EVALUATION OF SMALL IRRIGATION PROJECTS

IN THE PHILIPPINES

THE CASE OF SMALL WATER IMPOUNDING PROJECTS

By

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ABSTRACT

An economic evaluation of the proposed Camagsingalan Small Water Impounding Project was conducted using the benefit-cost analysis framework to determine its economic desirability to the society. The project will be located in Sual Pangasinan and envisioned to provide irrigation water to about 55 hectares which will give the upland farmers an oportunity to shift from dryland to irrigated farming systems. The recommended cropping pattern for the project area is a crop of rice followed by a crop of mungbean or garlic. Moreover, about 20 hectares each of mango and cashew will be planted in the surrounding portion of the watershed area.

Based on the twenty period economic analyis, the Camagsingalan Small Water Impouding Project would generate a substantial gain to the province and to the nation in general. At discount rate of 15 per cent,the project will result in a Net Presnt Value of P 536,194.00 using the Cropping Pattern 1 and an Internal Rate of Return (IRR) of 39 percent. On the other hand Cropping Pattern 2 will result in a Net Present Value of P 5,911,844.00 and an Internal Rate of Return of 41 per cent. In summary, the project based on quantifiable costs and benefits is economically desirable and worthwhile undertaking.

However, a number of enviromental problems have not been dealt with in the economic analysis. This include the possible environmental and socio-economic problems that will result due to the construction of the SWIM project. Though the scale of the project is small, the extent of effect is however not yet established. Water pricing is not also dealt with in the analyis.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

In the last ten years the role of agriculture in economic growth in developing countries has gone through a period of reconsideration with rural enterprise emerging into greater prominence as the basic area of activity for the provision of welfare, livelihood and new capital resources that will stimulate economic growth. There is now a wide recognition that an increase in agricultural productivity is a necessary and crucial development to improve national income and personal welfare. In the Philippines agriculture remains an important sector of the economy. Together with fisheries and forestry, it provides livelihood for about two-thirds of the rural population. The agriculture sector contributes one-third of the country's total Gross National Product (GNP). It also employs half of the country's workers and earns 36 percent of the country's total export income.

From ancient times irrigation has been a powerful lever for intensifying production. Irrigation development has generally been considered a key factor in helping agricultural production meet the growing demand for food. Today irrigation projects are undertaken primarily as a means of increasing the productive capacity of agricultural lands by assuring a steady supply of water during the dry months of the year. Improved water control and availability are recognized to be important for the achievement of the full potential of modern rice varieties.

In the Philippines, irrigation development is by no means a recent undertaking. Traditionally, irrigation has been practised by rice farmers for 1,000 years. In Northern Luzon, about 25,000 hectares of paddy field terraces have been cultivated on steep-sloped mountains, where levees built of earth and stone hold and collect the water. Such construction is widely praised and regarded as one of the wonders of the world. Irrigation systems were built during the Spanish colonial period and many of the masonry dams built then still remain in use today. Though irrigation practices started long ago, the pace of development has been slow, with today only 40 percent of the total crop area in the country under irrigation. It was only during the last two decades, that the Philippines made impressive progress towards irrigation development. Tremendous expansion in irrigated areas occurred from 1950 to the early 1980's. This can be attributed to the creation of government agencies like the National Irrigation Administration (NIA) which have systematically hastened the construction of both large-scale communal and pump irrigation systems. From about 0.7 million hectares in 1968, the area provided with irrigation facilities increased to about 1.47 million hectares in 1990. Public investment in irrigation infrastructure averaged over 2.0 billion pesos annually during the same period.

There are three types of irrigation systems in the Philippines to which irrigation investments are directed. The first is the national irrigation system (NIS) which are gravity or run-of-the-river type. Areas under this type of irrigation system range from 1,000 to 100,000 hectares in size. In general these systems are constructed by the government, with operations placed under the NIA supervision.

The NIS service areas are, in most cases, larger than communal irrigation systems. They are also most intensive in terms of infrastructure per unit service area with structures consisting of an appropriately-sized concrete dam, service roads, intricate irrigation and drainage canal networks, as well as other structures for controlling water distribution. Examples of this type are the Upper Pampanga River Integrated Irrigation Systems (UPRISS) with service area of 103 thousand hectares, the Bicol River Basin Integrated Systems and Magat Multipurpose Dam, to name a few.

The second type is the communal irrigation system (CIS). These are small gravity systems, mostly run-of-the-river type which are constructed under NIA or Bureau of Soils and Water Management (BSWM) supervision. The basic structure of this system is an appropriately-sized concrete or earth fill dam and a simple network of irrigation canals for water distribution. After completion, these systems are turned over to the farmers through their respective farmer associations. This type of irrigation system is popularly called Small Water Impounding Projects which are mostly built in areas which are not benefited by national irrigation systems. The service area can range from 25 up to 1000 hectares. This study is focused mainly on this type of irrigation system.

The pump irrigation systems (PIS) is the third type and is classified according to water source. Surface pumps draw water from rivers, creeks, canals or any surface water reservoir. Deepwell and shallow pumps, on the other hand, draw water from an underground water source. Pump irrigation systems are

usually privately owned and are small with a majority of them serving fewer than 20 hectares.

Like most developing countries, self-sufficiency in food, particularly rice, has been the foremost objective of irrigation development in the country. Irrigation development together with the green revolution (adoption of high yielding varieties and other improved farming technologies), fertilizer subsidy and investments in farm mechanization, such as postharvest technologies, increased total paddy production from 4.1 million tons in 1967 to 9.2 million tons in 1986 . The rapid rise in rice production (about 4 percent annually) during the late 1960s and 1970s enabled the country to attain self-sufficiency in 1977. This was sustained until 1983. However, succeeding years showed a slow increase in rice yield of about 2.0 per cent per year, way below the annual growth rate in population. In the 1984-1990 period rice production fall short of consumption. The re-emergence of rice import is becoming a major socio-economic. technical and political issue (David,1990).

With rapid population growth, about 2.7 percent to 2.8 percent for the past decade, there is a crisis in terms of land and resources to produce food which will greatly increase in the coming years. Opportunities for expanding cultivated areas are diminishing while the need to increase crop productivity becomes more compelling. Increased production therefore will have to come from the utilization of less favourable rainfed and upland areas. Population pressure also causes farmers migrate to and cultivate upland areas. At present, upland population is

estimated to be 17.8 million or 3.18 million households. It is projected that there will be an additional 2.5 million persons per year who will occupy the uplands. At the present population growth rate, it is projected that by the year 2025, an additional 5.24 million hectare of forest lands will be cleared to accommodate the increasing population (Sajise and Ganapin,1990).

In the face of declining availability of frontier land for agricultural purposes and the increasing population level, the Philippine government is placing greater emphasis on the development of upland area which, if managed properly may augment current production. Properly developed, these lands are a key to sustainable development and socioeconomic progress . The policy is seen as a major government strategy to attain greater social stability .

A major component of the upland development undertaken by the Department of Agriculture is the provision of irrigation water through the construction of Small Water Impounding Projects (SWIPs). The experience gained in the Rainfed Resources Development Project (RRDP) funded by USAID which was locally known as the KABSAKA project has made Small Water Impounding Projects popular. This infrastructure along with the right technology and effective extension strategies will give upland farmers greater opportunity of developing and sustaining their farming system.

The emphasis on SWIPs is reflected in the recently enacted House Bill No. 1064 by the Philippine Congress which approved an accelerated ten (10) year

development program with an annual budget of P 3.0 billion. Development will focus on small irrigation projects such as small water impounding projects, shallow tube wells and similar projects. With this development, along with other support services, it is hope that the government can attain its goal of increasing rice production to achieve self-sufficiency and reduce poverty in the countryside.

1.2 STATEMENT OF THE PROBLEM

The compelling issue of increasing population and the provision of food given the limited area for expansion, coupled with the emerging issue of poor performance and increasing construction costs and operating and maintenance cost of existing large irrigation systems, have led policy makers to direct investment funds into small irrigations systems which are potentially more productive and more cost effective than large irrigation systems . In addition, emerging concerns about large irrigation systems, are the environment effects which are becoming evident today.

A recent World Bank (1989) study showed that even the Upper Pampanga River Integrated Irrigation System (UPRIIS), which is the flagship of the National Irrigation Administration (NIA), is performing well below expectation. Designed to irrigate 103 thousand hectares, the system can only serve about 85 and 64 percent of the service area during the wet and dry season, respectively. On

average, actual yields are still much lower than those projected during the design and project appraisal stages.

The National Irrigation Administration (NIA) estimated that the present cost of irrigation development is about P 60 thousand per hectare for gravity irrigation systems. In many small water impounding projects and large gravity irrigation systems, the cost of development exceeds P 100 thousand per hectare. For projects intended solely for irrigation the cost ranges from P 96,153.00 to P 212,226 per hectare .

Small scale irrigation project such as the Small Water Impounding Projects are gaining greater attention today because of quick yielding effects with relatively low capital investment needed for the construction of small reservoirs compared to the much larger national projects and their potential multi-oriented uses. Projects of this type are generally constructed in areas not benefited by large national irrigation systems, and where a potential exist for the development of upland watersheds by using small water impoundments as an economic source of water for irrigating small farm systems planted to both upland and lowland crops.

Small-scale projects (such as SWIPs) are attractive because they are conceived with the participation of local community and as such tend to be easier to manage and therefore to sustain. Their costs are on the whole lower and the time of completion (3 to 6 months) shorter. A small group of farmers organized

as an irrigator association has better control over the timing of operation of the irrigation systems.

The Small Water Impounding Projects are generally defined as those small scale-water impounding dams which have a structural heights of not more than 30 meters and/or a volume storage of not exceeding 50 million cubic meters (JICA,1989).

In Master Plan Study of Small Water Impounding Projects (JICA,1989), a total of 550 SWIM projects were identified throughout the country, of which 32 projects were already constructed and 17 projects were under construction (as of March 1989). The remaining 501 projects were to be investigated.

Based on the JICA evaluation, 230 out of 501 are qualified projects for implementation within a 10 year period. One hundred eighteen (118) projects, including 39 candidate projects for Overseas Economic Cooperation Fund (OECF-SWIM) have been prioritized for implementation during the first five years. The estimated total funds required for implementation of the 10 Year Action Program is P 6.1 billion, comprising for the first five years (118 projects) and P 3.8 billion for the second five years (112 projects).

As government initiated projects, irrigation projects such as these, derive financial support from public funds and from foreign aid and grants. Considering the huge amount involved and the prevailing economic condition of the country,

is it worthwhile to undertake such projects? To answer this question, it is imperative that a critical evaluation of the proposed projects be performed to help the decision maker make more rational decisions regarding the use and allocation of limited resources.

1.3 OBJECTIVES OF THE STUDY

This study generally aims to contribute to the general knowledge of the place of small irrigation projects in the Philippines and to evaluate their contribution to the society.

Specifically the project aims the following objectives:

1. To describe the Small Water Impounding Project Scheme and discuss its desirability.
2. To conduct an economic evaluation of a case study project to demonstrate its economic value to the nation.
3. To identify possible constraints (economic or social) to the implementation of SWIP that need to be addressed by the government and other institutions.
4. To draw conclusions and make final recommendations re-SWIM projects.

1.4 OUTLINE OF PRESENTATION

Chapter 1 is the introductory part of this thesis. Section 1.1 discusses the role of agriculture in Philippine economy and the state of irrigation development. Section 1.2 deals with the statement of the problem while Section 1.3 presents the objectives of the study.

A review of literature (Chapter 2) follows the introductory part and discusses the impact of irrigation on various areas of concern such as agricultural production and productivity, level and distribution of income and employment, and environment.

The methodology part (Chapter 3) outlines the framework of Benefit-Cost Analysis in the ex-ante evaluation of irrigation projects from the national point of view. Likewise the different parameters used in the economic analysis are explained.

The Small Water Impounding Project Case Study is presented in Chapter 4 with a general description of the project and its proposed development. It is then evaluated using the Benefit-Cost Analysis framework discussed in the previous chapter.

Chapter 5 discusses how the economic analyis was conducted as well as the results obtained in the analyis. A discussion of the wider impacts of the project is given in last section (Section 5.5) of this chapter.

A sensitivity analysis is conducted to show which variables most affect the result of the project appraisal. Decision criteria are subjected to variations in the value of parameters.

The closing chapter summarises the results of evaluation done and addresses the feasibility of the project. A set of recommendation to the overall implementation of the project and related issues are also presented.