

93206-5/62

PNAA 0058

A FRAMEWORK FOR DESIGNING AND  
EVALUATING RESETTLEMENT SCHEMES

IAN-34710

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December 1982

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"--the twin dangers in all  
development projects--  
grandiosity and arrogance."  
Baldwin (7)

Even a cursory review of the literature indicates that the number of resettlement failures--measured in terms of performance against original expectations--far exceeds the number of successes. The objective of this study is to develop a user-oriented framework for designing and evaluating resettlement projects with the goal of increasing the success ratio. The focus will be on approaches and procedures which are consistent with the data and skill constraints normally present in less developed countries.

The analysis starts with the assumption that the appropriate decision-makers have selected a resettlement approach in preference to other types of projects which might have been used to reach the development goals and objectives of the region or nation. The framework discussed here is not designed to assist in making comparisons among types of projects, but rather it focuses on design and evaluation procedures within the resettlement approach. This is a critical assumption because many authors question the appropriateness of using highly capital-intensive resettlement schemes in a nation's development strategy (19, 27, 77). Indeed, one author suggests resettlement is ecological imperialism (82).

The complexity of the linkages in resettlement schemes requires the development of a conceptual/analytical framework for sorting out

the issues involved. The approach developed for this analysis is to focus on the elements within a matrix. The rows in the matrix are designed to emphasize the relationships among the inputs used in the resettlement process. The classification scheme which seemed the most appropriate for use here was based on the following five categories of inputs: (1) natural resources; (2) human resources; (3) capital and technology; (4) organizations and institutions; and (5) spatial orientation and infrastructure.

The level of aggregation in the economic system was selected to represent the columns in the matrix. That is, the input groupings in each of the five rows are evaluated at various levels of aggregation in the production-marketing continuum. The specific classes used in the delineation of the columns include: (1) definition and parameters used in measuring the input class; (2) use of the input at the commodity or enterprise level; (3) input combinations at the production level of aggregation; and (4) forward and backward linkages at the project level.

The organizational format of the paper is designed to permit the discussion of issues in a series of stages within the framework of the above described input/level of aggregation matrix. The objective in Stage I is to delineate concepts and set the parameters for the analysis. This includes defining the concept of resettlement and grouping the various types of resettlement schemes into a classification system. The identification of common elements which have been found to contribute to the failure of resettlement projects is followed by a summary of the elements needed in developing a structural framework for the analysis.

The emphasis in Stage II is on methods for describing and measuring the resources (inputs) available for designing a resettlement scheme. In Stage III the focus is on concerns at the commodity or enterprise level of aggregation. The emphasis is on questions related to methods for combining resources in the pursuit of outputs which contribute to the fulfillment of the project goals and objectives.

Stage IV is a continuation of Stage III, but with the focus of attention shifting to the trade-offs at the production unit (farm) level rather than at the enterprise level. A methodology based on the "typical farm" concept is used to discuss the methods needed for evaluating each of five input elements at the farm level of aggregation.

The objective in Stage V is to examine the evaluation process at the project level. Macro, or more accurately, aggregate micro-concerns are discussed. Typical project evaluation techniques are reviewed, with emphasis on issues which need to be addressed from a project level perspective. A summary of the stages proposed for the development of a process for designing and evaluating resettlement schemes concludes the paper.

## STAGE I: DELINEATING CONCEPTS AND SETTING THE BOUNDARIES

A starting point in any analysis is an examination of the content of the phenomena being investigated. The approach used will be an inductive process, i.e., the emphasis will be on developing generalizations based on observations of activities associated with resettlement rather than on a precise, logically structured definition of the resettlement concept.

The first set of observations is designed to examine the three basic attributes of resettlement schemes. These attributes include:

1. the use of previously unused or underutilized land (natural resources);
2. the movement of people; and
3. some degree of control by the developer--usually the government.

A brief commentary on each of the attributes will help to narrow the focus when designing and evaluating resettlement schemes. For example, alternative sources of land could include:

1. more intensive use of underutilized land on large holdings, including changes in land use such as clearing unproductive forests;
2. development of previously unused land through investments in drainage, irrigation, salinity control, etc;
3. control of tsetse fly, malaria or other impediments to human habitation; and
4. development of technology and skills which permit planting crops on land that was previously not farmed (tractors

to plow hard pan soils, new short season varieties, etc.)

Determining the source of land inputs helps to identify the possible constraints, to success in a resettlement project. For example, the problem of whether and how much the previous owner should be compensated needs to be specifically addressed when the scheme is based on the intensification of land currently held in large estates (3, 5, 34, 73). Conversely, this is not a major concern when a scheme is based on control of the tsetse fly in previously uninhabited areas.

A second activity in the design and evaluation of resettlement schemes is the process of selecting--and the resulting societal composition of--residents in the resettlement area. A review of the literature suggests the methods by which new residents are "selected" usually follows one of three decision processes [excluding the unplanned "squatting" (82) on land owned by others]:

1. spontaneous migration--individuals or families make migration decisions on the basis of "free" land even when little or no services are provided as incentives (63);
2. encouraged migration--individuals or families migrate in response to the availability of land that has been developed to some degree by government or private groups (54, 57); and
3. compulsory migration--a decision is made by society to move people in an attempt to increase societal welfare--this includes such diverse purposes as prison farms, political refugee camps, and movement from areas flooded for construction of a dam (50).

It is of critical importance that the motivation for the migration act become an integral input into the design process (39, 64, 67). For example, the management inputs necessary to administer a spontaneous migration type scheme are much less than those in a scheme based on compulsory migration.

The two basic inputs, the land and the people, tend to be responsible for the confusion on whether these activities should be labeled settlement or resettlement. Because of the immobility of the land resource, the term resettlement seems more appropriate when unused or under utilized land is involved. The resettlement label seems more accurate when it concerns people migrating to new areas. The two terms generally describe the same phenomena with the specific attribute being stressed determining which term should be used.

A third attribute of the resettlement process is the type and degree of control exercised by the developer. This control can exhibit both "carrot" and "stick" characteristics. One method of control is to provide a level of incentives high enough to attract a large pool of applicants from which settlers with desired characteristics can be selected. Conversely, control can be enforced by instituting rigid performance goals which must be attained to prevent dismissal from the scheme.

This brief review of basic attributes of resettlement schemes is needed to focus attention on decisions which must be made very early in the design of a resettlement project. The basic issues include: (1) what land will be used; (2) who will be selected to migrate to the project; and (3) what will be the continuing role of government in the project's administration.

The next step in "sorting out" the variables to make the resettlement design process more manageable is to classify the schemes by purpose, i.e., why is the project being undertaken. A system of twelve specific classes of projects, grouped into three general categories of resettlement, was developed on the basis of a relatively extensive review of the literature. While other project designers may prefer alternative classification schemes, this approach seems most appropriate for the purposes of this analysis (19, 21, 24, 92).

The first category of resettlement schemes is one designed to increase and improve a nation's agricultural base. Specific classes include:

1. Schemes designed to increase the potential agricultural productivity of an area through eradication of disease or pests, control of flooding or salinity, and/or by improving growing conditions with irrigation and drainage. The emphasis is on increasing the basic productivity of the land resource (63, 73, 93, 94, 101, 102);
2. Programs aimed at changing the products obtained from the land. A common example is redirecting the use of land from subsistence to cash crops. This class is distinct from class (1) in that the primary aim is not to make the land more productive but rather to change the use of the resource (38, 70, 73, 82);
3. Projects designed to change the factor mix in the production process. Examples include the redistribution of people to relieve population pressure, increasing

job opportunities for landless labors, and providing education for training and skills in agriculture and agriculture related activities (63, 73, 92, 94); and

4. "Second round" resettlement projects which result from other actions. This includes projects where the migration of people is necessitated by development actions in other areas such as land inundation in the flood pool area of a new dam (1, 5, 33, 34, 51).

A second category of resettlement schemes are those which are a response to a disaster. This group includes:

5. Schemes in response to natural disasters such as desert encroachment, flooding, drought, and pests (26, 50, 58); and
6. Schemes which are the result of man-made disasters such as wars and political upheavels. Both classes within this group tend to be highly emotional activities which increases the difficulty of employing rational planning in developing the project design (50, 106).

A third category of resettlement schemes are those with socio-economic and political aims and purposes. Specific classes of projects include:

7. Schemes designed to change the political philosophy of a region or nation. An example of this class of project is where the purpose is to change agricultural operations from private to collective or communal farms (15, 67);

8. Projects designed to control certain groups within a nation such as nomads and prisoners. More subtle control is attempted in projects where certain tribes or groups are encouraged to return to specific regions or "homelands" (73, 104);
9. National security may be a reason (or an excuse) for developing a resettlement scheme. Resettlement has been used as a device for protecting "loyalist" against "insurgents" (51, 53, 57);
10. Regional balance has also been used as the goal of resettlement programs. The new capital cities of Lilongwe and Brazila are examples of attempts to develop the interiors of Malawi and Brazil (63);
11. Resettlement schemes designed as rewards or incentives to certain persons or groups of persons. For example, some colonial powers in Africa attempted to retain white settlers by offers of new lands and/or by settling natives in strategic villages as labor reserves for the whites. Resettlement land has also been used as a bonus for military service (25); and
12. Resettlement schemes which have religious or utopian beliefs as the basis for their existence. The high level of emotion associated with these schemes make them difficult to compare with other classes of resettlement schemes (92).

The rationale for developing the above classification scheme is to help in answering the "why" question. Why is this specific resettlement

project being undertaken? Do the project's goals and objectives support the goals and objectives of the nation? At this point the two basic concerns which must be included in the first stage of designing a resettlement scheme have been addressed--why is the project being developed and what are the basic attributes of the proposed scheme.

The third element in this introductory section is a review of studies evaluating previous resettlement efforts in an attempt to identify common characteristics associated with project failures (31, 102). Following are ten generalizations [with recognition of the danger of overgeneralizing (78)] why resettlement projects have not achieved their original objectives:

1. A lack of attention to exogenous factors. Examples include failure to account for changes in general economic conditions in the world (e.g., rapidly inflating oil prices), shifts in donor philosophy and changes in tastes and preferences (15);
2. The failure to adequately consider the process by which present conditions were achieved. The cultural practices of most peasant farmers are the result of many years of trial and error. Ignoring this information has resulted in spectacular failures (13, 18, 50);
3. The failure to distinguish between national (or societal) goals and individual goals. Except for compulsory migration, the question of whether or not to migrate is an individual or family decision. The decision is made on the basis of a favorable incentive/risk ratio at this level rather than at the national

- level. The magnitude of the penalty for making a wrong decision is also of prime importance in this decision process (42, 48);
4. Generalization of results from one project to another without adequate consideration of the difference in the resources available often leads to unfilled expectations (9, 35);
  5. Inadequate planning is a prime reason for lack of project success (3, 21, 41, 69). The failure to recognize that a resettlement project is a very complex undertaking often results in badly planned projects. For example, the design team may fail to adequately recognize the critical lack of managerial skills. One finds planners spending a substantial amount of time in computing capital/output ratios while paying only passing attention to objective measures of the management constraints (13, 21, 41, 69, 105);
  6. The importance of institutional/cultural obstacles, especially human stress associated with the migration, does not receive the proper amount of attention (34, 48, 92);
  7. Imposition of evaluation criteria tied to one objective in a project designed to meet multi-objectives results in a reported "lack of success." For example, a project may be evaluated as ineffective on efficiency grounds when the project's major objective was to redistribute land to the "poorest of the poor" (13, 77, 92).

8. A realistic time frame is needed for measuring the performance of a project. The short-run time frame often preferred by politicians cannot be used for measuring long term economic and social benefits (34, 49, 69).
9. The lack of commitment to the project. Some planners look at resettlement as a manifestation of an "anti-urban bias." Resettlement projects are viewed as a method of "keeping them down on the farm" when the more realistic alternative is to provide for rural to urban migration (55).
10. Finally, there is too often an attempt to develop sophisticated models of the implementation process (43) when what is needed, according to one Malian official, is "common sense, reflection and sometimes, courage" (105).

The activities described in this chapter complete Stage I in developing a design framework. The objectives in this stage of the analysis were to focus attention on broad issues such as: (1) why is this project being designed; (2) what land will be used; (3) who will live on the project; (4) what is the role of government in the operation and control of the project; and (5) have lessons learned from mistakes made in previous resettlement schemes been considered in the current design? Unless answers can be supplied for these questions, the design process should not continue.

## STAGE II: MEASURING THE RESOURCES AVAILABLE

The information developed in Stage I helped to delineate the boundaries of the design criteria for a resettlement project. In this chapter the focus is on developing measures of the quantity and quality of resources available for use in meeting the objectives of the project. As in Stage I, the framework is designed to address a series of specific issues which an analyst can follow in implementing the design process.

### Data Collection Guidelines

A precondition for conducting a resource appraisal is an analysis of the data needed to measure the level and distribution of resources in the area. The objective here is to develop generalizations which might serve as useful guidelines, but with due recognition that some of the data requirements will be project specific.

First, data should be directly relevant to the project being designed. There is a tendency to collect more data than are needed. The gathering of information which "might be useful" is a drain on the analyst's time, lengthens the time during which the data are not available, and increases the cost of data collection, manipulation and storage.

Second, if a large scale survey is planned, a pretest should be used to evaluate the data collection scheme. It is especially important to evaluate the extent to which responses are what the respondent "thinks the questioner wants to hear" (4).

Third, a partial census or a sample of respondent's views is often preferable to a complete census. Various sampling techniques and stratification procedures should be used to limit the amount of data that needs to be collected. Even very low sampling rates may provide sufficient data for decision making.

Fourth, the sampling rate should be adjusted on the basis of the function the data are expected to serve in the project design. Conducting a detailed soil survey in the mountainous area of a nation probably is not the best use of the project's planning resources. Yet this is often done because it provides "complete coverage" of the nation's soils. The failure to sample an area in adequate depth may lead to errors of omissions but the decision facing the analyst is whether the knowledge gained from the increased precision resulting from complete coverage will provide a higher return than if those resources were used in some other activity associated with the design of the project.

Fifth, useless precision is a costly mistake. The additional time and effort spent on collecting detailed data usually do little to increase the accuracy of the estimates.

Sixth, there is a tendency to neglect data that are currently available. Failure to use data that have been collected previously is a waste. Many economic measures, especially structural type coefficients, change slowly over time. Data that seem "out of date" may be valuable.

Seventh, one must carefully plan the amount of time allocated for planning, collecting and analyzing resource data. Starting with an overly ambitious plan and then taking short-cuts when time is running short is a critical and sometimes fatal mistake in designing a resettlement project.

Eighth, there is no "best" format for collecting, recording and storing data. Format examples from FAO, World Bank, or other USAID studies can be used as a starting point and adjusted to project conditions through a trial and error process by the design team.

### Defining the Resources Available

A second precondition for undertaking an appraisal of resource availability is the specification of the definition being used to measure resources. The natural resources literature (which can be extended to include other classes of resources) indicates there are three general approaches for defining resources--each with quite different parameters and each providing important insights for describing the resources available in an area (108).

The term resource reserve is used to define a situation where present economic and social conditions prevail and the current level of technology is assumed. That is, current production processes are assumed in place, as are price/cost relationships, institutional restrictions and the infrastructure in the area. Of the three measures of resources, the resource reserve definition is the most limiting.

In a second definition, called the resource base, the assumption of the current level of technology is retained, but changes in economic and social conditions are permitted. For example, if technology is available for extraction of a mineral, but the current price of the mineral is too low to cover mining and marketing costs, the mineral would be included in the resource base but not in the resource reserves.

The most inclusive definition of resources is called the resource stock. Under this definition, changing technology, economic relationships and social conditions are assumed. For example, the resource stock of tillable land would increase with the development of new machinery and/or positive changes in price and cultural relationships.

It would be unprofitable to get bogged down in the infinite number of refinements possible with various shadings of these basic

definitions. It is important, however, to be specific about what assumptions are used in making a resource appraisal and include this information in the design plan. A technique that seems to be workable is to use the resource reserve definition as a benchmark, but with provisions for accommodating significant changes in technology and economic or social conditions.

#### Natural Resource Data Base

Within the context of the guidelines and constraints of the previous sections of this chapter, the following list is suggested as a starting point for conducting a natural resource appraisal of a potential project area (56, 65, 107).

1. Land: Include items such as topography, soil types, capability class, present and potential land use, soil erosion and soil stability. The emphasis should be on the amount of land available for growing various types of crops within the probable constraints that will be faced by the farmers (63, 107). If the project is of sufficient size to include new towns and villages, it is useful at this early stage in the process to select preliminary sites and check the soil in these areas to insure their adequacy as potential building sites.

2. Water: In addition to the standard rainfall level and distribution data, information is needed on the potential of the area's water resources for irrigation (including flow and stability), the propensity for salinity and drainage problems, and the projected evapotranspiration rates. It is also important to consider the legal status of water rights in the area (who has legal rights to the water) and the proximity of the water to land that is amenable to irrigation. Note

should also be made about the probable type of irrigation that would be needed under project conditions, i.e., ditch, sprinkler or other.

3. Climate: In addition to the rainfall information discussed above, it is important to determine the periods of sunlight and length of growing season, the altitude, latitude, longitude and prevailing humidity and temperature conditions under average and extreme conditions.

4. Diseases and insects: The presence and level of infestation of insect and the severity of endemic diseases are important. It is also important to determine any direct relationships between specific diseases and insects and the current and proposed crops and livestock. For example, will the introduction of a new plant variety result in it serving as host for one of the pests which is prevalent--or might be introduced--in the area?

5. Fertilizer Deposits: The presence of materials used in commercial fertilizer and lime may have an important impact on the agricultural viability of a specific area. The bulkiness of these products results in a high transport cost if they must be shipped long distances.

#### Human Resources Data Base

Information on the magnitude and distribution of people in an area identified for resettlement probably will be scarce. The reason an area is selected for resettlement is often the lack of human resources in the area. It is of vital importance to fully document the claims, wishes and desires of the present residents of a proposed resettlement area. For example, what legal and/or moral claims do the present residents have on the land? Will new residents be greeted warmly or with hostility? Will the "mixing of the old and new" people cause religious,

tribal or related types of conflicts?

Following is a generalized outline of the type of information which needs to be collected about the present residents of a proposed resettlement area:

1. Population characteristics: What are the density distribution, age-sex composition, fertility levels and related demographics in the area?

2. Skill level: Information on the general level of literacy as well as more specific information on technical and professional skill levels needs to be recorded.

3. Labor force information: What are the labor force participation rates by age and sex? Information is also needed on seasonal variation in demand for labor and off-farm employment in the area.

4. Organization of labor force: What is the general philosophy of work and rewards for work, i.e., communal or individual labor and collective or personal rewards for effort?

5. Values, rituals and religions: Will tribal loyalties and hostilities, ethnic origins, traditional values and/or compatibility of religious views require adjustments in the project design?

This information needs to be collected from current residents of the area and, if identified at this stage, the potential new settlers as well. However, the development of criteria for selecting new settlers and documenting their characteristics is a relatively detailed process which is better tackled a bit later in the design process. In this initial phase the focus will be limited to information on current residents of the resettlement area.

### Capital and Technology

A third component in the resource appraisal is a determination of the characteristics of the capital and technological inputs available for implementing a resettlement project. Important items to be considered in this initial resource appraisal include:

1. Long term capital: An estimate of the amount and interest rate of both internal and external sources of capital is needed. It is important to determine the amount of "associated capital" which will need to be allocated from the budgets of other government agencies (87). The design team also needs to determine the likelihood of a continuing commitment of capital to the project, including how capital availability may be effected by changes in the price level and the country's terms of trade with the outside world. The potential for additional capital from sources such as the sale of timber currently growing in the resettlement area should be considered.

2. Short term credit: The source, level and price of short term production credit is important in the design process. One needs to specify whether the source of credit is a public, quasi-public or private agency. Questions of whether credit will be provided on a subsidized or full cost basis and if the legal structure for enforcing contracts is in place needs to be addressed (41).

3. Attitude toward credit: Religious restrictions and other values concerning money need to be considered. What are the incentives/penalties in using credit and how important is credit to the typical project resident? Does failure to make credit payments result in the loss of the farm and/or starvation of the family? It is also important to compare the returns from using scarce managerial skills in administer-

ing a credit program with the return to management when used in other activities in the project area (70).

4. Technology: It is important to inventory and record the level of current technology and the gap which exists between current and an "appropriate level" of technology. This depends on a great many factors that will be examined later in the design process. It is especially important to consider general constraints on technology such as the size of farm, cost of fossil fuel energy and availability of locally adapted crop varieties (102).

#### Institutions and Organizations

The form, structure and functions of major institutions (religion, education, government and family) within a proposed resettlement area need to be included in a resource appraisal. These institutions generally set the "rules of the game" for human interactions. Clashes over the role of the area's major institutions are subjective and rooted in emotional judgements which make decision-making methods very difficult.

It is important to list and describe an area's major institutions, but data collection activities tend to be concentrated at the organizational level, i.e., the emphasis is on the region's organizations which provide the specific forms through which human interactions occur and are measured.

A key concern is the role of government. More specifically, there is the question of the public-private mix in the provision of services such as what will be done jointly through public action and what will be allocated through actions in the private sector?

There are three major attributes of the public-private mix which need to be considered. First, what are the policy directions under which the project is being developed? The activities assigned to the public sector in a socialistic country undoubtedly will be greater than in a capitalistic country. The obvious, but sometimes neglected point, is that the analyst must work within the broader structure of the socio-economic and political philosophy of the host government.

Second, what level of resources will be made available for developing public services in the project area? The funds available for universal elementary education or primary health care will depend on the philosophy of the government and donor as well as on the level of funds available to the project. Specific guidelines will be examined in more detail in a subsequent section, but it is interesting to note that the literature supports a generalization that too many funds are allocated to the provision of "public services" in the initial stages of many resettlement projects (28, 63).

Third, is there a difference in the efficiency of resource use when project objectives are pursued through the public or private sector which should be reflected in the design process? This is a difficult task because: (1) it must be done within the constraints of the socio-economic philosophy of the host government; and (2) it is almost impossible to make direct comparisons among different systems for providing these services. Related to the question of efficiency in resource use is the need for a subjective judgement concerning the efficiency and honesty of the civil service system and the accuracy and availability of government records.

The role of cooperatives, and whether they are organized as voluntary or required membership associations, is discussed in a voluminous literature with less than universal agreement on what function they should serve. However, it is important to document, at this stage in the design, the organizational structure within which commerce and trade occur.

The role of organizational linkages also needs to be considered. One is the linkage of the agriculture sector to other sectors in the economy. Examples include: (1) if the demand for farm labor is highly seasonal, will there be provisions for off-farm employment and at what locations and (2) are there mechanisms in place for supplying the input needs of the farmer or for marketing the surplus output?

Another organizational linkage concern is the relationships of local organization to those at the regional, national and international level. Specifically, is there a corresponding higher level organization for each local organization? If not, will the organization be able to operate as an individual entity?

An indepth evaluation of a potential resettlement area's institutions and organizations is a project specific activity. The focus here is on the type of questions which need to be asked to determine whether a sufficient structure can be put in place to facilitate the operation of a resettlement project.

#### Spatial Organization and Infrastructure

There is an extensive literature which supports the importance of understanding the spatial relationships within a potential development area. Some authors address the more macro questions of organizing

space in developing countries [Johnson (56) is excellent] while others concentrate on specific concerns. As examples, these include:

(1) issues concerning the physical layout of towns to enhance the flow of information (71); (2) the need for roads (28); (3) the importance of the location of amenities (81); and (4) priorities in developing basic needs (91).

Translation of complex spatial relationships into the design process is difficult, time consuming and, project specific. There are some general items which should be basic to all resource appraisals. For example, information on the density and distribution of current residents is needed. The location and size of villages and higher level markets and the spatial flows among these centers are basic information in a resource appraisal. It is important to include information on the input markets (for both production and consumption items) and the markets for selling of surplus output. A listing and description of the presence, functioning and adequacy of the current public infrastructure is needed. For example, what facilities are available and functioning that can be used to support community service programs such as education, health, law enforcement and postal services?

A related spatial concern is the specific location of the proposed resettlement scheme. If the project site is a result of an area being cleared of tsetse fly or being provided with supplemental irrigation water, the location is essentially predetermined. The decision on selection of an area is limited to what adjustments are needed in the project boundaries. In other situations a nation or region may have several areas which could serve as viable sites for a resettlement project. In this case, it is necessary to continue the design process for each

potential location until sufficient information is collected to eliminate all but the one site which is to be implemented.

### Summary

The objective in the resource appraisal stage of the design process is to obtain an informed picture of conditions in a proposed project area. Most of the information collected will be statistical, much of it objective, but some of it subjective. The implementation of a resource appraisal is an interesting combination of art and science. No two appraisals will be based on exactly the same type of information--even if conducted by the same individual. The goal of this section is not to provide a worksheet which, if completed, would produce a resource appraisal. Rather, the goal is to develop a framework for and highlight the major ingredients of a recipe for developing such an appraisal.

### STAGE III: EVALUATING THE DEVELOPMENT POTENTIALS

In this section, the focus is on micro-level relationships which provide a framework for understanding how a nation's resource inputs can be combined to achieve specific production outputs. The emphasis is on the use of resources at the commodity or enterprise level. The analysis will be limited to three of the resource input categories-- natural resources, human resources and capital and technology. Issues related to organizations and institutions and the spatial orientation and infrastructure in the area become more relevant when various enterprises are aggregated into the overall economic system. These inputs will be considered in the next stage of the analysis.

#### Natural Resources

The purpose of this step in the framework is to match the resources available in the area with the various commodities that might be produced at these sites. The task facing the agriculturalists on the project design team is to estimate physical input-output relationships. The specific issue which needs to be addressed is what are the expected yields of various commodities (at the potential resettlement sites) using the resources available and within the goals and objectives of the nation's development policies? The emphasis here is on treating each commodity or production process as a separate entity. The complementary or competitive nature of various enterprise combinations will be investigated in the next stage.

The expertise of the project design personnel is the crucial factor in limiting the nearly infinite combination of uses that could be made of the area's resources and the commodities which could be produced.

In a typical situation, the skill of members of the design team should be able to narrow the list of feasible production alternatives down to a realistic number (12 or less) of crop enterprises and livestock activities. This selection should be made on the basis of general knowledge of production in similar areas and the information obtained in the resource appraisal. Cultural concerns and the incompatibility of certain enterprise combinations may limit the choices even further.

By limiting the analysis to a dozen or so enterprises there is a chance of missing a "golden opportunity," but it is simply one of the risks that must be taken to limit the time and expense needed to design a project. There is a high probability that a crop currently not being grown in this or similar areas is simply not suitable for production in the area. The knowledge peasant farmers have gained over decades of decision-making by trial and error should never be minimized!

Although the production estimates at this point are very "rough," this step in the analysis is important because it permits the focusing of the information collection process on the production activities which survive the initial screening.

The next step is to estimate the input-output relationships for each of the production activities identified as appropriate for the area selected. This means an evaluation of basic technical determinants as well as specific constraints which may be limiting output. To make this procedure operational the development of a check list which relates each category of resources (inputs) to potential outputs, by site and production activity, is the recommended procedure. Following is an example of a checklist for the natural resources inputs:

Natural Resources  
(Inputs) Available:

Potential Use of Inputs in Maize Production  
Activity in Area 1

- a) Soil                      Develop first round "rule of thumb" estimates of the yield of maize for grain from various classes of soil. Starting with a given level of other inputs, the list might follow the following format:
- Soil type a =    600 hectares yield 100 bu./ha.  
Soil type b =    800 hectares yield  65 bu./ha.  
Soil type c = 1,500 hectares yield  30 bu./ha.  
Soil type d = 2,100 hectares yield (not suited to corn production)
- Total Size        5,000 hectare project
- b) Water                    The above estimates would be based on a normal rainfall distribution. An estimate of the annual fluctuation in yield due to variation in the amount of rainfall would then be factored into the estimates. Increases which would result from supplying irrigation water to appropriate land areas would be developed if that is a potential recommended practice.
- c) Climate                  Varieties currently being used in the area would serve as a benchmark. It is especially important to make realistic assumptions on yield increases that would result from the introduction of new varieties.
- d) Disease and              "Best judgments" of the probable impact of disease and insects                    and pests on yields need to be added to the previously developed estimates (5).

- e) ~~Miscel-~~  
laneous            The aim here is to include the impact of other resource inputs which help narrow the range of the most probable yield for maize in area 1. This process is repeated for each crop on the 3 or 4 main soil types in the project area.

The preceding description of a process which can be used in developing input-output relationships based on natural resource availability is not complicated, but one should not assume it is an easy, mechanical procedure. It is a time-consuming effort which requires the best judgments--usually based on much less than a desired level of information--of the agriculturalists on the design team. The specific format for recording the data is best designed by project personnel. Examples of recommended formats are readily available from various FAO, World Bank and USAID publications (59, 66, 90, 95, 98, 100).

Economic information must now be added to the physical input-output relationships. The specific economic information required is an estimate of: (1) the price of the outputs (to estimate the marginal value products); and (2) the price of the inputs (to measure marginal factor costs). The objective of the economic analysis is to transform the data into a form which permits a direct comparison of the cost of inputs needed to attain outputs of various amounts. This activity is commonly referred to as partial enterprise budgeting, with the term partial used to note the enterprise or commodity being examined is an individual entity (i.e., not subject to aggregation) and budgets to denote a comparison of cost and returns.

It is much easier to describe than implement an economic analysis of the production data. Several major questions need to be examined

by the economic analyst at this stage: (1) are the prices used for inputs and outputs those available to the farmer or based on some "national average"; (2) what level of in-lieu-of prices should be used for outputs when a high percentage of production is not sold but used for home consumption; (3) how to adjust for the wide seasonal and annual fluctuations in the price of inputs and outputs because of the lack of a well developed market system; and (4) what elasticity estimates should be used to determine realistic prices when significant increases or decreases in production are projected? Each of these questions requires an analysis of the structure of the input and output markets at the local and regional level, and when appropriate, at the national and international level.

Other questions requiring consideration include what has been the trend in the relationship between production and price? Are there artificial constraints in the market (e.g., a cheap food policy) which effect prices? Are these policies expected to continue? On the input or cost side of the ledger some of the questions that need to be addressed include: (1) how will a significant increase (or decrease) in the demand for an input affect the price of that input; (2) are inputs of the quality needed to insure production targets available; and (3) what length of time will be needed to develop a dependable supply of inputs? These, and similar questions, are the responsibility of the agricultural economists on the design team, but the discussion on which the answers are based requires the "best judgment" of the entire design team.

#### Human Resources

At the micro-level, there are two major issues in evaluating the human resources associated with a resettlement project. One concern

is the level of labor (human resources) necessary to implement the production activities designed for the project (22, 39). Since each production activity is being treated as an individual entity at this stage of the analysis, the major effort is on developing labor coefficients for each stage in the production process. For continuity, the maize example started in the previous section will be used.

Human Resource (Inputs) Required in Production of Maize in Area 1	Labor Required Per Hectare in Person Days		Notes
	<u>M</u>	<u>F</u>	
a) On farm labor			
1. land preparation-- clearing, plowing, seedbed prep.	---	---	Estimate of the full time equivalents with details on seasonal changes.
2. planting and grow- ing	---	---	
3. harvesting and pro- cessing	---	---	
4. storage and market- ing	---	---	
b) Professional and managerial inputs--including extension personnel, resettlement pro- ject managers, etc.	---	---	The male/female dichotomy is not as important here, stress instead specific skill levels.
c) Off-farm employment oppor- tunities--both on and off resettlement scheme	---	---	Off farm employment needs to be evaluated as to accessibility, skill level and wage level.

The above estimates of labor requirements, adjusted for seasonal variation, are reported in physical terms. The expected percentage of the total labor requirements which could be supplied by family labor and the difference in the expected wage rates during periods of high and low demand for labor needs to be included (22). The probable affect of complementary and competitive forces from off-farm employment opportunities also needs to be evaluated.

The role of new settlers in the resettlement scheme is the other critical consideration in measuring human resource inputs. The sum of the labor needs, minus the labor already located in the project area, provides a first approximation of the additional labor required by immigration to the project area. However, this is a very tentative estimate. When selecting new residents for a resettlement scheme the emphasis needs to be on the entire person and their interrelationships with others rather than just their contribution as a labor input. Thus, it is more appropriate to address the desirable labor characteristics of the immigrants in the next chapter.

#### Capital and Technology

The determination of the most appropriate method for evaluating the capital and technology inputs is a difficult and complex undertaking. The first problem is definitional, i.e., how to distinguish between capital and technology. Some argue that technology needs to be treated as just another form of capital. Others contend that a series of important steps--including invention and adoption--separate the two concepts.

In terms of implementing the design process, the most useful starting point is with an assumed typical level of technology. For a resettlement scheme the level of technology on typical farms in similar areas should be used. Some suggest that the resettlement project will employ a more modern level of technology and thus a higher level of technology should be assumed. However, the hoped for results expressed in the planning targets are often too optimistic--the presence of "Murphy's Law" should be recognized and the analyst should normally

assume only modest changes in the level of technology. Special attention should be directed toward evaluating the impact of any methods or machines not in current use in the area (as distinguished from better use of currently available technology) because of the risk that the new technology may not be suited to the area (9).

The major credit considerations are: (1) the level of short term production credit needed in the production of specific commodities; (2) the amount of intermediate level credit (1-5 years) needed for investments in machinery, storage, etc.; (3) the credit needs for consumption items (which is especially important during the start-up phase of the project); and (4) the ability of farmers to repay loans on a realistic time schedule.

It is important to stress that the objective in this stage of the analysis is to develop information on how the three major inputs in the production process--land, labor and capital--might be combined in the production of a given commodity. The more difficult task, discussed in the next chapter, is to determine the trade-offs among the inputs in the production of various commodities to attain the highest level of aggregate satisfaction.

#### STAGE IV: ALTERNATIVE PRODUCTION UNIT SCENARIOS

The focus in the previous section was on the use of specific inputs in the production of a given commodity. No attempt was made to use efficiency, equity (or any other criterion) to compare the use of an input in the production of maize against what might be gained if the same resources were used in the production of other goods and services. The assignment at this stage of the analysis is to make trade-offs at the farm and aggregate farm level within the guiding principle of how an area's resource inputs can best be combined to meet the goals and objectives of the project.

It is difficult to develop allocation guidelines in the abstract. A partial list of potential allocation criteria in designing a resettlement scheme includes: (1) efficient use of resources; (2) a specified degree of equity; (3) access to the largest number of people desiring to migrate to the resettlement area; (4) provision of at least minimal levels of public services; and (5) minimizing the risk to farmers, merchants and society (8, 47, 70).

Even after the criteria are selected, the difficult problem of "weighting" the criteria must be addressed. For example, what decline in efficiency should be accepted for a given increase in equity among the participants? A related concern is how many of the available resources should be invested in public services in comparison to the amount available to private entrepreneurs, i.e., the public-private mix considerations.

Decisions on selecting the appropriate criteria are the responsibility of the host country's leadership. The members of the design

team should be willing to provide guidance on the probable impact of using alternative allocative criteria, but the decisions on what criteria are to be used must remain a responsibility of the host government. Conversely, bilateral or multilateral donors have the right to refuse to participate in a project if in good consciousness they cannot agree with the criteria selected by the host government.

At this point the analysis must proceed with the assumption that the host country can agree on a set of allocation criteria (including relative weights) and that the criteria are acceptable to the donor group. The next task is to address the pragmatic questions which help define the specific design parameters of the scheme. The emphasis here will be on aggregation at the farm level, with the micro-measures developed in the last stage being used to provide information for the aggregation process.

#### Natural Resources

Land, and to a more limited extent the other natural resources, are fixed and finite inputs and thus the most appropriate candidates for setting physical boundaries in the design of alternative schemes (32). Normally such attributes as topography, soil type, watersheds or river basins, and micro-climate will provide natural boundaries for delineating the outer parameter of a resettlement scheme.

The next step is to determine whether a scheme based on these natural boundaries is of a realistic size by comparing the amount of development capital available with rough estimates of cost per hectare for development. (The implicit assumption here is that development capital is the most limited resource--an assumption examined in more

detail below.) Assume a rough estimate of the cost per hectare for development is \$5,000 (based on the physical attributes of the natural resources and capital budgets available from previous studies) and the total amount of development capital available from donors and internal sources is \$25 million (18, 61). On the basis of this information, a "ballpark estimate" of the size of the potential scheme is 5,000 hectares. If the area delineated by natural resources amenable for resettlement totals 8,000 hectares, a balancing-out action needs to take place. The most probable courses of action are: (1) obtain more development funds; (2) design a method for reducing the development cost per hectare; or (3) eliminate some of the area suitable for development. Although alternatives 1 and 2 are the most palatable, the solution is usually found by focusing on number 3--decreasing the magnitude of the scheme.

Continuing the example, the lack of funds requires that about 3,000 hectares need to be defined as outside the boundaries of the resettlement scheme. In the typical case this means retaining the most productive resource areas subject to the constraint of being contiguous areas. There may be cases where selecting the best areas (regardless of the location within the 8,000 hectare area) would be the preferred course of action. This decision would be based on the degree of scatter among the parcels within the larger area and whether funds for developing the other 3,000 hectares might be available in the future.

The results of the above investigation should make it possible to limit the potential location of the resettlement scheme to two or three sites. In many situations, the superiority of a single site is readily apparent by this stage in the analysis. Since each site is examined in a similar manner, the assumption here will be that it has

been possible to select a single site. (Failure to accept this assumption increases the empirical complexity of the analysis but does not add significantly to the conceptual considerations.)

The design process has now proceeded to the point where a scheme of a given size at a specific location has been selected. The next step is for the design team, using a mixture of art and science, to engage in a trade-off process in an attempt to determine the "best" use of the resources available.

A basic economic axiom is that decisions are made "at the margin." One needs to compare the benefits given up by not using the last unit of an input in the production of A against gains of using the same input in the production of B. It needs to be re-emphasized that these comparisons are made within the framework of the policy goals of the project. There is no a priori reason that returns from the use of an input should always be the same because allocation criteria other than efficiency may have been selected. For example, if the project is designed to enhance the plight of the "poorest of the poor," the use of resources in production of goods and services of special importance to that group may be assigned a "higher return" than the use of the same input in production of items available only to the rich. [While this example neglects the whole controversy associated with the trickle down concept, it is included to show that the return to an input may be related to the distribution of the goods or services being produced (45, 84, 93).]

In a previous step the amount of development capital available was used as the limiting resource in determining the size and configuration of a resettlement scheme. The task here is to broaden the scope of the analysis to maximize--within specified allocation criteria--the

production obtainable from all the resource inputs available to the project. Where adequate data (and the equipment and technicians for handling the data ) are available, relatively sophisticated models can be used to estimate various constrained maximums. In most less developed economies a less rigorous approach must be employed. The one suggested here is a typical farm approach. To implement this approach, a criterion or a set of criteria for defining a typical farm is needed. One approach is to start with a self-sufficiency criterion. Under this criterion, the level of inputs used on a typical farm are just sufficient to meet the basic subsistence food crop needs of the farm family. For example, one might start with an estimate based on the calculation that 5 hectares of land need to be planted to maize (or some other staple food crop) for the farmer to provide a subsistence level diet for his/her family (62, 64).

Hopefully, sufficient land inputs are available to employ a more flexible criterion. Perhaps the typical farm can be designed to be 20 to 30 percent larger than that needed to produce at basic subsistence levels. This "extra" area provides an outlet for future population increases and provides the farmer an opportunity to produce a marketable surplus (68, 102). The balancing of the various factors in the man/land ratio--based on political as well as social and economic concerns--provides first estimates of the number and sizes of typical farms and the number of migrants needed to supplement the current residents to provide a viable scheme.

Since the goal here is to demonstrate a procedure rather than evaluate a specific resource situation, it is necessary to make assumptions about the area's natural resource base and use "rules of thumb"

developed from previous resettlement schemes. Assume, for example, a typical resettlement of 5,000 hectares with the following benchmarks available for designing the scheme: (1) 20% (1,000 ha.) is to be used for town, roads, public areas and other types of public and private infrastructure; (2) another 20% is too rocky or swampy to have any significant agricultural value; and (3) the final 60% (3,000 ha.) is available for ranching and farming. On the basis of the resource appraisal, i.e., soil topography, climate, and availability of irrigation water, etc., one finds that about 40% (1,200 ha.), of the land is tillable and 60% (1,800 ha.) is available only for range-type grazing.

Discussions between the design team and ministry officials on an appropriate man/land configuration result in an agreement that the typical farm should consist of 3 hectares of tillable land and access to 4.5 hectares of communal grazing land. A simple calculation indicates the example scheme could be the location for some 400 typical farms. This leads to several additional considerations. First, one needs to divide the 400 new farm units between farm families current in the area and new migrants. A rather typical approach is to provide current residents with first priority to a new farm in the scheme (29). To continue this example, it is assumed that 100 farm families currently live in the resettlement area and 80 accept new farms rather than compensate for their current operations (34, 73). Thus, a procedure (to be discussed in the next section) will be needed to attract some 320 new farm families to the resettlement scheme.

A second concern is a further detailing of the resources available to the farmer and his/her family. For illustrative purposes it is assumed that 30% (0.9 hectares) of the total tillable acreage of 3

hectares in a typical farm has access to irrigation water. The other 2.1 hectares (or 70%) must be operated as a dryland farm.

A 4.5 hectares for communal grazing will probably be located on the poorer soil. The use of the grazing land resources will tend to be determined by past practices. The design team needs to review the alternative production practices available, but the chance of major changes being made in the communal grazing practices is relatively small. The "best mix" of animals can probably be estimated with relatively unsophisticated data. For example, the relatively high level of technology and labor skills required for commercial dairy operations often preclude that activity from consideration.

Finally it is assumed that the farm homestead (plus some wastage) requires 0.5 hectares of land and that this land is subtracted from the communal grazing area. These assumptions result in a typical farm of:

Irrigated land	0.9 hectares
Dryland crop areas	2.1 hectares
Access to communal grazing	4.0 hectares
Homestead and misc.	<u>0.5</u> hectares
TYPICAL FARM	7.5 hectares

The partial enterprise budgets developed previously in the design process (Stage III) provide the basic information for starting the process of allocating the natural resources to various production alternatives. For example, one might start by comparing the size of the average farm family, the subsistence food preferences and requirements of the family, and the acreage and yield of staple crops best able to meet their food requirements.

A rough calculation shows that an output sufficient to meet the caloric needs of the farm family can be produced on the dryland segment of a typical farm. One can use this benchmark information to help determine:

1. what mixture of crops would "most efficiently" provide for the dietary needs of the farm family. One needs to be very careful that each crop considered meets the taste and preference requirements of the residents;
2. whether a reallocation of food crops from dryland to irrigated land would increase the overall productivity of the farm; and
3. whether changes to higher yielding varieties or cultural practices such as interplanting would significantly affect the production relationships.

The emphasis in the design process should be focused on production combinations which will help produce a marketable surplus as well as meet the total dietary (rather than just caloric) food needs within acceptable risk constraints.

For illustrative purposes, it will be assumed that the 0.9 hectares of irrigated land is available for the production of a marketable surplus crop while the remainder of the farm is needed for the production of subsistence goods and services. The process at this point is complex (even with the above simplifying assumption) because there needs to be a "simultaneous" evaluation among the following elements:

- (1) the output available from various livestock-crop combinations;
- (2) the inputs (in each of the five input categories) necessary for the

production of subsistence crops and livestock; and (3) the inputs available for the production of a surplus for market.

A pragmatic approach for working with all these elements is to develop a "spread sheet" following the general design of the following matrix:

#### ENTERPRISES

Input Requirements	A. Maize Corn	B.	C.	D.--N. Other Enterprises
	Sub. Mkt.	Sub. Mkt.	Sub. Mkt	Sub. Mkt.
NATURAL RESOURCES				
HUMAN RESOURCES				
CAPITAL & TECHNOLOGY				
INSTITUTION & ORGAN.				
SPATIAL & INFRA.				
OTHER				

The matrix is useful because it provides a structure for organizing the details of the various relationships and constraints in each of the production processes. The data from the micro analysis in the previous stages are more relevant now because one is examining a specific crop in a given scheme and as one production activity on a typical farm. It provides a structured way of discussing whether labor will be available for the production of a crop such as tomatoes for market when one also takes into account the labor demands for producing dryland crops and looking after livestock. The objective here is to take the first step toward aggregation with a farm rather than an individual crop perspective.

The matrix also facilitates the screening of alternatives because the development of a structured approach often leads to the elimination of certain production activities from further consideration. It provides the data base for measuring the cost and returns from each production alternative--within the constraints listed in the matrix. Also, the matrix should facilitate the examining of questions such as whether the introduction of new technology in dryland production areas would increase the amount of labor but decrease the amount of capital available for the production of a crop such as tomatoes and by how much.

The major reason for developing the above matrix was to stress the interdependence among enterprises and input requirements. Now it is necessary to return to the basic framework of this analysis and to provide the information needed for examining the impact of alternative activities for the other major input classes.

#### Human Resources

The analysis in this section starts with the assumption that the labor input requirements (including seasonal distribution) have been determined for each of the "most promising" enterprises in the resettlement area. This information, plus data developed earlier on the number of current and new farm families included in the design of the scheme, provides first-level estimates of the aggregate amount of labor required and available for the project.

Labor is a specialized input because of the complex inter-relationships between the labor supplied and other attributes of a farmer, his or her family, and their friends. It is important to develop a system which will facilitate a review of how these characteristics affect the whole resettlement scheme (1, 22, 54, 62).

The specific questions the design team needs to address include:

(1) which criteria should be used in the selection of new settlers (65); (2) who makes the selection (73); (3) what data should be collected on the attributes of the potential new residents (54); and (4) what factors are important in selecting the management and staff of the project.

The selection of criteria for identifying the in-migration candidates is the responsibility of the host government. However, it is the responsibility of the design team to develop alternative criteria and to assist the host government in the decision-making process by indicating the probable effect of their choice (18, 29, 101). As a starting point, it is useful to consider the following criteria (and the rationale for selecting these criteria) which have been used in the past:

1. The poorest of the poor receive priority in the selection process--a "worst first" philosophy (62, 63).
2. Applicants with the most agricultural experience are favored because of the potential for more rapid increases in agricultural production (28, 73).
3. The availability of personal capital is sometimes used by the host government to "stretch" project capital, i.e., require each settler to supply part of the capital input (83).
4. Leadership potential and personal charisma have been considered an important characteristic in some schemes--especially those stressing a particular religion or political ideology.

5. It has been argued that assigning a high priority to settlers with the most education helps insure success because those with more education are more adaptable. However, the higher expectations of these families may lead to development of a rural elite. Higher education may also be a source of conflict between the new settlers and the traditional leadership (6, 19, 62, 88).
6. Recognition of the demanding physical labor required on a resettlement scheme has led some planners to place high priority on physical fitness and strength (73).
7. Tribal variety or, conversely, ethnic purity, has been used as a criterion for selection. The objective here ranges from compatibility among the settlers to national representation (6, 9, 51).
8. Attempts to minimize the distance the new settlers need to move has been used as a criterion. The rationale is it permits a sharing of labor with family and results in less stress (18, 28, 92).
9. Interest in developing stable new communities has resulted in some governments assigning higher priority to applicants that are married and have children (73).
10. Payments for past "services"--whether military, being a loyalist or simply having the "right colored skin"--has been used as the basis for setting priorities in the selection process.

As indicated, the selection of the specific criteria is the responsibility of the host government. However, it is very important that the design team consider how the selection criteria will affect the human resources available on the resettlement scheme. For example, the mix of crops selected would probably be different under "a poorest of the poor" selection process than if the new settlers were chosen on the basis of capital availability.

A second question that must be examined is who has responsibility for the actual selection process within the criteria guidelines (73). Some alternative approaches the design team might wish to consider include:

1. A management committee. This may be a desirable method because the management personnel have more knowledge of the type of individuals who will complement the other resources available to the project. The disadvantage is the management committee may not understand the traditions, values and beliefs--or hostilities--among various candidates for resettlement.
2. A second approach is to hold open competition among all families meeting the selection criteria. Some sort of voting process could be used to select from among the pool of eligible candidates.
3. An open lottery, where the only criterion is citizenship, has a maximum amount of freedom. However, the lack of restrictions in the selection process tends to decrease the amount of "desirable" talent attracted to the scheme.

Both the management staff and the local chief (or leader) should have a major role in the selection process. The project manager plays one of the crucial roles in the ultimate success or failure of a project and he/she must be represented on the selection committee (103). Conversely, the traditional leadership should also be represented in order to decrease the stress and increase the acceptability of the whole resettlement concept.

A system used in Malawi (73) might serve as a model selection process. The first step was to inform potential candidates of the resettlement opportunity (and requirements) through normal agricultural information channels. This is followed by personnel interviews at the project site with a committee consisting of representatives of the local chief and development officers. If the number of applicants becomes too large, preliminary screening interviews are held and more restrictive criteria imposed.

The third step is to collect specific information on the characteristics of the resettlement candidates. Although the specific information collected will need to "fit" the project being designed, the following outline provides a set of questions which might serve as a starting point.

- a) Socio-economic Characteristic
  1. Family characteristics--age, sex, kinship relation, place of origin, tribal/clan relationship (both friends and enemies), religion, traditions
  2. Education, skills, previous occupations, previous migration patterns, economic assets
  3. Other

- b) Aspirations and expectations
  - 1. Attitude toward resettlement
  - 2. Reason for resettling and realism of expectations
- c) Relationship to current quality of life
  - 1. Realistic estimates of current and expected family income
  - 2. Magnitude and level of services available under current and project conditions
  - 3. Distance and difficulty in visiting friends and family not in the project area.

A fourth step is to develop procedures for selecting and organizing the management staff. It is important to emphasize again that the specific selection criteria will be chosen by the host government and be designed to support the general style of management consistent with government policies.

It is important that the design team help develop the mode of operation for the management staff. For example, what are the specific lines of authority (advisory or executive) and what is the span of control (organization chart) (8)? Are these compatible with the objectives of the project and will they work with the type of settlers the project is attempting to attract? Another responsibility of the design team is the development of specific job descriptions for each member of the staff. For example, what education and training is required and will tribal or regional differences limit the candidates effectiveness in the job?

The final assignment in this section of the analysis is to develop a system to insure proper staff motivation. These awards can

be either financial or personnel prestige. It is necessary to assure a delicate balance, i.e., one needs to prevent the development of staff "snobbery" toward the farmer and yet provide ample rewards to assure the attraction and retention of good staff members.

In summary, the focus in this section is on the source and characteristics of the human resources needed to support farming in the resettlement area. The design team needs to be aware of, and account for, the high level of economic interactions within the project area. The new "basic" employment in agriculture will attract "non-basic" employees to provide the goods and service needs of the farmers. Simple economic base multipliers can be used to provide rough estimates of the total employment base in the resettlement scheme (7, 14).

#### Capital and Technology

The determination of the most appropriate method for evaluating the availability of capital and technology inputs is another difficult and complex undertaking. To reiterate the position expressed in the resource appraisal section, the most useful starting point is to assume a typical level of technology, i.e., the level of technology assumed for project farms is typical of that used on similar units in the region.

How to treat the capital input is even more difficult because of the "fungible" nature of the input. Important issues which need to be addressed are: (1) the expected level and source of funds needed; (2) the probable price (interest rate); (3) the distribution of the capital inputs among enterprises (including between production and consumption); and (4) the expected contribution of capital to the production/consumption process.

The best way to start the disaggregation process is to focus on the level of funds by source and their probable use:

	Basic Capital Constr.	Infra- struc.	Houses & Shops	Long Term Loans	Prod. Credit	Consumer Credit
External public funds (AID, Multi- national, etc.)	X	X				
Internal public (National Treasury)	X	X	X	X		
Quasi-public (Coops, Parastatals)		X	X	X	X	
Private (Commercial)			X	X	X	X
Private (Family & Friends)			X	X	X	X

The development of "first round estimates" of the amount and interest rate of the capital needed at this aggregate level is based on trading off the needs for capital in each category against the availability of funds. The capital which accompanies the new settlers should not be overlooked. In many cases settlers will have been paid for the non-movable buildings and equipment at their previous residences, and in some cases, for their land (34, 73). Others argue that one needs to guard against making too much capital available to the farmer because it might decrease the level of savings at the individual farm level (44). However, if the projected level of capital available is much less than the needs in any category it is necessary to: (1) check for substitution among categories; or (2) rethink the magnitude and even the type of project that is being proposed.

At a more disaggregated level, the probable need for an contribution of capital inputs in various activities should be estimated. A calculation of the returns to capital in a specific activity such as maize needs to be compared with probable returns from other production and consumption activities.

Accuracy of the capital estimates are a function of the experience and analytical skills of the design team. However, there are several generalizations which should be considered when examining the availability of capital inputs in a project. First, there is general agreement in the literature that project designers normally error on the side of too many rather than too few facilities in the resettlement scheme (28, 63). Most families seem to prefer credit to assist them in building their home rather than having the developer build the home and present them with a commitment to mortgage payments (6). New settlers are often willing to exist with a minimum level of services if they are permitted to be part of the planning process and can "see" these services becoming available in the future (5).

Second, the cost of administering credit programs is often much higher than anticipated by the design team. Supervision of credit applications, loan approvals and the collection process places extensive demands on the scarce administrative talents available in most areas (101). Attempts to elude the loan collection process (usually by the more well-to-do farmers) has an obvious direct cost and also an important indirect cost in terms of declines in morale and the respect for regulations and authority.

Third, it is necessary to provide realistic loan repayment schedules. There are usually high capital requirements in the early

years when the farm is being established (69). This is also the period when the farmer is the most vulnerable to a poor crop because of the unfamiliar conditions. It is important to include provisions for the delaying of loan payments when factors beyond the farmers control make it impossible to meet some prearranged payment schedule (70).

### Institutions and Organizations

Evaluation of the institutional and organizational concerns in a resettlement scheme starts with a determination of the political-economic system under which the project will operate. This can be expressed as a point on a continuum ranging from a strictly free enterprise system to a tightly controlled communal system. This determination, which should be fairly evident from the national policies of the country where the project is located, then needs to be combined with the type of management best suited for that system. These interactions can be determined through the use of a simple matrix to view the institutional and organizational characteristics of the project.

	Free Enterprise	Communal
Democratic	1	2
Authoritarian	3	4

This approach helps the design team provide answers to questions such as what are the rights of the individual in land. In element 1, these rights are probably decided by the level of resources (money) available to individuals, but in element 4, land rights are held by the government or some other authority. Similar logic can be used to help identify such items as: (1) the type of production processes (e.g., individual or communal labor); (2) the marketing system (government,

parastatels, middlemen); and (3) the distribution of net proceeds among the residents of the settlement.

A second major concern, the probable management method, is also directly related to the placement within the matrix. For example, delineating the role of the public, private and voluntary organizations, is a function of the basic institutional and organizational structure within the scheme. One might consider the use of a cooperative to market a specific cash crop. In elements 1 and 2, a board of directors will probably be elected. The number of "votes" may be on a volume of use basis in number 1, while a "one man, one vote" approach is more likely in scenario 2. Under an authoritarian system, the policy direction will be set by representatives of the authority figure--with a "take it or leave it" alternative in element 3, and a "you will use this system" approach in number 4. It is important that project designer start with the overall structure of the system to prevent getting bogged down in attempting to consider the infinite variety of organizational and institutional schemes which might be employed.

A third major concern is related to questions of how rules and regulations are decided, what standards are used in settling of disputes, and what mechanisms are available for enforcing the sanctions imposed. Placement within the above matrix will also help determine the general guidelines. For example, it is important to consider the relative importance of the traditional and "western" legal system. Cultural specific concerns, such as the role of the clergy, religion and the position of women in society, need to be noted and evaluated for their importance as a constraint in the design of the project (19).

### Spatial Orientation and Infrastructure

This section addresses concerns associated with: (1) the general spatial relationships among entities within an area; and (2) the type of structures and activities which are needed to develop an operational infrastructure.

The complexity of spatial interrelationships in economic systems has been examined in a relatively extensive literature (20, 36, 37, 46, 84). It is not feasible for the design team to undertake a comprehensive analysis of the spatial orientation of people and activities in the resettlement area. The design team does, however, need to spend time on evaluating the realism and efficiency of the proposed spatial relationships. The first step is to expand on the resource appraisal to determine the presence, functioning and adequacy of presently available infrastructure within the project area. If the project is designed for an area that is uninhabited currently, an infrastructure is obviously non-existent. However, an inventory needs to be completed if there are people or activities currently in the area. Next, rules of thumb developed on the basis of previous studies of spatial relationships can be used to estimate the number of regional centers, towns, villages and crossroad markets needed to support the projected population.

The literature is in general agreement that the typical rural village should be designed for 200-300 families (10, 14, 15, 61). However, some studies suggest very small villages of 10-15 families while others believe that 500 families is an optimal size village (17). These studies report that two of the predominant factors in determining the appropriate village size are distance to farmers fields [2.5 km.

has been used as a maximum (14, 61)] and efficiency in the size of market for handling agriculture surplus (14, 17).

In addition to the placement of villages and towns, a decision needs to be made on the type of farming system that will be implemented. The basic approaches are the village-centered community (farmers live in village and commute to fields) and the on-farm homesteads (20, 50, 51, 52, 62, 83). Although there tends to be a preference in the literature for village-centered communities (usually based on the more efficient provision of services), it is important that the on-farm homestead concept not be neglected. The benefits of the scattered homesteads include: (1) on-farm homesteads permit increased supervision of the farming unit; (2) better utilization of animal manure on fields; and (3) decreases in environmental degradation resulting from decreased population density (15, 58, 72, 5, 102). Many of the gains claimed for more efficient service delivery are off-set by the farmers' need to commute to their fields. In the final analysis the major factor in this decision will probably be based on local traditions (57).

A second major decision facing the design team is the kind, number and sequencing of the public and private activities which collectively are defined as the project infrastructure. Under a democratic, free enterprise approach the allocation decision would tend to be directed by market forces. However, there will be some "merit" type of goods and services which will be selected on non-market criteria. At the other extreme, a comprehensive plan for implementation of the infrastructure system will need to be developed under an authoritative governing system.

The specific ordering of the provision of services will depend on a host of variables such as culture, traditions and availability of funds. Facilities for food, water and shelter will be high on the list, but schools and religious facilities are also often priority items (61, 62). As suggested above, previous studies indicate a tendency to over-design the infrastructure especially when donor funds are relatively plentiful (16).

It is important to permit adequate flexibility in the design process to permit the resettled residents to incorporate their wants and desires into the system plan (28, 63, 81). Although the aesthetics might not be as pleasing to the designer, it is much more important for the new residents to feel comfortable in their new surroundings. On some occasions the regulations of the bilateral or multinational development agencies prevent the building of the type of structure preferred by the residents.

### Summary

The activities in this stage of the analysis are the most time consuming assignments in the entire design process. It includes the basic questions that must be addressed by the design team at the farm and aggregate farm level.

The approach suggested here--based on the assumption that one is planning an agriculture-oriented resettlement scheme--starts with an examination of the physical input-output relationships between the natural resources and the production of various commodities. The experiences of the members of the design team, including the observation of production practices in similar areas, is used as the basis for estimating the trade-offs among the most promising enterprises.

The introduction of human resources inputs into the production function is the next step. The stress is on two major concerns--the labor required to produce the commodities delineated in the first step and the criteria and process for selection of residents for the resettlement area.

Step three is designed to examine the complex role of capital and technology in the production (and consumption) process. The fungible nature of capital and its relationship to the level of technology makes it important for the analyst to recognize the interactions in the use of the capital resources.

The fourth step focuses on the role of institutions and organizations as facilitators and constraints to the development of an operational resettlement project. A determination of the social-political-economic philosophy under which the project will be implemented provides the guidelines for a host of related decisions. The question of who sets the standard of conduct (in both work and general living) and how decisions are implemented is evaluated in this section.

The fifth step is viewed as transitional to the next section because of its emphasis on the relationship among various entities. The focus is on the location of people and activities within the project area, and sets the basis for a final evaluation of the overall impacts resulting from development of a resettlement scheme.

## STAGE V: DESIGN CONCERNS AT THE PROJECT LEVEL

The final step in the resettlement design process is to develop a framework for evaluating the scheme at the project level. The framework is complex because of the need to coordinate the "forward and backward" linkages. Forward linkages are concerns about how the project interrelates to broader national policy goals and objectives. In contrast, backward linkages are the relationships between the project and the individual farms in the resettlement scheme. The organizational approach in this section is somewhat different than in the previous chapters in that the focus is on major conceptual/analytical issues with examples drawn from the various resource input categories. The specific format is a grouping of the discussion around four issues: (1) analytical techniques; (2) risk and incentives; (3) spatial orientation; and (4) realism of estimates.

### Analytical Techniques

A framework for designing and evaluating resettlement schemes should include a review of the appropriate analytical techniques which serve as facilitators in implementing activities agreed to within the allocation criteria. It may seem inappropriate that so little attention is devoted to a discussion of analytical techniques. Two reasons are given in defense for not giving more attention to these techniques. First, there is a very extensive literature in terms of "how to" guides for project design and evaluation (43, 47, 66, 74, 90, 95, 98, 100). Anyone involved in the design and evaluation of resettlement schemes will almost certainly have access to the guides produced by USAID (100) and the United Nations (95, 98). A second reason for not emphasizing

analytical techniques is the belief that more attention should be placed on "asking the right question" and avoid excessive manipulation of data. The primary focus should be on determining the appropriate relationships to measure rather than on improving the measurement of these relationships.

Within the constraints of the above "boundaries," the objective here is to review several of the more commonly used empirical techniques to determine when they are appropriate, what are the obstacles to their use and what data are needed for their implementation.

Shift/share analysis is a descriptive technique which provides a structured approach for comparing economic indicators of various sub-parts within a larger region or nation. This approach is useful in the site selection process. For example, if one needs to select a location for a resettlement project from a number of alternative sites, shift/share analysis will provide a measure of the performance of certain economic measures over some previous time period. The measures provided are the "industrial mix" and the "regional share" effects. In addition, area-wide and sector specific growth rates are produced.

The "industrial mix" effect provides estimates of whether the performance of a sector (in terms of measures such as the relative rate of increase or decline in employment or income) is influenced by the share of the area's employment (income) in fast or slow growing industries. The "regional share" effect, by way of contrast, is a measure of within sector performance, i.e., what is the area's performance record after correcting for the influence of fast-growing and slow-growing sectors. For example, a negative industrial mix effect for a region suggests that one of the factors exerting a downward pressure on

employment (income) in the region is the presence of more than a proportional share of employment (income) in the slow growth sectors of the economy. One can hypothesize that structural changes are probably needed to improve the economic performance of the region. Conversely, a negative regional share effect indicates that the lag in the economic indicators is the result of an inability to successfully compete with other regions even after correcting to a standardized sector base. The "problem" is related to specific attributes of the region rather than the relative composition of the sectors.

A major advantage of the technique is that it provides a substantial amount of descriptive information about the basic economic indicators of an economy at minimum costs, i.e., it is cost effective. The availability of region and sector specific data is usually limited in a less-developed country, but relatively simple survey questionnaires can be used to acquire the needed information. A major limitation is that the information obtainable from the analysis is descriptive rather than diagnostic. It indicates what happened but does not provide information on the underlying causes for why these differences occurred.

Economic base analysis is another descriptive technique, albeit with some aspects of a forecasting model. The basic purpose of the technique is to provide an estimate of the relationship between the number of employees in the basic sectors and the non-basic or service sectors. The model, in its simplest form, groups employees in the agriculture, mining and manufacturing sectors in a basic employment category while employees in all other sectors are classed as service employees. The ratio of the number of basic over the non-basic employees is the economic base multiplier; a measure representing the number of service employees needed to support each basic employee.

In the more sophisticated versions of the technique, the employment in each sector is segregated into basic and service components. However, the concept of the economic base multipliers remains the same.

The advantage of the technique is similar to that listed above for shift-share analysis--it provides a substantial amount of information with a minimal amount of data or computational sophistication. It permits the development of rough estimates of total employment on the basis of known employment in specific sectors. This information is useful, for example, in determining the total level of food supply needed for self sufficiency or the potential demand for selected community services. While the multipliers provide only general estimates (e.g. are based on average rather than marginal relationships) they are useful in making first approximations of the impact of change (7).

Input-Output (I-O) analysis is a powerful analytical tool, but it is too data demanding to use in most less developed country settings. The core of the technique is a transactions matrix with the various sectors in the economy listed as rows and columns. The array of data in the matrix, compartmentalized into four quadrants, provides a structured framework for tracing the flow of goods and services through the economy at a given point in time. It indicates the economic impact on sector A through M when an increase or decrease in production (receipts, expenditures) occurs in sector N. For example, it is possible to trace the impact of an increase in agriculture production through the various manufacturing and service sectors of the economy.

A major reason for the popularity of input-output analysis is that it is one of the very few analytical approaches which provides a

measure of the distributional impacts associated with growth and change. Specifically, the products of I/O analysis are sector specific multipliers.

An added level of sophistication is gained by integrating a linear programming structure into the I/O model to compile estimates of resource (input) constraints. The use of linear programming coefficients provides estimates of when the inputs available would no longer support the prospected level of change associated with development.

Input-output analysis provides highly relevant information useful in the design and evaluation of resettlement schemes. The question is whether one can afford to use the time and related resources of the design team to implement the model. In most cases the answer must be no. Data from the transaction matrix from other similar economies can be used with caution for developing general rules of thumb, but the results of the analysis are only as good as the input data used in constructing the model (91).

Benefit-cost (B/C) analysis is the preeminent technique, in terms of use, in the project design and evaluation field. The focus in B/C analysis is on economic efficiency, but some attempts have been made to introduce equity constraints when applying the technique.

The B/C ratio in its simplest form is a comparison of the discounted benefits and costs. Decisions, or assumptions resulting in decisions, must be made in the following three areas before the technique can be used: (1) length of project life; (2) interest rates; and (3) flow of benefits and costs.

The "length of life" of the project must be estimated prior to implementing a B/C analysis. In most cases this will be an engineering

estimate of the life of the structural works, but it is also important to consider the economic life of a project. For example, will the project as designed be obsolete before being physically depreciated? A second area of concern is the proper interest rate to use in the discounting process. If the rate is set too low (a common fault), there is a tendency to favor projects with high capital intensity. That is, the price of one of the inputs, capital, has been set too low in comparison with other input prices. A related problem is that low interest rates often affect the public-private mix decision in the design process. Highly subsidized capital tends to place more emphasis on the role of the public sector in the project's design. Third, there is a need for an estimate of the flow of benefits and costs over time. Since a basic thrust of this approach is a comparison of discounted values, it is necessary to estimate specific costs and returns on a sequential (normally annual) basis.

Given the above requirements, B/C analysis is a useful technique when the allocation criterion is economic efficiency. Formats for implementing the technique, as well as a more detailed critique of its advantages and obstacles, is readily available in an extensive literature (47, 66).

Internal rate of return (IRR) analysis is another of the techniques which are economic efficiency oriented. A major contribution of the IRR approach is its role in evaluating the impact of false signals from the marketplace. Unrealistic foreign exchange rates or subsidized inputs can be examined with IRR procedures.

In comparing the two techniques, B/C analysis is based on the classical theory of the firm. The financial focus of B/C analysis is on

private benefits and costs. It is the approach which a private entrepreneur would use to evaluate a project, but it is also useful in helping to determine whether a government would support a project after the donors commitment is complete.

The IRR technique permits an examination of economic as well as financial relationships. Economic analysis, is designed to view investments from a societal rather than a private point of view, i.e., the social costs and benefits. The concept of shadow prices, which reflect the real cost of inputs, is an integral part of IRR analysis. In addition, inputs and outputs difficult to measure in the marketplace and pecuniary and technological externalities can be measured with the IRR technique.

It is important to emphasize the similarity between IRR and B/C analysis. Each technique is designed to provide measures of the comparative return on investments from alternative uses of inputs. As in B/C analysis, there is an extensive literature on specific applications of the IRR technique (66, 95, 98, 100).

#### Risk/Incentive Analysis

A comprehensive review of the implicit and explicit trade-offs between risks and incentives needs to be conducted at this stage in the design process. Although risk and incentive considerations are a continuing part of the design framework, it is crucial to include an overview of these forces at the project level of analysis. The specific issue that needs to be sorted out is the magnitude and distribution of opportunities (incentives) and risks to individuals and society from implementation of the design scheme (9, 89).

It is useful to start with the assumption that people in general prefer the status quo (1). Studies find that migration is a stressful experience because it often means leaving family and friends to face an unknown future (92). The incentives offered by the resettlement scheme must overcome the easier course of not participating in the scheme.

The main focus of concern is what stimuli serve as an incentive to encourage migration to a resettlement area. Previous studies indicate the more important factors include:

1. Rights of inheritance. The assurance of continued tenure for one's family and heirs has been found to be a strong incentive (19, 88, 89, 102).

2. Higher standard of living. A large difference in present economic circumstances and what can be realistically expected on the resettlement scheme is considered a strong incentive. The lack of incentives will tend to result in the populating of the project with misfits, criminals and those with minimal levels of motivation (48, 65).

3. The size of the penalty function. How severely is the new settler penalized when there is misfortune? Will a bad crop year or two result in the farmer being "wiped out" to the extent his/her family will face starvation and he/she become a landless laborer? Eicher concludes, in the 1982 fall issue of Foreign Affairs that "Empirical research has produced a consensus that African farmers do respond to economic incentives as do farmers in high-income countries, but that Africans rationally give priority to producing enough food for their families for the coming one to two years (p. 159).

4. Cultural compatibility. Provision of items and activities which permit a continuation of traditions is a major contributor to

the reduction in stress. For example, is there an adequate area provided (both in size and location) for building temples and shrines? Are there provisions (or at least no impediments) for other social-cultural activities such as marriage, birth and death ceremonies (6, 17, 32, 34, 48, 89)?

5. Availability of amenities. Previous studies have provided mixed results on what is a desirable level of amenities. The focus should be on basic needs such as food, water and shelter. Other high priority items include education, medical and sanitary facilities. The prudent approach is to start with a low level of amenities and then have the staff work with the new residents in providing the desired amenities (6, 16, 18, 39, 60). There is a lack of agreement on the importance of access (i.e., transportation and/or communication) to family and friends. Some studies suggest that easy access decreases stress and increases the amount of family support in terms of providing labor at seasonal peaks. Others believe that easy access leads to absenteeism and lack of interest in the success of the development scheme (88).

6. Nearness to urban center. An extra incentive (or decrease in risk) is related to the availability of markets and amenities. The potential for direct marketing (i.e., as a street vendor) is considered an important plus for the farmer (30, 39, 88, 102).

From a different perspective, the policy issue is whether prices will be high enough, and/or costs low enough, to encourage the farmer to extend the effort needed to participate in the scheme. Will low farm prices which result from a policy of keeping food prices low for the urban residents make it difficult to attract good settlers or cause high off-migration from a resettlement scheme? How will a national

system of subsidies on selected categories of inputs or outputs affect credit markets (5, 74)? Are subsidies provided with "no strings," or is it script that is only good "at the company store"? Are the goods which can be purchased limited to specific items agreed to in the loan contract? Do the farmers believe (whether real or perceived) that they are being cheated by the "company"?

It is important to determine the magnitude of the disassociation of costs and benefits, i.e., who benefits and who pays the cost (32). Does a cheap food policy merely shift costs from one group in society to another? The policies of parastatels, marketing boards and taxing units are examples of organizations which need to be evaluated in terms of the incidence of their program's costs and benefits.

#### Spatial Orientation

Although national and regional development concerns were considered in selecting the site of the resettlement project, it is important at this point to reconsider the spatial impact of the project on the national and regional economy. How will the output from the project affect the regional food balances? Will the excess produce from the scheme have a market outlet within a feasible distance? Will the other regions have the resources to pay for the marketable surplus from the resettlement area? Are roads and other transportation facilities necessary for moving goods and services between regions in place? If the scheme is designed to produce a cash crop to supply international markets, are dock facilities available for moving the goods in a timely manner? Are the institutions and political stability needed for international trade available?

The spatial orientation of facilities within the resettlement scheme and their relationship to one another need to be reviewed. Items to be examined include the flow of goods and services among the various crossroad markets, villages and market towns within the scheme. The who, what and where of "community services" need to be checked. For example, who decides the level of community services available, who is permitted to use the facilities and who pays for their use (i.e., fees, taxes, etc.)? Almost as important as the question of what facilities will be built is the question of where they will be located. What criteria are available for setting priorities when there is only limited resources available for providing these facilities? A basic question is what are the economics of providing the desired level of infrastructure within desired spatial configurations.

From a different perspective, the design team should consider the feasibility of starting with a pilot resettlement scheme. A working model of a scheme of a few hundred hectares would be useful in identifying potential spatial--as well as other--problem areas without making major commitments of capital. The constraint, in most countries, is a host government not willing to wait for the results from a pilot scheme before moving forward with the overall project (14, 92).

#### Realism of Estimates

At this stage in the analysis an important task is to review all yield, production and price estimates as well as the availability and costs of all inputs. It is imperative that a sensitivity analysis, i.e., an evaluation of the magnitude and probable impact of errors in these estimates, be included in the design process (70). Will a

reduction in yields of 10% (or 25%) in the staple crops cause the entire scheme to fail? What happens if these lower yields continue for two, three, or even five years? What is the probable impact of unavailability or untimely delivery of seed or fertilizer inputs? A critical problem occurs when the host government or representatives of donor agencies require the use of overly optimistic price and output estimates or unrealistic assumptions about the availability of inputs. The use of conservative estimates--perhaps 10 to 15% lower than original expectations--is a prudent approach.

A special concern is the accuracy of price assumptions. The lack of price and income elasticity estimates encourages the use of unrealistic assumptions such as projecting increases in income using price levels existing before production levels increased (70, 74, 98). It is important to review the logic used in developing the elasticity estimates and what will happen if the actual elasticity coefficients are substantially higher or lower than the estimates.

Estimates of the availability and price of capital inputs need special attention. If the capital cost per settler family in the scheme being designed is significantly higher or lower than the benchmark data from similar projects, it is imperative to determine why. It is possible that conditions on the project are unique, but it should also serve as a warning to check for unrealistic assumptions and/or estimates. Using the same logic, other indices that need to be examined include: (1) operating cost per farm family; (2) value of output per unit of capital; and (3) foreign exchange requirements per unit of capital.

An explicit statement of the assumptions regarding the role of markets should be included in a description of the design process. It

is argued here that marketing activities should not be viewed as a separate entity but rather as one component in the total production process. When determining the trade-offs in the use of resources, it is necessary to assume price (and price elasticities) for the inputs and outputs. Thus, the appropriate place in the design process to examine the market system is when decisions are being made about these prices and price responses. This does not preclude the need to explicitly discuss marketing functions when examining market structure or capacity and when evaluating the spatial relationships among markets.

A check of the probable impact of the organizational and institutional framework built into the project design needs to be conducted. The most direct approach is to focus on the negative, i.e., identifying the factors which, from an institutional/organizational viewpoint, will hinder the potential success of the project. A checklist of the potential constraints include:

1. Selection of area and new settlers. The design team should conduct a realistic appraisal of the interaction between the natural resources and the values and beliefs of the settlers in the site selected. An example of the type of concern which needs to be considered is represented by the failure of a scheme because the new settlers believed that thunder and lightning at the resettlement site--which they had not experienced previously--was a warning from the Gods to return home.

2. Decrease in family and peer pressure. Less family pressure may result in movement away from traditional lifestyles. This may cause undesirable changes in family relationships which need to be evaluated before the patterns become too ingrained.

3. Changes in the production process. The design team needs to review the participation of the various "actors" in the production and marketing process to ascertain that undue burdens or responsibilities are not being assigned to one group.

4. Storage and markets for surplus production. The concerns here range from "will it rot in the field" to the role of middleman, and the compatibility and adequacy of alternative marketing approaches. If the present organizations or institutions are unsatisfactory for implementation of the project, it is necessary for the design team to develop alternatives which will permit the project to move forward.

5. Respect for traditions. The "bottom line" is which actions in the settling and implementing of a resettlement scheme will require changes (however slight it may seem to the outsider) in the traditional lifestyles. The follow-up question is whether plans have been made to eliminate the actions that adversely affect the project's success--or at least minimize those that are unavoidable?

It is also necessary at the project level of analysis to consider how "unrelated" national policies will effect the implementation of the resettlement scheme (24, 26, 43, 70). Will the drive for increased production result in increased sheet or gully erosion? What is the potential for salinity problems if irrigation is introduced or expanded (48)? Another example is whether the introduction of new tillage equipment will result in a shifting of the burden of work from the male to the female members of the family, i.e., increase the amount of "women's work" (18). Similarly, one must guard against programs designed to train the male members of the family when females are the head of the house decision-makers.

A final suggestion for checking the realism of the analysis (even though it may seem naive) is to use the journalistic practice of asking the five questions starting with "w's" and an "h." Who will be affected, what is the design plan, where will the scheme be located, why is this particular design being used, when will the project be implemented, what is the sequence of activities and what specific analytical techniques will be used?

## SUMMARY

The objective of the analysis reported in this monograph is the development of a pragmatically oriented framework to assist in the design, implementation and evaluation of resettlement schemes in less developed countries.

A matrix format is used as the organizational structure for analyzing the large amount of diverse information used in the resettlement design process. An advantage of the matrix approach is that it permits an examination of the relationships among each element in the matrix as well as comparisons among the elements.

Resource categories used in delineating the columns of the matrix are: (1) natural resources; (2) human resources; (3) capital and technology; (4) institutions and organizations; and (5) spatial orientation (including infrastructure).

The level of aggregation is used as a second classification criterion in the design process. The rows of the matrix are used to show these levels of aggregation and serve as the organizational "stages" in dividing the monograph into chapters. The information in the rows in the matrix is delineated on the basis of the following classes: (1) definitions and classifications; (2) measurement of the resource base; (3) input combinations at the commodity or enterprise level; (4) farm level trade-offs; and (5) design alternatives at the project and national levels of aggregation.

The parameters for defining and classifying various concepts and activities are the focus of attention in the first chapter (Stage I). The specific attributes of the resources needed in a resettlement scheme--the land, people, and organizational control--is discussed. A classification system is developed for grouping resettlement projects according

to their goals and objectives. Reasons for the high percentage of failures in resettlement schemes is examined. The chapter concludes by stressing the importance of reaching agreement on parameter definitions early in the design process.

In the next chapter, Stage II, the emphasis is on measuring the resources available for implementing the resettlement scheme. A prerequisite to the measurement process is the development of, and agreement on, the benchmarks to be used in making the measurements. The amount of land, labor and capital available for implementing a project can only be determined if explicit assumptions concerning price, culture and technology conditions are stated. The kind, amount, source and method of acquiring data needed for designing resettlement schemes is discussed.

Physical and economic input to output relationships are analyzed in Stage III. The land, labor and capital inputs determined to be available in the previous stage of the design process are now evaluated in terms of their potential contribution in the production of desired outputs. Basic coefficients, e.g., the amount of land, labor and capital required each month in the production of a given crop, are determined at this stage in the analysis.

In Stage IV the focus shifts from the relatively simple process of using a single input in the production of a specific output to a "system of decisions" required for combining resources in accordance with predetermined allocation criteria. This is the most complex and time consuming activity in the entire design process. The large number of inputs used in the production of a variety of desired outputs needs

to be combined in some optimal manner.

A "typical farm" methodology, using the information collected, sorted and stored in matrix discussed above, is the recommended procedure for implementing this difficult step. The matrix format facilitates an examination of the required trade-offs not only by showing the impact of using an input in the production of a commodity but also the competitive and complimentary relationships among the various resource categories.

The final stage in the analysis is to evaluate the resettlement design at the project and national levels. The pros and cons of using various analytical techniques for this task are discussed, but only minimally, because of the extensive literature readily available on the use of these techniques. Another issue emphasized is the role of risks and incentives in the design of resettlement schemes. Although risk and incentive measures are a continuing concern throughout the analysis, the effects of these concerns are of such importance that they need to be re-examined in the final review of the project's design.

The last step in the design process is to review the realism of all the estimates used in the analysis. Formal sensitivity analysis is a highly recommended procedure, but a practical, common sense evaluation of the reasonableness of all the estimates used in the analysis is of even greater importance.

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