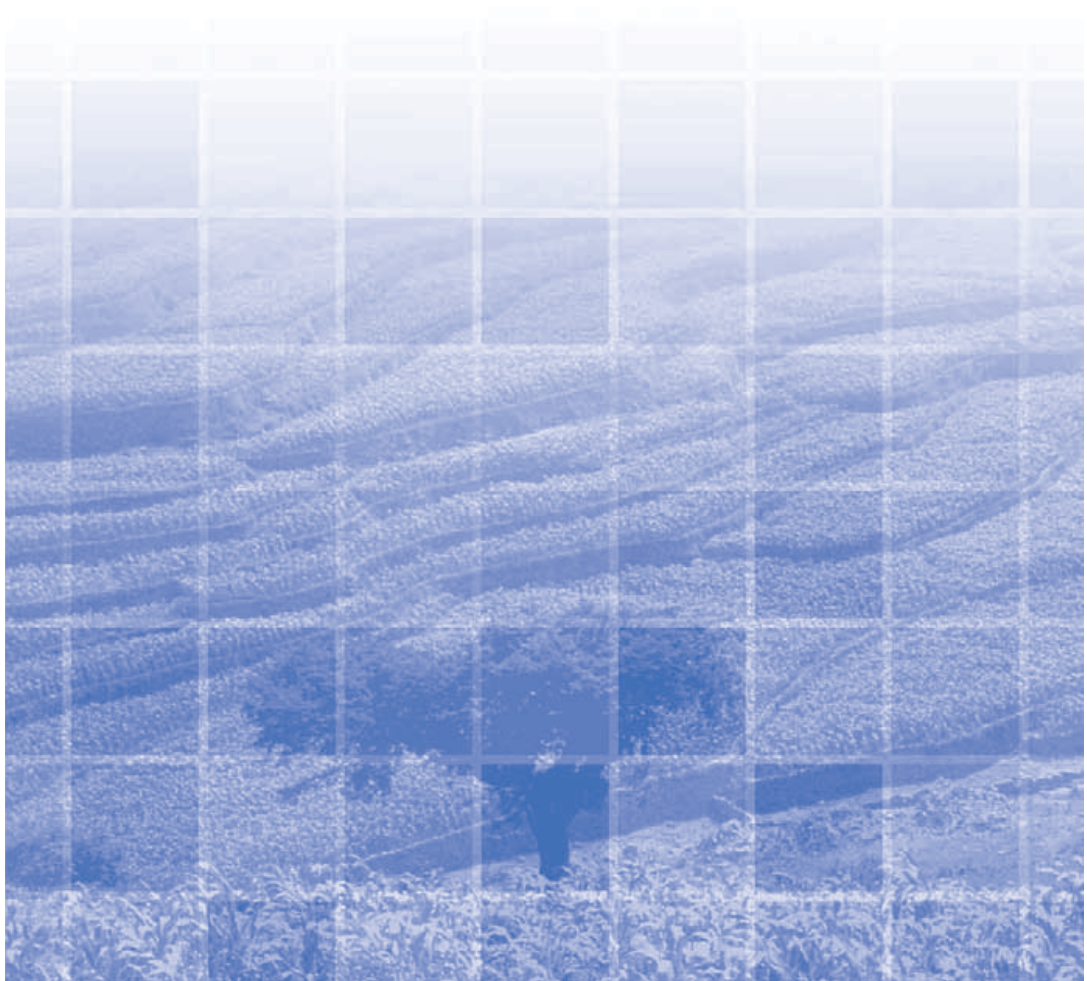
Chapter VII

FINANCING THE INVESTMENT



VII FINANCING THE INVESTMENT

Although there are a number of rural investment funds directed solely at non-profit investments, the majority of financing provided to communities and individual applicants in the rural sector also contemplate the financing of activities that generate income; that is to say, profit-oriented activities. Although they might receive subsidies, investments in income generating projects almost always require that the recipient(s) accept part of the cost of the investment in the form of a loan.

In this section, we characterize the different needs for reimbursable (or repayable) financing and discuss the loan features that can influence the cost of financing.

A. Credit Requirements

Credit or loans are required to finance two basic costs, and can be calculated as follows:

- Investment Loans: The total cost of the investment less (i) any grant funds offered by the supporting agency; (ii) donations from other sources (e.g. NGOs, government, churches etc.), and (iii) personal resources provided by the applicants.
- Working Capital: Funds to cover operating expenses (as defined in Chapter 6) less donations and personal resources.

The availability of donated funds will depend on the supporting agency and its resources. In many cases, in addition to covering the cost of the field technicians assisting in the preparation of the investment proposal, grant funds are also available to reduce or eliminate the cost to the applicants of human resources and systems development (training, designing accounting systems, etc.) and for environmental studies and mitigation measures. In some cases, a supporting agency may offer grants or subsidies for investments in what are called 'common goods' – that is items that can be used by a wide range of people, such as access roads, water collection works, etc. Less frequently, a supporting agency might subsidize the cost of productive investments or working capital for the operation of these investments.

One warning about the excessive use of donations and subsidies: Although they might appear to be very attractive to the applicant, he or she must be careful to ensure that ***the product would continue to be feasible or profitable even if these grants or subsidies were not available***. Why? Because when the time comes to replace the investments, the project may not be able to cover these new costs and can fail. Thus there is a real risk of undertaking an unsustainable project.

Although the question of financial feasibility tends to apply more to income generating projects than to social or environmental investments, it should not be forgotten in these cases, either. For these non-income generating projects, donations frequently cover most, if not all, the investment cost. When the time comes to repair the roof, or replace the furniture, there are simply no resources available to cover the cost.

A certain level of personal contribution on the part of the applicants is important, and is generally required by the financial agency. A significant contribution of personal or community capital (in cash or kind) demonstrates the borrower's commitment to the project, and insures that, if it fails, the borrower will also suffer from the loss of his or her own capital.

1. Financing for investment

Investment financing normally occurs through single credit with a loan duration of 4 to 5 years or longer. Typically, in small and medium sized projects, a single loan is obtained to cover the total amount. However, in larger projects, it may be wise to split the cost of the investment into two amounts, especially if land is purchased. One loan can cover either land or other long term investments with long life spans (structures, heavy machinery, etc.). The second can be used for investments with short to medium life spans (vehicles, electronic equipment, etc.). On this basis, two loans would be requested, each with a different payback period, and probably interest rate.

It may also be the case that the financing agency imposes limitations regarding the type of items that it will consider, (for example, it might not allow loans to finance the purchase of vehicles). In this case it might be useful to divide the financing into two parts: the majority of the costs to be financed would be covered by the supporting agency, while alternative sources (e.g. commercial bank, cooperative, savings and loan association, etc.) would be sought for the financing of the excluded items.

2. Financing working capital

Loans for financing working capital are always short term. They may be 'rolled over', or renewed, from one year to the next but are rarely extended

beyond one year. Thus, if there is a need to continue to use external financing for working capital in the second year, it would be more customary to pay off the current year's loan at the end of the year, and then obtain a fresh one for the following year.

This short term nature of working capital loans affects the way that the loan is recorded in the accounts of the project. Given that the loan is both ***received*** and then ***paid back*** within the same year, ***the only element of a working capital loan that appears in the annual accounts is the interest cost of the loan***. The actual loan amount will neither appear as an income nor as an outstanding capital debt as would be the case for an investment loan – only the interest payment remains. This is illustrated below in comparison with an investment loan.

Amounts	Loan Investment	Working Capital
Borrowed at the beginning of the year	$ 2,000	$ 200
Principal repaid at the end of the year	$ 400	$ 200
Interest paid (at 10%)	$ 200	$ 20
Principal outstanding	$ 1,600	$ 0

B. Loan Characteristics

It is impossible to carry out a financial analysis of an investment without defining some of the key characteristics of the loans involved. Among these features, the most important are the interest rate, the grace period and the duration of the loan.

a) Interest rate

Interest rates will be determined by the financial agency that supports the investment. In some cases, these rates will be subsidized. Normally, the interest rate for a medium or long term loan (for investment) will be different from the rate for a short term loan (working capital). As RuralInvest works with constant costs and prices, real – rather than nominal – interest rates should be used for medium and long term loans. The importance of this, and why it is done, is discussed in more detail later in this Chapter.

b) Grace period

A grace period is the time during which the borrower need not make payments on his loan. It is common for even commercial banks to offer grace periods for medium and long term loans, but it is rare for them to do so for short term credit.

There are two types of grace period. The first refers only to the payment of the loan capital. This is the most common. During the grace period on principal, interest is fully paid by the borrower but the principal (or capital amount) remains untouched. Thus after one year, the borrower owes the same amount as at the beginning. The second type of grace period refers to interest. In this case, the interest is not paid, but instead is added to the principal, **thereby increasing the total amount of the loan**. Grace periods on interest are less common than on the principal and, if offered, tend to be shorter. A bank or other lender may, however, offer to provide six months or one year's grace on interest where it is clear that no income will be generated in the first months of the project.

It is important to understand that neither of these two types of grace period signify the forgiveness of any part of the loan. They only postpone payment, and where interest payments are not made, will actually increase the size of the debt.

FINANCING THE PURCHASE OF A COMPUTER

The managers of a small business finally decide that the time has come when they can no longer survive without a computer to keep their accounts straight and to prepare their invoices. They determine that a computer (with its printer, software and other necessities) will cost an equivalent of US$5,000. They estimate that the equipment will have a useful life span of 4 years and will have no significant resale value at the end of its life. If the rate of interest on the loan is 10% per year, what will be the impact of taking out a US$5,000 loan for 2, 4, or 6 years?

	2 years	4 years	6 years
Annual Payment:	2,881	1,577	1,148
Total Payment:	5,762	6,309	6,888

You can see that the annual payment is almost double for the two year loan compared to the four year package; that is, although the total cost of the loan for 4 years is US$547 more than that of the 2 year loan (because interest is paid over a longer time period), the annual cost is US$1,300 less. The 6 year loan is even cheaper in annual terms: only US$1,148. However, at the end of the fourth year, when the computer must be replaced, the company will still owe US$2,300 and must now also finance the cost of replacement.

c) Duration of the loan

The ideal loan is one that lasts just as long as the item being financed. However, in real life, loans are used to buy a series of goods, each with its own life span. So, you must define a period that covers the majority of the investments; especially the most important of them, in terms of cost.

If the loan has a shorter term than the life of the article being purchased, the project will have to find a larger amount each year in order to pay it off quickly. However, if the loan lasts longer than the item, the project could find itself in a position where it is starting a new loan to finance a replacement, while it has still not yet finished paying off the original loan (see box).

In any case, the life of a loan for investments should not be longer than the period of analysis of the project. If the nature of the goods and the project itself justify a 20 year loan, then it is necessary to analyse a period of 20 years.

C. The Changing Value of Money over Time

As we mentioned earlier, a possible definition of a project is "an investment today in order to generate a flow of benefits in the future". However, this difference in time – the investment today and the benefits tomorrow – causes complications. We all recognize the fact that something received in the future is worth less than the same thing received right now. For this reason, it is not possible to say that a project is feasible simply because its future income is greater than the present investment. Everything depends on the relative value of the money (or other benefits) today and in the future.

Below, we will consider the impact of time on the value of money and describe how to take this fact into account when analysing an investment.

1. Inflation and Future Value

When we speak of the difference between money today and in the future, many people immediately think of inflation.

It is true that when there is inflation, the future value of money is less, as a consequence of the rise in prices. However, ***the methodology used by RuralInvest attempts to eliminate the impact of inflation by calculating all of the elements of the project in terms of constant prices***. That is to say, it is assumed in the analysis that the prices of all goods, inputs, labour, products, etc. will stay the same during all of the years analysed. Thus, if a day of work in the workshop or school costs $2.50 in the first year, it will cost $2.50 throughout the period of the analysis, even if it is 20 years.

How is it possible to do this? The answer is that although it is probable that the **costs** will rise with the passing of the years, the **prices** received for the sale of the products will also rise. So the rise in costs will balance out the increase in income, and there will not be a significant distortion in the results[12]. Excluding inflation from the calculation eliminates the need to calculate new costs and prices for each year of the analysis, an exercise that may well be justifiable in projects involving multi-millions, but not in small or medium sized investments.

However, inflation is not the only factor that makes something in the future less valuable than today, and entices us all to prefer something now than in an uncertain future.

According to *The Economist* magazine, prices in Europe in 1914, at the beginning of the First World War were not, on the average, higher than they were in the 17th Century; that is in 200 years there had been no inflation. But the banks in Europe continued offering positive interest rates for deposits during this entire period, although often no more than 2 or 3% per annum. So, even without inflation, people demanded some compensation (the interest rate) for waiting until the future to have their funds.

Below we discuss what factors influence interest rates in the absence of inflation.

2. Constant Prices and the Real Interest Rate

If constant prices are to be used for inputs and products, they should also be used for the cost of money; that is, the interest rate, as interest rates are heavily influenced by inflation, both actual and expected. For medium and long term loans, therefore, the model used by RuralInvest deducts the current inflation rate from the 'nominal' interest rate (that is the one paid by the client), thereby leaving a "constant" or "real" interest rate.

The question of real interest rates on loans is the area which presents RuralInvest users more difficulties than perhaps any other. To understand how inflation affects the interest rate, let us consider the different elements that combine to determine the rate charged by a lender (bank, cooperative, project, etc.):

a) **The initial cost of the funds**: the price that a bank or other lender pays the deposit holders whose money they use;

b) **The cost of administering the loan**: this is commonly the highest cost for small loans, as

12 In fact, in the absence of very different inflation rates among the different elements of the project, probably the most important impact in using constant prices found in the underestimation of the needs for working capital.

it takes almost the same time to process a loan for $500 as it does for $500,000;

c) **The risk of loss or delays in payment**: this varies with the kind of security offered by the client and how well the bank knows the client;

d) **The profit margin required by the bank**: the part of the loan cost that generates profits for the bank.

Expectations concerning the inflation rate over the life of the loan clearly influences at least two of these elements – the cost of funds and the bank's profit margin. To compensate for any decrease in the value of funds due to inflation (either the bank's own funds or those of its depositors), the bank will have to increase these two elements, increasing the overall interest rate.

Where inflation rates are significant, there can be a major difference between nominal and real rates. In fact at very high inflation rates, real interest rates will often drop below zero, because it takes some time for people to believe that inflation will stay so high into the future.

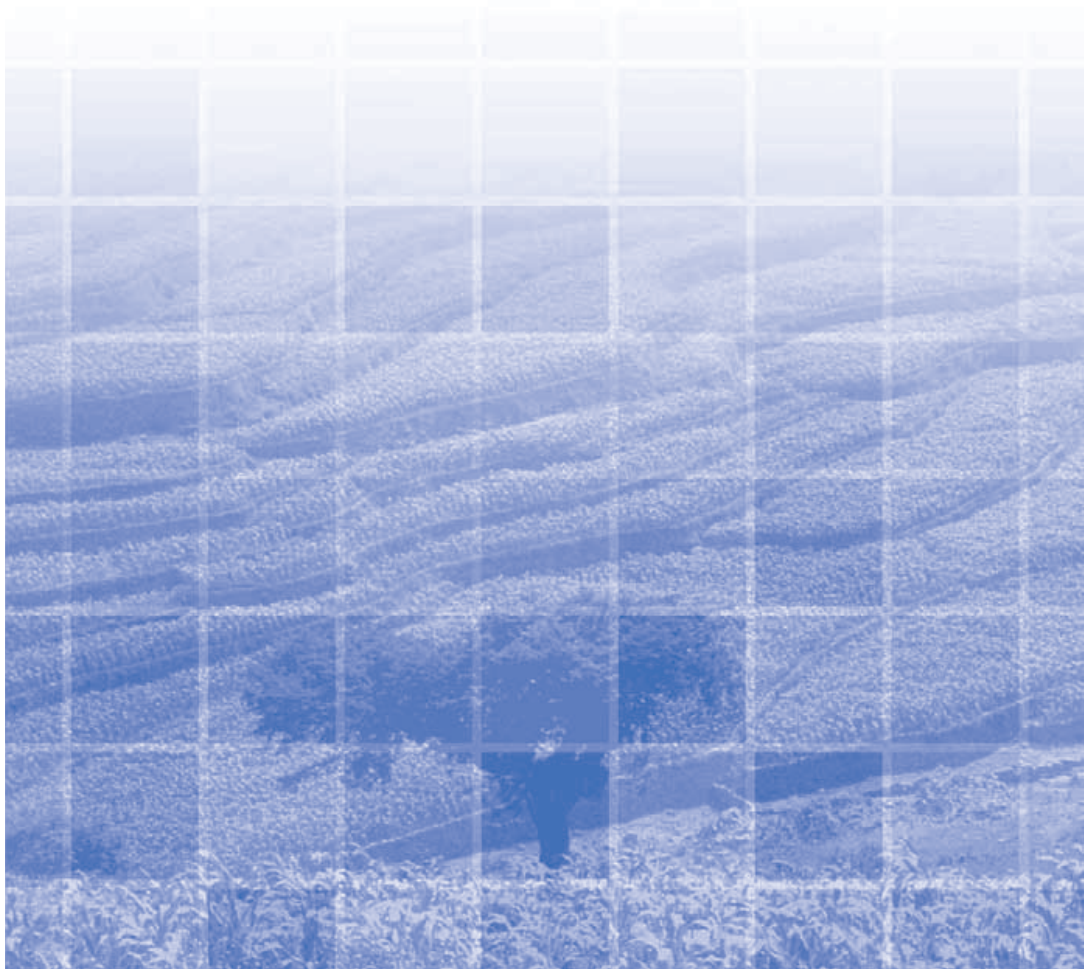
It is very important to be clear about one thing. The use of a 'real' interest rate (that is one that excludes inflation) helps us to determine the underlying feasibility of the project – ***it does not tell us how much the project will pay every month or year to the financing agency***. That is not its purpose, although a user can get some idea of these actual payments by setting the inflation level to zero in the RuralInvest software. This will force the computer to make the 'nominal' interest rate equal to the 'real' rate, and the payments calculated will be thus be at the nominal rate.

Even if the nominal rate is used, however, extreme care must be taken in assuming (or even worse, telling the applicants) that the amounts calculated by RuralInvest are those that the project will pay once underway. This is because there are many ways to schedule repayments, as well as to incorporate associated loan charges. For example, while it is common to equalize payments over the life of the loan (as is done with mortgages and in RuralInvest), this is not essential, and some lenders will vary payments according to the amount outstanding, which will mean high payments in the early years. Still others will 'balloon' payments at the end, resulting in low costs early on, but high costs towards the end of the loan period. All involve the same interest rates, but result in a quite different pattern of payments. In a similar manner, some agencies will charge cash for loan services, while others will add them to the loan amount, or to the early payments, and so forth. Thus, ***the loan payments calculated in RuralInvest are not a good guide to actual payments that will be faced by a project***.

In theory, the same method of eliminating inflation could be used for working capital, but the relation between constant prices and real interest rates is less clear over short periods, because some prices respond more quickly than others. For this reason, in the case of less-than-one-year loans, the models use current interest rates, which give us a higher cost than necessary; but it is considered better to take a conservative position.

Chapter VIII

ORGANIZATION AND MANAGEMENT OF THE INVESTMENT



VIII ORGANIZATION AND MANAGEMENT OF THE INVESTMENT

The organizational and managerial aspects of an investment proposal constitute an area that rarely receives the attention it deserves. The majority of effort is generally dedicated to financial and technical factors, and very little time is spent on defining an appropriate and effective managerial structure. As a result, many small and medium investments - especially those that are owned by groups or communities - fail because of problems of control or management.

Rural communities typically do not have many people with management and business administration experience, and it is risky to assume that these are functions that will solve themselves, or that their definition can be left for the stage of project execution. Below, we discuss the three most important factors determining project organization and management:

a) the ownership structure

b) supervision and oversight

c) daily management

There is also a brief discussion on the use of technical assistance by the management team.

A. Ownership Structure

The first task that is encountered in determining the organizational and managerial model for an investment is the choice of its ownership structure. Typically, there are several available options, including both informal and formal structures. However, the decision depends to a great extent on whether the operation or investment will be carried out by a single person or family or by a group of persons or families.

1. Individual Owners

In the case of an investment made by an individual, or a single family, the principal decision concerns the necessity and usefulness of formalizing the legal status of the activity by registering it as a corporation.

This manual offers no guidelines on legal aspects, mainly due to the number of countries in which it may be utilized. It is therefore the responsibility of the people in charge of the process of formulation and evaluation of the investment to determine what the legal requirements are, as well as the advantages and disadvantages of registering a small business in each specific case.

In broad terms, however, formal registration of a project as a company may bring some of the following benefits:

a) It can facilitate access to formal sources of credit (banks, etc.) as well as government programs that support small enterprises;

b) It will often permit the business to reclaim value added taxes (VAT) on goods and services purchased;

c) It may help employees to access state medical insurance and social welfare programs;

d) It may give the company the right to import certain products (for example, packaging materials and inputs) tax-free, in those cases where the end product is destined for export.

Among the possible disadvantages of registration are:

a) Bureaucratic red tape, which is frequently time consuming and frustrating;

b) The need to maintain a variety of records and documents in order to comply with legal requirements;

c) Responsibility for collecting VAT on sales and remitting it to the fiscal authorities;

d) The possibility of attracting more attention from the tax authorities

2. Multiple Owners

When dealing with an activity that involves a group of persons, or an entire community, further options can be added to those discussed in individual investments (informal and company). The most common alternative is the use of a cooperative structure, although some countries also offer other types of ownership for groups.

It is not recommended that cooperatives be founded for the explicit purpose of managing an investment. A successful cooperative is the result of a series of developments involving a number of community efforts. A process of maturation and learning is required before a cooperative can successfully take on the responsibility for directing and controlling a project of significant size. However, if the community already has an active and well managed coop, this may be the most attractive solution.

Nevertheless, in spite of all their ideals, in many countries cooperatives have had a disappointing

history, and most success stories appear to result from the efforts and dedication of a single dynamic individual. If a cooperative structure is considered, therefore, it is necessary to insure that there is a firm commitment on the part of its members to make it function adequately.

Should you instead select the corporate structure for a project that belongs to a group or community, certain key decisions must be made regarding the nature of the corporation, and it is highly recommended that a lawyer be consulted if possible to ensure that the options available are clearly understood.

One possibility is to issue shares to all of the participants, in much the same way that a company on the stock exchange does. At the end of the year, the company will distribute any earnings according to the number and distribution of its shares. In this case, however, the right of the shareholders to sell their shares (and to whom), and the requirement that they actively participate in the project must be established from the very beginning. For example, if a community corporation is used as a marketing channel for products derived from only some villagers, it may be considered important that these participants have the right to increase their shares in comparison to those of non-participants.

B. Supervision and Oversight

Any project or operation that manages significant resources, and represents the interests of more than two persons, requires some form of board or supervisory committee. Obviously, the size and responsibility of such a group depends on the scale of the project.

If a small group of families establishes an operation involving 5 workers, there is no need for a Board of Directors with 12 members that meets every month. However, even a small operation, or one that only performs one task (for example, selling the agricultural product of the member families), needs some kind of oversight. If this doesn't exist, the enterprise runs the risk of misuse of funds or resources by the person or persons that administer it.

In the case of relatively small groups, it is possible that everyone involved can participate in the duties of direction and general follow-up of the activity.

When dealing with larger groups, however, it is necessary to rely instead on the formation of a board or steering committee. Such a Board will require bye-laws, which define matters such as:

a) How many people constitute a committee? We recommend a minimum of 5 and a maximum of 8 or 9 persons

b) How much time can each person serve as a member of the board or committee? There may be no limits, but frequently a maximum of two or three years is appropriate.

c) Should the duties of the President, the secretary and the treasurer be defined? This is generally not recommended, except for the smallest of committees.

d) How often should they meet? This could be monthly, quarterly or even every six months, according to the scale of the operation and the complexity of its operations.

e) How frequently should the Board present their report to the other members? It is advisable to do so once a year.

The supervision of the project can be as important regarding what it does not do, as for what it does do. While a Board of Directors or any supervisory committee should play an important role in monitoring the progress of the project and the strategic decision making process, it is not an adequate forum for making managerial decisions (and even less so when supervision is the responsibility of all of the participants). Many projects have been destroyed by boards and supervisory committees that obstruct the manager from fulfilling his responsibilities.

The by-laws of the company, cooperative or group, in addition to defining the structure of the board or supervisory committee should specify the following:

a) Areas of responsibility of the Director's Committee:

- Hiring (and firing) the manager or person in charge of the day to day decisions;
- Review and approve the bi-annual or annual accounts of the project;
- Make decisions regarding the bookkeeping method for the project accounts, and the use (if any) of auditors;
- Strategic decisions, such as: types of activities to be carried out; approval of significant investments and possibly, the determination of employee salaries.
- Call general annual or extra-ordinary meetings.
- Make decisions concerning the contracting of external experts to review or assist the operations of the project

- Establish general procedures for selecting suppliers, contracting personnel and carrying out other similar activities.

b) Areas normally out of the competence of the Director's Committee:

- Making decisions on production levels (within the range determined by staffing levels and equipment capacity);
- Buying and selling input materials and products (including the determination of prices and the selection of markets);
- Administrative activities, such as keeping records, dealing with bills, invoices and receivables, and relations with clients and suppliers;
- Personnel selection (within agreed upon staffing levels).

It is important that the Board or Steering Committee allow the manager of the operation to manage the activity according to his or her criteria, and not attempt to dictate day-to-day decisions. If the committee lacks confidence in the manager, it must refuse to renew their contract at the end of the agreed term and seek a replacement. By revoking or changing management decisions, they only destroy the manager's ability to run the project in an efficient manner.

Only when the committee finds (or suspects) the manager guilty of illegal activities, or activities contrary to the previously established and agreed upon guidelines, should there be grounds for a direct intervention in the activities of the operation. Even in this case, it is recommended that the Board or steering committee seek the approval of an extra-ordinary general assembly before acting.

C. Daily Management

Once the structure and the mandate of the supervisory and oversight group have been determined, project management and administration needs should be defined.

The smallest of projects may need no more than one person, responsible for all tasks in both areas. However, it would be a false economy to place all of the responsibility on one person when the project generates significant costs and income.

A common combination for a small project is a general manager backed up by a bookkeeper. This second person may also carry out the duties of secretary. In a larger operation, the following positions may supplement the general manager, according to the types of activities carried out. One of these positions may be the particular responsibility of the general manager:

- Field manager: in charge of field operations including raw materials and inputs production or procurement;
- Plant manager: responsible for all operations within the facility, including processing, packaging, storage etc.;
- Sales manager: responsible for all marketing of the finished product;
- Financial manager/Accountant: Responsible for maintaining project accounts, dealing with banks and managing payments and receivables;
- Personnel officer: responsible for managing employees including labourers, field hands, secretaries, technicians and administrative staff;
- Foremen: supervision of routine labours in the field or in the production process.

Nevertheless, only a very large operation could justify filling all of the positions described above. Remember: these positions represent fixed costs. In other words, costs that are paid regardless of the volume of production. Furthermore, although each additional person in management has no direct impact on the volume of production, they do increase the general expenses (telephone, office supplies, office space requirements, etc.) Extreme caution is therefore needed in defining a large managerial structure.

Among the areas covered by the general manager's mandate and which he/she may delegate to his assistant managers, the following are worth noting:

- Decisions on the daily production volume or the combination of products to produce;
- Decisions on planting or harvest dates, or the beginning of seasonal operations;
- The selection of supply sources for raw materials and inputs and the price to be paid (in some cases, according to guidelines laid down by the management committee);
- The selection of markets, timing of supply, and the decision over sale prices;
- The determination of the number of employees needed and their selection, frequently within the limits set by the supervisory committee

- Approval of normal expenses, such as office supplies, fuel purchases, electricity, water, maintenance, etc.

D. Technical Assistance and Managerial Support

The demands of management and administration of a business or other rural activity are frequently beyond the capabilities and experience of the participants. In order to bolster this area, it may be worth considering three broad levels of external support.

A project might require one or more of the following types of assistance, at least during the first years of its operation.

1. Professional Full-time Managers

This option is recommended when dealing with a fairly complicated operation or which involves technical activities that are very demanding on the participants and for which they have little prior experience. A common example might be a food processing operation, such as cheese or juices, where poor quality can not be tolerated. It is rare that a project, except in the case of the largest, need more than one outside manager

In some cases, it may be that the community or the investors have technical capability, but no administrative abilities, or that the marketing process calls for a highly experienced expert. As a result, it is not always the general manager post that is the position to be filled, an external accountant, plant manager or sales manager being more valuable.

When using an external manager, it is recommended that his or her contract be for a long enough period to allow the business or activity to become established on a firm base. This could be for a minimum of two or three years, with the right of earlier termination, in case the investment fails to meet determined levels of volume, sales or other indicators. In addition, it must be made clear from the outset that the position is not permanent, and that the manager must train one or more assistants from the community or group, who can eventually replace him.

In addition to the right to terminate the contract, it is also suggested that the rewards of the job (salary, benefits) be linked to the performance of the business. For example, a moderate basic salary plus a portion of yearly profits, which will yield a good income if the project performs well.

The cost of an experienced, successful manager can be substantial. It is, therefore, not often feasible to employ one on a small project, where the earnings are insufficient to cover their cost and leave some profits for the owners/participants. Nor should a full-time manager be used for social or environmental investments (which generate little or no income) unless an NGO, international donor or state agency is willing to guarantee financing the position.

2. Management Consulting and Periodical Administration

In cases in which the size or complexity of the operation does not justify contracting full-time experts, serious consideration may be given to using a periodic consulting or advisory service. As a minimum, a small or medium sized investment could benefit in the following areas:

- Financial systems: Help is often needed to establish and train staff in the operation of the accounting system, including periodic follow-up visits to review the financial accounts. For medium size or larger projects, it is recommended that professionally qualified persons be used and that the operating rules call for a certified accountant to carry out one – or better yet – two inspections of the financial accounts per year.
- Strategic Planning: Assistance in this area can provide significant support for the Board or supervisory committee and the management in the preparation, execution and monitoring of a coherent plan for the growth and development of the operation, including decisions about the goals, changes in the activities themselves and new investments. This type of support normally need be no more frequent than once a year, and is frequently undertaken at longer intervals (every two to five years).
- Marketing: Consultants or advisors familiar with the product can carry out an evaluation of the existing markets, identify potential new markets, and draw attention to the need to modify the product (or some aspect of its presentation) in order to improve its market position. Again, unless the operation is facing a crisis, assessment in this area is not recommended more than once every two or three years.
- Technical processes: Support may be needed for overall product quality control, solving specific problems, and reviewing technical procedures. Generally, this type of support is particularly useful during the first 12 to 24 months of the operation, but it may continue, on a reduced scale (half-yearly visits) indefinitely, particularly if the

specialist(s) bring knowledge of developments in other countries or markets which the project management is not familiar with.

- General Management: This is most often required when the inexperienced manager of a small investment does not know where to look for help in solving the problems that he encounters. It may, in fact, be difficult to distinguish whether a problem is bad enough to justify calling upon external assistance. Sometimes a government agency or internationally funded project will cover the cost of having a management expert visit the project on a periodic basis to assess whether the operation is proceeding well.

Whether or not the last of these services is available or utilised, it is very useful to have someone who is available by telephone in an emergency, to advise the manager on how to evaluate a problem and suggest where he can find help, if necessary. The ideal solution is that the person who helped in the evaluation of the investment, that is, the person that applied RuralInvest, stay in contact with the investors beyond the formulation stage to give them support in all of the areas they need. This matter is discussed in the following sub-section.

3. Teaching Skills and Training

With the exception of the smallest investments, it is rare for a project not to have at least some need for training. In the previous sub-sections, we analysed some of the areas where it is often necessary to strengthen the skills of project staff, including those working in accounting systems, financial control, marketing and sales, and strategic planning. Also there might be a need for training the technicians in production processes, packaging, quality control and management of inputs or finished goods, among other areas.

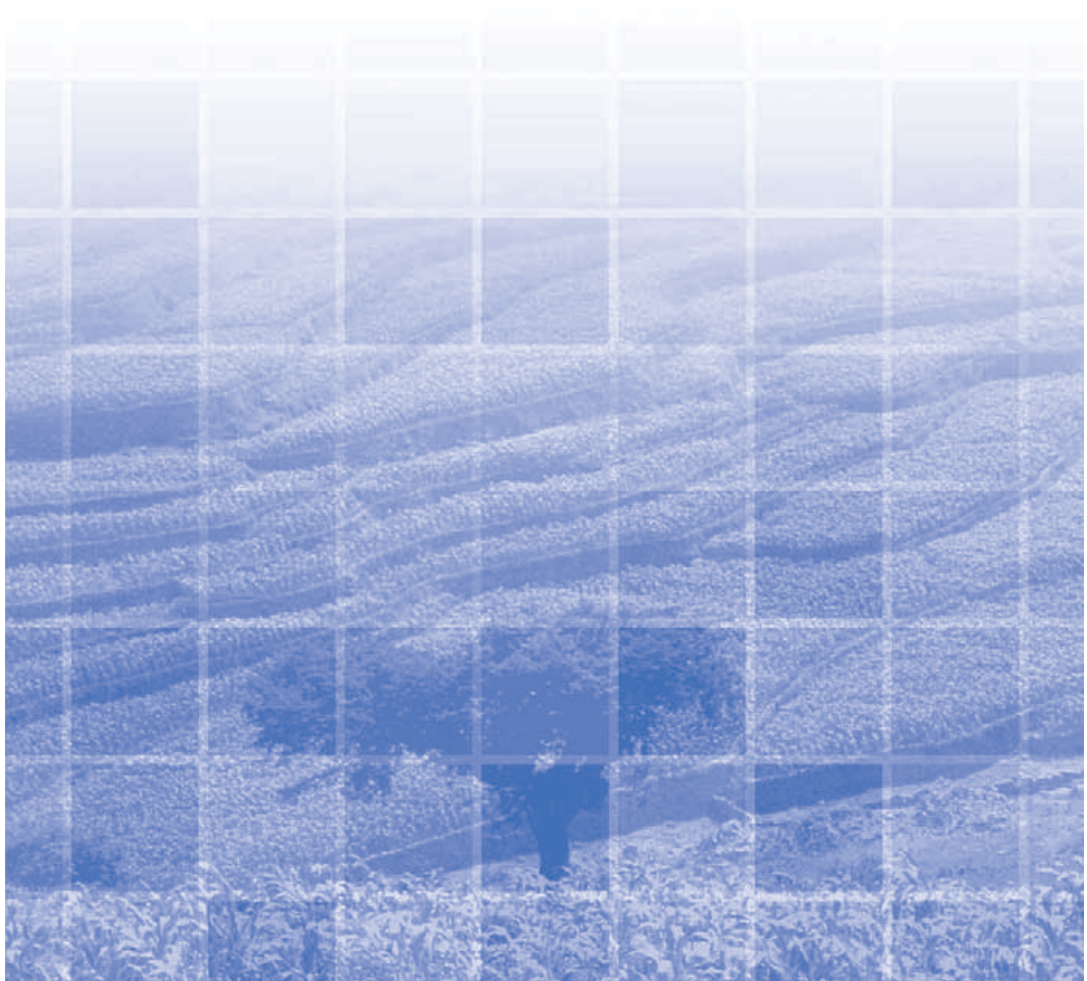
It is not necessary to carry out all training prior to project start-up. In some cases it is preferable to focus training initially only on the areas most critical in getting a process started. Such areas as strategic planning or inventory control can be left for a later date.

It is worthwhile remembering, when programming training activities, that some of the persons being trained will not be available later on, whether because of leaving their jobs, illness, or simply vacations. It is therefore strongly recommended that, where finances and scheduling permit, at least two – and preferably three - persons be sent to each training activity that takes place outside of the actual project, to insure the availability of a second person.

As with the case of technical assistance, it is frequently possible to find grant funds to pay, or at least subsidize, the cost of training for the personnel of small scale investments. If the investment proposal is not linked to a support agency with this type of funds, it is worth contacting the Ministries of Agriculture, Rural Development or Economy, in addition to the NGOs active in matters of rural business development, to see if there are grants or other sources of funds available.

Chapter IX

FINANCIAL ANALYSIS AND THE PREPARATION OF RECOMMENDATIONS



IX FINANCIAL ANALYSIS AND THE PREPARATION OF RECOMMENDATIONS

Financial analysis applies mainly to projects designed to generate income. It is possible to analyse social projects, environmental undertakings or production support activity, by calculating and assigning artificial prices, but such 'economic analysis' is generally far too complex for small or medium scale projects [13].

For income generating projects, the profitability of the activity is the first and most important factor determining sustainability, because no 'comercial' project will survive which does not generate enough income to cover operating expenses and pay financial costs. However, there is more than one way to determine the profitability of an investment. Each approach has its strengths and weaknesses. It is therefore convenient to use more than one method.

It is also important to understand that the figures generated through financial analysis are not very useful on their own; they need to be interpreted. It is the responsibility of the technician who carries out the formulation and evaluation process for the project to explain to the applicants, as well as to the committee reviewing the application for financing, the significance of the results, as well as to combine the profitability calculations with other indicators of likely success and sustainability, such as the capability and commitment of the applicants, the reliability of the market, the complexity of the technology, the environmental impact and the degree of organization of the management.

A. Measurements of the Investment's Feasibility

Once all of the costs and incomes have been determined for the analysis period (whether 8, 12 or 20 years), the following questions should be asked: What measurements will be used to determine the feasibility of the investment, in financial terms? How can we interpret these results?

There are two distinct measurements used in the RuralInvest models for this purpose, each having its advantages and disadvantages. Together they provide a comprehensive vision of the proposed project's feasibility.

1. Annual Cash Flow

The annual cash flow largely avoids the problem of comparing costs in one year with benefits in another year by evaluating costs and incomes each year, using only cash costs and incomes. The cost of the investment enters into this analysis through the payment of the loan taken out to finance it.

The annual cash flow is calculated by adding all cash income from each year and subtracting all cash costs for the same year; the result is the net yearly income. Then subtract the cost of financing (capital and interest) from this result. If the remaining amount is still positive, then the project will generate sufficient income during that year to cover all production costs, as well as the costs of credit, and still leave some amount of profit (the remaining amount).

The annual cash flow is the measure of greatest interest to the potential lender (bank, project, cooperative etc.), as it shows whether the project will be able to generate enough cash to pay all costs and still meet the financing costs. It is also typically the measure most easily understood by the applicants themselves, although they should understand that by taking only cash, this approach can miss out important costs and benefits that are not in cash terms.

2. Financial Profitability

The cash flow measurement represents only a snap-shot of the cash position each year; it does not offer an overall evaluation of the project. It is therefore not very useful for comparing different projects, or for assessing a project against some form of benchmark. If a government, a development project or even the applicant himself or herself wishes to choose the most productive use for available funds, they will need a different measurement This requires an evaluation of the financial profitability of the project.

A financial analysis takes the results of all of the years under study and presents them in terms of a single figure. However, to achieve this objective, the methodology must take the decreasing value of money and the general benefits that occur with the passage of time into account. How should this analysis be carried out?

We will use the following as an example: If a person were offered the opportunity to invest in a project in which the expense is US$1,000 today, but which generates an income of US$2,000 tomorrow, there are few who would hesitate (assuming faith in the honesty of the project managers). However, if the offer instead is an

13 The prices calculated under economic analysis not only provide values for those inputs and products that have no market prices, but also frequently adjust market prices which do not adequately reflect the true value of the good or service (due, for example, to taxes, protective measures, or minimum wage levels).

investment of US$1,000 to earn US$1,001 in 5 years, there would be no takers. The question, therefore, is to decide: What rate of return will make it worth while to invest in a project? In other words, what rate of return represents a favourable investment and good use of the available resources?

There are two main measurements that attempt to respond to this question: Net Present Value (NPV) and Internal Rate of Return (IRR). Both have several key elements in common:

- They charge the total cost of the investment in the year in which it takes place, so that the financing method and cost do not affect the result of the analysis. Remember, **the purpose of the analysis is to identify a good project, not to select the best financing option**.
- They both include the value of the main project assets at the end of the analysis period (such as buildings, machinery and other substantial items). These are not in cash, of course, and so are excluded from the annual cash flow analysis, but they are of value and should not be forgotten.
- They both place a value on self supply (e.g. unpaid family labour) and auto-consumption (outputs used or consumed but not paid for in cash).
- They adjust the value of future benefits in such a way that a US$1 today is worth more than a US$1 in one year, which in turn, will be worth more than a US$1 in two years, etc. This process is called discounting the future benefits in comparison to benefits today.

a) Net Present Value

The simplest measurement is Net Present Value (NPV). After calculating the net annual income for each year (as in the annual cash flow, but with the differences noted above), a discount rate is applied to reduce the value of both net benefits and losses in future years. Remember that a discount rate is the opposite of an interest rate. If I have $1, an interest rate of 10% will give me $1.10 in one year. By the same token, a discount rate of 10% will mean that $1.10 received a year from now is worth only $1 today (its present value). So, the NPV is a figure that represents the value of the project after discounting the net future benefits.

If for example I require an 8% interest rate on my money, then applying an 8% discount rate to the

NPV CALCULATION (Discount rate = 8%)	YEAR						
	0	1	2	3	4	5	6
Net income generated by project in Year 6:							50
Year 6 net income discounted to Year 5:						46.30	
Net income generated by project in Year 5:						+50	
Total net income in 5th year						96	
Year 5 net income discounted to Year 4:					89.16		
Net income generated by project in Year 4:					+50		
Total net income in 4th year					139.16		
Year 4 net income discounted to Year 3:				128.85			
Net income generated by project in Year 3:				+50			
Total net income in 3th year				178.85			
Year 3 net income discounted to Year 2:			165.61				
Net income generated by project in Year 2:			+50				
Total net income in 2nd year			215.61				
Year 2 net income discounted to Year 1:		199.64					
Net income generated by project in Year 1:		+50					
Total net income in 1st year		249.64					
Total Earnings		249.64					
Initial Investment		250.00					
Net Present Value:	-0.34	-0.36					

future net benefits of a project will ensure that I get that return. If the amount left (the NPV) is 0, the project is generating exactly the 8% required. If the NPV is positive, I have obtained my required rate (the 8%) and have that sum as a bonus. When the NPV is negative, it means that the investment cannot yield the expected 8%; it would have to earn (after discounting) an additional amount equivalent to the NPV amount to reach break-even.

For example, let us imagine that a project in which an investment of $250 results in six years of benefits of $50 each year, or a total of $300 (see previous page). It would appear that there is a profit of $50. But this is true only if you do not take the time-value of money into account. If instead you apply an 8% discount rate you can see that, in reality, the project is not very attractive. The NPV of the $250 investment is -$0.34. That is to say, if you require an investment to yield an 8% interest rate, it fails to meet this goal by an amount of $0.34.

Clearly, the critical aspect of the calculation of NPV is the selection of the discount rate (or interest rate). A high rate will result in the rejection of more projects and will favour those projects that generate their earnings in the first years. A low discount rate will normally result in acceptance of more projects and will give more weight to the benefits generated in the more distant future.

But, how do you choose the discount rate? The most correct definition, as stated by the World Bank, is that it is the rate equal to the increase in the Gross Domestic Product (GDP) resulting from the investment of one additional dollar in a given country. So if a dollar causes an increase of US$1.07 in the GDP of the country in which you live, the discount rate should be 7% - because then your investment will be equal to or better than the average for the economy as a whole. Such a definition, however, is easier said than measured, because there is no easy way of making the necessary calculation.

For practical purposes, it is better to say that the discount rate is the rate of annual net earnings (excluding inflation) that is required for an investment to be worth the effort. However, this rate will not remain the same for all investors or all investments. It will depend greatly on the alternatives that are available and, even more, on the risks that the project faces. An investor in a big solid bank would probably require a lower discount rate on future earnings than someone putting money into a petroleum exploration company, where rewards can be high but bankruptcy is always a possibility.

It has become customary in many cases to use 8%, but any figure between 6% and 12% would be acceptable. However, remember that investments with high levels of risk need a higher rate of return, and that if few other uses can be identified for the available funds, it might be acceptable to lower the rate.

b) Internal Rate of Return

The Internal Rate of Return (IRR)[14] uses a methodology very similar to that of the NPV. The key difference is that, in using the IRR, one is asking what discount rate (or interest rate) will this investment support? If the IRR is 15%, that means that the initial investment will yield an interest rate of 15% over the life of the project.

Calculating the IRR is tricky, as one must first guess at the IRR, then run the NPV calculation and see if the resulting NPV is positive or negative. The estimated IRR is then adjusted (up if the NPV is positive, down if it is negative) and the calculation repeated again. This goes on until the NPV reaches exactly zero. This then is the IRR.

Making these calculations used to be a most tedious procedure, but nowadays the computer has made it easy, doing in a second what the analyst might have taken many minutes to do a few years ago.

B. The Impact of Taxes

The RuralInvest methodology places little emphasis on the calculation of taxes, especially on those related to income. Although these taxes may prove important in well established and successful projects (for example, in the case of an agro-industrial plant), they are irrelevant for the determination of the feasibility of small investments. The problem that these projects face is more one of survival than estimating taxes on earnings.

When dealing with other types of taxes (for example, property taxes) the RuralInvest methodology considers them simply as other indirect or general costs and they should be included in the tables for these costs.

C. Preparation of Recommendations

A blind faith in the results of a financial analysis, as a guide to the approval of an investment proposal, is dangerous for the following reasons:

a) A computer can only process the data that is fed into it. Therefore the quality of the calculation generated by the formats depends, to a large extent, on the quality of

14 Also called the Internal Financial Rate of Return, IFRR, to distinguish it from the Internal Economic Rate of Return, IERR

the information provided by the applicants and their support technicians. In the real world, very little information is 100% reliable. Estimations of prices, costs, volumes and duration can be wrong, in spite of the best efforts of the persons involved. So it is important to remember that a financial analysis represents the results ***under the assumptions made by those who supplied the information***.

b) A project that is profitable may be successful, but is in no way **guaranteed** to be a success. Even if the figures used for the calculation are reliable, a project can still fail. Among other factors, problems arising from poorly committed participants, an ineffective management, or unexpected price changes can destroy a profitable project. Therefore, it is vital that you consider all of the factors that may influence the success of the investment, and not only the financial profitability.

How can these risks be recognized and taken into account in presenting the results of the evaluation? First, it is crucial to take advantage of the considerable speed and power of the computer. Once the data have been entered it is very easy to test alternative possibilities without having to repeat all the earlier work. One can immediately see the impact of a change, sometimes by altering a single number. This is called "sensitivity analysis" and its purpose is to indicate how the results of the study will change with small changes in the assumption made.

For example, if a product has an average price of $10, what will happen if the price drops to only $8 If the profit disappears completely (or even becomes a loss), you know that the profitability of the investment depends very closely on the price of the good or service it produces and sells. The same procedure can also be used for a non-profit project. How would the running costs of a community health clinic be affected if the number of patients attending were lower than expected? If the community relies on a standard subsidy per patient from the Ministry of Health, then lower than expected patient numbers might mean the clinic can not meet its overhead costs (nurse, lighting, repairs etc.) and has to close down.

To make a sensitivity analysis, the technician must:

a) Identify those elements of the project for which: (i) doubt exists as to the correct number to use (e.g. should the price be 6, 8 or 10), and (ii) which are expected to be of importance to the project (there might be doubt over the price of paperclips, but it would probably not be worthwhile testing the impact of this change on project performance). Commonly, such elements include: prices of outputs, number of anticipated users, cost of inputs; production volumes, the efficiency of the production process (i.e. how much input is needed to produce 1 kg. of output), the time needed to start-up or yield (in the case, for example, of tree crops) and once production is underway, the time needed to reach the full production level.

b) Determine a likely range of possibilities for each factor. For example, for a price analysis, one might say that, although the average price is $10, the possible range is from $7 to $12.

c) Insert new figures into the RuralInvest computer tables and note the results. The best way of presenting the results is to organize the figures into a chart, demonstrating the profitability of the investment for each factor (price, cost, etc.) with average, pessimistic and optimistic assumptions, but this is not essential.

d) In the transmittal letter that must accompany the detailed analysis, the analyst should identify those factors for which the project is most sensitive and indicate how variations in these factors might change the profitability of the investment, for example:

"Although the proposal to install an irrigation system looks quite profitable, it must be noted that it is very sensitive to variations in the yields of the vegetables grown. If, instead of 12 metric tons per hectare (mt/ha), only 10 mt/ha are obtained, the project becomes marginal. If the yield drops further to 9 mt/ha or less, the investment ceases to be profitable."

e) When a proposal shows high sensitivity to changes in key factors, the technician's report should consider the probability of these variations occurring, for example:

"However, the applicants have extensive experience in growing vegetables and already obtain yields in excess of 12 mt/ha in the few areas where there is now access to water during the summer. The risk of lower than expected yields is not therefore considered to be very high".

The steps described above insure that the people considering the financing proposals have the information that they need to make an informed decision.

With respect to the relative importance of financial and other factors in project success, it is the responsibility of the technician in charge of

formulation and evaluation to carefully consider and identify any other aspect of the proposal that could influence in its feasibility, and not rely solely on the financial analysis. The transmittal letter for the proposal should make reference to the ability of the applicants to manage and administer the investment, to the sustainability of the project, in terms of environmental impact and the utilization of resources and the risks that the investment might encounter.

Remember, you are doing no one a favour by recommending an investment that does not have a good possibility of success. Where the project is financed with credit, a failure can leave a group or community in debt, with no possibility of paying it off (probably restricting its access to financing in the future). Even in the case of a project that only uses donated funds, you must remember that every failure means that there was another good project that was unable to obtain the resources it needed for success.

Investing in an Existing Activity – the Importance of Incremental Costs and Revenues

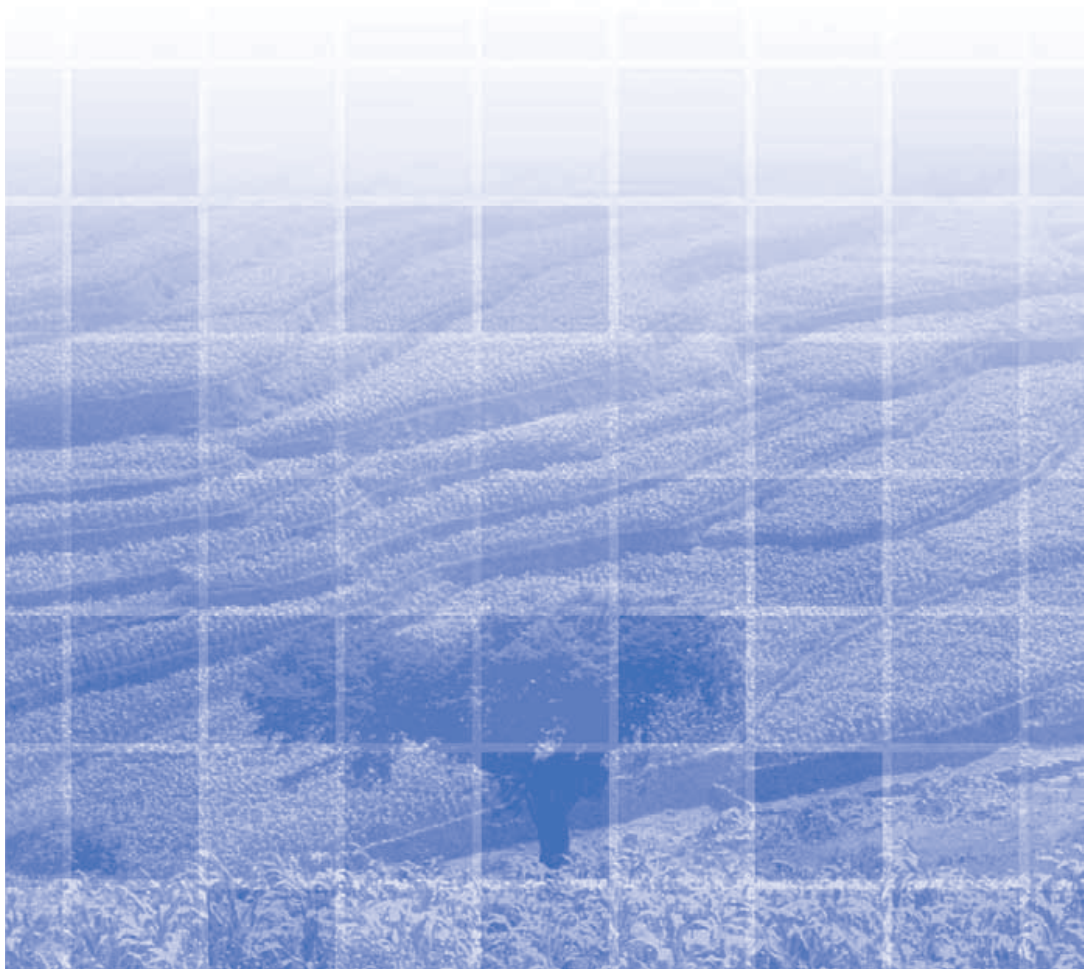
The procedures explained in this chapter largely assume that the proposed investment is completely new, and thus all costs and income will be directly attributable to the project. This is certainly the simplest case. But what if the investment is applied to an earlier, existing activity where there are already costs and revenues? How can the impact of the new investment be properly reflected in the financial analysis? The answer is that, where the proposed investment will give rise to changes in an existing activity, it is necessary to look at costs and revenues both with and without the new project.

Take, for example, the case of a group currently growing melons on a 3 hectare field. They wish to install a pump which will bring water from a nearby stream during the dry season to provide supplemental irrigation. Clearly the cost of purchasing and operating the pump are new costs, but what about the actual production? As more water is available, it may be worthwhile adding more fertilizer and other nutrients, to allow the melon plants to make full use of the new supply. Currently, the group is applying 2.5 bags of fertilizer per hectare, but the group decides to increase this to 3.5 bags if water is available. The incremental fertilizer usage would thus be 1 bag/ha, and the incremental cost would be the price of 3 additional bags (for 3 hectares). Equally, yields are currently 5 tons/ha, but the group is confident that this can be increased to 8 tons/ha with irrigation. Incremental revenue is thus 3 tons per hectare, or 9 tons in total, times the price per ton received for the melons. Other incremental costs incurred by the new project may arise from changes in the amount of seed sown, the increased number of melons to be harvested, and the increased number of bags or boxes needed for packaging.

Remember, if you apply all costs and income anticipated after the new investment, you may well come up with the wrong answer as to the profitability of the additional investment. In the case above, it is important to compare only the incremental costs (the pump and additional fertilizer etc.) with the incremental output of 9 tons of melons. If fuel for the pump is expensive, or if the projected increase in yield is small, it is not impossible that the group would be better of without irrigation, but they can not know unless they use **incremental** costs and revenues.

Chapter X

PREPARATION FOR THE INVESTMENT AND BEYOND



X PREPARATION FOR THE INVESTMENT AND BEYOND

It would be very unfortunate if the support given to a community, group or individual applicant were to end with the presentation of the investment proposal to the financing agency. Although this may have seemed to be the final goal while formulation was underway, in reality it is just the beginning.

Between the formulation of an investment proposal and the actual launching of the project, lie many tasks that are extremely difficult for persons who have no experience in negotiating with bankers, lawyers and government officials, (either municipal or from the central government, as is the case when applying for health permits). Even when these obstacles have all been surpassed, there is still the enormous challenge of making the investment function smoothly. If the group encounters a problem after a few months of operation, where does it go for help?

A. The Importance of Support and Follow-Up

In order to achieve a successfully functioning project, it is vital that the small investors have a reliable and accessible source of support and follow-up during the preparation and start-up period. The best person to provide this support is, without doubt, the same person that helped the group identify and formulate the proposal. If for some reason it is impossible for the field technician to continue with the group, he or she may be replaced by someone else, but some support should always be made available during this critical period. If it is not provided, the entire effort is at risk, because there is a good possibility that the project will never get underway as it was conceived.

Among the most important tasks to be taken care of during this period, are the following.

(a) Helping the applicants to reaffirm their commitment to the project and their participation (especially in the case of community-based projects);

(b) Accompanying the applicants in financial negotiations, the acquisition of legal permits, etc.;

(c) Support in preparing the start-up plan;

(d) Procurement or contracting of goods and services needed in the investment and their installation and supervision;

(e) Follow-up in the execution process.

Below, each of these tasks is described in detail.

B. Reaffirmation of the Commitment of the Applicants

To ensure the applicants' full commitment to the final project, it is first of all necessary to have their active participation throughout the process, starting with identification. As the final design emerges from the formulation process, it is important to verify that the group is both capable and willing to provide its contribution as stipulated in the final design, as and when needed, be it in cash, labour or in the supply of materials. To evaluate this capacity and availability, the technician, working with the applicants, should conduct at least one meeting before presenting the final proposal to the financial agency, to explain it to the applicants and to insure that the final product reflects their intentions and interests.

He or she should conduct an additional meeting, once the formulation and evaluation process is concluded, organized by the members of the applicant group, at his request. One condition that the group must fulfil is attendance and the personal involvement of all adult members (men, and women of the participating families) in the meetings. As a result, they should develop an outline of the plan of execution, which specifies:

- Necessary activities, deadlines and persons responsible for their performance.
- Financial and material contributions by members of the group.

C. Accompanying the Applicants in Financial Negotiations and Seeking Legal Permits.

The field technician, with the approval of the applicant group, should make contact with the financial institutions that collaborate in the process of investment. This could involve periodic consultations with the financing agency on the progress of the proposals in formulation, or may require only a single presentation upon completion of the detailed proposal. However, once the formulation and evaluation phase is completed, the technician is responsible for advising the applicants as to any specific

administrative requisites of the financial agency. This might include, for example, attaching a variety of legal documents relating to the applicants to the investment proposal.

The financing agency may also require the applicants, or at least their selected representatives, to attend a formal meeting for the review of their application, and they should be supported at this meeting by the technician. He or she may also help by gathering information on legal aspects, or assisting them in filling out mandatory forms.

It is possible that the group may need guidance on selecting between alternative financial options.

D. Support in Preparing a Start-up Plan

Whether during the detailed formulation and evaluation phase, or during the resource procurement stage, the field technician, should assist a working group, chosen by the applicant group itself, to prepare a plan for the implementation of the project, based on the investment proposal. This plan must contain:

- Overall guidelines as to the timing and objectives of the implementation process;
- A listing of the specific activities needed and their schedule of implementation;
- The identification of the persons responsible within the applicant group for these activities;
- Any organizations or institutions which have promised to provide technical support in different activities;
- The exact financial and material contributions to be made by members of the group for the different activities, and the timing of these contributions;
- Indicators for monitoring of the implementation process, including book-keeping and measuring physical quantities (where relevant).

It is essential that the groups be provided with adequate training on the administration of funds. Among other tasks, the field technician might advise them on aspects of accounting and general administration. Alternatively, he or she might act as an intermediary in obtaining such assistance from another advisor.

Once the project is underway, the technician will normally only make periodic visits to follow up on the progress of the investment. In particular, it is important to try and identify problems before they cause serious difficulties and help the project members to obtain appropriate advice on how to deal with these problems. In this regard, it is recommended that the agency sponsoring the investment process, keep a register of specialist advisors from governmental and non-governmental institutions to which projects with problems can turn.

Such a register of approved advisors can serve as a powerful tool, by laying down specific requirements for those who wish to offer their services. Those wishing to be listed in the register can be required, for example, to participate in RuralInvest training, and those who perform poorly can be removed from the register (this latter procedure makes it necessary for the work of each advisor to be evaluated by project members). However, the significance of the register can be even more important; having a list of approved experts will allow the sponsoring agency to leave in the hands of the applicant group the selection of the person they want, and thereby, strengthen their participation in the process.

E. Purchase and Contracting of Goods and Services

The financial agency will probably have requirements and standards for the procurement of goods and services, for example, demanding three quotes and a transparent selection process. Even if such established procedures are missing, it is important that the applicants follow a clear process of identifying, evaluating and selecting vendors and service providers. Furthermore, there must be norms for the monitoring and control of the activities carried out by the contractors, including procedures for materials control, register of advances and certification of the time dedicated to the job by the contractor and his team.

F. Follow-Up to the Implementation Process

Each agency or financing project should have its own methodology for the process of follow-up on the implementation of the investment. The important aspect is that it have a methodology. Investments that are begun without some form of follow-up will be more likely to fail, in comparison with those that receive support and advice.

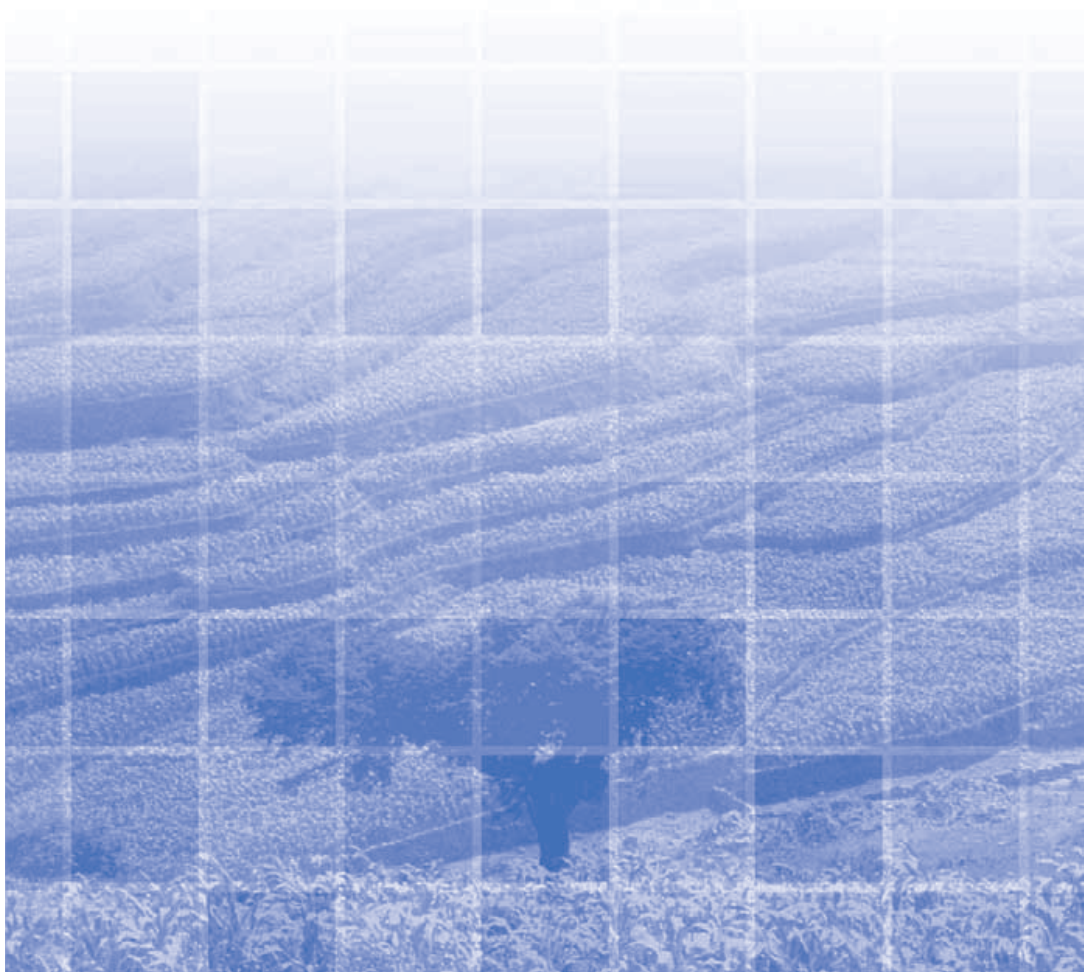
In many cases, project participants will need training in accounting and in the local laws, in matters concerned with taxes, health permits, and social benefits for employees, among other things.

Frequently, project managers will need training in planning, marketing and similar subjects. If the project involves the management of production processes, it is possible that there will be technical problems during the first year of operations.

There are two general models for handling this type of support. The first is to continue with the field technician or community promoter, playing the role of "family doctor"; this means that the technician visits the community or investment every month or six weeks and keeps an eye on the progress of the work. If a problem comes up, it is the responsibility of the technician to request the approval of the financial agency or the sponsor, to use specialized consulting and to select, or to help the investors to choose, the right person for the work required.

The second model, is to contract a local consulting firm, NGO or other group to take on the total responsibility for supporting the project members during a period of one or two years. With a set amount of resources available, the advisors arrange for all of the support the group needs. On a more sophisticated level, it should be possible to relate the remuneration received by the advisors to the success of the investment, although, in practice, this arrangement is not that easy.

ANNEXES



Appendix 1a: Environmental Categorisation of Projects

The following is an indicative list of investment types that could be included within the four environmental impact categories described in Chapter 5.

It must be noted that the list is only a guide for assessing each project, without loosing sight of its characteristics and merits. It is recommended that, before starting RuralInvest use, environmental expert advice is sought on how to apply these categories in the project area. It is also strongly recommended that a program of training and technical assistance in environmental assessment be designed and implemented, to improve the understanding of field technicians on the meaning of these categories. This would enable the technicians themselves to propose modifications in the classification to ensure the inclusion of local productive systems and hence the incorporation of appropriate environmental mitigation measures into project design.

For Category A:

Projects in which no or negligible adverse effects on the environment are foreseen and which, consequently, require no environmental mitigation measures.

- Soil conservation activities, for the purpose of improving farmland productivity, hence avoiding the conversion of forests into cropland/pasture;
- Controlled experimentation (agricultural/ pastoral/forestry) for research purposes and demonstration in small parcels, except in highly sensitive areas[1];
- Small-scale organic agriculture[2];
- Cultivation of permanent crops under the forest canopy that does not involve pesticide use;
- Sustainable harvesting[3] of non-wood forest products[4];
- Construction of rural warehouses, if limited to small collection centres for the storage of grains or other agricultural products, community stores and structures for harvest drying;
- Initiatives for integrated micro-watershed management;
- Small-scale initiatives on the conservation and sustainable use of biodiversity.

For Category B:

Projects with possible low adverse environmental impacts, which can readily be mitigated. In this case, a detailed identification of the possible environmental impacts has to be made and mitigation measures incorporated in project design (see section D of chapter 5).

- Small or medium-scale agricultural and/or pastoral activities in areas with no or little constraints of slope (e.g. cultivated soils on slopes not greater than 6%)[5], rockiness, drainage, effective depth, water availability and/or soil fertility;
- Agroforestry associated with annual crops[6] in areas with little constraints of slope (e.g. cultivated soils on slopes not greater than 6%), rockiness, drainage, effective depth, water availability and/or soil fertility;
- Agroforestry associated with perennial crops in areas with moderate constraints of slope (degree of slope less than 10%), rockiness, drainage, effective depth, water availability and/or soil fertility;
- Construction or rehabilitation of small-scale irrigation infrastructure for areas up to e.g. 50 hectares;
- Pasture management on natural pastures;

1 Highly sensitive area refers to ecologically sensitive sites such as areas with steep slopes (more than 10 degrees), riparian vegetation, vegetation around springs, critical habitats for local species, etc.

2 However, in the case of organic coffee, category A is only applicable when the producers do not use wet coffee processing methods, which can cause river and stream pollution.

3 Sustainable harvesting refers to the extraction of plants and other resources from forests which does not affect the availability of these resources in the long term and does not damage the ecological integrity of the forest.

4 Non-wood forest products (NWFP) include products used as or with food (e.g. fruits, mushrooms, nuts, herbs, spices, cacao, honey, and animals hunted for meat), fibres (such as rattans), rubber, resins, gums, and plant or animal products used for medicinal, cosmetic or cultural purposes. They can be gathered from the wild, or produced in forest plantations, agroforestry schemes and trees outside forests. NWFP are vital to the daily subsistence of forest-dependent communities, and contribute to the subsistence and local commercial economy in other rural communities. Some NWFP are also commercialised in a larger scale (e.g. cork).

5 Source: Jain, Urban, Stacey, Balbach: Environmental Assessment. MacGraw-Hill, 1993, p.90/373.

6 Systems of permanent plantings associated with trees (isolated into blocks or plantations, whether these be fruit species or others for the purpose of lumber and other forestry products).

- Community forestry;
- Rehabilitation planting (with native species) in areas that have been deforested;
- Eco-tourism;
- Construction or rehabilitation of minor rural roads and bridges (within farms) which do not cross ecologically sensitive areas[7];
- Establishment or improvement of small-scale agro-industries (e.g. processing of milk products with an average daily consumption of less than 100 lt. of milk, meat processing with an average daily output of less than 50 kg of meat, wet coffee processing with less than 1,500 cwt. of coffee berries per week);
- Small-scale artisan workshops, including small clothing and textile workshops (e.g. silk screen printing done by hand);
- Establishment or improvement of small-scale aquaculture activities (e.g. total area of ponds less than 0.5 hectare);
- Construction or improvement of small-scale water supply and sanitation infrastructure (less than 100 persons)[8];
- Construction or rehabilitation of small schools or health centres (if not located in ecologically sensitive areas).

For Category C:

Projects with possible moderate or significant adverse environmental impacts, but where mitigation is possible. These projects require an environmental assessment, undertaken by an environmental specialist, and detailed mitigation measure proposals have to be incorporated in the project design. Commissioning of specialised environmental studies on critical aspects, or a full Environmental Impact Assessment (EIA) may be necessary.

- Controlled and regulated exploitation of timber and other wood products of a forest[9];
- Small/medium-scale agricultural and/or livestock activities in areas with strong (but not severe) constraints of slope (degree less than 10%), rockiness, drainage, effective depth, water availability and/or soil fertility;
- Agroforestry involving with annual crop-tree systems in areas with strong (but not severe) constraints of slope (degree less than 10%), rockiness, drainage, effective depth, water availability and/or soil fertility;
- Construction or rehabilitation of medium-scale irrigation infrastructure for areas of more than 50 hectares;
- Purchase and use of pesticides, other than those listed in Table 1, or project activities that are likely to increase pesticide use (e.g. construction of irrigation schemes, establishment of orchards, etc.) (see also category D);
- Construction or rehabilitation of small rural roads and bridges which do not cross ecologically sensitive areas[10];
- Establishment or improvement of medium-scale agro-industries (e.g. processing of milk products with an average daily consumption of more than 100 lt. of milk, meat processing with an average daily output of more than 50 kg of meat, wet coffee processing activities with more than 1.500 cwt. of coffee berries per week, palm oil mills, wool scouring);
- Medium-scale textile industry (e.g. silk screen printing done by machine in less than 100 m^2 / day);
- Small-scale artisan workshops involving fibre dying and tanning;
- Saw-mills and processing plants for forestry products;
- Establishment or improvement of medium-scale aquaculture activities (total area of ponds more than 0.5 hectare);
- Construction or improvement of water supply and sanitation systems (e.g. for more than 100 persons);
- Establishment or improvement of solid waste collection and disposal structures;
- Initiatives in the buffer zones/multiple usage zones of protected areas;
- Initiatives that might affect endangered species (e.g. introduction of exotic species) or negatively affect their habitat (tropical forests, mangrove swamps and other wetlands, etc.).

7 Highly sensitive area refers to ecologically sensitive sites such as areas with steep slopes (degree more than 10%), riparian vegetation, vegetation around springs, critical habitats for local species, etc.

8 Source: World Bank Environmental Guidelines for Social Funds; D. Graham et. al, 1998).

9 These activities may be counterproductive unless they have an adequate Management Plan, approved by an environmentally competent institution.

10 Highly sensitive area refers to ecologically sensitive sites such as areas with steep slopes (degree more than 10%), riparian vegetation, vegetation around springs, critical habitats for local species, etc.

For Category D:

Projects with potentially significant adverse environmental effects, for which there are no effective mitigation measures, or projects which are incompatible with the sustainable development policies of the country or of international development agencies. In this case, the project has to be completely reformulated or excluded from financing.

- Agricultural activities that involve deforestation and/or conversion of forested areas into farm and/or pasture land (whether they be deforestation of primary forests[11], deforestation of natural or artificial forests established for protection purposes (including the protection of riverbanks and slopes), or cutting of trees around ponds, springs or artesian wells, puddles and natural or artificial lagoons, archaeological sites, etc.);
- Forestry activities that involve deforestation or exploitation of wood products from natural forests, except when these are consistent with the Forest Management Plan approved by the competent forestry or environmental institution;
- Colonisation in primary forests;
- Exploitation of trees from mangrove swamps;
- Construction, improvement and maintenance of roads that pass through unexploited natural forests;
- Any activity in strictly protected areas such as nature reserves, national parks, and core zones or rehabilitation zones of protected areas;
- Initiatives that might significantly affect endangered species or negatively affect their habitat;
- Changes to less sustainable agricultural systems such as the transformation of shade- covered coffee plantations into unshaded plantations;
- Agricultural activities involving the planting of annual crops in areas with severe constraints (steep slopes (more than 10 degrees) etc.);
- Purchase and use of pesticides classified by the World Health Organization as Extremely Dangerous (Class Ia) and Highly Dangerous (Class Ib), see Table 1;
- Purchase and use of pesticides classified by the World Health Organization as Moderately Dangerous (Class II) if (i) the country lacks restrictions on their distribution and use, or (ii) they are likely to be used by, or accessible to, lay personnel, farmers, or others without training, equipment, and facilities to handle, store, and apply these products properly;
- Purchase and use of pesticides over large areas.

11 Natural forests in pristine conditions, undisturbed by humans.

Table 1. Pesticides classified by the World Health Organization as Extremely Dangerous (Class Ia) and Highly Dangerous (Class Ib)

The users of this table should note that the actual hazard classification of a formulated pesticide product available on the market depends on a number of factors, including the toxicity of the active ingredient, its concentration, and the physical state of the product (liquid or solid). The actual classification of the formulated product should be provided on the label. In many - but not all! - cases, it will be the same as the classification of the active ingredient. The table below provides an initial indication of the hazard classification of active ingredients ("common name") and formulated products ("trade names and trademarks").

The list of trade names and trademarks are commonly available products. Particularly in developing countries, there may be other trade names that are not on this list. The list should therefore not be considered as exhaustive but rather as a list of examples.

It should also be noted that, in addition to the extremely and highly dangerous pesticides listed in this table, World Health Organization classifies moderately hazardous pesticide formulations in Class II. Even if less hazardous than Class I products, use of Class II pesticides still requires a high degree of precautions and may cause lethal or otherwise severe poisoning if used improperly. Preconditions for the use of Class II pesticides include: (i) adequate and enforced legal restrictions on their distribution and use; (ii) safeguards to prevent the use of, and access to, these pesticides by lay personnel, farmers, or others without appropriate training, equipment and facilities to store and apply them properly; and (iii) user adherence to precautionary methods proven effective under field conditions in developing countries.

The final column of the table includes some of the most common trade names and trademarks used by basic producers and formulators of pesticides. It is based on information contained in the MeisterPro Version of the Farm Chemicals Handbook (Electronic Pesticide Dictionary), edition 2001.

CLASS 1a		
Common name	**name***	**Trade name or trademark**
aldicarb	I-S	Aldicarbe, Temik, Sanacarb
brodifacoum	R	Brobait, Forwarat, Havoc, Micedie, Mr. Morton, Nofar, Sorexa, etc.
bromadiolone	R	Acilone, Atila Pellets, Bromalone, Killrat, Lafar, Obamice, etc.
bromethalin	R	Vengeance
calcium cyanide	FM	-
captafol	F	Santar, Foltaf
chlorethoxyfos	I	Fortress
chlormephos	I	Dotan, Sherman
chlorophacinone	R	Actosin, Lepit, Dicusat, Trokat Bait, Ramucide, Ratomet, Raviac, Topitox, etc.
difenacoum	R	Frunax-DS, Neosorexa, Sorexa
difethialone	R	-
diphacinone	R	Diphacin, Promar, Ramik, Tomcat, etc.
disulfoton	I	Ekatin, Disyston, Bay 19639, Disultex, Disulfoton P10, etc.
EPN	I	-
ethoprophos	I-S	Mocap, Fertiprophos, Vimoca, Rifenfos
flocoumafen	R	Storm, Stratagem,Kukbo Coumafen
fonofos	I-S	Dytonato
hexachloro-benzene	FST	Bent-cure, Bent-no-more, No Bunt
mercuric chloride	F-S	-
mevinphos	I	Phosdrin, Duraphos, Mevidrin
parathion	I	Alkron, Ekatox, Folidol, Rhodiatox Paration Metilico, Chimac Par H, Pox Konz, Woprophos, Alleron, Aphamite, Corothion, Etilon, Orthophos, Panthion, Paramar, Phoskil, Soprathion, Stathion, Fighter, etc.
parathion-methyl	I	Cekumethion, Fulkil, Metacide, Bladan M, Folidol M, Metacide, Amithion, Agrodol, Paration Metilico, Agro-Parathion, Vitamethion, Penncap-M, Folidon, Devithion, Dhanudol, Dhanumar, Pox M20, Metpar-200, Fosforin'M, Bration, Methion, Kildot, Korthion, Parathol, Faast, Dipathio M, Vegfru Klofos, Probel MP-35, Proficol, Woprophos- M, Parasul, Gearphos, Metaphos, Partron M, Tekwaisa, etc.
phenylmercury acetate	FST	-
phorate	I	AC 3911, Granutox, Thimet, Agrophor, Frotox, Dhan, Chimifor, Pestophor, Chim, Tuskar, Phoril, Kurunai, etc.
phosphamidon	I	Dimecron, Phosron, C 570, Fosfamid, Alfamidon, Chemphos, Devimidon, Phos-All, Pradhan, Mitekron, Midon, Phos-Sul, etc
sodium fluoroacetate	R	-
sulfotep	I	Bladafum, Dithio, Thiotepp
tebupirimfos	I	-
terbufos	I-S	Plydax, Contrave, AC 92100, Turbolux, Contraven, Counter, Biosban, Pilarfox, Terborox, Tertin, Fortune-T1, etc.

* AC = acaridicide, FM = product for fumigation, F = fungicide, FST = fungicide for treatment of seeds, H = herbicide, I = insecticide, L = larvicide, MT = miticide, N = nematocide, O = other use for plant pathogens, R = rodenticide, S = applicable to the soil.

CLASS 1b		
Common name	**Use***	**Trade name or trademark**
acrolein	H	Aqualine Magnacide
allyl alcohol	H	-
azinphos-ethyl	I	Bay 16259, Gusathion, Sepizin L, Crysthion
azinphos-methyl	I	Azimil, Azinugec, Carfene, Metazintox, Sepizin M, Pancide, Gusathion, Guthion, Azinfosmetil, Agrothion, Chimithion P.B., Crysthyon, Cotnion'H, Azin, Azition, Mezyl, Probel G-20, etc.
blasticidin-S	F	Bas-S
butocarboxim	I	-
butoxycarboxim	I	Plant Pin, Co 859
cadusafos	N, I	Apache, Taredan, Rugby
calcium arsenate	I	Spra-cal, Turf-Cal
carbofuran	I	Carbodan, Carbosip, Yaltox, Rampart, Furacarb, Vitafuran, Curaterr, Diafuran, Chemfuron, Fertifuran, Furasun GR, Carbo-Tox, Carboter, Damira, Caribo, Curasol, Fury, Volfuran, Furadan, Woprofuran, Buraon, Furasul, Thodfuran, etc.
chlorfenvinphos	I	Birlane, Supona, Steladone
3-chloro-1, 2-propadeniol	R	-
coumaphos	AC,MT	Asuntol, Co-Ral, Penzin
coumatetralyl	R	Racumin, Kukbo Stunt
zeta-cypermethrin	I	-
demeton-S-methyl	I	Metasystox, DSM, Mifatox, Metaphor
dichlorvos	I	Aminatrix, Canogard, Dedevap, Mafu, Acivap, Agrona, Cazador, Agro-DDVP, Dichlorate, Vitavos, Ouo, Cekusan, Nuvachem, Devikol, Domar, Didivane, Foravap, Didifos, Hercon Vaportape II, Hilvos, Kilvos, Koruma DDVP, Stevie, Novos, Midiltipi DDVP, D.D.V. Paz, Vantaf, Woprylphos, Rupini, Dadasul, De De Vap, Tazusa, etc.
dicrotophos	I	Bidrin, Dicron, Ektafos
dinoterb	H	Herbogil
DNOC	I-S,H	Hercynol, Trifinox, Polartox, etc.
edifenphos	F	Blastoff, Hinosan, Bay 78418, Edisan, Vihino
ethiofencarb	I	Croneton
famphur	I	-
flucythrinate	I	Cybolt, Cythrin, Pay-Off, Fluent
fluoroacetamide	R	Rhodex, Fluorakil, Navron, Yanock
formetanate	AC	Carzon, Dicarzol
furathiocarb	I-S	Deltanet, Promet
heptenophos	I	Hoe 02982, Hostaquick, Ragadan
isazofos	I-S	Miral, Triumph, Victor
isofenphos	I	Bay 12869, Oftanol, Lighter
isoxathion	I	Karphos, E-48
lead arsenate	L	Gypsine, Soprabel, Afos
mecarbam	I	-
mercuric oxide	O	-
methamidophos	I	Tamaron, Monitor, Bay 71628, Tam, Sinator, Amiphos, General, Metamidofos, Agromon, Vitaphos, Nuratron, Sherman, Tamanox, Erkuron, Matón, Amidor, KASA, Metalux, Metaron, Metafós, Methamidopaz, Woprotam, Thodoron, Vetaron, etc.

CLASS 1b		
Common name	**Use***	**Trade name or trademark**
methidathion	I	Supracide, Supra, Supradate, Datimethion, Medacide, Bumerang, Ultracidin, etc.
methiocarb	I	Draza, Mesurol
methomyl	I	Flytec, Dupont 1179, Kipsin, Lannate, Aldebaran, Acinate, Metholate, Avance, Dumil, Dunet, Memilene L, Lanox, Fertiomyl, Matador, Dynamil, Lanomac, Lanomed, Methopaz, Metopron, Methylan, Agrinate, ect.
monocrotophos	I	Azodrin, Nuvacron, Susvin, Aminophos, Monoglen, Monocrotofos, Monacron, Aimocron, Monochem, Devimono, Monodhan, Crisodrin, Foradrin, Hukron, Atom, Agrodrin, Inisan, Kilphex, Hazodrex, Luxafos, Monofos, Azakron, Milphos, Agrophos, Cropaphos, Monolex Lucadrin, Croton, Woprotect, R C Pos, Monosul, Thodocron, Vacron, etc.
nicotine	I	Nico Soap
omethoate	I	Folimat, Modern, Le-mat
oxamyl oxydemeton-methyl	I	Blade, Vydate Aimcosystox, Anthonox, Metasystox R, Oxydemetchem, Dhanusystox, MSR2, Mesh
paris green	L	-
pentachlorophenol	I,F,H	Pentacon, Sinituho, Penchloral
pindone	R	-
pirimiphos-ethyl	I	Solgard, Primicid
propaphos	I	Kayaphos
propetamphos	I	Catalyst, Blotic, Safrotin, Seraphos
sodium arsenite	R	Arsenipron L, Prodalummol Double
sodium cyanide	R	Cyanogas A
strychnine	R	-
tefluthrin	I-S	Attack, Forca, Forza, Force, Komet
thallium sulfate	R	-
thiofanox	I-S	Decamox, Dacamox
thiometon	I	Ekatin, Bay 23129, Thiotox
triazophos	I	Hoe, Hostahion, Able, Fulstop, Triumph, Trelka, Trihero, Try, Sutathion, Perfect, Tries
vamidothion	I	Kilval, Trucidor
warfarin	R	Dicusat E, Luxarin, Ramorin 2, Woprodenticide, Warfotox, Cov-R-Tox, Rodex, Tox-Hid
zinc phosphide	R	Deviphos, Fastkill, Zinphos, Fokeba, Phosvin, etc.

* AC = acaridicide, FM = product for fumigation, F = fungicide, FST = fungicide for treatment of seeds, H = herbicide, I = insecticide, L = larvicide, MT = miticide, N = nematocide, O = other use for plant pathogens, R = rodenticide, -S = applicable to the soil.

Appendix 1b: Checklists for Environmental Assessment

TABLE 1 - Crop cultivation: Practices associated with environmental risks. Possible adverse impacts, mitigation measures and indicators for monitoring.

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Cultivation of annual crops using ploughing:		
Wind and water erosion due to ploughing; Water erosion due to slope; Loss of soil fertility.	Conservation Agriculture based on integrated practices such as zero tillage, minimum tillage, crop rotation and permanent soil cover (for more details, see FAO Conservation Agriculture website: http://www.fao.org/ag/ags/AGSE/Main.htm; Strip cropping or contour planting, by i) direct seedling, e.g. by planting cocoa mother trees' seeds in the furrows, or ii) contouring with grass (preferably native); Earth bunds, stone lines, contour terraces (using rocks, trunks, etc.); Protection of cultivated plots with fences, border grasses and windbreaks.	Change in the height of root pedestals; Accumulation of silt/sand at the foot of bushes, posts and fences, as well as in downstream water bodies; Depth of rills/gullies; Changes in yields and total production; Changes in the soil's water retention capacity; Data on sediment loads in streams and dams if available from a nearby hydrological station.
Cultivation of grain crops using hoe:		
Loss of soil fertility and proliferation of weeds due to shortened fallow periods; Water erosion due to slope.	Increased fallow periods; Use of compost and/or green manure (using legumes) in rotation with grain crops (e.g. velvet bean in rotation with corn improves corn yields, protects the soil from erosion and from evaporation, and prevents the growth of weeds; besides, harvest residue is excellent fodder); Inter-cropping with leguminous trees and or annual leguminous crops; Enriched fallow with leguminous crops.	Change in humus content of soil; Change in the height of root pedestals; Depth of rills/gullies; Changes in yields and total production; Data on sediment loads in streams if available from a nearby hydrological station; Appearance or disappearance of weeds.
Monocultures:		
Proliferation of pests; Soil and water contamination resulting from intensive pesticide use; Soil depletion; Water contamination resulting from intensive fertilizer use.	Crop diversification practices, inter-cropping, relay cropping; Crop rotation practices; Integrated Pest Management (IPM): see below; Cultivation of nitrogen fixing species (e.g. leguminous plants that fix nitrogen in the soil); Use of green manure.	Appearance or disappearance of pests; Pest management practices, including use levels of pesticides; Area of barren land; Change in the height of root pedestals; Depth of rills/gullies; Changes in yields; Sediment loads in streams if data available from a nearby hydrological station.

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Use of pesticides:		
Contamination of soil, surface and ground water; Appearance of and/or increase in intoxication cases among farm workers or rural populations; Appearance of and/or increase in cases of death by contamination in wild flora and fauna, including beneficial organisms such as earth worms, termites and pollinators; Pesticide residues on crops affecting public health and product marketing; Old pesticide stocks turning into toxic waste.	Integrated Pest Management (IPM) to reduce reliance on pesticides. IPM refers to the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms. Techniques that can be applied under an IPM approach include e.g.: crop rotation, crop diversification, selection of pest resistant crop varieties, biological control or other non-chemical techniques, selective pesticide use as a last resort control option. For more details, see IPM website http://www.fao.org/globalipmfacility/home.htm. Where pesticide use remains necessary: substitution of highly and moderately hazardous and broad-spectrum pesticides with less dangerous and more target specific products, and reducing the concentration and number of applications to a minimum; Knowledge and enforcement of pesticide legislation to eliminate products or applications that are not permitted and to ensure appropriate packaging and proper labeling; Product knowledge, use of adequate personal protection equipment during handling and application and correct use of appropriate application equipment; Proper storage of pesticides.	**Direct:** Uptake of IPM practices; Incidence of poisoning cases and pesticide related chronic health problems among farmers and workers using pesticides; Incidence of health problems due to consumption of produce or drinking water contaminated with pesticide residues. Water quality in drinking water wells and pesticide residues on food crops; Changes in populations of beneficial organisms, wildlife, and flora. **Indirect:** Training courses on the subject; People being trained on the subject; Requests for technical assistance on the subject; Sales of dangerous pesticides in the area; Total sales of pesticides in the area.
Use of chemical fertilizers:		
Deterioration in groundwater quality through infiltration as a result of inappropriate application; Excessive growth of algae and aquatic plants in water bodies due to upstream use of fertilizers, leading to oxygen depletion and eventually to fish kill.	Knowledge about the substances being used, correct storage and application; Reducing fertilizer use or substituting chemical fertilizers with manure or other organic fertilizers.	Water quality in drinking water wells (if measurements performed); Visible changes in aquatic plants in downstream water bodies; Number of farmers using organic fertilizers.

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Use of machinery:		
Soil compaction; Erosion and soil degradation.	Conservation Agriculture (see above).	Formation of barren soil; Change in the height of root pedestals; Accumulation of silt/sand at the foot of bushes, posts and fences, as well as in downstream water bodies; Depth of rills/gullies; Changes in yields; Sediment loads in streams if data available from a nearby hydrological station.
Burning of plant residues in the fields:		
Salinization of soil; Erosion.	Stop burning of residues and adopt the following: ▶ Mulching with crop residues; ▶ Use of plant residues to create humus; ▶ IPM to control pests and diseases (see above); ▶ Agricultural extension and applied research on the prevention of soil salinization.	Deaths or decreased productivity of plants and soil organisms due to salinity; Change in the height of root pedestals; Accumulation of silt/sand at the foot of bushes, posts and fences, as well as in downstream water bodies; Depth of rills/gullies; Changes in yields; Sediment loads in streams if data available from a nearby hydrological station.
Social impacts from land use changes:		
Competition between different users for land and water resources; e.g. crop farmers and livestock breeders over the use of water sources or most fertile lands.	Participatory land use planning at village level; Creation of water user associations and training of their management committees, etc.; Crop/livestock integration (use of crop residues as fodder, use of manure as fertilizer, etc.).	Number of land use plans prepared; Number of management committees in operation.
Impact of technology changes on women :		
The impact of new agricultural crops/practices/machinery on traditional division of labor between men and women; Elevated vulnerability of women to pesticide poisoning.	Participation of women in technology development and adaptation; Mainstreaming gender considerations in training and attention to gender balance in training; Access of women to agricultural extension services. IPM – see above.	Number of women participants to training courses; Changes in pesticide use by women and occurrence of pesticide poisoning symptoms.

TABLE 2 - Livestock husbandry: Practices associated with environmental risk. Possible adverse impacts, mitigation measures and indicators for monitoring.

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Impacts of overgrazing:		
Soil compaction, increase in surface run-off and erosion due to overgrazing and excessive trampling; Degradation of vegetation and reduction of most palatable species, in particular around water points.	Reduction of stocking density: ▶ Selective culling of animals in the herd; ▶ Pasture rotation, deferred grazing; ▶ Farm diversification (e.g. agro-tourism). Increasing carrying capacity: ▶ Pasture management and fertilization; ▶ Supplementary forage production; ▶ Supplementary feeding; ▶ Inclusion of forage shrubs and trees. Erosion control: ▶ Cover crops & direct seeding; ▶ Crop residue management & treatment; ▶ Avoid grazing fragile areas. Elaboration of drought survival strategies: ▶ Livestock markers; ▶ Temporal slaughter houses. For more details, see Livestock, Environment and Development website http://www.fao.org/lead/.	Area changes of degraded pastures; Size of "desertification circles" around water points; Change in the height of root pedestals; Accumulation of silt/sand at the foot of bushes, posts and fences; Depth of rills/gullies; Sediment loads in streams if data available from a nearby hydrological station; Animal population & density; Changes in weed incidence.
Lowering of water table due to increased extraction of groundwater through cattle wells; Groundwater contamination through cattle wells.	Strategic placement of water sources; Regulation of water use: control of waterpoint use, limitation of well capacity, closure of permanent water sources during the rain season, covering of wells, appropriate watering structures, well management committees, etc.	Changes in water table levels in wells; Water quality in drinking water wells (if measurements performed).
Deforestation for grassland establishment:		
Biodiversity loss; Change and loss of natural habitats.	Silvopastoral systems for conservation of biodiversity and carbon sequestration; Farm diversification.	Area changes in forested areas and grasslands.

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Use of pharmaceuticals and hormones (in commercial feed concentrates) and acaricides:		
Contamination of animal products destined for human consumption.	Preparation of balanced feeds on the farm.	Chemical analysis of animal products destined for human consumption.
Intoxication of workers handling tick killers and/or persons using empty bottles; Water contamination from inadequate disposal of chemicals; Tick resistance to acaricides.	Choice of tick killer chemicals, methods and timing that minimize environmental impacts (see also Table 1, on the use of pesticides); Training and awareness-raising of livestock owners and herders on acaricide & insecticide use and handling.	For monitoring the use of tick killers, see Table 1; Water quality in water bodies (if measurements performed).
Animal breeding:		
Reduction of agro-biodiversity due to breed choices; New breeds less adapted to local conditions.	Promotion of local breeds; Maintaining variability within populations; Unconventional livestock production (e.g. alpaca, llama).	Proportion of local breeds in cattle population; Number of breeds grown in the area.
Impact on wildlife:		
Increased killing of wildlife considered as pests or predators; Competition for food and water resources; Increase in diseases; Loss of habitat or migratory routes.	Creation of protected areas; Range management strategies that minimize impacts on wildlife; Agro-tourism; Appropriate methods of pest and predator control (e.g. traps instead of poison, see also Table 1 on pesticides).	Cases of wildlife killing and poaching; Number of predator poisoning cases; Size of Protected Areas.
Pollution from animal waste:		
Contamination of surface and ground waters; Odor problems & greenhouse gases.	Proper manure storage and management: ▶ Reduction in water use; ▶ Separation of solids; ▶ Proper storage until application time; ▶ Anaerobic fermentation & biogas production.	Water quality in streams; Proportion of farmers with manure storage facilities; Volume of biogas produced.
Nutrient enrichment of soils.	Manure application to soils at recommended fertilizer rates; Use of high yielding crops.	Nutrient concentration in soils (N, P, K); Changes in crop yields.
Social impacts:		
Social and cultural changes due to change from nomadism/transhumance to stable livestock production.	Access of mobile pastoralists to veterinary and other services; Consultation of all affected communities; Recognition of traditional land use rights and practices.	

TABLE 3 - Small-scale irrigation infrastructure: Practices associated with environmental risk. Possible adverse impacts, mitigation measures and indicators for monitoring.

Small-scale irrigation may include one of the following categories: run-of-river schemes, small reservoirs or ground water schemes (deep and shallow wells).

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Construction of irrigation infrastructure:		
Reduction of minimum flow in rivers, affecting aquatic flora and fauna and reducing water availability downstream; Changes in the natural course of waterways; Soil- and tree-cutting along riparian areas where water will be drawn (uptake for irrigation), resulting in erosion along riverbanks; Vertical drainage associated with high concentration of wells for pumping ground water and the consequent lowering of water table.	Proper siting and participatory planning, including studies on water availability; Community participation in design and construction (walkthrough with farmers and Participatory Rapid Appraisal (PRA)) and establishment of water users association before construction; Design of works so as to minimize the need to change natural watercourses; Soil conservation; Control on boring of new wells; Reduction in the density of wells or limitation of pump capacity (it should be pointed out that in the case of water logging, vertical drainage might be deemed necessary to lower the groundwater level).	Changes in the level of lake/river flow; Changes in fish catches from the affected water body; Area of exposed riverbanks; Fall of water table in wells; Change in the height of root pedestals; Accumulation of silt/sand at the foot of bushes, posts and fences, as well as in downstream water bodies; Depth of rills/gullies; Sediment loads in streams if data available from a nearby hydrological station.
Operation of irrigation system:		
Reduction of minimum flow in rivers, endangering aquatic flora and fauna and reducing water availability downstream; Water logging (rise of water table) associated with low irrigation efficiency; Overexploitation of groundwater through wells and consequent lowering of water table; Salinization or alkalization of soil; Erosion; Degradation of water quality in reservoirs or receiving water bodies (algal blooms, aquatic weeds, etc.); Increase in waterborne diseases; Disease transmission through contaminated irrigation water;	Control of irrigation water volumes, respecting minimum flows and aquifer capacity; Operation and maintenance plans for irrigation infrastructure; Agricultural extension, training and applied research on soil salinization and related issues (water logging, alkalization, etc); Micro-watershed management; Quality tests on irrigation water, including monitoring of pesticide contamination; Particularly for larger schemes: good irrigation management, i.e., a more rational and efficient use of irrigation water, by: a) closely matching irrigation demands and supply to reduce seepage and increase irrigation efficiency; b) providing drainage if water is of good quality, and c) maintaining canals to prevent seepage, and reduce inefficiencies resulting from siltation and weed;	Changes in the level of lake/river flow; Changes in fish catches from the affected water body; Changes in water table in wells; Volume of water used per hectare; Visible changes in the water quality in receiving water bodies; Water quality in drinking water wells (if measurements performed); Change in the area of barren lands; Change in the height of root pedestals; Accumulation of silt/sand at the foot of bushes, posts and fences; Depth of rills/gullies;

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Operation of irrigation system:		
Conflicts over the use of water and irrigated land; Unsustainable crop production and excessive use of pesticides, resulting in water contamination and diminishing returns on investment in the irrigation scheme.	Training in sanitation and hygiene; Protection of canals from livestock; Consultation of all affected communities, establishment of management committees, etc. IPM – see Table 1.	Deaths or decreased productivity of plants and soil organisms due to salinity; Alkalinity: increase in soil pH; Number of operation and maintenance plans; Number of micro-watershed management plans; Changes in water-related disease levels; Number of serious land use conflicts; Pesticide residues in water; Pest management practices and use levels of pesticides.

TABLE 4 - Agro-industry: Practices associated with environmental risk. Possible adverse impacts, mitigation measures and indicators for monitoring.

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Agro-processing:		
Contamination of surface and ground water from wastewater; Over-extraction of surface and ground waters; Air pollution; Noise and odor pollution. Contamination of products with pesticides due to improper post-harvest pest control.	Location of agro-industries in zones where water supply can be ensured and which have sewage and wastewater treatment systems; Minimization of water and chemical use; Promotion of transformation processes based on bio-degradable substances; Use of "clean" production technologies; Treatment of wastewater, and atmospheric emissions; Acoustic protection methods in plants that create excessive noise; Non-chemical post-harvest pest control.	Volume of water use; Changes in the level of lake/river where the water is drawn; Changes in water table level in wells; Visible changes in the water quality in receiving water bodies; Changes in fish catches from affected water bodies; Water quality in drinking water wells (if measurements performed). For bigger plants (in addition to the above): Quantity and quality of wastewater discharges; Quality of air emissions. Complaints on noise and odor from local populations; Chemical analysis of products destined for human consumption.
Contamination of the environment due to accumulation of solid waste, introduction of hazardous waste, and/or decomposition of organic materials.	Use of organic waste as fertilizer on agricultural/pasture soils; Reduction of solid waste through the use of cleaner technology, recycling residues, etc.; Treatment and disposal of solid waste according to the regulations on solid waste management; Proper treatment and disposal of hazardous waste (disposal in regulated landfills).	Volume of solid waste (not recycled); Volume of organic waste (not reused); Volume of hazardous waste; Water quality in drinking water wells (if measurements performed); Final disposal of waste (regulated or unregulated landfills).
Deficient hygienic practices:		
Contamination of processed foodstuffs.	Strict hygienic standards; Product quality control; Training of workers.	Chemical and bacteriological analysis on foodstuffs.

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Consumption of fuelwood in agro-industry:		
Deforestation in forests near agro-industry; Incentives for deforestation for sale to agro-industry; Air pollution.	Use of alternative energy sources; Use of energy efficient equipment; Use of agro-residues as fuel; Woodfuel plantations (but see Table 5).	Volume of fuelwood use per plant; Size of degraded forest around the plant.
Changes in livelihoods:		
Decreased demand for certain agricultural products or for micro-scale agro-processing.	Consultation and participation of the whole community in project preparation.	

TABLE 5 - Small-scale forestry operations: Practices associated with environmental risk. Possible adverse impacts, mitigation measures and indicators for monitoring.

All tree plantations of one hectare and above, and all forest harvesting operations should be carried out in accordance with an approved simple management plan. Each **management plan** should include an outline environmental assessment, which should prescribe many of the mitigation measures listed below. Where possible, small-scale operators should be encouraged to form cooperatives or producer associations/organizations so as to reduce management costs. It would also facilitate the introduction of forest certification, a process that can confirm that the forest products are being harvested from sustainable sources. This is especially important for products destined for export.

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Establishment of forest plantations:		
Reduction or loss of bio-diversity.	Avoid clearing indigenous forest; Give complete protection to critical habitats; If adequate samples of the original vegetation do not exist outside the plantation, create protection areas (set-asides) of representative samples (10%) inside the plantation.	Field inspection/maps Changes in populations of Indicator species Protection Areas identified in management plan.
Soil erosion during land preparation.	Plant up as soon as possible after land clearing.	Increase in areas subject to erosion and depth of rills/gullies.
Siltation of streams.	Do not clear steep, unstable slopes or highly erosive soils, and limit site preparation to the dry season.	Sediment loads in streams.
Soil compaction.	If ploughing is needed, it should be done along the contour using tractors with flotation tires.	Presence of hardpan (i.e. soil/subsoil condition in which the soil grains become cemented together by such bonding agents as iron oxide and calcium carbonate, forming a hard, impervious mass).
Reduction in stream flow and lowering of the water table.	Conserve all riparian forests (areas located on the banks of rivers, creeks and springs); plant with indigenous species; Conserve all wetlands and marshes.	Changes in dry season water levels and water table level; Management plan and field inspection.
Soil contamination due to use of herbicides and insecticides.	Ensure that only the correct dosage of herbicides and insecticides are used, that workers are properly trained in their use, and closely supervise field operations.	Level of contaminants in ground water and streams.

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Establishment of forest plantations:		
Increased incidence of pests and diseases.	Use mixed species plantations; Implement a simple, ocular system of pest and disease monitoring.	Increase or decrease in the incidence of pests, damage to trees.
Wild fires.	Clear firebreak in the area if burning is to be used for clearing and keep adequate labor available to control fires.	Fire records.
Use of exotic species in plantations:		
Changes in soil structure and loss of fertility.	If possible, use exotic species in agroforestry/silvopastoral systems only, and use only organic fertilizers.	Nutrient levels in soils organic content and pH of soil.
Reduced stream flow and lowering of water table.	Conserve riparian forest and wetlands; use wider tree spacing.	Changes in dry season water levels in wells and dry season flow in streams.
Increased risk of pests and diseases.	Implement simple ocular systems of pest and disease monitoring.	Increase or decrease in pest and plant disease levels.
Forest harvesting, including wood and non-wood products:		
Reduction or loss of biodiversity, especially in natural forest areas.	Products from natural forest must be harvested in accordance with an approved harvesting plan which must be based on growth data and inventories; logging must include pre harvesting climber cutting, minimum diameters limits, an adequate felling cycle, annual coupes, directional felling, well planned skid trails and protection areas.	Approved management plan and, if practical, certification received.
Fragmentation of habitats and disruption of biological corridors.	Identify critical habitats and prohibit intervention, avoid sensitive areas and provide passageways to link corridors.	Inventories to monitor populations of indicator species.
Forest/ecosystem degradation.	Harvest in accordance with prescriptions of management plan, and have the operation certified; In plantations, avoid areas of natural vegetation.	Management plan and field records.
Uncontrolled human settlement and deforestation.	Ensure the existence of enforceable property rights and the institutional capacity/commitment to control settlement.	Cases of new illegal human settlements; Existence of legislation/institutions regulating human settlements.

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Forest harvesting, including wood and non-wood products:		
Conflicts with traditional users.	Define and enshrine traditional user rights in management plan.	Management plan.
Soil compaction and erosion.	Use cable ways instead of roads; Where roads are the only alternative, they must be well planned and constructed in accordance with technical specifications appropriate to local conditions; Minimize canopy disturbance and damage to the understorey through better road alignment; Use animal extraction.	Management plan and field observations; Erosion indicators (see above tables).
Siltation of streams.	Conserve riparian forest and minimize canopy and understorey disturbance.	Sediment load in streams.
Illegal hunting and accidental fires.	Implement environmental education programs for forest workers and forest communities in and around forest; Ensure that adequate legal protection exists to control hunting.	Bushmeat consumption surveys, species inventories and forest fire records.
Small scale processing plants:		
Air pollution – carbon dioxide, carbon monoxide smoke and dust.	Legislation, emission control, cyclone dust removal, use of hydropower.	Air quality monitoring.
Soil and water pollution – extractives of bark, wood preservatives, additives, sawdust, charcoal, acids, tars, vehicle fuel oils and lubricants.	Legislation, spill ponds, oil traps, recovery of waste wood.	Soil and water quality monitoring.
Noise.	Legislation, careful site planning, insulation, noise abatement.	Noise level monitoring; Complaints from local populations.
Indigenous forest-dependent people:		
Changes in livelihoods and cultural identity; Spread of infectious diseases.	Careful site selection avoiding indigenous areas, participation of indigenous people in project planning, indigenous peoples' plan.	Consultations and workshops with local people; Medical records.

TABLE 6 - Ecotourism: Practices associated with environmental risk. Possible adverse impacts, mitigation measures and indicators for monitoring.

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Campsites and cooking fires without adequate protective measures:		
Fires in forest and grasslands.	Construction of proper campsites and fireplaces; Regulation, supervision and control of tourist activities.	Changes in the frequency and severity of forest fires.
Construction of small-scale infrastructure (trails, signboards, campsites etc.):		
Disturbance of wildlife; Erosion associated to trail construction; Increased human presence in isolated areas that may lead to illegal logging or land conversion.	Proper siting avoiding ecologically sensitive areas; Awareness-raising and training of local communities and visitors; Schemes for sharing benefits from ecotourism.	Changes in occurrence of wild animals; Depth of rills/gullies along trails; Cases of illegal logging or land conversion; Training sessions for local communities.
Unsustainable consumption of vegetation, wildlife and other natural resources:		
Loss of bio-diversity; Loss of natural resources.	Prohibition/restriction on tourism in sensitive sites; Restriction on the extraction of plants or other resources in Protected Areas (in consistency with their management rules, see section E of chapter 5); Prohibition on the hunting or removal of endangered plants and animals; Prohibition/restriction on coral collection and/or extraction or other marine life; Awareness-raising of visitors and guides; Supervision and control of tourist activities.	Wildlife monitoring; Cases of illegal hunting; Cases of coral collection; Degradation/disappearance of plants, corals or other resources.
Solid waste:		
Accumulation of garbage and rubbish at tourist sites.	Proper waste collection facilities and services	Occurrence of non-collected waste at sites.
Social and economic impacts:		
Impact on indigenous and local communities.	Involvement of these communities in project design; Benefit-sharing schemes.	Stakeholder consultations during project design.

TABLE 7 - Aquaculture: Practices associated with environmental risk. Possible adverse impacts, mitigation measures and indicators for monitoring.

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Intensive and super-intensive culture:		
Pond culture: Contamination of downstream water-bodies in particular when draining ponds due to excessive organic loading and accumulation in pond water and pond bottom sediments; Higher risk of diseases among cultivated fish related to stress and, eventually, in neighboring wild populations; New bacterial diseases due to the use of medicated feeds. **Floating cages**: continuous pollution of surrounding waters and bottoms when cages are in shallow waters; Impact on local fauna from escapes from cages.	Proper siting of ponds and cages avoiding sensitive water bodies; Distance between cages and sufficient depth to reduce impact on bottom; Use of reservoirs for treatment of effluents in pond farms or use of pond recirculating systems to treat water. Closed systems (i.e. without effluent discharge) are more desirable in intensive systems; Use of vaccines preferable to routine use of antibiotics and chemicals (use chemicals and drugs only in extreme cases when symptoms of disease are apparent); Use of species present in nearby waters to avoid impacts on biodiversity.	Changes in water quality within the system and in neighboring water bodies; Changes (degradation) in bottom fauna and flora in the case of floating cages; Cases of fish disease within the system and in neighboring water bodies; appearance of bacterial strains resistant to antibiotics; Changes in composition of catches in surrounding waters.
Semi-intensive and extensive culture systems		
Large seed mortality rates of non target species due to the collection of shrimp or fish seed from the wild; Destruction of mangroves and wetlands for construction of coastal ponds; exposure of acid sulfate soils; accelerated coastal erosion by reduction of mangrove forest; Soils and groundwater salinization due to percolation of saltwater; Elimination/reduction of local species due to the introduction of exotics for stocking purposes; Introduction of diseases due to transfer/import of seed.	Utilization of hatchery-produced seed for stocking; Use of barren areas bordering mangroves using pumping and not tides to fill ponds, separation of pond farms to avoid creation of barriers behind mangroves; Avoid pond construction in coastal areas close to agricultural fields or freshwater wells. Use of liners to avoid water percolation in proximity of agricultural field and freshwater wells where viable; Carry out studies on potential impact on existing fauna prior to introducing a new species in an open water body. Utmost care with the introduction of predator species. Improve regulations on introductions; Quarantine practices for seed and introductions; use of hatchery produced certified disease-free seed. Improved education of farmers and improved regulations on movements of seed/adults.	Monitoring of seed collectors operation, changes in species abundance and composition in catches of fishermen; Testing of soils for potential acidity prior to pond construction; Measurable increase in salinity in water extracted from coastal wells near aquaculture farms; Displacement or elimination of local fish species; Occurrence of epidemics or noticeable presence of disease in farms or surrounding water bodies.

TABLE 8 - Small rural access roads and bridges: Practices associated with environmental risk. Possible adverse impacts, mitigation measures and indicators for monitoring.

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Impact on soil and water bodies:		
Compaction of soil during construction; Slope and riverbank destabilization: landslides, collapse of gullies and steep slopes, side-tipping of spoil material; Degradation of vegetation along riverbanks, road bed or at sites where construction materials are drawn; Hydrological changes (e.g. increased runoff and flooding, waterflow diversion, channel modification); Erosion due to the above reasons; Clogging of drainage works, creation of stagnant water pools; Siltation, sedimentation and degradation of water bodies; Changes in groundwater table levels; Contamination and health risks from oil and hazardous waste; Dust and noise during	Careful route and site selection avoiding steep slopes and rivers with low flow, minimizing cutting of trees, minimizing number of water crossings and disruption in waterflows; Careful design to minimize impacts of water crossings, to balance filling and cutting, and to avoid creation of steep cut slopes; Buffer zones between road and water bodies; Construction in dry season; Ensure use of proper and appropriate construction standards (incl. protection of soils during construction, construction site clean-up and rehabilitation); Proper drainage and infiltration ditches; Stabilization of vulnerable surfaces: terraced slopes, retaining walls/ponds, barriers, riprap, gridwork, crib walls etc.; Replanting (with native species) early in the construction process; Proper disposal of oil and hazardous materials; Dust control by water and other means.	Change in area of denuded slopes/length of exposed riverbanks; Number of landslide cases affecting traffic; Change in the height of root pedestals; Accumulation of silt/sand at the foot of bushes, posts and fences; Depth of rills/gullies; Changes in yields in neighboring fields; Flow and sediment loads in streams if data available from a nearby hydrological station; Visible changes in water quality in neighboring water bodies; Changes in water table levels in wells; Changes in fish catches from the affected water body; Changes in levels of water-related diseases.
Access to previously isolated areas:		
Restriction of biological corridors, barriers to the free movement of wildlife; Disruption or destruction of wildlife, road kills; Loss, fragmentation and disturbance of natural habitats (incl. aquatic); Disturbance of protected areas, threats for endangered species; Increase in forest fires caused by increased human activity; Illegal hunting, see Table 5;	Careful route and site selection to avoid important habitats, sensitive or protected areas; Conservation of natural corridors; Creation of animal crossings under and over roads, fencing; No construction during breeding season; Awareness-raising and training among rural communities on sustainable use of forested areas and their resources; Vigilance and monitoring by both local communities and police and wildlife authorities; Establishment and maintenance of firebreaks;	Changes in occurrence of wild animals; Changes in hunting/fish catches; Rates of extraction of timber and non-timber forest products; Cases of illegal logging/land conversion.

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Access to previously isolated areas:		
Deforestation and loss of biodiversity from increased logging, tourism, and conversion of forest areas into pasture or farmland.	Elimination of flammable materials in construction; Educational programs to reduce the incidence of fires; Establishment of protected areas.	
Social impacts:		
Loss of buildings, property , or economic livelihood; Impact on human health from traffic accidents and transmission of diseases along roads; Degradation of historical/cultural sites; Social changes from new roads to isolated communities; Impacts on indigenous people.	Careful route selection avoiding economic losses, indigenous peoples lands, cultural sites, etc.; Safety designs: regulation, signposting, visibility, speed limits, etc.; Special measures to protect cultural sites.	Traffic accidents; Disease cases.

TABLE 9 - Small social infrastructure investments: Practices associated with environmental risk. Possible adverse impacts, mitigation measures and indicators for monitoring.

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Water supply and sanitation:		
Contamination of surface and groundwater from wastewater at site or downstream; Lowering of water table due to overexploitation; Creation of stagnant water pools; Unpleasant odors; Degradation of soil cover and vegetation; Disturbance of natural habitats and wildlife; Increase in waterborne diseases.	Siting studies to avoid sensitive sites; Consultation and participation of all affected communities; Regional water use planning; Minimal distance from human settlements and fields; Proper drainage; Wastewater treatment systems: settling ponds, screens, aeration systems, connection to larger sewage systems; Odor-control technology; Soil and vegetation protection during construction, stabilization (e.g. re-vegetation); Operation and maintenance plans and training; Protection from livestock; Water quality tests; Hygiene training.	Changes in water table levels in wells; Water quality in wells (if measurements performed); Visible changes in water quality in receiving water bodies; Size of area of degraded vegetation at site; Number of operation and maintenance plans and regional water use plans; Disease cases.
Solid waste collection/disposal:		
Pollution of surface and groundwater from landfill; Smog, haze and particulate contamination from burning garbage (incl. impact on human health); Unpleasant odors; Contamination and health risks from hazardous waste; Disease transmission; Unpleasant living conditions close to site.	Siting studies (covering also transport needs); Proper design of collection and disposal systems; Proper drainage; Spread and cover garbage at landfill site, prohibit or minimize burning; Separate disposal system for medical or hazardous waste; Operation and maintenance plans and training; Recycling programs; Safety procedures and training.	Water quality in wells (if measurements performed); Visible changes in water quality in receiving water bodies; Number of operation and maintenance plans; Illegal landfills; Cases of garbage burning; Disease cases.
Construction of buildings (health centers etc.):		
Water and soil contamination from building waste; Degradation of vegetation at site and along transport routes;	Proper siting and selection of transport routes; Protection of soil surfaces and vegetation during construction; Dust control by water or other means;	Water quality in wells (if measurements performed); Visible changes in water quality in receiving water bodies;

IMPACTS	MITIGATION MEASURES	MONITORING INDICATORS
Construction of buildings (health centers etc.):		
Water contamination from inadequate sanitation; Accumulation and soil contamination from solid waste; Contamination and health risks from medical waste; Construction accidents. Dust and noise during construction; Disturbance of habitats and wildlife;	Control and daily cleaning of construction sites; Provision for adequate waste disposal and sanitation during construction and operation; Separate disposal facilities for hazardous waste; Special attention to drainage; Safety measures and procedures.	Size of area of degraded vegetation at site; Disease and accident cases.

RURALINVEST

In recent years, locally designed and managed investment projects have assumed increasing importance as effective tools for sustainable rural development. Supporting local communities to conceive and implement their own projects – whether for income generating activities or for social investments – not only ensures greater ownership and commitment to those projects, but also strengthens the capacity of communities to contribute to and manage their own development. However, the increasing adoption of this approach by national governments, international financing agencies and rural banks has also highlighted the critical importance of providing adequate support and guidance to national technicians working with communities and other groups in identifying investment needs, defining potential projects, and developing them for external financing.

RuralInvest answers this need by offering a series of modules, developed over a number of years and tested extensively in the field, which provide such support through a range of materials and training courses, and include technical manuals, custom developed software and instructors' guides. Modules currently in use or under development include:

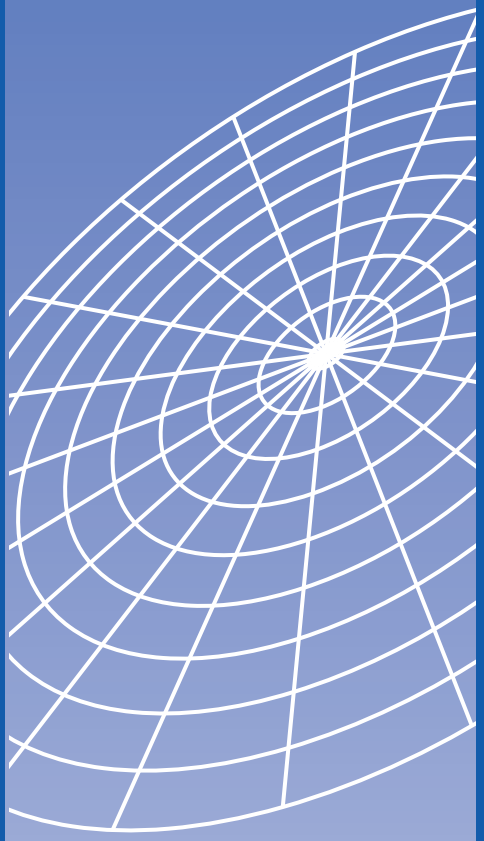
Module 1: **Participatory Identification of Local Investment Needs**
Module 2: **Preparing and Using Project Profiles**
Module 3: **Detailed Project Formulation and Analysis**
Module 4: **Monitoring and Evaluation of RuralInvest Projects**

An associated training course "**Assessing Demand for Rural Investments**" is also available to assist technicians to evaluate market and non-market demand for project outputs.

Module 3: Detailed Project Formulation and Analysis

Following on from earlier needs identification and project definition activities, Module 3 provides guidelines to assist local technical staff in developing high quality project proposals suitable for external appraisal and subsequent monitoring and evaluation. Drawing on MS Windows-compatible software which can be extensively customised to meet user needs, the Module facilitates the presentation of essential project data and automates key calculations such as cash flow, working capital requirements, rates of return, employment generation and costs per beneficiary. The Module comprises this technical manual, software with a user's guide, and training materials with an associated instructor's guide.

MODULE 3



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