886 500	9 215	
			Rehab (ha)	-	-	LP	2 659 500	-	
			Farmer Beneficiaries	-	-				
13	Ilaguen Multi-Purpose Project	Construction of an 89 m high dam across Ilaguen River, an after-bay dam, catch dam, irrigation and drainage facilities and access roads.	New (ha)	-	-	Total	20 798 920	9 215	NIA-Region 2
			Resto (ha)	-	-	PC	9 669 260	9 215	
			Rehab (ha)	-	-	LP	11 129 660	-	
			Farmer Beneficiaries	-	-				
14	Kulaman SRIP	Construction of zoned earthfill dam and appurtenant structures, canal network, road	New (ha)	-	-	Total	450 000	46 075	SRIP-PMO
			Resto (ha)	-	-	PC	450 000	46 075	

Key Programs/Projects (1)	Description of Program/Project Objectives (2)	Department FY 2011 Actual Accomplishment (3)	Department FY 2012 Targets/ Milestone (4)	Total Program/ Project Budget (P'000) (5)	Program/Project Budget for FY 2012 (6)	Responsible Bureaus/Delivery Units (7)
	network and irrigation facilities.	Rehab (ha) -	-	LP -	-	
		Farmer Beneficiaries -				
15 Saug River Multipurpose Project, Phase I	Construction of a 46 m high storage dam (diversion & regulating dam), irrigation and drainage facilities, powerhouse and installation of hydro power plant with 1,000 kw capacity.	New (ha) -	-	**Total 996 236**	**9 215**	NIA-Region 11
		Resto (ha) -	-	PC 378 570	9 215	
		Rehab (ha) -	-	LP 617 666	-	
		Farmer Beneficiaries -	-			
16 Kabulnan II Multipurpose Irrigation & Power Project	Construction of 80 m high earthfill dam, spillway, 5.8 km transbasin tunnel, re-regulating dam, power plant to generate 110 MW electricity, water treatment plant, irrigation & drainage facilities.	New (ha) -	-	**Total 14 372 940**	**9 215**	NIA-Region 12
		Resto (ha) -	-	PC 4 538 650	9 215	
		Rehab (ha) -	-	LP 9 834 290	-	
		Farmer Beneficiaries -	-			
17 Irrigation Systems Operation Efficiency Improvement Project (ISOEIP)	Improvement of irrigation and drainage facilities, capability building for IA & LGU, agricultural productivity enhancement, procurement of equipment and provision of consulting services.	New (ha) -	-	**Total 6 306 170**	**9 215**	NIA-C.O.
		Resto (ha) -	-	PC 1 506 170	9 215	
		Rehab (ha) -	-	LP 4 800 000	-	
		Farmer Beneficiaries -	-			
Sub-total for FAPs		**New (ha) 5 876**	**8 270**	**Total 98 851 116**	**4 253 968**	
		Resto (ha) 3 721	**8 347**	PC 37 408 617	2 106 304	
		Rehab (ha) -	**-**	LP 61 442 499	2 147 664	
		Farmer Beneficiaries -	**11 080**			