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IICA



FARM PLANNING

GUIDING PRINCIPLES AND CONCEPTS

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IICA OFFICE IN JAMAICA

October, 1991

IICA OFFICE IN JAMAICA

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IICA was founded as an institution for agricultural research and graduate training in tropical agriculture. In response to changing needs in the hemisphere, the Institute gradually evolved into an agency for technical cooperation and institutional strengthening in the field of agriculture. These changes were officially recognized through the ratification of a new Convention on December 8, 1980. The Institute's purposes under the new Convention are to encourage, facilitate and support cooperation among the 32 Member States, so as to better promote agricultural development and rural well-being.

With its broader and more flexible mandate and a new structure to facilitate direct participation by the Member States in activities of the Inter-American Board of Agriculture and the Executive Committee, the Institute now has a geographic reach that allows it to respond to needs for technical cooperation in all of its Member States.

The contributions provided by the Member States and the ties IICA maintains with its twelve Permanent Observer Countries and numerous international organizations provide the Institute with channels to direct its human and financial resources in support of agricultural development throughout the Americas.

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PREFACE

This series of training manuals are the result of class notes used in the training of Ministry of Agriculture personnel. The training manuals were developed by the Ministry of Agriculture Farm Management Section and the Inter-American Institute for Cooperation on Agriculture for the purpose of enhancing Ministry of Agriculture extension personnel skills in areas of farm planning and monitoring of farm plans implementation.

Training was implemented in modules of three days workshops covering the areas of farm plan preparation, investment analysis and control of the farm plan implementation. During the first workshop the participant is exposed to concepts of enterprise budgets and the development of the best farm plan given farmers goals and resources. The emphasis is on the development of farm plans with annual crops.

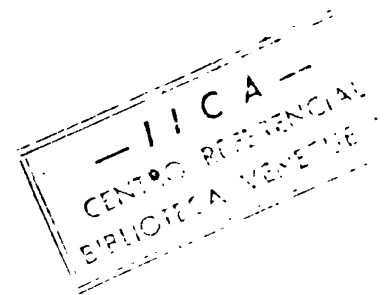
The second workshop covers the aspects of farm investment decision making. Concepts of capital budgeting and the Net Present Value method to compare between investment alternatives in permanent crops are presented and illustrated with examples.

The third workshop deals with the aspects of the control of the farm plan implementation. During this workshop the emphasis is on the presentation of a recordkeeping system to monitor the technical and financial implementation of the farm plan and on how to use the information to improve the farm operation.

The publication of this series of training manuals is for the purpose of contributing to the improvement of farm management skills of small farmers in Jamaica. Those interested in expanding the information for training purposes will find the list of sources of information used in the preparation of these materials very useful.

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FARM PLANNING

GUIDING PRINCIPLES AND CONCEPTS

I Introduction

It is common to see successful and not so successful farmers in the same region managing the same amount of resources, in quantity and quality, and facing the same market opportunities and information. The difference between the successful and not so successful farmer can be explained in large proportion by differences in management.

Management functions include planning, implementation, monitoring and control of the farm plan. Planning is the main basic function to accomplish farmer's objectives. Farmers in general do not have a farm plan developed on paper, but every farmer has a "plan", no matter how vague or unorganized it may be.

Planning involves analysis of different production alternatives to select a course of action with the objective of reaching the farmer's production and financial goals. Thus, planning is the function of deciding in advance what to produce, how much to produce, how it should be done, when to produce and sell, and who will be responsible for completing the tasks.

Planning is a prerequisite to the satisfactory accomplishment of the implementation and control functions of management. Systematic planning and budgeting on a whole farm basis can be a powerful tool for increasing farm profit.

Furthermore, farm planning and budgeting is employed to provide information for formulating agricultural development programs and for evaluating the cost and benefit relationship of such programs.

Farm planning and budgeting in connection with the planning of development projects have four major roles to play:

1. To reveal the prospective needs of farmers so that a suitable scheme will be designed.
2. To determine the best alternative for the reorganization of the farm units so as to use the full services and facilities made available after the completion of the development plan.
3. To anticipate farmers' requirements in the services and materials other than those provided directly by the project in order to ensure the success of the project.
4. To furnish information for the appraisal of its Cost/Benefit relationship.

II Farm Planning

A farm plan is a description of the farm enterprise mix or crop combination, the technology and resources needed to implement the goals of a given farmer. It may include details such as fertilizer, seed and chemical application rates. When the farm plan includes the expected costs and returns for the plan, the combined result is a detailed physical and financial scheme for the organization and operation of the total farm.

Farm planning, farm plan implementation, and control are three main functions of a farm manager. Which one of the three functions is more important? Well, we are talking about which of the three legs of a tripod is more important. Farming is very complex, and a number of factors need to be considered to optimize the use of farm resources.

A plan is implemented to attain certain production and financial goals. The plan provides the indicators (expected yield per acre, milk produced, price received, return on farmer's labour and capital). The control system provides the information on actual results to assist the farmer to monitor farm plan implementation, detect deviations from programmed goals and make decisions to correct problems and achieve goals.

The information recorded and analysis performed, as part of the control function, provides important data for the monitoring of plan implementation and for planning the farm operation. This feedback from the control system is an important component of a management system because of the interrelation between the planning, implementation, and control functions.

Not all farmers have a system of records. Nor do all farmers have plans on paper, but all farmers monitor and control farm plan implementation and compare actual performance with expected results and take corrective measures or modify farm plans. Farmers also introduce improvements in future plan implementations based on their experience.

Although farming is complex, a farmer's memory to keep track of all relevant information is limited. An organized farm plan on paper and a very simple recordkeeping system, to compare actual with programmed results, can assist the farmer to improve farm organization, maximize resource use efficiency and increase profit.

Some of the important tasks of farmers in planning and controlling the whole farm plan implementation are abstracted and presented below in Table 1.

Table 1 Management Functions and Activities

PLANNING	I	CONTROL
1. Review long-run farmer's goals in relation with actual farm plan. Define goals if it is for a new farm operation.	M P	1. Develop records system to measure production marketing, marketing and financial performance.
2. Inventory resources available.	L E	2. Keep detailed production marketing, and financial records.
3. Prepare enterprise budgets for actual farm plan. Develop whole farm budget and estimate income for actual farm plan. Outline alternative plans. Select the best.	M E N T A	3. Compare actual recorded results with production and financial goals established in planning.
4. Develop a detailed annual farm plan and prepare a whole farm budget.	T I O	4. Identify corrective actions needed in farm plan during plan implementation, if any, and adjust farm plan.
5. Implement recordkeeping system and select indicators of performance to compare with actual recorded results (during plan implementation).	N	5. Use farm records data to prepare future farm plans.
6. Modify plans in light of control results.		

III Farm Planning Activities

3.1 Definition of Goals

The starting point for planning is to define goals and objectives to be achieved over the short-run and long-run. It is not possible to plan without goals. A farmer needs to know his or her destination to decide on the best strategy to get there. Setting the goals to be achieved during the implementation of the next annual farm plan and over the long-run provides a basis to analyze alternative plans.

It is necessary to know where you want to go and the purpose of your trip to analyze different alternative roads and means of transportation to select the best alternative. There are several routes to go from Kingston to Montego Bay. Which one you select depends on the objectives of your trip. If your goal is to go from Kingston to Montego in the morning for a business meeting and come back in the afternoon, you may consider going by car using the most direct road, or you may consider flying. If your goal is to minimize the cost of transportation then you may consider going by train or bus.

Important goals that need to be considered in farm planning, that relate to farmer's goals, fall within the production and financial category. They include setting goals on yields, net income, net worth and the amount of borrowing. This implies something about the risk which the farmer is willing to accept and will be discussed in more detail later on.

Farmers' personal and business goals depend on their age, values, current financial situation and future financial needs, and the type of farm operation. Small farms are operated by the farmer and the farmer's family which means that personal/family, as well as business goals and objectives, must be considered.

Some of the personal/family considerations are not relevant for large commercial farms, while some of the business goals may be given less attention by those farms emphasizing personal/family aspects of farming.

Many times there is conflict between a farmer's personal and business goals. Increases in family living expenditures result in less income to invest in the farm business.

Family needs and aspirations need to be taken into account in the definition of goals. Dependence on farm production for home consumption and farmer's preferences affect the optimum production mix of a family farm.

Some of the most common farmers' personal goals that affect farm plan production and financial goals and farm business decisions are listed next:

i) Maximize net income/return

Obtaining the largest net return possible is frequently identified as the primary goal of most market oriented farmers. Maximizing net income or return over a period of several years is usually more desirable than achieving a high income in one year at the expense of other years.

ii) Reduced risk

Most farmers will not get involved in production activities that will endanger their chances of survival. Thus, risk reduction and the desire to maintain a viable farm business are important goals of many farmers. Reducing risk frequently results in production diversification and other actions that may not maximize income but may reduce possible losses.

iii) Increased leisure time

Leisure time could be a major goal for older farmers who want to rest and devote more time to other activities in the community, but could also be important to younger farmers who wish to spend more time with their children and families.

iv) Self-sufficiency in fresh food production

Small farmers may have strong motivation to meet certain crop and livestock production goals for home consumption that may affect the optimum crop combination.

The definition of personal and business goals helps to identify the demands of money and products from the business part of the farm operation, their importance for the farm family and how they affect the business.

Some important short and long-run family and business goals and objectives that need to be defined during the farm planning process are presented in Table 2. Completing this process helps to understand personal, family and business goals and to determine the best farm plan that will satisfy most of the goals. Long-run goals may include plans for changes in farm production proportions from annual crops to permanent crops, and plans for expansion of the farm operation.

Table 2 Personal, Family and Business Goals

	Next Year	Within 10 Years

PERSONAL/FAMILY GOALS & OBJECTIVES		
* Farm production for home consumption		
Crops		
Beans (lbs.)		
Livestock		
Milk (qrts.)		
* Money required for family living		
Food (\$)		
Clothes		
Entertainment		
Education		
* Others		

BUSINESS GOALS & OBJECTIVES

- * Production
 - * Marketing
 - * Financial
- Net Worth
 Annual Net Income
 Short-term Debt
 Long-term Debt

3.2 Inventory of Resources

The next activity in farm planning consists of estimating the resources available to implement the plan. These are land, farmer's and family labour supply, working assets, capital position and managerial capacity.

These resources provide the means and the constraints to the farmer to produce and generate income. The quantity and quality of the resources and soil types will determine the type of production mix that will be feasible to consider in farm plan alternatives.

i) Land

The land inventory is best done by drawing a farm map showing the location and size of the different plots and physical features of the farm.

ii) Labour supply

The farm labour supply is composed of two major parts. The first being the farmer and his or her family, and the second being hired labour. The year should be divided into seasons or periods showing operator and family labour supply available by period and type of operation. Sometimes children of school age and women perform very specific tasks in the farm operation and may not be available for farm activities during part of the year.

iii) Assets

The major working assets of which an inventory should be made are the buildings, machinery, equipment, tools, supplies and livestock that are available on the farm. The capacity limit of machinery will have an impact in determining the size of certain cropping activities in the farm plan.

iv) Financial situation

Using data from an assets inventory, plus information on cash and accounts receivable, and a list of the claims, debts, or liabilities of the farm business, an initial balance sheet (net worth statement) can be prepared to determine the impact of the proposed farm plan in the capital position and the liquidity of the farm business (see Farm Records and Recordkeeping notes for more information on inventory and preparation of net worth statement).

v) Managerial capacity

Like hired labour, the farmer may have experience in certain production activities and not in others. These capabilities need to be taken into account in selecting production enterprises for the whole farm plan. If the farmer does not have experience in some enterprises included in the farm plan, the feasibility of providing technical assistance should be explored and programmed to ensure a successful farm plan implementation.

3.3 Short, Intermediate, and Long-Run Planning

The objective of analyzing farm resources is to identify more effective ways of using the land, labour, and capital available to achieve farmer's goals. This can usually be accomplished by careful analysis of the plan the farmer is currently following.

It is reasonable to assume that whatever farm plan production and financial goals the farmer is currently pursuing represent some of his or her long range goals. The enterprise mix currently being implemented provides the basis for estimating the expected financial return for the existing plan and for comparing alternative long range farm plans.

The estimates for the present plan provide the basis to judge how much better any alternative long range plans may be. It may also suggest ways to improve productive efficiency and employ unused resources.

When the final long-run plan is considered acceptable, the farmer (or the extension agent) must consider whether financial projections should be made for one or more years. When there are major changes in the actual farm plan and use of resources, it is necessary to develop intermediate farm plans to analyze the financial feasibility of the plan changes. For example, shifting from annual crops to permanent crops will affect personal and business cash-flows and credit needs. Intermediate steps therefore need to be planned in order to assist with this type of adjustment.

Enough years should be planned to move through any transitions in production and financing that may cause significant fluctuations in year to year cash flows. If the cash flows for the last year planned are expected to prevail in subsequent years, then the data for the last year should indicate the general level of profitability and the trend in liquidity and solvency expected in subsequent years.

In the following sections a detailed description is presented on the development of enterprise and farm actual plan budgets.

3.3.1 Enterprise budgets

Development of budgets is a necessary part of the planning process. To estimate the financial returns of the actual farm plan and to develop alternative farm plans is necessary to prepare enterprise, partial and farm budgets.

Once the best alternative has been selected a detailed short-run plan is developed. This plan includes a whole farm budget with an estimate of the expected net farm income and a cash-flow budget to determine financial feasibility and needs.

An enterprise is a single crop or livestock commodity being produced on a farm. An enterprise budget is a listing of all estimated income and expenses associated with a specific enterprise to provide an estimate of its profitability.

Enterprise budgets are the building blocks for the preparation of a whole farm budget and the cash flow budget. To prepare the budgets we should try to come up with the best estimate of the most probable prices and their possible level of variation. Price forecasting and developing costs and returns under different price assumptions is an important element of the planning process.

Budgeting can be used to estimate the gross margin (gross income minus variable cost) of a production activity to be considered in a farm plan. Each budget is developed on the basis of a small common unit such as 1 acre of crops or 10 heads of livestock. This permits easier comparison of gross margins for alternative and competing enterprises.

i) Crop Enterprise Budget

Enterprise budgets can be organized and presented in several different formats, but they typically contain three sections: gross income, variable costs, and fixed costs.

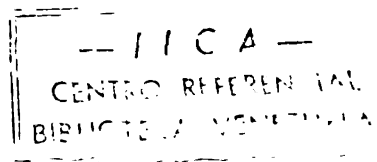
The distinction between fixed and variable costs is important in decision-making. Fixed costs are not relevant in **short-run decision-making**. Fixed costs like property taxes and insurance will have to be paid whether you produce or not. Machinery will get older and depreciate whether you use it or not.

The farmer needs to be concerned only with variable costs and gross margins in deciding what to produce, how to produce, and how much to produce in the short-run. This will become more evident as we progress in the explanation of the farm planning process.

The first step in developing an enterprise budget is to estimate gross income generated by the enterprise. Gross income is the total production per unit (for example, yield per acre for crops times the expected farmgate price. Both of these values will obviously have a great effect on gross margins and enterprise profitability, and they should be the best estimate that we can get.

The estimated yield should be the average yield expected under normal weather conditions given farm soil types and input levels to be used. Input levels must be considered because seeding rates, fertilizer levels, chemical use, and tillage practices, all affect yield. Output prices should be the expected price at marketing time.

The second step is to estimate variable costs. These costs change with the level of production. If there is no production then there are no variable costs. These include cash expenses in labour, fuel, oil, fertilizers, seeds, chemicals and other inputs used in the production process.



A distinction between variable cash and variable non-cash costs can be made. Some non-cash variable costs are the opportunity costs of resources used in the farm, for example, farmer's working capital.

Another important factor to consider when budgeting is that farm resources have alternative uses. The income forgone by choosing to use a resource for one purpose, instead of another is the **opportunity cost** for use of that resource. In other words, the **opportunity cost** of a resource is what it could have received if it had been employed in the most profitable alternative use (with similar level of risk) instead of on the farm.

Intermediate products, such as grain produced on the farm for livestock production are examples of variable non-cash costs in a livestock enterprise budget. Non-cash inputs that are variable have an alternative use; they can be sold off the farm. Thus, they have a short-run opportunity cost and must be considered as variable for decision-making. The opportunity cost would be zero, only if the resource does not have a profitable alternative use.

Another non-cash variable cost is the opportunity cost of the cash used to pay for inputs during the production process. These charges cover the time period between expenditure of the capital and harvest, when the income is or can be received. The cash used in the purchase of inputs can receive interest if put into a savings account. Therefore, that foregone income value can be used to charge for the use of farmers' cash.

Similar criteria can also be used to value farmer and family labour and other farmer owned inputs.

The third and final step in developing an enterprise budget is estimating fixed costs. Fixed costs are those costs that you incur whether you produce or not. These costs in a crop enterprise budget are those associated with depreciation and insurance of machinery, opportunity cost of capital invested in machinery, and charges for land use. Machinery fixed costs must be prorated to the specific crop enterprise on a per acre basis. The land charge is the opportunity cost of land and represents a return for its use in crop production. Renting the land is an alternative use that the owner has for the land. The cash rent charged in the region can be used as the land charge.

Table 3 Red Pea Enterprise Budget (1 acre)

ITEMS DESCRIPTION	UNIT	QUANTITY	PRICE/ UNIT	TOTAL	MONTH
<u>Gross Income</u>					
	lbs.	800	\$5.80	\$4,640	June
<u>Variable Costs</u>					
Labour	man days	20	40.00	800	March-June
Inputs					
Seed	qrts.	35	10.20	357	March
Fertilizers	cwt.	8	105.90	847	April
Insecticide	lbs.	3.9	66.55	260	March-May
Fungicide	lbs.	6	40.00	240	April
Miscellaneous				122	April
Interest on Variable Cost (15% for 3 mths.)				98.47	
Total Variable Costs				\$ 2,724.47	
<u>Gross margin</u> or Income above Variable Cost				\$ 1,915.53	
<u>Fixed Costs</u>					
Machinery depreciation, Interest, Taxes and Insurance				627.53	
Land Charge (5 months)				50	
Total Fixed Costs				677.53	
Total Costs (Variable + Fixed cost)				\$3,402	
Estimated Profit (Gross income -Total Cost)				\$1,238.00	

The Month column indicates the month that the transaction is expected to take place. Red peas will be planted in late March and harvested in June. Labour and other input expenditures will be incurred during this period and marketing of production will be in June. The planned transaction month information for inputs and outputs is necessary to prepare the cash-flow budget.

Interpretation of budget information

The enterprise budget for red pea production shows an estimated profit of \$1,238.00 per acre above all costs. The estimated profit can be compared against the estimated per acre profit for other crops and used to select the more profitable crops and crop combinations to be grown each year.

All resources (either owned or purchased) that aroused in production (land, labour and capital), have been taken into account in the estimation of the cost. The farmer's labour and capital invested in inputs and machinery have been valued at what they can earn at the best alternative use outside the farm (their opportunity cost). The cost of capital invested in land has been valued using the rental value paid in the region and purchased inputs have been valuated at their purchase price.

The estimated per acre profit of \$1,238.00 is a true return above all costs and may be thought of as "pure" profit. Profit is a return above all costs including opportunity costs on farmer's own labour and capital invested in the purchase of variable inputs, machinery, equipment, land and buildings.

Another interpretation of the estimated profit is to consider it a return to the farmer's time spent in the management of the farm or a payment for the management input.

To summarize, gross income (price x yield) of any production activity or set of activities is used to pay all factors of production in the following way:

Gross income minus

- Cash expenditures, including hired labour
- Depreciation of capital assets
- Farmer's labour (opportunity cost)
- Charge (opportunity cost) on cash used in cash expenditures
- Charge (opportunity cost) on farmer's investment in machinery (capital assets)
- Charge (opportunity cost) for land use

The balance is equal to the return to management. That is, gross income minus all the expenditures incurred in the production process, cash and non-cash, is equal to the return to management. The return to management in the red pea enterprise budget is \$1,238.00.

From the information presented above, it can be said that:

Gross income minus

- Cash expenditures, including hired labour, and
- Depreciation of capital assets

is equal to the return to farmer's labour, capital (cash used to pay inputs and other cash expenditures, and money invested in capital assets including land) and management.

ii) Livestock Enterprise Budget

Livestock enterprise budgets have the same format and components as crop budgets but they are more difficult to prepare. Cost of improved pastures planted to feed livestock, (intermediate products), need to be estimated as part of the variable livestock cost first. Livestock production involves multiple outputs (milk, calves and cull cows for a dairy enterprise) that you need to take into consideration to estimate expected output, prices and profitability.

Dairy Enterprise Budget

The following data represent the budget for a herd of 20 dairy cows with an average production of five quarts of milk per cow per day. All labour required to run the farm and milk the cows is provided by the farmer and his family.

The budget includes a 15 per cent replacement rate and a 90 percent calf crop. That means that there will be 18 calves and three cull cows for sale. Three cows will be purchased every year to replace the culled cows.

Machinery and equipment are valued at \$6,000. The total area of land is 32 acres valued at \$320,000 and the buildings at \$10,000. The total value of the 20 cows is \$120,000 and one bull at \$10,000. The opportunity cost of capital invested in inputs is 15 percent, 12 percent for cattle and 8 percent for machinery, equipment and buildings.

The difference in opportunity cost of capital reflects the difference in levels of interest paid outside of the farm investment alternatives for similar periods of time and risk.

It is important to recognize that money put into mortgages generates a lower return than short term loans with no collateral or government guarantees. However, money invested in land is safer than money invested in cattle.

Table 4. Dairy Enterprise Budget (for 20 cows)

Gross Income

Milk (100 quarts/day x 365 days x \$4.00/qrt.)	\$ 146,000.00
Steer calf (9 at \$1,000)	9,000.00
Heifer calf (9 at \$1,200)	10,800.00
Cull cow (3 at \$1,500)	4,500.00

Total Gross Income	\$ 170,300.00

Variable Cost

Labour

Maintenance of pastures including repairs to fences and buildings (120 hrs. at \$5/hour)	\$ 600.00
Milking of cows (1095 hrs.)	5,475.00
Management and supervision of herd (730 hrs.)	3,650.00

Inputs

Medicines	1,000.00
Salt Minerals	1,500.00
Feed Supplements	7,300.00
Water pump fuel and oil	4,800.00
Fertilizer	1,200.00
Chemicals	1,350.00
Machinery Operating Expenses	1,720.00
Miscellaneous	1,100.00
Interest on cash variable cost (15% x 2 months)	742.40
Mortality cost	1,500.00

Total Variable Cost	\$31,937.40

Gross margin or income above variable cost \$138,362.60

Fixed Costs (see Annex I for estimation procedures)

Depreciation of:	
Dairy Buildings	500.00
Dairy Equipment	600.00
Cows	13,636.40
Bull	1,000.00
Land charge or interest on investment in land	25,600.00
Interest on average investment in dairy buildings	800.00
Interest on average investment in dairy machinery and equipment	480.00
Interest on average investment in dairy cattle (includes bull, see Annex I)	10,020.00
Land taxes, insurance and administrative expenses	3,100.00

Total Fixed Cost	\$55,736.40
Total Cost (Variable + Fixed Cost)	\$87,673.80
Estimated Profit (Gross Income - Total Cost)	\$82,626.20

Most of the variable cost items do not need clarification. Estimation procedures of depreciation, interest (opportunity cost) and mortality costs are presented in Annex I.

The charges for fertilizer and chemicals are for pasture maintenance. A charge for repairs to fences, buildings and equipment used by the dairy enterprise is included. The farmer's labour and that of his or her family is charged at the opportunity cost of \$5.0 per hour.

The variable cost includes a charge (opportunity cost) on capital invested in the purchase of variable inputs. This charge covers the time period between expenditure of the capital and the recuperation of that money. In a dairy enterprise the money is recovered faster than in a crop enterprise.

Fixed costs include a land charge and depreciation on cow herd, bull, buildings and equipment. Depreciation on the cows and bull is the annual decrease in their value and accounts for the net annual cost of replacing them.

When replacement cows are raised on the farm, a charge for depreciation is not included. The replacement cost is the annual cost of raising and maintaining the replacement herd.

Fixed costs also include an interest charge (opportunity cost) on the capital investment in livestock and facilities. The opportunity cost charged is the interest that the farmer could get for the capital invested in an alternative short, medium and long run investment with similar risk conditions.

The dairy enterprise budget includes a charge for all inputs used (land, labour and capital) with one exception; there is no charge for management. The estimated profit can be considered a return for the management of the farm.

iii) Partial Budgets

Partial budgeting is used to analyze small enterprise changes in the whole farm plan. The procedure consists of taking into consideration the income and expenses that will change by reducing the level, or dropping, of an enterprise from the plan and expanding another. The final result is an estimate of the gain or loss in profit. (See page 20 for an example)

3.3.2 Actual whole farm plan budget

To develop the whole farm budget it is necessary to complete the enterprise budgets for the other crops and for the other livestock activities that are produced on the farm.

Profit maximization is a means to accomplish the farmer's goals. Since fixed costs do not change in the short-run, maximizing gross margins in the short-run is therefore the same as maximizing profits. Fixed costs will not be taken into consideration for the time being to simplify the analysis.

First, a farm map showing land utilization should be developed for easy reference. If the farm plan for the next period is going to be for one year, then the actual farm plan being implemented should include the annual production activities.

Figure 1 Farm Map and Present Land Use

Field # 1 Tree Crops Area 1 acre	#2 Food crops ½ acre	#3 Vegetables and grains ½ acre
	#4 Pasture and livestock 1 acre	

More detailed information on the farm plan being implemented should be presented in tabular form (see Table 5 for an example). The analysis of alternatives is facilitated by having the data organized in tables.

Table 5 Present Farm Plan

Field number	Acres	Crops and livestock
1	1	Cocoa - coconut - banana <u>1/</u>
2	½	Yam - sweet potato
3	½	Vegetables (cabbage, lettuce, carrot) and grains (red peas, gungo peas)
4	1	Pasture and 1 dairy cow and calf

1/ Four-year-old coconut and cocoa plantation

An estimate of income, cost, and gross margins for each production activity is calculated to determine the total gross margin for the actual farm plan.

Table six presents a summary of enterprise budget information per unit of production.

Table 6 Enterprise Gross Margins (crops, per acre)

Enterprise	Unit	Yield	Price	Gross Income	Variable Cost			Gross Margin	Labour Man-days
					Expenses	Interest	Total		
Cocoa-	boxes	12	76						
Coconut-	nuts	400	1						
Banana	stems	550	10						
Total				6,812	2,659	399	3,058	3,754	41
Yam	lbs.	10000	2.0	20,000	5,422	678	6,100	13,900	53
Sweet potato	lbs.	8625	0.8	6,900	2,326	174	2,500	4,400	50
Cabbage	lbs.	5000	1.5	7,500	3,949	296	4,245	3,255	70
Lettuce	lbs.	6000	2.0	12,000	4,019	301	4,320	7,680	60
Carrot	lbs.	10000	1.25	12,500	5,235	393	5,628	6,872	100
Red Peas	lbs.	800	5.8	4,640	2,626	98	2,724	1,916	20
Gungo peas	lbs	1100	3.0	3,300	1,084	116	1,220	2,080	35
Dairy <u>1/</u>	1 cow			8,515 <u>2/</u>	1,560	37	1,597	6,918	12.0

1/ Derived from 20 cows dairy budget

2/ Based on 1878 quarts of milk and one steer calf

Fixed costs in the short-run will not be affected by changes in the farm plan and therefore can be set aside to simplify the calculations. When alternative farm plans include changes in fixed costs, these also need to be estimated and included in the analysis.

Table 7 Present Farm Plan Gross Margin

Enterprise	Land Acres	Labour Man-days	Gross Margin
Cocoa-Coconut-Banana	1.00	41.0	\$ 3,754
Yam	0.30	16.0	4,170
Sweet potato	0.20	10.0	880
Cabbage	0.10	7.0	325
Lettuce	0.10	6.0	768
Carrot	0.10	10.0	687
Red peas	0.10	2.0	192
Gungo peas	0.10	3.5	208
Dairy	1.00	12.0	6,918
Totals	3.00	107.5	\$17,902

The information presented in Tables 5 to 7, shows the present farm plan being implemented and the expected gross margin.

3.3.3 Development of alternative farm plans

i) Annual crops

The process of finding best alternative farm plans can take some time but the rewards can be high. In the following sections emphasis on the selection of alternative farm plans will be in the selection of annual crops. The identification of profitable long-run alternatives with permanent crops is presented in the manual Long-Run Farm Planning - Investment Analysis.

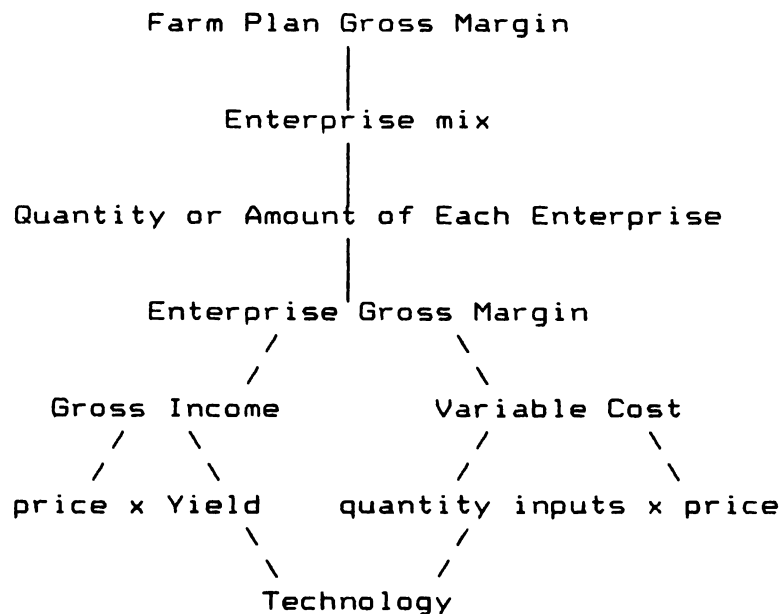
There are systematic procedures and computerized techniques that can be used to select the optimum farm plan. However, these techniques will not be presented in this manual.

By looking at the different components of a farm plan and the factors that affect gross margins we can develop an organized system to look at ways of improving actual expected gross margins.

There are two major factors that have an impact on whole farm gross margins: a) enterprise mix (crop and crop-livestock combination) and, b) the quantity or amount of each individual enterprise in the farm plan (area planted, number of heads of livestock). The two basic items in an enterprise budget that affect gross margins are: gross income and variable cost.

Figure 2 presents the different components and factors affecting farm gross margins. The arrows indicate the direction of influence of factors. Each level provides an opportunity for analysis and exploration of alternatives to increase farm plan gross margins.

Figure 2 - Factors Affecting Short-Run Farm Plan Gross Margins



Analysis of actual production mix, yields, technology, prices obtained for production and paid for inputs, and marketing practices, may provide clues to develop alternative farm plans resulting in more efficient use of resources.

Information about profitable production activities and technology implemented by other farmers in the region and information from agricultural research are other sources of information to explore.

One alternative to the present farm plan could be the same enterprise mix and area for each enterprise but with an improved technology (improved varieties, cultural practices and use of inputs). The present farm plan reflects the farmer's long run goals and the farmer may not be willing to introduce any major change in the enterprise mix and area planted. The farmer knows that with this plan he has survived periods of bad weather, low yields and low prices and he does not want major changes unless they are highly profitable and do not result in a major increase in risk.

Let's assume that after analyzing the information on gross margins in Table 6, we find that the yields obtained and technology used on the farm are the best and no major gains in income could be expected by improving the technology used, and that the expected prices for production reflect the existing market conditions. This means that gross income of present production possibilities offers very little opportunities for improvement.

In addition, by looking at the variable cost component of each individual enterprise in Table 6, we arrive at the same conclusion. Variable costs are within a normal range according to the levels of inputs used and prices paid for inputs.

How then can income be increased?. First, we look at enterprises with the highest return per unit of land. At some point in the process a resource other than land may become more limited. At this point, the selection of alternative enterprises shifts to looking for those enterprises with the greatest return per unit of the limited resource.

Expansion of a profitable enterprise or substitution between enterprises could be used to develop alternative farm plans and explore means of increasing farm plan gross margin.

The data in Table 6, show that yam has the highest gross margin per acre followed by lettuce and the dairy activity. Red peas and gungo peas present the lowest gross margins per acre. Therefore, there exists a possibility of increasing income if the area planted with yam in the next farm plan is expanded and the area under peas is reduced. Gungo peas will be dropped from the plan first because they use land for 10 months instead of five months for red peas.

From the present farm plan, Table 7, we have noted that dropping gungo peas in the next plan releases 0.10 acre of land and 3.5 man-days of labour that can be used in the production of yam. The area planted with Yam will be expanded in only 0.10 acre because there is no more land available. The additional 0.10 acre of yam will require 5.3 man-days of labour. The present farm plan uses 107.5 units of labour and the total available is 272, therefore labour is not a limiting factor to increase the area planted with yam.

Let's assume for simplicity that capital is not limited and that the area with yam can be expanded. The expected change in gross margin can be estimated using the enterprise gross margin information in Table 6.

expanded: Yam	0.10 acres	gross margin \$	1,390
dropped: Red pea	0.10 acres	gross margin	208

Expected change in gross margin		\$	1,182

Another form to arrive at the same results is using a systematic partial budgeting procedure to analyze the expected change in profit. This procedure is presented next:

Enterprise dropped: Gungo peas

Enterprise expanded: Yam

Estimate of change in income (using enterprise budgets information in Table 6)

A. Increase in income (0.10 acres Yam)	\$	2,000
Decrease in cost (0.10 acres Gungo)		122

Total	\$	2,122
B. Decrease in income (0.10 acres Gungo)		330
Increase in cost (0.10 acres Yam)		610

Total	\$	940

Expected change in income (A minus B) \$ 1,182

We arrived at the same value, \$1,182, as before, when gross margins information was used.

When fixed costs are affected by the changes in the farm plan, the increase and decrease in costs values has to take into consideration the changes in fixed costs. For example, reducing or expanding the dairy activity involves changes in fixed costs that need to be considered in the analysis.

The expected change in gross margin is positive and therefore more profitable than the actual farm plan.

Table 8 Alternative Farm Plan A Gross Margin

Enterprise	Land Acres	Labour Man-days	Gross Margin
Cocoa-Coconut-Banana	1.00	41.0	\$3,754
Yam	0.40	21.3	5,560
Sweet potato	0.20	10.0	880
Cabbage	0.10	7.0	325
Lettuce	0.10	6.0	768
Carrot	0.10	10.0	687
Red peas	0.10	2.0	192
Dairy	1.00	12.0	6,918
Totals	3.00	109.3	\$19,084

Plan A represents an alternative to the actual farm plan. Using the partial budget technique, some additional adjustments can be introduced into the plan to explore possibilities of a larger profit for the farmer.

Expanding the area planted with yam and dropping the production of red peas, sweet potato and vegetables, results in a larger farm gross margin and less use of labour.

Table 9 Alternative Farm Plan B Gross Margin

Enterprise	Land Acres	Labour Man-days	Gross Margin
Cocoa-Coconut-Banana	1.00	41.0	\$ 3,754
Yam	1.00	53.0	13,900
Dairy	1.00	12.0	6,918
Totals	3.00	106.0	\$24,572

It will depend on the farmer's preferences, goals and risk aversion whether the farmer will prefer farm Plan B or some combination of Plan A and B.

Maximization of profits may result in some resources not being fully utilized. Alternative farm Plan B results in a total utilization of the land resource during the 12 months when labour is not fully utilized.

Again, can alternative Plan B be improved? The limiting factor is land. The question is: is there an alternative use for land that will yield a higher return?. The answer is yes.

If we reduce the amount of yam by 0.10 acre in the plan, we can plant 0.10 acre of Carrots in April, followed by Lettuce in September. This results in a gross margin increase of \$65.

Included: Carrot	0.10 acre	gross margin	\$687
Lettuce	0.10 acre	gross margin	\$768

		Total	\$1,455
Reduced: Yam	0.10 acre	gross margin	\$1,390

Expected change in gross margin			\$ 65

The expected gross margin for Plan C is presented in Table 10.

Table 10 Alternative Farm Plan C Gross Margin

Enterprise	Land Acres	Labour Man-days	Gross Margin
Cocoa-Coconut-Banana	1.00	41.0	\$ 3,754
Yam	0.90	47.7	12,510
Carrot-Lettuce	0.10	16.0	1,455
Dairy	1.00	12.0	6,918
	-----	-----	-----
Totals	3.00	116.7	\$24,637

Let's assume that the farmer prefers alternative C. Plan C has higher income and is more diversified than alternative Plan B and has a higher expected income than Plan A. But, Plan C uses more labour and working capital than the actual farm plan.

Assuming that the farmer does not have a constraint in getting the additional money to finance the implementation of Plan C, a more detailed short-run plan, including marketing and administration cost information can be developed in order to prepare the whole farm and cash flow budgets.

ii) Permanent crops

An important aspect of long run planning is planning new investments on the farm. Investments can take two major forms: a) perennial crops, and b) capital assets. The methodology for selecting the best investment alternative in permanent crops is presented in the manual: Long-Run Planning, Investment Analysis.

3.4 Short-Run Plan

Once an alternative long-run farm plan has been selected (improved actual farm plan), a detailed short-run plan to be implemented next season is developed. The development of a production, marketing, and financial plan for the coming year is referred to as **short-run planning**.

The process involves specifying the timing of input purchases, production activities, product sales, and investment for the coming year. It also includes the development of a financial plan (or cash flow budget) to carry out the year's activities.

The process has five steps: 1) develop a farm map with proposed land use; 2) develop a crop and livestock production and marketing table with the timing of production and marketing activities (gross income information) and information on variable and fixed costs; 3) develop a whole farm budget to estimate the profitability of the plan; 4) project a **cash flow** (monthly, bi-monthly, quarterly or bi-annual financial budget) for the coming year, and 5) project the **balance sheet** for the end of the year's operation and compare it to the balance sheet at the start of the year (see 3.2 Inventory of resources, Financial situation) to estimate the effect of the plan on the structure of assets and liabilities.

Step 1. Land use

This step consists of preparing a land use and cropping plan representing **crops and livestock** production activities to be implemented during the year. This is similar to the one prepared for analyzing the actual farm plan.

Figure 3 Farm Map and Land Use

Field # 1 Tree Crops Area 1 acre	#2 Yam ½ acre	#3 Yam 0.4 acre Carrot-lettuce 0.1
	#4 Pasture and livestock 1 acre	

More detailed information on the farm plan is presented in tabular form.

Table 11 Farm Plan

Field number	Acres.	Crops and livestock
1	1	Cocoa - coconut -banana <u>1/</u>
2	0.5	Yam
3	0.4	Yam
3	0.1	Carrots-lettuce
4	1	Pasture and 1 dairy cow and calf

1/ Four-year-old coconut and cocoa plantation

Step 2. Crop and livestock production and marketing plan

Table 12 Estimated Production and Disposal of Crops

Name of Crop	Production			Use in the farm*				For sale			
	Acres	Yield/acre	Total	Home	Seed	Feed	Total	Quantity	Price	Value	Time
Cocoa	400 trees	12 boxes	12				-	12 boxes	\$76.00	\$ 912	Jan.
Coconut	50 trees	400 nuts	400				-	400 nuts	1.00	400	Nov. - Dec.
Banana	500 trees	550 stems	550				-	550 stems	10.00	5500	Mar. - Aug.
Vegetables											
Carrots -	0.10	10,000 lbs.	1000					1000	1.25	1250	August
Lettuce	(0.10)	6,000 lbs.	600					600	2.00	1200	Nov.- Dec.
Roots											
Yams	0.90	10,000 lbs.	9000	2500	1500		4000	5000	2.00	10000	Nov. - Dec.
Pasture	1.00										
TOTAL	3.00	---	---	2500	1500		4000	----		\$ 19,262	

* Value of crop production consumed and used in the farm: yams \$8,000.

This format and detail of information facilitates the preparation of the whole farm and cash flow budget. The column, "Time" indicates the expected marketing period and timing of expected cash inflows.

The next section deals with the livestock aspects of the farm plan. The livestock plan format includes a table for production and marketing of livestock and another table for livestock products.

Table 13 Estimated Production and Disposal of Livestock

LIVESTOCK	No. on the Farm	Production	Purchase	Total	Death Loss	Home Use	For Sale			Time
							Quantity	Price	Value	
Cows	1	-	-	1	-	-	-	-	-	-
Calf	-	1	-	1	-	-	1	\$1000	\$1000	Dec.
Goat	-	-	-	-	-	-	-	-	-	-
Poultry	-	-	-	-	-	-	-	-	-	-
TOTAL	1	1	-	2	-	-	1	\$1000	\$1000	

As in the crop plan, the detail used in the presentation of the information will facilitate the preparation of the whole farm budget and cash flow budget.

Table 14 Estimated Production and Disposal of Livestock Products

Product	No. of Prod. Units	Production per Unit	Total Production	Home Use	For Sale			Time
					Quantity	Price	Value	
Milk	1 cow	1878 quarts	1878 quarts	730	1,148	4.00	4,592	Daily
Meat	-	-	-	-	-	-	-	-
Eggs	-	-	-	-	-	-	-	-
TOTAL	----	----	----	----	-----	----	4,592	-

* Value of livestock products used in the home: milk \$ 2,920

Table 15 Estimated Variable Costs 1/

Item	No. of Units	LABOUR			INPUT COSTS					Total Expenses
		Man-days	Price	Cost	Seed	Fertilizer	Chemicals	Medicines	Others	
<u>Crops</u>	<u>Acres</u>									
Cocoa-Coconut-Banana	1.00	41	40.00	1640	-	580	439	-	-	2,659
Carrrots-Lettuce	0.10 (0.10)	10 6	40.00 40.00	400 240	60 62	40 60	23 40	- -	- -	523 402
Yam	0.90	47.7	40.00	1908	3,000	402	112	-	-	5,422
<u>Livestock</u>	<u>Head</u>									
Cattle	1	12	40.00	480	-	60	68	50	902	1,560
TOTAL		116.7	----	4668	3122	1142	662	50	902	10,566

1/ Information from enterprise budgets (hypothetical data are used for illustration). The opportunity cost or interest on the cash used to pay labour and inputs is not included. The expected net farm income estimated for the whole farm budget, therefore, will be a return to farmer's capital (cash used in paying for inputs, invested in machinery, buildings and land) and management.

Depreciation, taxes, administration expenses and other fixed costs are not considered during the selection of the short-run best plan but need to be included in the estimation of net farm income.

Table 16 Estimated Administration and Other Costs 1/

Item	LABOUR			CASH AND NON-CASH COSTS					Total
	Man-days	Price	Cost	Land Taxes	Depreciation Buildings	Machinery	Rent	Others	
General farm activities & expenses	48	40.00	1920	1100	235	665	-	82	2,082
Total	48		1920	1100	235	665	-	82	4,002

1/ Fixed cost information on land taxes, administration and depreciation will be included in the whole farm budget to estimate plan net farm income.

Table 17 Labour Requirements and Distribution

Item	Acres	Labour needs Man-days	MONTHLY LABOUR NEEDS											
			Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Crops														
Cocoa-Coconut-Banana	1	41	3	2	3	6	6	4	4	2	3	2	3	3
Carrot	0.10	10				4.5	1.5	4						
Lettuce	(0.10)	6							2	1	0.5	0.5	2	
Yam	0.90	47.7		9	9	2	2	2	2	2	2	2	9	6.7
Yam		9	9											
TOTAL	2.00	113.7	12	11	12	12.5	9.5	10	8	5	5.5	4.5	14	9.7
Livestock														
	Head													
Cows	1	12	1	1	1	1	1	1	1	1	1	1	1	1
Calves	1													
TOTAL	2	12	1	1	1	1	1	1	1	1	1	1	1	1
General Farm Activities		48	4	4	4	4	4	4	4	4	4	4	4	4
TOTAL Labour Required		173.7	17	16	17	17.5	14.5	15	13	10	10.5	9.5	19	14.7
TOTAL Labour Available*		272	24	24	24	21	21	22	24	24	20	20	24	24
Labour Surplus/Deficit		98.3	7	8	7	3.5	6.5	7	11	14	9.5	10.5	5	9.7

* The total number of man-days corresponds to one person. The number of days of labour available per month takes into account holidays and days not suitable for work in the field due to weather conditions.

The requirements for labour includes nine man-days in January to complete the harvesting of yams already planted (the farm plan being implemented includes three squares of yam, Table 7).

Step 3. Whole farm budget

The farm plan provides information and details on amounts of income and expenses by enterprise. A whole farm budget provides the details and the final estimate of net farm income.

Cash farm income includes all cash receipts from the sale of annual crops, permanent crops and livestock products and any other payments derived from the farm operation.

Cash farm expenditures include all cash expenditures in annual crops (seed, fertilizer, fuel and oil, labour and machine hire), expenditures in livestock (feed purchases, medicines, labour hire), administration expenditures and taxes, insurance and rent. The total of these expenses is called Total Cash Operating Expenses. Subtracting Cash Expenses from Total Cash Income results in **Net Cash Farm Income**.

Cash income needs to be adjusted for non-cash receipts and non-cash expenses to have an accurate estimate of production and expected net income during the planning period. Non-cash receipts are expected increases in inventory of supplies and livestock. If the final inventory is larger than the beginning inventory, an adjustment is necessary to take into consideration production that has not been sold within the period considered in the plan (for example, calves born but not sold during the planning period).

The value of farm products consumed in the home or used on the farm is another non-cash receipt. The value of these products represents production by the farm and should be considered as income generated by the farm.

Non-cash expenses include depreciation of machinery, buildings, and breeding livestock and decreases in inventory of livestock and supplies.

The **Net Farm Income** return to farmer's labour, capital and management) or loss for the plan is the sum of the cash operating income, the value of farm products produced on the farm and used and consumed by the farmer and his family and the total net adjustment for inventory, minus cash and non-cash expenses.

The proposed farm plan budget is recorded in the column, Next Year's Budget. The column Last Year's Results can be used to enter present farm plan results (if the farmer keeps records). This information can be used as a reference for comparing net actual income with the expected income from the proposed plan and helps to analyze the impact of any changes that are introduced.

Whole Farm Budget or Projected Income Statement

EXPENSES (Data from Tables 15-16)

	LAST YEAR'S RESULTS	THIS YEAR		NEXT YEAR'S BUDGET
		BUDGET	RESULT	
Cash Operating Expenses				
Crop Expenses				
. Labour				
Cocoa-Coconuts-Bananas		1,640		
Carrots		400		
Lettuce		240		
Yam		1,908		
. Seeds				
Carrots		60		
Lettuce		62		
Yam		3,000		
. Fertilizer		1,142		
. Chemicals		682		
.		-		
Livestock Expenses				
i) Cattle				
. Labour		480		
. Fertilizer		60		
. Chemicals		68		
. Medicines		50		
. Others		902		
ii) Goats		-		
Taxes, Rent, Others, Labour in general activ.		1,182 1,920		
1. TOTAL CASH EXPENSES		13,796		
Non-Cash Expenses				
. Depreciation				
Buildings		235		
Machinery and Equipment		665		
. Decrease in inventory				
Livestock		-		
Crops & supplies		-		
2. TOTAL NON-CASH EXPENSES		900		
3. TOTAL EXPENSES (1. + 2.)		14,696		

INCOME (from Tables 12-14)

	LAST YEAR RESULTS	THIS YEAR		NEXT YEAR BUDGET
		BUDGET	RESULT	
Cash Income				
Crop Sales				
. Cocoa-Coconut-Banana		6,812		
. Carrots		1,250		
. Lettuce		1,200		
. Yam		10,000		
.				
Livestock Sales				
. Cattle				
Cows				
Calves		1,000		
. Goats		--		
. Hogs		--		
. Livestock Products				
Milk		4,592		
Eggs				
. Others				

4. TOTAL CASH INCOME		24,854		

Non-Cash Receipts				
(Farm products				
consumed by the family				
and/or used in the farm)				
Crops				
Yam		8,000		
Livestock				
Milk		2,920		
. Increase in inventory				
Livestock		-		
Crops & supplies		-		

5. TOTAL NON-CASH RECEIPTS		10,920		

6. TOTAL FARM INCOME (4+5)		35,774		

7. NET CASH FARM INCOME (4-1)		11,058		

8. NET FARM INCOME (6-3)		21,078		

The column This Year Result is used to compare with planned production and financial goals (after farm plan implementation), and draw conclusions to improve the farm plan for the next year.

The net income figure in the farm plan needs some interpretation. The whole farm budget includes a retribution to all the inputs used in the production process (cash and non-cash expenses). Inputs are charged at the purchase price.

Services provided by buildings, machinery, equipment and other durable assets are charged based on an annual depreciation rate. Farmer and family labour are included in the budget at a salary rate similar to the salary they could earn working outside the farm (at their opportunity cost).

No charges have been included for the use of the land (a retribution to the money invested in land) and for the money invested in working capital, machinery, equipment, buildings and livestock. So the expected Net Farm Income in the whole farm budget can be interpreted as a retribution to farmer's capital and management of the farm.

When the land is rented, the rent paid is recorded as a cash cost. The interpretation of expected Net Farm Income is the same as before; it is the retribution to a farmer's capital in the business (all forms of capital, except land) and management.

When a farmer and family labour retribution is not included in the budget, Net Farm Income is a retribution to farmer and family labour (retribution to the number of days they work in the farm), to his capital and to management.

More information on farm plan implementation control and analysis is included in the Recordkeeping and Farm Records manual.

Step 4. Cash flow budget

A cash flow budget includes a summary of the cash inflows and outflows expected during the implementation of the farm plan. Its main use is to monitor financial implementation of the farm plan, and to estimate credit needs and determine the loan payment capacity of the farm business operation.

The projected cash flow provides information on the time and the amount of the transactions during the farm plan implementation. Analysis of deviations between what is planned and what is realized can assist to detect future cash flow problems and to take corrective measures to solve the problem in time.

The cash flow budget differentiates with respect to the whole farm budget in that the cash flow budget takes into consideration all kinds of cash flows. Principal payments on loans and cost of new

capital purchases (machinery and equipment) are included as cash outflows. New loans and the sale of capital items are included as cash inflows. Non-cash income or non-cash expenses are not part of the cash flow budget.

Depending on the activities of the farm and information needed, the cash flow budget can be prepared showing monthly, bi-monthly or quarterly cash flows. There are different formats for recording cash flows but in general all require the same information.

Most of the information needed for a cash flow budget can be found in the farm plan, in the whole farm budget and in the enterprise budgets. The cash flow for the farm plan includes a beginning balance on January 1st of \$1,000 in cash that the farmer is expecting to have at the beginning of the year and inflows in January corresponding to production of beans and yam from the actual farm plan. The beans have already been harvested and are in storage and the last square of Yam will be harvested in January.

The cash flow includes a loan payment of \$800 that is due in August (\$730 principal and \$70 interest) and an outflow of \$1,200 for a daughter's wedding in November.

In a small farm family operation exceptional cash family expenses influence the farmers' business decision making. By including those cash outflows in the cash flow budget, the timing of marketing farm production can be programmed to meet the additional cash needs. The cash flow budget can include personal and family cash outflows required for food, clothes and entertainment and cash inflows from personal and family sources of income outside the farm.

CASH FLOW BUDGET

	Jan.-Feb.	Mar.-Apr.	May-June	July-Aug.	Sept.-Oct.	Nov.-Dec.
1. Beginning Cash Balance	\$ 1,000	\$ 500	\$ 98	\$ 1,380	\$ 3,155	\$ 2,747
<u>CASH INFLOWS</u>						
2. Crop Sales						
Cocoa-Coconut-Banana	1,412	1,000	2,000	2,250	1,000	400
Carrots				1,250		
Lettuce						1,200
Yam	2,000					
Red & Sungo peas	400					
3. Livestock						
Calf						1,000
Milk	708	732	732	744	732	732
4. Capital Sales (used machinery)						
5. Other Sales						
6. TOTAL INFLOWS	\$ 5,520	\$ 2,232	\$ 2,830	\$ 5,624	\$ 4,887	\$ 4,079
<u>CASH OUTFLOWS</u>						
7. Labour	\$ 1,320	1,360	1,180	920	600	1,348
8. Farm Operating Expenses						
Seeds	3,000	60	62			
Fertilizer	290	472	60	290	30	
Chemicals	220	112	23	327		
Medicines	10	10	5	10	10	5
Others	150	150	100	100	200	202
Administrative, taxes	20	20	20	22	1,100	--
9. Family Expenses (wedding)	--	--	--	--	--	1,200
10. Capital Purchases	--	--	--	--	--	--
11. TOTAL OUTFLOWS	\$ 5,020	\$ 2,134	\$ 1,450	\$ 1,669	\$ 2,140	\$ 2,755
12. NET CASH FLOW (Item 6-11)	\$ 500	\$ 98	\$ 1,380	\$ 3,955	\$ 2,747	\$ 3,324
13. Borrowed Funds	--	--	--	--	--	--
14. Loan Repayment						
. Principal	\$ --	\$ --	\$ --	\$ 730	\$ --	\$ --
. Interest	\$ --	\$ --	\$ --	\$ 70	\$ --	\$ --
15. Ending Cash Balance (Item 12+13-14)	\$ 500	\$ 98	\$ 1,380	\$ 3,155	\$ 2,747	\$ 3,324
16. Debt Outstanding	\$ 800	\$ 900	\$ 800	--	--	--

From analysis of the above cash flow budget, we see that net cash flows are positive and the farmer may not need to borrow money to implement the farm plan. The first four months of the year seem to be the most critical in terms of cash. Any reduction in the expected yields or prices for the crops to be harvested during the period January-April may result in a shortage of cash to buy inputs and pay the bills on time.

The cash flow budget could include monthly family living cash expenses. In this example labour is provided by the farmer and it is assumed that the cash outflows for labour contemplated in the plan are enough to cover farmer and family regular living expenses. If additional cash is required, this information would be included under Item 9, "Family Expenses".

Item 12, "Net Cash Flow", shows the loan repayment capacity of the farm operation. When net cash flows are negative, it indicates that to implement the proposed farm plan and meet obligations, the farmer will have to look for additional funds during those periods.

The expected amount to be borrowed is entered in Item 13, "Borrowed Funds". The repayment period and quantities will depend on the lending institution conditions. The repayment of the loan is recorded in Item 14, "Loan Repayment".

If the loan to be repaid is greater than the expected net cash flow for that period the farmer will not be able to repay the loan on time. In order to be able to meet the loan payments the farmer will have to negotiate a longer repayment period.

During the implementation of the plan the cash flow budget can be used to monitor farm income and expense patterns. If expenditures during the implementation of the plan are higher than expected, then the farmer can take corrective measures or plan ahead for future cash needs.

Similar action can be taken when cash inflows are below the planned level. Lower yield or crop losses during the first quarter of implementation of the plan will affect the cash flow for the rest of the year and may reduce the financial capability of the farmer to buy inputs and pay bills and loans on time. The monitoring of the cash flow during farm plan implementation and the comparison with planned cash flow allows the farmer to anticipate problems and plan corrective measures.

Step 5. Projected Balance Sheet

The balance sheet contains a listing of assets and liabilities of the farm business. Comparison between the balance before farm plan changes and the projected balance sheet provides information on how the alternative plan affects assets, liabilities, farmer's net worth and the liquidity of the business (See preparation of net worth statement in the manual on recordkeeping and farm records).

3.5 Recordkeeping

If a farmer's production and financial goals are to be realized, it is necessary to relate the control measures to the same goals. A control system for the farm operation must monitor production, marketing and financial information.

A recordkeeping system is an organized set of records where descriptions, quantities and values on the physical and financial transactions of the farm plan implementation are registered for control and analysis. Simple farm records provide the information for monitoring farm plan implementation, for analyzing the farm business results, for budgeting and farm planning (See preparation of income statement in the manual on recordkeeping and farm records).



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ANNEX I

**Estimation Procedures of Depreciation,
Interest on Investment and Mortality Cost**

**ESTIMATION PROCEDURES FOR:
DEPRECIATION, INTEREST ON INVESTMENT, AND MORTALITY COST**

Annual Depreciation

Depreciation is a method of allocating on an annual basis the cost of a working asset over its productive life on the farm. Many of these assets have a residual value after they are no longer useful on the farm.

$$\text{Annual Depreciation} = \frac{\text{Cost} - \text{Salvage Value}}{\text{Useful life in years}}$$

In the preparation of the dairy enterprise budget the following values for depreciation were used:

Useful Life

Cows	6.6 years (replacement rate of 15%)
Bull	3 years (replaced every three years)
Buildings	20 years
Equipment	10 years

Salvage Value

Buildings	\$ 0
Equipment	\$ 0
Cull cow	\$1,500
Bull	\$7,000

Annual depreciation of cows

$$\text{Annual Depreciation} = \frac{120,000 - 30,000}{6.6} = \$13,636.36$$

Annual depreciation of bull

$$\text{Annual Depreciation} = \frac{10,000 - 7,000}{3} = \$1,000$$

Interest on investment in cattle

First it is necessary to estimate the average value of the capital invested in cattle. This is done by taking into consideration the purchase price (cost) or actual value of the cow and the expected value at the end of its useful life (cull cow).

$$\text{Average Value of Cow} = \frac{\text{Cost} + \text{Cull Cow Value}}{2}$$

$$\text{Average Value (1 cow)} = \frac{\$6000 + \$1500}{2} = \$3,750$$

$$\text{Average Value (20 cows)} = \$3750 \times 20 = \$75,000$$

The annual interest on the invested capital will be equal to the average value of the cow (or the total amount of capital invested in the 20 cows) times the interest rate.

$$\text{Interest on Investment} = \text{Average Value of Cows} \times \text{Interest Rate}$$

$$\text{Interest on Investment (20 cows)} = \$75,000 \times 12\% = \$9,000$$

$$\text{Interest on Investment (1 bull)} = \frac{\$10000 + \$7000}{2} \times 12\% = \$1,020$$

Mortality Cost

Mortality cost is sometimes included in livestock budgets. It is reasonable to expect that during the year a certain number of animals will die. What is not known with certainty is the age of the animals that will die. It could be a four year old cow or a cow that is at the end of its useful life.

Mortality rates vary between categories of cattle. We should expect a higher mortality rate in calves than in young cows. If the herd composition is close to the end of its useful life we should expect a higher mortality rate.

$$\text{Mortality cost} = \frac{\text{Cow cost} + \text{Cull Cow Value}}{2} \times \text{Mortality Rate}$$

If the average mortality rate for dairy cows in the region or in the farm is 2 percent, that means that there exists a probability that two cows for every 100 cows will die per year. In our example the mortality will be less than one cow per year or two cows every five years.

$$\text{Mortality Cost (1 cow)} = \frac{\$6000 + \$1500}{2} \times 0.02 = \$75$$

$$\text{Mortality Cost (20 cows)} = \$75 \times 20 \text{ cows} = \$1,500$$

SOURCES:

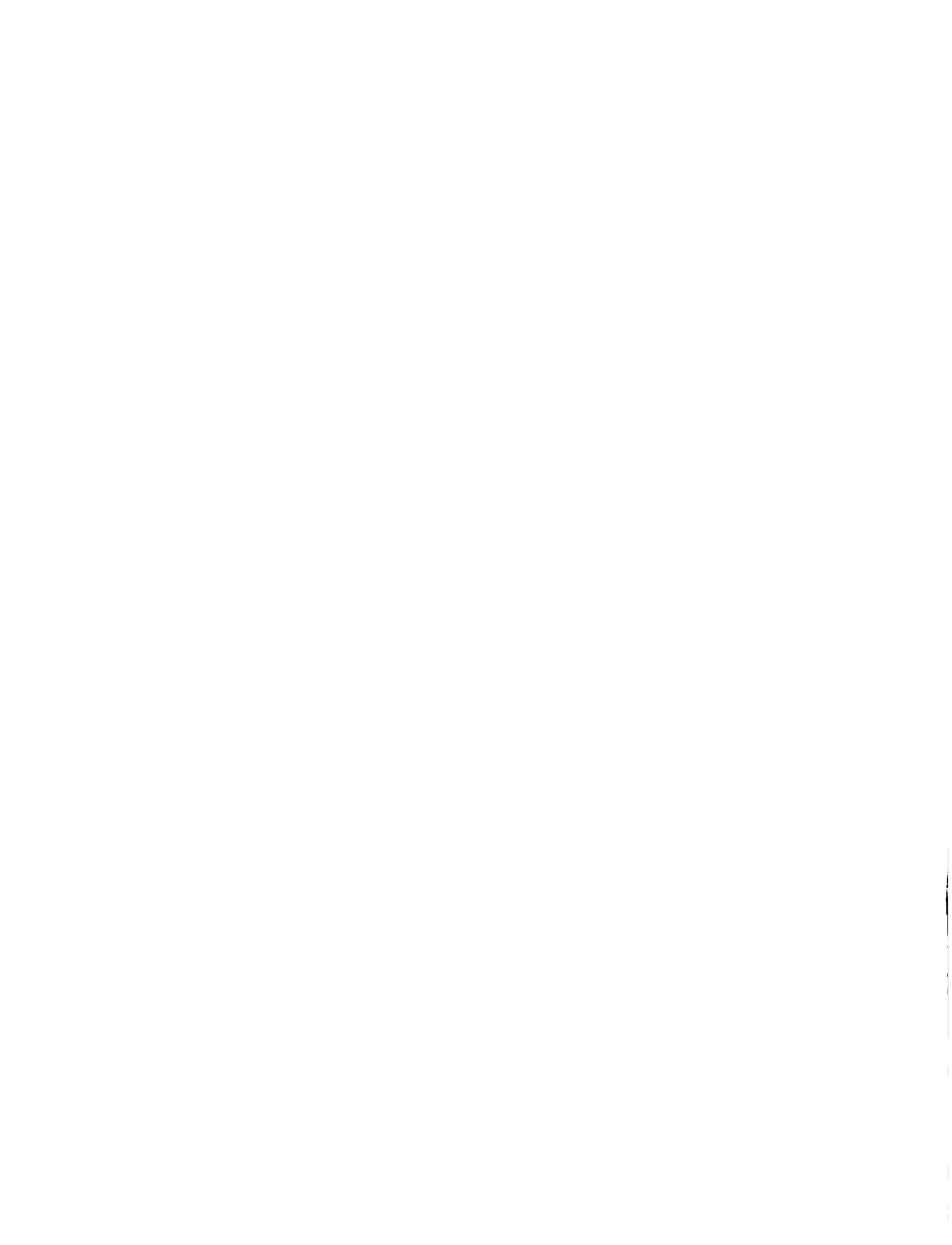
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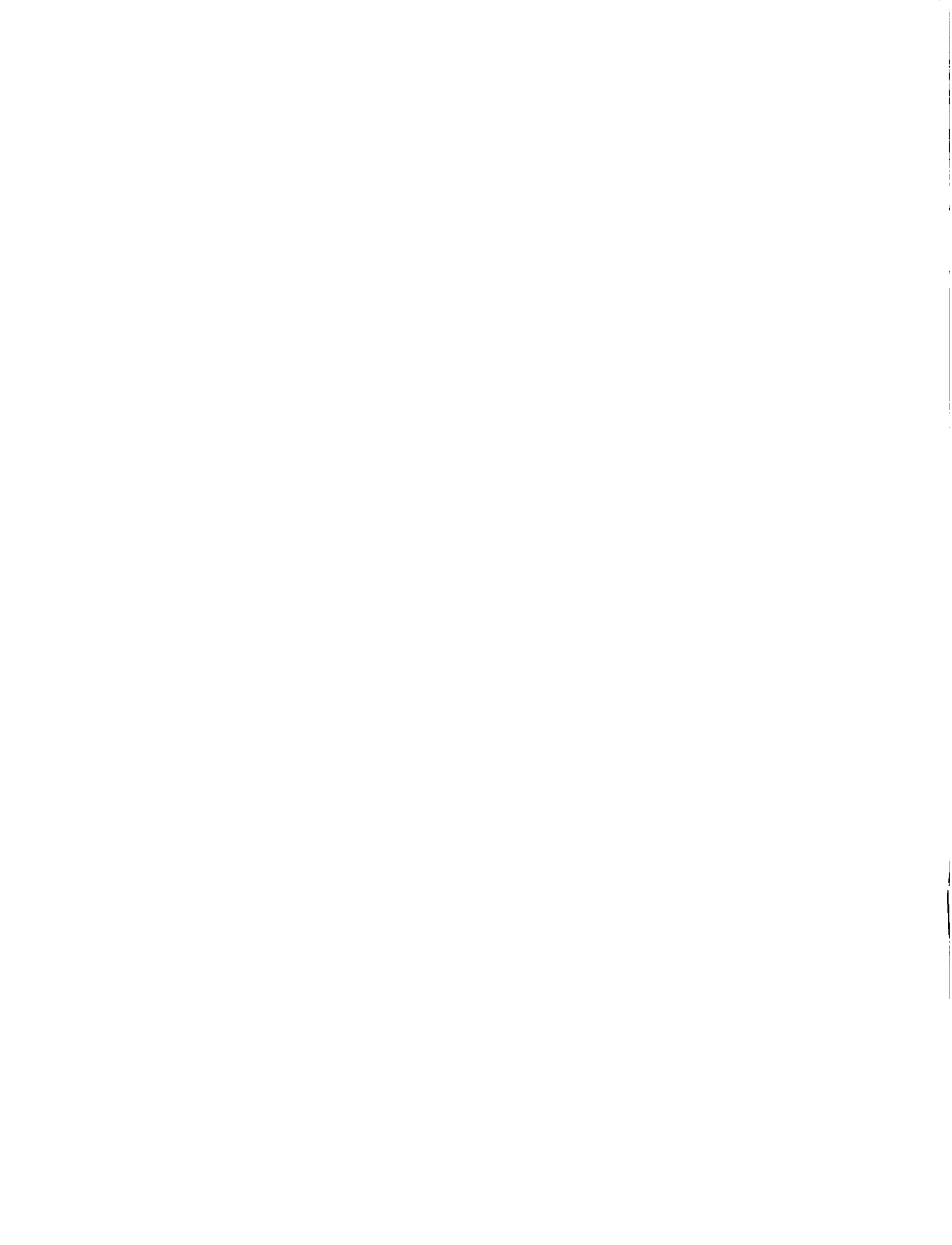
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