

# ICC PROJECT EVALUATION PROCEDURES AND GUIDELINES

## I. Rationale

This set of guidelines on project evaluation aims to provide standards of procedures for the ICC in assessing development programs and projects to ensure their technical, financial, economic and social merits. The procedures are also formulated to achieve uniformity in and set the basis for evaluation. An appreciation of these procedures is deemed necessary in order for the proponents to understand the various information requirements of the ICC as contained in the ICC-PE Forms 1-6 and is envisioned to facilitate the processing of requests for ICC action.

These guidelines are organized into eight (8) sections. Sections II to V cover the procedures in undertaking the financial, economic, technical and institutional evaluation of programs and projects. Section VI provides the steps in undertaking a sensitivity analysis of the selected parameters. The evaluation of technical assistance components of projects is detailed in Section VII. Section VIII describes the procedures in conducting public consultations on programs and projects.

## II. Financial Evaluation

These guidelines will apply to revenue generating projects of government agencies, government-owned and controlled corporations (GOCCs) and private firms/entities whose programs and projects qualify under the conditions set for private sector access to ODA.

A special case of financial analysis is carried out for agricultural projects where farm income analysis is undertaken. Please refer to Technical Annex A for specific guidelines.

### A. Objectives.

1. To assess the financial viability of a project and its ability to meet its debt-service obligations, and
2. To determine, thru the DOF-Corporate Affairs Group (CAG), the financial capability of government corporations to finance their proposed programs and projects.

### B. Procedures

1. The project proponents should submit ICC-PE Forms 1 to 6.
2. The proponent, if a private enterprise, should submit the following:
  - a. projected cash flow of the enterprise covering the entire program/project life including the year prior to implementation with the addition of an account indicating the beginning cash balance; and
  - b. the audited financial statements covering a period of at least three (3) years prior to implementation of the program/project, as applicable.

The major assumptions used in the financial statements, (e.g., exchange rates, volume of sales, prices) should be clearly stated.

3. If necessary and where applicable, the Secretariat may require the proponent to submit a market study of the program/project. This should include a definition of the types and nature of the products/services to be generated by the program/project, their specific and potential markets, existing and projected demand and the resulting supply gaps.
4. In the financial analysis (using constant prices), contingency allowances may be provided as follows:
  - a) physical contingency, which represents an allowance for increases in the quantity of real goods and services utilized for the program/project;
  - b) price contingencies, for relative price changes, involving changes in the market price structure for program/project inputs and outputs.

Physical contingencies are usually estimated separately for each major cost component, and separately for local and foreign costs. Normally, this is 10% of direct cost, although higher allowance is possible for complicated/lengthy works which are more vulnerable to design changes and adverse external phenomena.

For price contingencies, escalation rate is applied to major cost/benefit items, which is the projected annual price change of the item net of the general inflation rate.

5. For local cost items, relative price changes can be projected from past trends in the item's price movement relative to inflation, or from forecast demand/supply trends. For internationally traded goods, price projections can be sourced from international publications (especially World Bank Commodity Price Projections or WBCPP).

Projections of relative prices for local items need not extend beyond the medium-term. Local price relationships may be assumed constant beyond the 2-year period.

Cash flows given in current prices are converted to constant terms, thru the use of general price deflators. The GNP Implicit Price Index (IPIN) is the deflator for local costs, while the manufacturing unit value (MUV) Index (IPIN) is the deflator for local costs, while the MUV index from the WBCPP is appropriate for foreign components.

6. The ICC Secretariat will determine the financial viability of programs/projects from either, or both, of the following viewpoints: the "all capital" viewpoint and the "equity capital" viewpoint. The former looks at the discounted returns to all real investment flows for the project as a whole, irrespective of whether these come from equity or from loans. The latter looks at the proponent's (investor's) equity contributions as the investment, such that loan proceeds are treated as inflows, while loan repayments are treated as outflows.
7. In both cases, the financial internal rate of return (FIRR) and the net present value (NPV) will be computed based on the validated submissions of the proponents of the benefit and cost streams. For the

program/project to be financially viable in the “all capital” approach, the resulting FIRR should exceed the weighted average cost of capital (WACC), while the NPV should be greater than zero using the same WACC as the discount rate. The computation of the WACC is described below.

Meanwhile, for the “equity capital” approach, the resulting FIRR should exceed the cost of equity contribution of the proponent while the NPV should be greater than zero using cost of equity capital as discount rate.

8. The WACC is the weighted average of the yields, net of tax on different sources of funds of the proponents. This is determined by calculating the relative weights of the capital resources and multiplying them with the corresponding opportunity cost of capital for each of the capital resource. The WACC is mathematically represented in equation form by:

$$WACC = P_e \times R_e + P_c \times R_c + P_1 \times R_1$$

Where  $P_e$  = percentage of equity investment to total capital investment

$P_c$  = percentage of corporate funds (i.e., internal cash generation for government corporation).

$P_1$  = percentage of loaned funds

$R_e$  = opportunity cost of capital of equity funds

$R_c$  = opportunity cost of capital of corporate funds

$R_1$  = effective cost of loaned funds,  
 $P_e + P_c + P_1 = 1$

The use of the WACC in financial analysis should be limited to cases where the program/project risk is consistent with the overall business risk of the agency/company, and that the program/project will be financed from a pool of funds with proportions indicated in the WACC.

Otherwise, the equity capital approach is more appropriate, particularly:

- a. when capital markets are imperfect, where cost and availability of long term capital is unpredictable, and prevailing financing sources are relied upon at any given time; and
- b. when the nature and scale of the program/project influences the sources and cost of financing, such as the case when foreign financing is tied to the program/project.

Conditions relevant to GOCCs appear to warrant the application of the “equity capital” approach if the sources of financing being considered come from abroad and may be viewed as tied to the particular program/project at hand. Since the “stockholder” of the GOCC is the economy-at-large, the cost of equity capital is the opportunity cost of capital to the economy.

If the program/project involves foreign sources of funds, the decision makers have to decide whether foreign funds may be treated as tied to the program/project, in which case, the “equity capital” viewpoint should be adopted.

Specific examples of the appropriate approach to pursue are provided in Technical Annex B.

9. The proponent will be guided by the projected foreign exchange rates as indicated by the Secretariat, in converting foreign funds into their local currency equivalent.
10. Under the “all capital” analysis, the foreign exchange risk can be captured by adjusting the WACC. Projected annual movements in the peso rate against relevant currencies will be converted by the Secretariat into corresponding percentage points adjustments in the WACC.

Under an “equity capital” approach, repayments for foreign loans as outflows should be converted to peso equivalent using projected exchange rates.

11. For public sector proponents, the DOF-CAG will evaluate the ability of the corporation to finance the investment cost (local component) and meet the debt-service requirements of the project. DOG-CAG will then submit a formal evaluation to the ICC, indicating therein its recommendations, findings and the bases for favorable endorsement of the program/project to the ICC-Technical Board.

For private sector proponents, the ICC Secretariat will appraise the private firm’s capability to shoulder the investment cost and assess its repayment capacity. This will be undertaken by taking into account the following:

- a. Ability of the corporation to finance the local investment cost of the program/project.

This will be determined by subtracting the capital requirements of ongoing programs/projects and the corporate debt-service from the internal cash generation (ICG) and comparing the net with the local cost component of the proposed program/project. A net ICG greater than the local cost component indicates that the corporation may be able to finance the program/project; otherwise, it can be expected that it will resort to borrowings.

- b. Ability of the corporation to service its principal amortization and interest payment.

This requires a projection of the financial position of the company when the program/project is already operational and when it is already amortizing its loan.

To determine the effect of the program/project on the corporation’s financial position, the ICG of the corporation should be positive after deducting the program/project’s interest and principal

repayments, together with other obligations falling due. Otherwise, the corporation, based on its own operations may not be able to service fully or in part the program/project's debt service requirements and may have to resort to external funding.

12. For both public and private proponents, cash flows should also capture tax payments (i.e., corporate taxes) inasmuch as the cost of capital measure is on an after-tax basis.
13. For private firms, the financial evaluation should be complemented by the estimation of relevant financial ratios, with and without the program/project, based on submitted balance sheets and income statements. The ratios are contained in Technical Annex C.

### **III. Economic Evaluation**

#### **A. Objective**

To ascertain the program/project's desirability in terms of its net contribution to the economic and social welfare of the country as a whole.

#### **B. Procedures**

1. Documents submitted by proponent agencies for financial analysis is the take-off point for economic analysis.
2. The steps involved in economic evaluation are as follows:
  - a. Identification of project costs and benefits. Since programs/projects are usually evaluated in terms of their effect on national income, costs and benefits identified must necessarily reflect the additions to and reductions from national income as a result of program/project implementation.
  - i. Economic Costs<sup>1</sup>. The basic guidelines in identifying the costs of a program/project stems from the definition of cost itself, or activities that involve use of real resources. Cost items are usually classified into two (2) types: capital costs and operating and maintenance costs which may include the following:

Capital Costs – land, detailed engineering and design; preparatory installation work; cost of equipment; raw materials and supplies for construction; cost of buildings and auxiliary installations; engineering and administrative cost during construction, organization cost;;

Operating and Maintenance Costs – raw materials and other supplies; energy and fuel; labor; rent and insurance; depletion of natural resources.

---

<sup>1</sup> Sunk costs are defined as all those costs incurred on the project prior to the preparation of the feasibility study. Since these expenses have already been incurred, they are no longer subject to investment decision-making. As such, this component of project cost should not be included in the analysis.

- ii. **Benefits.** A benefit constitutes an increase in output or savings in resource use. In the case of transport projects for instance, the set of benefits may include: reduced vehicle operating costs; lower maintenance costs; fewer accidents, savings in time for passenger and freight; and in the case of developmental transport infrastructure, production increases. Of these cases, only the first two benefits and the last are easily quantifiable. However, to the extent possible, the effects of other benefits on national income should be quantified (e.g., value of each human life saved in terms of the capacity to earn during productive life).
- iii. **Externalities and Secondary Benefits.** In several cases, project effects – positive or negative – go beyond the limits of the program/project, but are not reflected in the financial accounts of the program/project. If these effects, known as “externalities,” involve a significant economic cost or confer a significant economic benefit, these should be taken into account in estimating the overall economic impact of the program/project.

The external economic impact on the cost side may include increased pollution resulting from cement or a chemical plant, or the adverse effects of an irrigation scheme on health and fisheries. External economic benefits may include improved recreational or tourist facilities provided by a water storage dam. While it may not be possible to measure all such effects, an attempt should be made to identify them, and if they appear to be significant, to evaluate them.

Secondary benefits, on the other hand, refer to the beneficial effects on activities which are technologically linked to the program/project’s direct users, either forward as consumers, or backward prove to be significant, they should, whenever possible, be incorporated into the analysis.

- b. **Valuation of costs and benefits in terms of economic prices.** This procedure involves adjustment of the financial prices of goods and services of both costs and benefits to reflect economic values. Market prices may not be an acceptable measure of the true costs and benefits due to distortions (i.e., taxes, subsidies, quotas, regulatory measures, or monopolistic practices). To deal with this problem, shadow prices are employed to measure the value of a commodity from the economy’s viewpoint. Technical Annex D provides techniques for adjusting inputs from financial statements to conform to concepts in economic evaluation.

The valuation of program/project costs and benefits should be in constant prices at the current year’s level. In the case of projects where price levels are not in current year’s levels, appropriate price indices shall be applied to inflate or deflate prices accordingly.

- i. **Valuation of Costs.** Estimation of program/project costs involves an analysis of the supply-demand situation of the program/project inputs and, in the case of major programs/projects, the

corresponding price changes resulting from the program/project's implementation. General procedures are as follows:

- The entire set of program/project inputs must be differentiated between those inputs that reduce the supply to other users, and those inputs that would be supplied from increased production.
  - For inputs resulting in reduced supply to other users, the shadow price is the market selling price appropriately adjusted for the value of rationed components, the effect of monopoly power in buying or selling and the actual price impact of the supply reduction.
  - If the supply of inputs is obtained from expanded production, the relevant cost estimate is the actual cost of production.
  - If some of the inputs are imported or are substitutes for exports, the foreign exchange cost involved, corrected by the shadow price of foreign exchange, should be estimated and any transport costs and trade service margin should be added.
- ii. Valuation of Benefits. Estimation of direct benefits involves the following steps:
- For outputs leading to additional supply or reducing the output of other local producers, the shadow price is the market price, corrected for the following: effects of any rationing, monopoly power of some buyers, and actual price impact based on the size of the additional supply.
  - For goods that substitute for imports or add to exports, foreign exchange earnings or savings involved are estimated and corrected by shadow price of foreign exchange.
  - For goods/services that are supplied freely, the value placed by users on the facilities should be estimated, i.e., what they would pay if they were to purchase the facilities. This would likely involve some value judgment.<sup>2</sup>
- c. Measurement of economic desirability, sensitivity analysis and selection of projects based on economic feasibility indicators.

The indicator to be used for estimating the economic desirability of programs/projects will be the economic internal rate of return (EIRR), defined as the discount rate which equates the net present social value (NPSV) of the benefits and costs of the program/project such that the NPSV is zero and the benefit cost ratio (BCR) is one. The NPSV is the discounted net economic benefit accruing to the

---

<sup>2</sup> This case brings us to the economic concept of "willingness to pay" and "consumer surplus." In principle, the benefits of a program/project can be defined as the total amount that individual beneficiaries are willing to pay rather than be without the program/project.

program/project. The decision rule is to accept programs/projects where the NPV is greater than zero.

3. The ICC Secretariat will provide the following parameters for estimating the economic stream of costs and benefits:

- a. Shadow Exchange Rate

The shadow exchange rate (SER) is applied to correct the distortion in the prevailing exchange rate due to balance of payments disequilibrium and the projection structure. The SER currently adopted is 1.20 of the prevailing exchange rate, and will be applied to all direct and indirect foreign exchange costs of a project and those benefits which may be expressed in foreign exchange, particularly in the case of exports and/or import substitutes or savings.

- b. Shadow Wage Rate

The shadow wage rate (SWR) is used to reflect the true economic value of labor employed in a program/project. The SWR is applicable only to the unskilled labor component of wages paid and is currently estimated at 60 percent of legislated wage rates.

- c. Shadow Discount Rate

The social discount rate (SDR) is used to discount the stream of economic costs and benefits to their present values. It is the rate at which the social value of program/project costs and benefits decline over time. The SDR will likewise be used as the hurdle rate for a program/project's EIRR. SDR currently used is 15 percent.

4. In addition to the EIRR, the ICC Secretariat will compute for the domestic resource cost (DRC) of tradable goods as the output of the program/project, where relevant. This will indicate the amount of domestic resources used for every foreign exchange earned or saved from production. The DRC shall apply in programs/projects that involve production of tradable goods (e.g., coal, steel, sugar, etc).

#### **IV. Technical Evaluation**

##### **A. Objectives**

1. To determine if the program/project is technically feasible, workable and that its operations and maintenance can be locally sustained;
2. To ascertain if the proposed technology is cost effective; and
3. To ensure that the program/project does not adversely affect the environment and/or that appropriate measures are taken to protect the environment.

##### **B. Procedures**

1. The ICC Secretariat will evaluate the technical aspects of the program/project, and may consult with DOST and other relevant

agencies in cases when the proposed technologies are untried, new, or old/obsolete. Inputs or comments from other experts, consultants from industry or academe may also be solicited as necessary. The technical evaluation will cover, among others, the following:

- a. Issues of technical design such as size, location, timing and technology package proposed for the program/project (refer to Technical Annex E for details);
- b. Advantages and limitations of the technology used by the program/project;
- c. If a new technology is applied; success rate in other countries;
- d. Applicability of the new technology to Philippine conditions particularly to the proposed program/project area; and
- e. Environmental impact that would arise from the proposed design of the program/project.

## **V. Social Analysis**

### **A. Objective**

To determine if the proposed program/project is responsive to national objectives of poverty alleviation, employment generation and income redistribution.

### **B. Procedures**

The ICC Secretariat will, whenever possible, take into consideration program/project benefits beyond those that are simply financial and economic. If the program/project is of interest mainly because of its social benefit, this section takes on added importance. The Secretariat should devote considerable attention to the analysis of socially desirable but financially unviable program/projects. This will be especially true for private non-profit firms whose programs/projects may be eligible for ODA financing.

The following aspects may be considered in the qualitative assessment of the social benefits of the program/project:

1. **Income Distribution.** The extent to which the income of the poorest sector of the rural population is improved as a result of the program/project may be quantified. Reference must be made to the relative improvement in comparison with other groups in the country.
2. **Employment.** The extent to which the program/project reduces underemployment may be assessed. This may be quantified in terms of work years created by the program/project, with distinction made between permanent employment and employment during the investment or construction phase. The number of jobs created may be compared with the expected increase in the labor force of the program/project area.

3. Access to Land. If the program/project includes a land settlement or land reform element, the distribution of land rights with and without the program/project should be demonstrated.
4. Internal Migration. It may be useful to note the possible effect of the program/project on rural-urban migration.
5. Nutrition and Health. If the program/project is located in an area where serious nutrition or health problems exist, or if the program/project is directed toward groups with nutrition and health deficiencies, the expected effects of the program/project on these problems might be mentioned. In some cases, the effect on nutrition may be quantified in the daily intake of calories in protein that is expected as a result of the program/project.
6. Other Indicators of the Quality of Life. Some programs/projects may have a significant effect on the quality of rural life through improvements in access to domestic water supplies, electricity, schools, and other facilities. These may be mentioned and the quantities of the new amenities noted.

Technical Annex F presents some pointers for social analysis for reference.

## **VI. Institutional Evaluation**

### **A. Objectives**

1. To review and recommend improvement/revisions on the institutional arrangements and linkages in order to ensure a more efficient implementation of the program/project.
2. To ascertain the ability of the project proponent(s) to implement the program/project as proposed and scheduled.

### **B. Procedures**

1. The ICC Secretariat will assess the capability of the proponent(s) to implement the program/project, per the proposed activities and as scheduled, considering the following:
  - a. The internal arrangements within the project organization/implementing agency and the external arrangements among the project proponent(s) or concerned agencies;
  - b. The feasibility of proceeding as scheduled based on the preparedness of all concerned agencies; and
  - c. When relevant, the arrangements made to address the concern of those who may oppose the project (e.g., environmental conservation groups and those who may be relocated).

The above will be complemented with a review of the past performance of the proponent(s) on related/similar programs/projects.

2. The ICC will recommend possible measures to improve the program of implementation.

## **VII. Sensitivity Analysis**

### **A. Objective**

To determine whether the program/project will remain feasible if changes in the assumptions used in the calculation/projections were to take place according to the degree in which they are likely to vary from the estimated or projected values.

### **B. Procedures**

#### **1. Financial Evaluation**

|          |   |                                            |
|----------|---|--------------------------------------------|
| Case I   | : | Increase in projected costs by 10% and 20% |
| Case II  | : | Decrease in revenues by 10% and 20%        |
| Case III | : | Combination of Cases I and II              |

#### **2. Economic Evaluation**

The sensitivity parameters above will likewise be applied in the economic evaluation of programs/projects. The basis will be the cost-benefit flows (adjusted to economic terms).

Probability weights for the above sensitivity analysis may later be assigned as validated by the Secretariat.

3. Sensitivity analysis, when constant prices are used, involves testing of relative price changes. Price contingencies should not be applied to items for which sensitivity analysis will be performed.

## **VIII. Evaluation of Technical Assistance Components**

### **A. Objective**

To determine/evaluate project components that may be eligible for separate technical assistance (TA) funding.

### **B. Procedures**

1. The ICC Secretariat will determine which components of the program/project may be considered for separate technical assistance financing.
2. In general, the strategy for financing activities involving pre-feasibility or feasibility studies, program/project identification, sector survey, institution building activities including training, will be sourced from grants. On the other hand, consultancy/advisory services related to construction activities, including detailed engineering will be considered as part of the program/project capital cost and may be financed by the loan.
3. EO 40 dated 1 October 2001 on "Consolidating Procurement Rules and Procedures for All National Government Agencies, Government-Owned

or Controlled Corporations and Government Financial Institutions, and Requiring the Use of the Government Procurement System” sets the guidelines on the Use of Consultancy Services, will be considered in the review of the estimated amounts for hiring of consultants for the conduct of feasibility studies, detailed engineering, and construction supervision.

4. The ICC Secretariat shall advise the proponent on the alternative/possible source of financing for the TA components of the project.

## **IX. Conduct of Public Consultations on Proposed Project**

### **A. Objectives**

1. To determine the socio-political impact of the project.
2. To determine the extent of private sector competition resulting from the project.
3. To verify information and statistics provided by the project proponents.

### **B. Procedures**

1. All region-based programs/projects should be supported by an RDC/MMDA/ARMM-RPDO Resolution stating that the program/project is a priority in the province(s) and region and that concerned local parties particularly beneficiaries have been made aware of the program/project and have no objections.
2. Public consultations regarding programs/projects will only be undertaken after they have been determined to be economically viable, in order to save on time and resources.

## FINANCIAL ANALYSIS OF AGRICULTURAL PROJECTS

This section focuses on the specific tools used for the financial analysis of agricultural development projects. It particularly deals with:

- b) farm income analysis including the analysis of farm enterprise income and net farm income, and
- c) farm budgets for financial resources.

### 1. Farm Income Analysis

In the case of an agricultural development project, farm income analysis is carried out to determine the profitability of the project in agricultural project analysis because the outcome will determine whether and to what extent farmers may be expected to actively participate in the project.

Farm income analysis is essentially similar to standard income analysis. The basic objective is to determine the incremental returns that the farm households may be expected to generate as a result of the incremental inputs that they would be bound to put in as a result of the project. The biggest difference between standard and farm income analysis is that farm income sometimes includes noncash income, for example, vegetables produced and consumed by the farm family.

### 2. Farm Enterprise Income Analysis

In cases where farms produce a single output, farm income analysis involves assessment of financial performance with respect to only that single output. It is probably more usual, however, for farms to produce more than one output, e.g., more than one crop or livestock or both. In such case, it is helpful to treat each production activity as a separate enterprise, carry out a financial analysis for each of the enterprise, and at a later stage, combine all these into an analysis of the entire farm.

Such procedure enables the conduct of farm income analysis in a more systematic manner and allows for a comparative assessment of the relative profitability of the various production activities in the farm.

- a) **Farm Enterprise Profit.** The objective of farm enterprise analysis is to determine the profitability of the individual production activities or enterprises. As such, it provides useful information for decision-making on which activities to pursue, which to emphasize, and which to discard altogether. It also helps determine whether and how a particular enterprise may be made more viable.

In terms of definition, enterprise profit is simply the difference between gross value of production and total cost of production.

- b) Farm Enterprise Gross Value of Production. Gross Value of Production. Gross value of production is a measure of the value of output produced by the enterprise, whether the output is sold, consumed on the farm, or stored for consumption or sale in future accounting periods. All outputs are valued at their respective farm-gate prices which, for each type or produce, is the weighted average that accounts for variations in prices according to the grade of produce, time of sale, and market outlet.

In cases where stocks are carried over from one accounting period to another, gross value of production is measured as the difference between the closing valuation of stocks plus sales (where sales include output consumed on the farm) less the opening valuation of stocks plus purchases.

- c) Farm Enterprise Cost of Production. Total cost production includes all variables and fixed costs associated with the product. For enterprise income analysis, it is easier to classify cost into labor, material and other charges.

i. Labor

Labor cost is labor requirements (in mandays) multiplied by the projected wage rates. Estimates of labor requirements are derived from labor input models; wage rates to be applied are those that are projected for the area for the particular operations involved.

At the enterprise level, farm family labor that goes into the production activity, although not paid, is included in the computation of labor cost in order to obtain an accurate assessment of the profitability of the enterprise, particularly in comparison with other enterprises on the farm. Family labor is valued in the same way as hired labor.

ii. Materials

Materials include seed, feed, fertilizer, insecticide, etc. Costs are obtained by multiplying quantities required for each item by their respective unit prices as delivered on the farm. Quantities of each input are obtained from the material inputs model.

iii. Other Charges

Other charges are applied on assets that have a useful life that exceeds the accounting period and are used as a means of allocating the cost of the asset over the accounting periods of its useful life. If the asset is used in more than one production activity (enterprise) on the farm, a method of allocating depreciation charges for particular accounting periods among these enterprises would have to be developed. The principal factor to consider is the extent of use of the asset in each enterprise.

Interest is return on borrowed capital. In the same manner and for the same reason that an imputed cost of family labor

is included in the enterprise labor cost, an imputed interest on (financial) capital supplied by the farm should also be included in the enterprise interest cost.

## 5. Net Farm Income Analysis

Net farm income measures the profitability of the farm as a whole for the accounting period under consideration. It represents the "...reward for the labor, capital, and management contributed by the farm..." during the accounting period.

As in enterprise income analysis, net income for the farm is obtained by deducting on a farm basis, total cost of production from gross value of production. Because of the particular definition of net farm income given above, however, its derivation is not a simple matter of aggregating gross value of production of all enterprises, adding up costs of production of all enterprises, and obtaining the difference. Accordingly, while the income analysis for each enterprise serves as the principal inputs to net farm income analysis, a number of adjustments would need to be made to accurately reflect the financial situation of the farm as a whole.

a) Net Farm Income. Net farm income is the difference between gross value of production and cost of production. It represents the return to the family for their contribution of labor, capital and management. For purposes of analysis this can be disaggregated into family labor income, investment income and management income.

The return on the family labor would be the total of family labor costs imputed in the analysis of individual enterprises. The return on capital would be the interest expense also imputed on the family's capital contribution. Whatever is left over is the return to the family for its risk-taking and management function, this is equal to the total of the profits from all enterprises.

b) Gross Value of Production. For the farm as a whole, gross value of production may differ from the sum of gross value of production of all enterprises. The principal factor that would account for such difference is inter-enterprise transfers of intermediate outputs. Specifically, in enterprise analysis, gross value of production of an enterprise would include intermediate outputs produced by the enterprise (i.e., forage crops) and "sold" to another enterprise (e.g., livestock production) on the same farm for use as input. From the standpoint of the farm as a whole, however, to include both the intermediate and the final products in the measurement of gross output would be double-counting and would result in an overestimation of the farm's gross value of production. Accordingly, intermediate outputs produced by the farm but which are consumed in the process of producing another output are excluded in the estimation of gross value of production of the farm. However, intermediate outputs produced by the farm and sold to entities outside of the farm do form part of the farm's gross value of production.

c) Costs of Production. The farm's cost of production would also differ from the aggregate of all enterprises' cost of production because of a difference in treatment of the farm family's labor and (financial) capital inputs into the production activity. Specifically, in farm income analysis, these items are treated not as cost but rather as investments of the farm family, and are therefore excluded in the computation of the farm's cost of production.

## 6. Farm Budgets for Financial Resources

Like physical resource budgets, farm budgets for financial resources have the objective of determining whether, at all stages during the project life, the farm may reasonably be expected to have at its disposal sufficient funds to meet all expenditures required to generate projected outputs. Budgeting for financial resources is thus directed towards testing for the farm's liquidity. If, at any point in time, cash shortages should be expected to occur, the project should be so designed that financial assistance is extended to the farmer during these periods.

The analysis of the farm budget for financial resources provides information that would be useful for another purpose: that of determining whether, to what extent, and at what stage the farms in the project area may be expected to make a financial contribution to the operation and maintenance of the project. As such, farm financial budget analysis also inputs into the subsequent stage of budget preparation for the project as a whole.

a) Basic Elements. Since the objective of the analysis is to assess the farm's liquidity position at each accounting period during the lifetime of the project, only those transactions that affect the farm's cash position in each of these accounting periods are entered into the budget for financial resources. Given this, the basic elements of the budget are cash inflows, cash outflows, surplus or deficit, and a running balance.

Under cash inflows, transactions that would improve the cash position of the farm are recorded. Principally, these would involve cash sales of farm produce as well as loan proceeds (including those from informal sources) and cash grants. Farm produce consumed on the farm are thus not included. Also, if the farm should make any sale on credit, the sale would enter into the budget for financial resources not when the sale is made but rather when the payment is received. Where relevant, cash income from other sources would be included.

Cash outflows represent transactions that reduce the amount of cash available to the farm. These involve cash payments for goods and services obtained, amortization and interest payments on loans received, tax payments, etc.

For each accounting period, cash outflows are deducted from cash inflows to produce either a cash surplus (net inflow) or deficit (net outflow). Even more significant than the surplus or deficit for each

period is the running cash balance, which shows the expected cumulative cash position of the farm as of the end of any accounting period. As the running cash balance shows the total amount of cash that the farm may be expected to have at its disposal as of the end of any accounting period, it serves as an indicator of the amount and the timing of credit intervention that may have to be designed into the project if the farms are to achieve projected outputs. This is important because the timing and the magnitude of necessary interventions are crucial to a project's success or failure.

b) **Accounting Period.** The time element also has a bearing on the choice of accounting periods for which budgets for financial resources of a farm should be prepared. Normally, as in farm income analysis, the analysis of farm budgets for financial resources is carried out for each year of the project life. Because of certain peculiar characteristics of agricultural production activities (particularly crop production which has a strong seasonal character), and considering that venturing into new activities or expanding existing activities usually call for relatively larger cash outflows in the earlier periods because of capital outlays, it would be advisable, at least for the first three years of the project life, to carry out projections of farm budgets for financial resources for at least each quarter of the year. This enables the project to detect and provide for expected seasonal cash imbalances that may occur during the project's early years; it can, for instance, extend production credit to farmers. Thereafter, a solid basis for the farm's cash balance may be expected to have been laid, at which point annual budgets should suffice.

c) **Farm-Household Relationship.** Following the business entity concept, the farm budget for financial resources should be prepared for the farm as a production entity. Under this concept, cash inflows and outflows resulting from activities of the farm household that do not have a direct bearing on the farm's production operation should not enter into consideration. Theoretically, this is the correct approach to take, and there are instances, as in corporate farming, plantation farming, where this should be done.

In the large majority of cases, however, particularly in developing countries, the distinction between the farm as a producing entity and the farm as a household barely exists; in reality, no such distinction is made. Recognition of this fact can be crucial to a project's success or failure. If household receipts and expenditures are not taken into account in the preparation and analysis of the farm's budget for financial resources, the project may fail to correctly anticipate the emergence of cash flow problems, as a result of which, required assistance will either not be forthcoming or its delivery delayed.

In general, where small farms are involved, the farm budget for financial resources should include both farm and household cash transactions.

Financial analysis of projects can be seen from two viewpoints: (1) the “all capital” approach or the weighted average cost of capital (WACC) approach where it looks on the overall financial viability taking into consideration the costs of all capital resources and (2) the “equity capital” approach which considers only the equity contribution as investment.

Financial institutions usually apply the WACC approach in analyzing the financial viability of the project as they decide on how much and in what form their exposure would be. This paper discusses the treatment of WACC in project evaluation.

### TREATMENT OF WEIGHTED AVERAGE COST OF CAPITAL (WACC) IN PROJECT EVALUATION

The WACC approach is one way of estimating the overall opportunity cost of capital used in the financial evaluation of the project. The WACC is determined, as the term implies, by calculating the relative weights of the capital resources and multiplying them with the corresponding opportunity cost of capital for each of the capital resource. The WACC is mathematically represented in equation form by:

$$\text{WACC} = \frac{P_e \cdot R_e}{P_1 \cdot R_1} \quad (\text{equation 1})$$

Where  $P_e$  = percentage of equity investment to total capital investment (i.e., government budgetary appropriation)

$P_c$  = percentage of corporate funds (i.e., internal cash generation for government corporation) to total capital investment

$P_1$  = percentage of loan to total capital investment

$R_e$  = opportunity cost of capital of equity

$R_c$  = opportunity cost of capital of corporate funds

$R_1$  = effective cost of borrowing

Such that  $P_e / P_c / P_1 = 1$

For purposes of consistency, WACC should be used for nominal or “current” price analysis since the cost of capital is normally expressed in nominal terms. For example, interest rate of a loan is usually expressed in its nominal rate and normally fixed over the period regardless of the inflation rate.

Adjustments in the nominal interest rate as stated in loan documents should be made to include other financial charges such as commitment fees, front-end fees, and the like. A more appropriate approach is to use the effective cost of borrowing instead of merely the nominal interest rate as stated in loan documents.

In order to get the WACC using constant price analysis, there is a need to compute the real WACC net of the effects of inflation, by using the following relationship:

$$\text{Real WACC} = \frac{1 + \text{nominal WACC}}{1 / \text{inflation rate}} - 1 \quad (\text{equation 2})$$

This equation can only be used if the inflation rate remains constant over the project life.

As discussed in the book of Cesar Saldana entitled "Financial Management in the Philippine Setting;" the WACC should only be used when (a) the project's risk is consistent with the overall business risk of the company, and (b) the project is to be financed from a pool of funds with the proportions indicated in the WACC.

#### Limitation of the WACC

As seen in equation 1, the WACC is a linear function in the form of

$$x = A_1 x_1 + A_2 x_2 + \dots + A_n x_n$$

Mathematically, it is incorrect to use a linear function or represent a non-linear function of the form

$$Y = B_1 y_1 / B_2 y_2 / \dots B_n y_n$$

An example of a non-linear function is the formula used in discounting cash flow which is basically the same equation for calculating the NPV. This equation is mathematically expressed as

$$PV = C^1 (1 + r)^{-1} + C^2 (1 + r)^{-2} + \dots + C^n (1 + r)^{-n}$$

$$1 = r = r = r \text{ which means constant}$$

Assuming that

Interest rate is applied over the period N, the linear function x is not equivalent to, but can approximate, the value of r.

Below is an example of an incorrect use of a linear function into a non-linear equation.

Assume that a project has two sources of funds namely:

#### Fund 1

|                             |               |
|-----------------------------|---------------|
| Amount                      | 60            |
| Opportunity cost of capital | 15% per annum |

#### Fund 2

|                             |               |
|-----------------------------|---------------|
| Amount                      | 40            |
| Opportunity cost of capital | 20% per annum |

$$\text{Using equation 1, the WACC} = \frac{60 (.15)}{100} / \frac{40 (.20)}{100} = .17$$

In the discounting (NPV) approach, the future value of the investment at the end of period 10 should be at least

$$PV = 100 (1.17)^{10} = 480.6826 \text{ to cover the opportunity costs of capital}$$

However, if one is to analyze the FV of each investment component, the total investment on the project should have at least a future rate of

$$FV = 60 (1.15)^{10} / 40 (1.20)^{10} = 490.4029 \text{ at the end of period 10.}$$

Another example of mathematical inconsistency in the use of WACC can be seen in Annex 1. Given the project profile, and the streams of costs and benefits, the project seems to be financially viable using Case 1. The computed IRR indicated in Case 1 (10.31%) is greater than the computed WACC of the project, and the NPV computed at the WACC of 10% is positive (17.428). Intuitively, the project can cover the interest expense and principal repayments of the loan and, at the same time, be able to realize earnings more than the opportunity cost of equity investment. Using the WACC approach, one can conclude that the project is acceptable, albeit marginally.

In Case 2 however, we examine the return on equity investment of the project. This is done by computing the net cash flows from the investors' point of view. Outflows from the investors during the investment phase are derived by adding investment and interest costs, and deducting loan proceeds from the sum. Inflows to investors, meanwhile are derived by subtracting the repayments of interest and principal from benefits. The net investors' cash flow are then discounted; and the IRR on equity investment is that discount rate which yields zero on NPV. Note that the IRR is computed to be 15.16%, which is lower than the required opportunity cost of equity. The equity capital approach can also be used to examine alternative financing schemes available in order to maximize the discounted returns to equity.

It can also be shown that in general, if a project is feasible from the "equity capital" viewpoint, that is IRR on equity is greater than the equity cost of capital, the project is also feasible from the WACC approach.

Although there are mathematical inconsistencies in the calculation of WACC, it still provides a good approximate of the overall opportunity cost of capital of the project. Cases which yield inconsistent conclusions, as shown in Case 2 are relatively uncommon. However, one should be aware of the limitations of the WACC approach in making investment decisions on the project. It is desirable, therefore, to perform an in-depth analysis such as sensitivity analysis on the estimates of costs and benefits of the project before making such investment decisions.

In summary, both the "all capital" and the WACC approaches can be used in determining the financial approaches can be used in determining the financial viability of the project. It should be noted, however, that for public sector projects, the economic analysis is more important in deciding on the true worth of a project. The financial analysis is conducted to explore the financing options for the project.

FINANCIAL RATIOS

a. Current Liabilities

Total Liabilities

The ratio indicates the amount of the liabilities that need to be serviced during the operating/accounting period relative to the company's total obligations, which could affect its ability to finance the project.

b. Current Assets

Current Liabilities

The ratio shows the amount of resources, in terms of cash and those which can be converted to cash within the accounting period, to meet the obligation which will fall due during the same period. This complements the above ratio as liabilities are compared with available resources.

c. Total Liabilities

Total Assets

The ratio shows the relative amount of its assets financed by loans and other forms of obligation and indebtedness vis. Equity and retained earnings. It is important to determine the corporate leverage so as to know whether the firm can safely accommodate the loan component of the proposed project.

d. Debt-Service Payments

Net Income Before Interest and Taxes

The ratio indicates the extent to which existing financing costs eat into the annual income of the enterprise. It will show whether the corporation has been or is able to meet the existing financial obligations from its income or partially from its equity.

e. Net Profit Before Tax

Sales

The ratio shows the profit margin of the firm. This shows the ability of management to control/maintain/improve its cost and revenue structures while it responds to internal and external factors which impinge on the operation of the enterprise (e.g., operating expenses, collection efficiency, demand for the product/services).

f. Net Profit Before Interest and Taxes

Assets

The ratio measures the rate of return to the assets of the firm. It shows the ability and efficiency of the enterprise to generate revenues from its available resources.

## ADJUSTMENTS TO INPUTS FROM FINANCIAL STATEMENTS FOR ECONOMIC ANALYSIS

Confusion between financial and economic analysis arises because the same discounted cash flows measures applied in financial analysis to estimate returns to a project proponent are applied to economic analysis in estimating returns to the economy. The following three (3) very important distinctions between financial and economic analyses must be born in mind:

1. In economic analysis, taxes and subsidies are treated as transfer payments. The new income generated by a project includes any taxes the project can bear during production and any sales taxes buyers are willing to pay when they purchase the project's product. These taxes, which are part of the total project benefit, are transferred to the government, which acts on behalf of the society as a whole, and are not treated as costs. Conversely, a government subsidy is an expenditure of resources that the economy incurs to operate the project.
2. In financial analysis, market prices are normally used. In economic analysis, however, some market prices may be changed to accurately reflect social or economic values. These adjusted prices are called "shadow" or "accounting" prices, intended to better approximate efficiency prices or "opportunity costs," the amount we must give up if we transfer a resource from its present use to the project.
3. In economic analysis, interest on capital is never separated and deducted from the gross return because it is part of the total return to the capital available to the society as a whole and because it is that total return, including interest, that economic analysis is designed to estimate. In financial analysis, interest paid to the entity from whose point of view the financial analysis is being done is not treated as a cost because the interest is part of the total return to the equity capital contributed by the entity.

### SUNK COSTS

A project may require the use of facilities in existence prior to appraisal of the project. The cost of such facilities are "sunk costs" and thus should not be included in the project cost, provided that these facilities have no alternative use, and their use in the project involves no opportunity cost.

In some cases, a project is part of a sequence of related investments. While a project that uses excess capacity created by an earlier project may well show high returns, such returns may also arise if a project is designed in a way that allows it to capture benefits originally expected from an earlier project. For instance, a rehabilitation and modernization project for an irrigation system may include as benefits yield increases expected from the original project. Hence, in all such cases, it would be desirable to also indicate the net return on the entire project, including sunk costs, in order to show whether the original decision to provide the facilities was well founded.

### DEPRECIATION

The financial accounts of a project include provision for depreciation on the basis of prevailing accounting prices. For purposes of economic analysis, the important factor is the stream of real investment required for realizing and maintaining project benefits at the assumed levels. Apart from the initial investment, this may require repairs, maintenance and replacement during the project's life. The time profile and magnitude of these expenditures does not generally coincide with the time profile of depreciation in the financial accounts of the project. Moreover, at the end of the project's life, the assets created may have some residual value, even though they may be fully depreciated in the financial accounts. Hence, economic analysis requires that depreciation provisions be excluded and that expenditures for repairs, maintenance and replacement and the salvage value of assets at the end of the project life be taken into account.

#### FINANCIAL CHARGES, INTEREST AND AMORTIZATION

In general, financing of the project is not relevant to the economic evaluation phase of project preparation. Amortizations, interests, and other charges are financial items specific to the terms of financing and are independent of the economic value of the project. To ensure that only feasible projects are financed, investments should be subjected to cost-benefit analysis removed from financing considerations. Only after a project is determined feasible should terms of financing be incorporated to evaluate possible additional benefits derived from relative favorable (e.g., concessional) loan terms.

## ISSUES OF TECHNICAL DESIGN

The range of types of projects and technological alternatives is wide and very little can be said by way of generalization. Many issues of technical design are specific to a project. Nevertheless, certain broad issues relevant to many, if not all, projects can be identified. These can be grouped into the following four categories:

1. **Size.** The size, scale, or scope of a project is almost always variable that must be determined in the course of project preparation. Whatever the sectoral focus, a bias in favor of bigness on the part of planners has to be guarded against. Absence of a proven technology package may dictate a phased approach, starting with research or adaptive work and continuing with a pilot project that is scaled up subsequently as experience warrants. Finally, financial considerations, such as the burden of recurrent costs to operate the project once it is completed, may determine project size.
2. **Location.** Issues affecting the choice of location can be as diverse as those affecting size. In most instances, site selection entails a trade-off among various considerations.
  - For industrial projects, location may be dependent on proximity to needed raw materials, a primary source of energy, principal markets or suitable infrastructure.
  - For agricultural development projects, the quality of soils, pattern of rainfall, structure of landholdings, and availability of ground or surface water will determine site selection.
  - For social projects, population densities and service areas will determine the number and location of school buildings or of health and family planning clinics.

In some cases, a project's location may reflect a deliberate government policy to decentralize industrial investment away from the nation's capital, to open up an underdeveloped region, or to protect a fragile environment from further encroachment.

3. **Timing.** Issues on the timing of project investment may be less obvious than those of scale and location and therefore more likely to be neglected. Timing is often confused with preparedness or state of readiness. Projects should not only be put forward because they are "ready" – there should be an explicit determination of appropriateness of timing of the projects. The decision to invest should be guided by the projects. The decision to invest should be guided by the project's first year EIRR, rather than the overall return on the investment to determine whether a project is premature (demand for output, state of technology is not yet sufficiently advanced to make it economically justified or financially viable) or too late (overall contribution or benefit would have been greater had it been undertaken earlier).

4. Technology Package. Technology selected for a project should be suited to the development objectives of the project, to intended users, and to local conditions – including the availability and cost of local capital, raw materials and labor, as well as the size of markets and the actual and potential capacity for local planning and implementation. This implies that the technology chosen need not be the most modern that is available internationally, nor the traditional one widely used in the country; it can be selected, and perhaps designed, specifically to meet the objectives of the project.
  - a. While the search may often lead to a choice that occupies an intermediate position on the scale of technical complexity, there are situations in which the advantages of the most sophisticated, modern or high technology are so great as to override all other factors. This is true for capital projects whose impact may be felt nationwide (i.e., remote sensing by earth satellites for national resource surveys, installation of microwave radio system or coaxial cables for long distance communications, electric power generation, large scale development of mineral deposits, offshore oil exploration, deep well drilling, and enhanced oil recovery).
  - b. At the other end of the scale of complexity, projects with localized impact such as maintenance of rural roads, construction of rural schools, or provision of tertiary irrigation ditches call for a highly labor-intensive approach that entails difficult managerial and logistical problems in handling large numbers of workers.
  - c. The following range of considerations that may enter into the choice of technology package should be:
    - i. The tradeoffs between imported and domestically produced technology, between capital- and labor-intensive technology, and between new investment, maintenance, and operating costs.
    - ii. The interdependence between choice of technology and administrative and institutional feasibility.
    - iii. The way the choice of users, as well as environmental concerns, influence technical design.
    - iv. The impact, intended and otherwise, of the policies of governments and of aid agencies on technical design.
    - v. The role of economic and financial analysis in elucidating the choice of technology.
    - vi. The opportunities that the choice of technology provides for developing local resources and capabilities.

### ELEMENTS OF SOCIAL ANALYSIS

1. The sociocultural and demographic characteristics of the project population, its size and social structure, including ethnic, tribal and class composition.
2. The way in which the project population has organized itself to carry out productive activities, including the structure of households and families, availability of labor, ownership of land, and access to and control of resources.
3. The project's cultural acceptability; that is, its capacity both for adapting to and for bringing about desirable changes in people's behavior and in how they perceive their needs.
4. The strategy necessary to elicit commitment from the project population and to ensure their sustained participation from design through successful implementation, operation, and maintenance.

### IDENTIFICATION AND INVOLVEMENT OF TARGET GROUPS AND SOCIAL AND DISTRIBUTIONAL ANALYSIS

1. The target groups intended to benefit from the project and the main agents in its implementation should be carefully specified at the outset whenever possible and appropriate.
2. The early specification of intended target groups should be followed by a qualitative analysis of the distributional effects of the project. To the extent possible, the distributional analysis would attempt to assess the project impact on various relevant groups. The analysis should further clarify the groups and individuals who may benefit or may be harmed by the project, including positive and negative employment effects. In certain cases, there may be adverse social effects on some groups even when objectives for the target groups are fully met. The appraisal should assess these adverse effects and consider means for alleviating them.

Socio-cultural conditions, structures and traditions need to be analyzed in order to identify possible constraints to successful project implementation. This may involve such issues as land and water tenure arrangements, resettlement issues and local and organizational arrangements which require sociological and/or anthropological expertise.

3. Attention should be paid to involving women in the planning and implementation of development projects. Consideration should be given to gender issues at the initial screening stage as well as at the preparation and appraisal stages. Particular attention should be given to gender composition when considering the division of labor, access to and utilization of resources, decision-making processes, distribution of income and benefits, time allocation and legal status of women, and the impact that these factors will have on project success.
4. For many types of projects, appraisal requires adequate data on demographic patterns including growth of different population strata and migration flows. Where a project affects a large number of people, it may be useful to assess its impact on population patterns, including spatial distribution.