MASTER PLAN FOR THE EVALUATION OF CADU

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1. INTRODUCTION

Most development assistance programmes are subjected to evaluation of some sort. In the majority of cases this evaluation takes the form of periodic qualitative assessments conducted on a "common sense basis" by individuals who are not directly involved in the development effort they are reviewing and who perform this function on a part-time basis only. The net flow of financial resources to the developing countries in 1970 totalled US$15.5 billion of which about US$4.7 billion were official grants mainly in the form of technical assistance (1). The efforts made by donor agencies towards the evaluation of the utilization of this sum bear no apparent relationship to its size. Considering the level of the funds involved, the methods used for study of the effects of development assistance have been relatively undeveloped as is evidenced by the following quotation from a letter from a major UN technical assistance agency (2):

We are relatively new to evaluation and are anxious first to exploit evaluation as a management tool ... In respect of on-going products, ad hoc evaluation from time to time will seek to determine the extent to which a project is fulfilling the stated targets and objectives and to recommend any necessary modifications at the right time either in the scope of the project, or its contents.

A large bilateral donor agency wrote:

(We) do not know of any particular case of continuous formal evaluation at project level ... We do not carry this out on projects which we, as a Ministry, finance ... Of course informal continuous evaluation has very often been carried out by project management as a normal part of their function and sometimes the results are presented in the annual reports of the project.

(1) SIDA, Frågor och svar om u-land och bistånd. SIDA, Stockholm, 1972, p. 13

(2) In 1968 the then head of CADU's Planning & Evaluation Section, Goran Nyberg, surveyed most of the major technical assistance donor agencies to investigate their approach to evaluation in general and continuous built-in project evaluation in particular and the two quotations are from replies he received in his survey. The general attitude of the donor agencies at that time towards evaluation may be termed one of "benign neglect".
Only of late have concentrated efforts begun to be made towards relating benefits to costs not only for capital assistance, where this task is easier, but also for technical assistance. As a result, the efficiency of funds earmarked for technical assistance in the past has been relatively low and the multitude of projects that have failed to meet their expressed goals have been written off as the cost of gaining experience.

Few technical assistance projects have been designed to include an evaluation function, a unit specifically intended to monitor the project's evolution and to assess its impact on a continuous basis with a view to improving its goal attainment through feedback to the project management. This is remarkable as a large technical assistance project like any organized social effort presents management problems of considerable complexity.

CADU would appear to be an exception in this respect. The original project proposal of 1966 stated (1):

A planning unit must be established to survey the natural and manpower resources of the region, to plan the development towards the targets jointly agreed upon, to make or plan feasibility studies of specific projects and to design suitable actions, to register progress and on the basis of appraisals of the various activities to suggest modifications in the programme.

This unit was called the Planning & Evaluation Section (2) and attached as a staff unit directly to the project direction. Since the project's inception in September 1967 this unit has been engaged in measurements of the effects of project activities and in providing feedback information to the project direction.

The present paper is an attempt to draw up a master plan for the evaluation of CADU for the remainder of the project period, i.e. up to 7 July 1975. It may be argued that this should have been done at an earlier time and that it is now somewhat late in the lifetime of CADU to design a scheme for its evaluation.


(2) Below referred to as the "P & E Section".
The answer is that there has in the past existed an elaborate plan for the evaluation of CADU, that this plan due to intermittent staff shortages never has been implemented in full, and that the changes now being proposed to the original plan are made in the light of the experiences gained by the P & E Section during almost five years of work.

The emphasis of CADU's work on evaluation has changed with the progress of the project. Initially it was considered essential to gather base-line data and to assess the adequacy of specific key project activities (e.g., the training of model farmers) in order to enable any requisite modifications in the CADU design to be made as early as possible. With the growth and increasing complexity of CADU (1) it has become necessary to devote increasing attention to short-term evaluation as a tool for management purposes. It is becoming equally necessary to pay more regard to the overall impact of the project and to abandon the previous sectoral and rather narrow approach focusing on individual project activities in favour of a wider perspective. The need has also been felt for a more standardized system as a framework for the evaluation work in lieu of the earlier "ad hoc" system, which was justified when all possible experiences were being gathered but which now tends to render the evaluation work somewhat unsystematic. This master plan is therefore intended to provide a comprehensive framework to guide the evaluation work of the P & E Section up to the end of the present project period.

All essential aspects of the plan have been thoroughly discussed between the project direction and the P & E Section throughout the 1971/72 budget year and trials have been held of its major components. The plan was put in force on 1 April 1972.

This paper first addresses the task of discussing the various concepts entering into the process of technical assistance evaluation with a view to offering a conceptual framework for

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(1) In CADU's Work Programme & Budget for 1972/73 a total gross cost of Et$18 million has been provided for; the total net cost after deduction of revenues is Et$7 million. The project is organized in 23 sections and autonomous divisions and has some 625 contract employees including about 20 expatriate specialists. There is no doubt that CADU, as technical assistance projects go, is a major effort.
the ensuing discussion. CADU's evaluation function is described in chapter 3, and an analysis of the project's goals is provided in chapter 4. Chapters 5, 6, and 7 outline the evaluation plan on three different levels. Chapter 7 also gives some brief comments on methodological problems connected with the surveys necessary to assess project impact. A summary of the evaluation system and its capacity requirements is provided in chapter 8.
2. THE PROCESS OF EVALUATION OF TECHNICAL ASSISTANCE

2.1. Evaluation Defined

The term "evaluation" covers a wide range of concepts and is often somewhat carelessly used. The literal Swedish translation of the term reads "resultvaluation", and this describes perhaps more adequately the generally accepted connotation of the term in connection with technical assistance. It refers to the assessment of results of projects.

However, the term is used in its broadest sense, hence the effort made here in defining it. "The scrutiny of experts' reports is described as evaluation. The inspection of a project to determine its administrative or technical efficiency is evaluation. So is the narrative report of a visiting mission composed of outside experts. A descriptive report, without a trace of assessment, saying that two experts are in an East African country to advise on a particular subject is also referred to as evaluation" (1). Evaluation has a different connotation depending on by whom and in what context it is used.

In its manual for project preparation SIDA defines evaluation as a comparison between plans (goals) and plan realization and specifies two types of "systematic evaluation: built-in evaluation which takes the form of continuous reporting, mainly on production results and costs and which aims at some form of assessment of productivity; and "special evaluations consisting of socio-economic depth studies." The manual shows how built-in evaluation concentrates on the activities of a project while special evaluations are more oriented towards the main project goals. (2)

USAID's Evaluation Handbook states that evaluation seeks to answer the three basic questions of the effectiveness, significance and


efficiency of "assistance at all levels - project, sector, country programme". (1) It goes on to say that "the primary purpose of evaluation is to assist programme and project managers in making better decisions" by providing "reasonably objective information on projects in a regular fashion rather than on an ad hoc basis, so that the lessons learned can be applied through either quick 'feed-back' into current programme decisions or to future operations in the same programme or elsewhere".

A UN Inter-Agency Study Group on Evaluation has defined evaluation in terms of the four stages of project activities into each of which elements of evaluation enter: project preparation (identification of needs), project appraisal, operational control, assessment of results (2). These four stages cover the entire life cycle of a project which are thus all considered embraced by the concept evaluation.

For the majority of projects evaluation will only enter as an element of operational control, i.e. for the purpose of monitoring administrative and technical efficiency. It will take the form of brief and usually qualitative periodic reports to the executing and/or financing agency (what SIDA terms "built-in evaluation"). Assessment of results frequently takes the form of specific, one-time review missions conducted by outside consultants. Project preparation and appraisal is usually carried out before the project is operational and by staff from the donor agencies and their field missions (3).

For the purposes of CADU's evaluation function and in the context of this paper attention will focus on operational control and assessment of results. While the identification of needs and appraisal of project proposal is a past stage for CADU as a whole, it is still

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(2) UNITAR, op. cit., p. 14 - 15
(3) That this is so is many times unfortunate since it would obviously be advantageous to have the same staff who prepared a project proposal in the field later participate in its execution. It is conceivable that many projects would be somewhat differently (less ambitiously) designed if the project preparation team knew that they were also designated as project execution team. In this respect CADU was fortunate since the project preparation team remained almost intact to continue with project execution.
taking place with respect to new project activities initiated within the project area; feasibility studies conducted within the framework of the new industrial programme are one example. As a practical matter, however, these activities fall under the "planning" function of the P & E Section which is regarded as separate from the evaluation function.

Evaluation is here defined as the process of appraising past and current activities with a view to improving the project's goal attainment. CADU is said to have a built-in evaluation function in the sense that this process is being actively developed within the auspices of the project.

2.2. Purposes of Evaluation
In broad terms evaluation may be said to have the following three purposes or objectives:

The political objective
The managerial objective
The research objective

By the political objective of evaluation is understood the accounting to the agencies participating in a project of how the funds appropriated have been spent. Such funds have been approved from a limited source in competition with other proposals. Decisions of fund appropriation are ultimately political and within major assistance programmes choices of resource allocations are frequently based on political as well as purely technical considerations. Evaluation will provide unbiased and objective assessments of the achievement of the politically formulated project goals and thus serves the purpose of "telling the taxpayers how their money has been spent." As many if not most technical assistance projects require additional financing and thus more than one close review by the participating agencies, the political arguments for or against a project may well be reactivated more than once and the political purpose of evaluation applies also to ongoing projects. Evaluation will aid politicians and other decision makers in reviews of other projects or project proposals of similar nature or in similar surroundings. Evaluation will enhance the goal-orientation of the decision makers of development assistance and improve the steering
of such assistance (1).

The managerial objective concerns the effects of evaluation on the management and steering of projects. It is believed that the problems of management of development projects frequently have been underestimated. Most project managers are selected on the basis of their technical capabilities and lack experience in modern management techniques; yet they are held responsible for the disbursement of considerable amounts of funds under difficult conditions. Nyberg has said that "development assistance is one of the most complex managerial undertakings conceivable" due to the complexity of multiple and sometimes ill-specified and conflicting goals, disparate staff, intricate problems of financing (usually from two or more sources), logistics and administration, and the paucity of basic background data. (2) As indicated on p. 3, the evaluation function at CADU is being increasingly concerned with management control as a direct result of the project's rapid growth.

Many projects at the present stage of the art should be regarded as experiments and technical assistance is yet by and large a process of trial and error. Evaluation endeavours to reduce the error margin not only by generalizing the experiences gathered for the benefit of future projects but also by preparing for the eventual follow-up of projects. It is therefore appropriate to regard the costs of evaluation of a development programme as akin to the

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(1) Dahl, Birgitta, Resultatvärdering - en felande lank i samhällsbyggnadet. SIDA, Stockholm, 1972 (stencil), p. 7. Dahl notes that since political values will govern the ultimate weighing together of the results, as obtained from evaluation, of development assistance, evaluation can never be politically neutral. However, it is submitted that the evaluation process, while guided by political goals, must remain neutral in relation to these goals. It is the evaluator's task to assess on the basis of established research methods whether the politically formulated goals have been achieved and to be able to do this he must remain neutral to these goals. Evaluation tinted by political expediency is somewhat anomalous for rational conduct of development assistance.

research and development (R & D) costs which frequently form separate parts of the budgets of large enterprises. UNITAR has suggested that two or three per cent of total project costs might be earmarked for the full evaluation cycle (i.e. including project preparation) (1).

2.3. A Conceptual Framework for Evaluation

Like any organized social effort, a development project will have certain specified goals. Evaluation implies the measurement of performance against a predetermined standard and this standard is set by the goals. It is the degree of achievement of these goals that will determine the success of the project.

A development project can be viewed as a system for development, a bounded collection of interrelated parts (subsystems) devoted to the accomplishment of common goals. This system can be viewed from different altitudes or observation levels at which different amounts of detail and different subsystems will emerge (2). Viewed from a high level of observation CADU may be regarded as one of many activities designed to improve the Ethiopian economy. When viewed from a lower level of observation CADU is an important component of the Ethiopian agricultural sector contributing to raising the output of the sector in conformity with the development plan. At a still lower level there are the subsystems within CADU designed to enable CADU meet its main goals and each composed of a variety of activities. Each system is therefore a subsystem in some larger system, the goal of each system will be a subgoal in a larger system, and attainment of the subgoal may be a necessary if not sufficient criterion for attainment of the main goal. It is thus possible to define a goal hierarchy consisting of main goal, subgoal and production target for the system, its subsystems and the integrated parts of the subsystems, the activities, respectively.

(1) UNITAR, op. cit., p. 23. In the 1972/73 budget year the cost of CADU's evaluation function corresponds to 2% of the total net project cost.

Each goal at each level in the goal hierarchy is specified in terms of the group of individuals affected by the activities of each system. This group of individuals is referred to as the target population. For CADU as a system the target population is the population of Chilalo awraja. For the agricultural extension programme of CADU, a subsystem within the CADU system, the target population is the farmers of Chilalo awraja. For the milk marketing activity, one activity of the CADU Marketing Division, the target population is a geographically limited part of the Chilalo farmers.

A project may have several main goals of equal importance bound by a variety of constraints. The totality of goals and constraints at one level of the goal hierarchy (mostly the main goal level) is here referred to as the goal structure.

The technical assistance project's goals are often expressed in several different dimensions, that may well be internally inconsistent making goal optimization more relevant than goal maximization. Thus "economic development" may conflict with "social development" in CADU's first main goal of "economic and social development". Goal conflict is therefore a common feature of the goals of the technical assistance project. Frequently the goals are poorly specified because of lack of information at the time of submission of the project proposal and precise quantified indicators of goal achievement of the type "reach at least x % of the target population" cannot then be formulated. The project's goals often express the direction in which its efforts should move rather than give an indication of the strength of this movement. The evaluator may therefore have to commence his task by specifying progress itself and making the goals operational. Since management of an organization with a complex and nonoperational goal structure is a difficult task, this would lend further support to Nyberg's thesis of the complexity of management of technical assistance projects.

It was recognized above on p. 8 that much of present development assistance is experimental in nature. Empirical knowledge is frequently missing in important respects when projects are formulated.
"In fact, the development assistance process, like a scientific experiment, may be described as a series of hypotheses" (1). The project may be viewed as a set of linked hypotheses: if input then output, if output then purpose, if purpose then goal (2). Consider the following example of a basic project design:

<table>
<thead>
<tr>
<th>Goal</th>
<th>Colonize malarious regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>Eradicate malaria</td>
</tr>
<tr>
<td>Outputs</td>
<td>Viable organization</td>
</tr>
<tr>
<td></td>
<td>All villages sprayed as scheduled</td>
</tr>
<tr>
<td>Inputs</td>
<td>DDT</td>
</tr>
<tr>
<td></td>
<td>Vehicles</td>
</tr>
<tr>
<td></td>
<td>Administrative advisors</td>
</tr>
<tr>
<td></td>
<td>Technical advisors</td>
</tr>
</tbody>
</table>

Underlying each link there are basic assumptions, i.e. a series of assumptions fundamental to the project design: if all villages are sprayed as scheduled and the organization is effective, then malaria is eradicated; if malaria is eradicated then malarious regions will be colonized. If any basic assumption is proven wrong the project may not meet its goal and the history of development assistance is full of projects that have floundered due to fallacious basic assumptions. If the basic assumptions are proven wrong it may often be easier to change the goal rather than to modify the project design: if the organization was viable and all villages were sprayed as scheduled, but malaria was still not near being eradicated, then possibly the purpose should be changed to "eradicate mice" and the goal changed to "colonize mice-infested regions" (the viable organization would be put to some alternate use). To facilitate evaluation the basic assumptions should be made very explicit in the project proposal, as it is the task of the evaluator to test whether they, with the benefit of hindsight, may be said to have been correct or whether they account for failure in some respect of the project.

The basic assumptions were not made explicit in the initial CADU proposal. The major basic assumptions (e.g. "peasant farmers will

(1) USAID, op. cit., p.7. USAID refers to this approach as "the logical framework for evaluation" which is more elaborate than will appear from this sketchy presentation.

(2) USAID, Some Practical Concepts to Assist Project Evaluation. Practical Concepts Inc., Washington, 1971, p.6. The example is also taken from this booklet prepared for USAID.
respond to economic innovations") have, of course, been proven correct. Since the underlying basic assumptions should be specified in respect of every goal in the goal structure for a cause-end relationship to be established, and since CADU's goal structure is so multi-faceted, it would be an arduous and possibly not fully meaningful task to elaborate these assumptions at this stage.

The project goals are formed, given the basic assumptions, on experiences gained from related projects and activities elsewhere and from preliminary investigations of the project area. Assuming a linear function, the goal formation process can thus be described at the inception of the project by

\[ G_m = a_1E + a_2S + c \]

where \( G_m \) is the main goal structure of the project, \( E \) is the experience gained from the project site, \( S \) is relevant experience gained elsewhere, \( c \) is a constant representing the basic assumptions, and \( a_1 \) and \( a_2 \) are coefficients adding to unity (1).

With the evolution of the project there will be a continuous process of goal adaption as experience is gained within the organization (E) and from external sources (S). With the benefit of additional experience goals at all stages of the goal hierarchy are reviewed and revised. Most frequent are revisions of subgoals and production targets as expressed in annual budgets, but also main goals may be revised through amendments to the Plan of Operation. The dearth of data during the initial phases of most development projects make such revisions frequent and necessary during the lives of projects. This goal adaption process would then be

\[ G_t = a_1 G_{t-1} + a_2 E_{t-1} + a_3 S_{t-1} + c \]

where \( G_t \) is any goal in period \( t \), \( G_{t-1} \) is the degree of attainment of that goal during the previous period, \( E_{t-1} \) and \( S_{t-1} \) are the two types of experience gained in the previous period, and \( a_1 + a_2 + a_3 = 1 \).

There will often be a considerable time lag in this goal adaption process depending on the complexities of project management and

group. The budget is thus an important force holding the coalition together and making it a functioning system.

Every measurement of goal achievement entails a comparison of benefits to costs and benefits or costs in isolation do not provide a complete picture for evaluation purposes. Some kind of input-output relationship therefore has to be constructed for the project as a whole as well as for its isolated activities. There are two important concepts of this kind which are frequently referred to in literature on programme budgeting. (1) The extent to which the project, given its overall total costs, has achieved its stated main goals is a measure of its effectiveness. The extent to which it has transformed its direct costs into productive services is a measure of its efficiency. These two measures indicate the productivity of a project, a programme or an activity in relation to its degree of overall goal achievement and to its immediate output respectively. Effectiveness is the wider concept relating to the politically designed goals and to all costs, including any appropriate social costs, caused by the project. Efficiency is the more narrow concept that often can only be technically determined and that relates the goods and/or services generated by the project to their direct costs.

In the sphere of public administration in general and development assistance in particular effectiveness may well differ substantially from efficiency. Consider the following examples (2)

A hospital reduces costs for a certain treatment without reduction of the number of patients (high efficiency) which has the result that the number of revisits by treated patients increases as a result of lowered treatment standard and lowered health standard (low effectiveness).

CADU's sales of seed and fertilizer on credit to farmers have expanded rapidly from Et$15,700 in 1968 to Et$1,437,517 in 1971, a much faster increase than the corresponding growth of costs (high efficiency). On the other hand, there is evidence that these sales initially generated benefits mainly to comparatively large farmers in conflict with CADU's main goal of economic and social development which has the specific

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(2) The first is from Dahl, op. cit., bilaga 1
proviso that "the activities shall be directed mainly towards the farmers in low income brackets" (low effectiveness) (the situation has since the initial years been much improved).

To assess, say, the effects of the distribution of agricultural inputs in relation to CADU's main goals it will be necessary to take into account a host of other direct and indirect effects of this activity (e.g., tenant displacement as a result of increasing land values, soil erosion as a result of substitution of land under wheat for grazing land, changes in income distribution) and to consider various intervening variables (e.g., farmers' attitudes, the reactions of non-eligible large-scale farmers and merchants, the constraints created by other CADU activities). Measurement of effectiveness entails difficult problems of delineation and definition of programmes and activities, isolation of effects and various assumptions regarding intangible background factors. The effectiveness concept should in a measurement as fully as possible cover all project effects and all project costs in relation to project goals. By contrast, measurement of efficiency mainly entails the more easily formulated technical problem of relating certain outputs to their direct costs.

This distinction between efficiency and effectiveness does not to the same extent exist in the commercial firm. The firm's efficiency (as defined by output divided by input or cost per unit produced) normally will be fully compatible with, or at least not in conflict with, its effectiveness since the main goal of the firm usually is maximization of profit subject to a variety of constraints like a certain market share, a certain inventory level, emission of a minimum of pollutants etc. Since the profit goal for the firm is of overriding importance its effectiveness can usually be measured in one single dimension: money. Due to the goal conflict inherent in the goal structure of many technical assistance projects, however, their effectiveness has to be measured in terms of a variety of internally inconsistent variables, and it is often difficult to provide an unambiguous measure of effectiveness for the project as a whole.

As set out above, the project and its environment may be regarded as a system consisting of several subsystems. The subsystems are linked by the financial commitments specified in the budget and
are together designed to meet a goal. Three major subsystems in a project system may be distinguished: the participating donor agencies (the donor agency proper as well as the host government), the project itself, and the target population. Each of these subsystems have inputs and outputs and the outputs of one are the inputs of the next in the chain. Thus the outputs of the donor agencies funds mainly are the inputs of the project which converts these into outputs (goods and services). The outputs of the project subsystem are the inputs of the target population subsystem. The target population subsystem converts these goods and services into changes of behaviour in some desirable respect specified in the goal structure. Evaluation measures efficiency by relating the inputs of the project subsystem to its immediate outputs and effectiveness by relating the inputs of the project subsystem, including any other factors if relevant, to the outputs of the target subsystem and provides feedback on the results to the donor agencies as well as to the project management. The project subsystem, by which is here understood the "project in the administrative sense" (2), is the hub of the entire project system and is the source of energy triggering responses from the donor agencies as well as from the target population. This discussion is summarized in the following figure:

(1) Nyberg, op. cit.: pp 10 - 14
(2) Ibid., p. 12
2.4. **Some Conceptual Problems of Evaluation**

As pointed out on p. 1, evaluation of technical assistance has in the past received relatively scant attention by donor agencies. Efficiency evaluation as a tool for management has been virtually unknown, at least as a continuous function built into the project design. The approach taken to effectiveness evaluation has often been unimaginative at best and intended to serve the "political" purpose of evaluation in connection with e.g. a decision of whether to extend a project. Part of the explanation is to be found in the conceptual and methodological difficulties connected with measurement of the impact of technical assistance, some of which are suggested below:

- a) length of time perspective;
- b) lack of baseline data;
- c) difficulties in isolating change caused by a project from change caused by other factors;
- d) problems of defining the output of technical assistance;
- e) the scope of the surveys necessary to determine impact in a "scientific" manner;
- f) communication problems in the environment of the developing country;
- g) the complex and ill-defined goal structure of many development projects.

Most technical assistance projects are designed to have primarily long term effects. The viability of an institution created by a technical assistance project, the effects of a training course, the productivity increase resulting from a vocational training scheme, are all effects that should remain after completion of the project in question, and that therefore should only be assessed some time thereafter. The problem, of course, is to define how long this time period should be. It would be desirable if project budgets included provision for a comprehensive evaluation at some time, the length of which would depend on the character of the project but be arbitrarily decided, after the termination of the project. In practice the evaluator is usually by convenience forced to adopt the much too short time span of the lifetime of the project for an assessment of its effectiveness. Such an assessment will be incomplete and provide more information on
efficiency, i.e. the short term efficacy of project personnel, than effectiveness.

All development assistance strives to achieve change in some respect. The essentially only way to measure change is to measure a variable before and after it has been exposed to a stimulus. Most practical evaluations are after-measurements only that do not relate to any strictly comparable before-measurements. They tend to be qualitative assessments by a group of outside consultants or "wise men" who conduct the review during a visit to the project of perhaps a couple of weeks; similar "mid-term review missions" are also common. These missions are limited to the information available to them at the time of their review which may or may not be biased by influential staff and by events occurring at that particular time. While they make an effort to relate conditions at the time of their review to conditions at the start of the project, such an effort often becomes haphazard in the absence of thorough base-line studies making explicit the base values of verifiable indicators to which the goal achievement of the project may be correlated. For any systematic evaluation process such base-line studies are thus of overriding importance. On this count CADU's evaluation work may, incidentally, be faulted: the extensive general agricultural survey carried out in 1972 by the P & E Section provides base-line data for evaluation purposes, but this survey should have been the primary task of the Section back in 1967.

While base-line surveys initially should be accorded highest priority for evaluation, the theoretically desirable use of control groups, i.e. groups not exposed to the same stimuli as the target groups providing the no-change alternative against which change may be assessed, will often be difficult in practice. An environment at a low level of development is very susceptible to influences of unexpected and isolated events, which may affect the control group and prejudice its use. It is also fairly easy to select control groups in such a way that the outcome of the evaluation may be determined in whichever desirable direction. The use of control groups is therefore mostly abandoned in practical evaluations, a fact which further underlines the importance of base-line surveys of the target population. (1)

(1) Hyberg, op. cit., p. 24 - 25
A further confounding factor is the difficulty in isolating the change in the goal variable accruing from the activities of the project. There will normally be a variety of intervening variables the effects of which may be difficult or impossible to assess and as indicated above communities on a low level of development will be particularly easily affected by such variables. A significant production increase in an area may have resulted from an agricultural project's extension activities but also from unusually favourable climatic conditions and it may be difficult to isolate one effect from the other. An expatriate expert's counterpart may have raised his knowledge as a result of the expert's presence but also through his own independent endeavours.

A related difficulty is the precise definition of the output of a technical assistance project. The term "technical assistance" has the connotation "transfer of knowledge" or "advice". The problem then revolves around the specification of the impact of the advice rendered and measurement of this impact. Contrary to a popular belief the output of a technical assistance expert is not measured by the number of sheaves of paper that he is able to generate. His output is rather the impression he is able to make on the people he is working with and the relations he is able to establish with them. A unique feature of the expert is that he should succeed in making himself dispensable; the successful expert trains his counterpart to the point where the latter is able to carry the work on after the expert's departure. Replication may therefore be the most fundamental goal of many technical assistance projects, but yet it is exceedingly difficult to define and measure. It is its quality rather than its quantity that counts. Statistics on technical assistance tend to emphasize quantity: number of expert man-years, number of trainees, number of seminars held etc. The real output, however, is the learning effects transferred by the experts to the trainees through the seminars and the adequacy of these effects.

In order to carry out fully reliable and valid measurements of these learning effects it is necessary to have recourse to modern social surveying techniques and to carry out surveys of the target populations. The cost and effort required to carry out such
surveys is frequently such that this course of action is abandoned in favour of the "wise men" approach indicated above. This approach has the additional advantage of being uncontroversial and relatively expiditious ("We'll send Mr. X there for a couple of weeks. Who would doubt his judgment?") while surveys tend to be time consuming. However, while the "wise men" usually may produce a reliable judgment on efficiency, there are for the reasons set out on p. 18 all too often unable to assess effectiveness. The case may be made that large technical assistance projects should have much to gain from concluding research agreements with local universities and similar institutions (which would also have the advantage of providing policy-oriented research opportunities to graduate students). This could provide the pool of knowledge required for a correct assessment of the attainment of the complex goal structure of a large development project and enable the requisite surveys to be done at a relatively low cost that, furthermore, might be defrayed from the project's local currency component.

Social surveying techniques in use in developed countries may prove to be inadequate in the context of the developing country (see further section 7.4). In the choice between extensive surveys using structured questionnaires and large random samples on the one hand and depth studies with a much more limited and often not random sample on the other, the researcher is frequently forced to depend on the latter for collection of his data. However, depth studies rely upon repeated contacts with the respondents or lengthy interviews and are therefore time consuming. The researcher also has the fundamental problem of adjusting to the terms of reference of people on a low level of development and formulating questions in such a manner that they have the same connotations to him as to the respondent. Social surveys in an environment on subsistence level are difficult to conduct because of the basic communication problem that frequently arises between the respondents and the researcher. It has been mentioned how the lack of background data at the inception of many a technical assistance project prohibits the exact specification of goals. Further, the goals may be internally inconsistent rendering goal attainment to be ambiguous in the sense that attainment of one goal may have led to failure in respect of
another. However, improvements in the specification of the goal structure made possible by subsequent data collection are not always carried out. Failure to revise a project's goals in the light of additional available data may contribute to explain why a majority of technical assistance projects are extended repeatedly as the originally envisioned goals may remain unattainable (1). More effective and continuous evaluations might contribute to pointing at needs for goal revision or, alternatively, termination of projects.

With a view to facilitating, indeed enabling, anything but purely qualitative and judgmental assessments of a project's progress towards its specified goals it is necessary to formulate, if possible at the time of the submission of the project proposal, a number of indicators that may be readily quantified and measured (2). If this is not possible at the very inception of the project, it might in many case be done at a later time, for instance in connection with a mid-term review of the project. Examples of such indicators are number of classrooms built, number of trainees graduated, number of hectares under a certain crop etc. While these indicators obviously will not give the total picture of the project's progress, they will provide some undisputable measure of project efficiency that together with other types of assessments would provide a better progress evaluation than statements of the type "the project has made good progress towards its goals."

(1) UNITAR, op. cit., shows on p. 37 that of a sample of UHDE/TA projects programmed in the 1967-68 biennium, projects started in 1965-66 or earlier and continuing constituted 49 % in terms of number of projects and 54 % of 1967 value. Project initiated 1957 or earlier accounted for no less than 21.7 % of the value of the 1967-68 programme. "The opportunity for new projects, reflecting new priorities or re-arrangements of programme, is limited in each programming period by the continuation of projects originating in earlier years. Continuing projects are given priority in the sense that financial provision is made for them first." (Ibid. p. 36.)

Such "progress indicators" should be provided in respect of the project's major activities and be used as soon as the availability of data permits. In the absence of such indicators, the progress of a project will be only to be seen in the eyes of the beholder giving full freedom to all kinds of interpretations and evaluation will not provide a very sound basis for decision making.

Such progress indicators have not been specified for CADU (the Tentative CADU Programme, 1970 - 1975, CADU Publication No. 26, suggested four indicators for the goal of economic development only, but these are not sufficient) which tends to render work on the project's evaluation somewhat poorly anchored in any set of values established ahead of time.
3. THE EVALUATION FUNCTION OF CADU

Since its beginning in September 1967 CADU's built-in evaluation function has been discharged by the P & E Section. The effectiveness of the Section's work in evaluation, which is only one of the Section's duties, has of necessity varied with its staff resources which at times have been meagre. The Section has had the following expatriate and senior Ethiopian staff:

- Lars Leander, Agricultural economist (1967-1969)
- Goran Nyberg, Senior economist (1968-1969)
- Arne Flodh, Agricultural economist (1971-1972)
- Johan Holmberg, Economist (1971-1972)
- Mehari Tesfaye, Economist (1971-1972)

To date five expatriates and three Ethiopians have served with the Section suggesting that all expatriates have not had counterparts and that the continuity of the work therefore has suffered (particularly since Yeshiwas Bekele now works outside CADU and in a different profession). The difficulties in recruiting qualified Ethiopian economists have been considerable and no Ethiopian staff member has been fully engaged in evaluation. Excepting Nyberg all those mentioned above have been relatively inexperienced, none having had more than five years of working experience on assumption of his duties with CADU.

During the 1971/72 budget year the Section was staffed with one agricultural economist, one general economist and two business administration economists, a probably almost ideal combination. Recruitment of the expatriate economists has in the past been marked by CADU's connections with the Swedish Agricultural College in Ultuna and the Marketing Department at the Faculty of Economics at the University of Gothenburg. Thus Leander and Flodh are both graduates of the Agricultural College while Nyberg, Bergman and Holmberg all graduated from the Marketing Department of the University of Gothenburg. Nyberg has a Ph.D. in marketing economics while all others have M.A. degrees (the Swedish equivalents). Of the Ethiopian staff Henock Kifle has an M.A. degree from an American university, the others have had B.A. degrees.
The Section has been fortunate to be well staffed with statistical assistants and interpreters for conduct of interviews during field work, simple statistical analyses, tabulations etc., and during 1971/72 it had an average of eight such staff members. The Section has also at all times had ample budgetary resources for field work.

A conspicuous feature of the staffing of the Section is the absence of any expertise in sociology. This largely reflects the project's emphasis on economic development and improving the economic conditions of the target population and the priority given to these aspects over social change (see section 7.1 below where the main goal "economic and social development" is discussed.) It has also been felt that economists may be more immediately "productive" to the project considering that evaluation is only one of the tasks of the Section. With the growth of particularly CADU's marketing activities an increasing demand for a variety of economic cost analyses and forecasts has taxed the capacity of the Section to its limits. While the absence of a sociologist probably has been a handicap for the Section's work in evaluation, such a post has not been considered justified in the light of the Section's other activities.

The absence of a statistician has also been felt at times and several of the Section's surveys are imperfect in terms of statistical design. CADU has on several occasions approached SIDA in order to be able to have a statistician "on call" (the post would be shared with other SIDA projects in Ethiopia), which solution would have much to commend it. However, considering the all but unavoidable error margins inherent in large scale surveys in a rural peasant community at a very low level of development and with extremely poor communications, it is submitted that much statistical refinement in terms of optimal sample size, correct randomization and sophisticated quantitative analysis would not be possible. Nevertheless, it would appear that the ideal composition of a group working solely with evaluation would be one economist, one sociologist and, on call, one statistician.

The nature of the various tasks of the P & E Section, including the increasing attention devoted to CADU's industrial programme,
in March 1972 prompted the organization of the Section into three groups:

- an economic analysis group;
- an evaluation group;
- an industrial programme group.

The intention is to have an expatriate economist working together with an Ethiopian counterpart in each group and recruitment of an expatriate industrial economist and two Ethiopian economists is at present (July 1972) under way.

In April 1968 Hyberg prepared a first plan for the evaluation work at CADU entitled CADU Evaluation Programme (Appendix II to Plan of Work and Budget 1968/69). This plan includes three types of evaluations: 13 activity level measurements essentially of the before/after type; one project level measurement of the aggregate effects of all activities; activity level reports to be prepared by the departments/sections on each activity on its completion or at least one per year in accordance with a detailed schedule. The plan described in some detail the type of report or study expected from each measurement and discussed evaluation methodology and criteria to be applied.

This ambitious plan could never be implemented in full mainly because of subsequent staff shortage within the P & E Section. It was also premature to introduce the activity level reporting at this early stage when the scope of the project's activities was comparatively limited and there was no readily felt need for control impulses. The priorities applied in the selection of activities to be subjected to special study were not clear from the plan and work was initiated on studies of relatively peripheral activities; thus one of the first studies concerned the health programme which has since been abandoned by CADU. However, the original plan for before measurements has since been followed in several respects, and from 1968 through spring 1971 the following studies were carried out on key activities:

Health Education
Training of Model Farmers
Women's Extension Programme
Co-operative Training
Credit Programme
The other eight before-measurements proposed in the original plan have since been abandoned in favour of other studies considered to be more urgent. While the project level evaluation envisaged in the plan was never implemented, a crop sampling survey was designed and carried out, and this survey in several respects fills the function of a project level impact measurement. This study was carried out for the first time in 1968 and has been repeated annually ever since with successive improvements of the methodology used. The survey measures yields in the project area to provide an assessment of yield responses to the project's activities.

While the P & E Section during the first years was understaffed and thus unable to implement in full its own programme for evaluation, much valuable data were gathered and methodology developed that has enabled later work to proceed at a much faster pace.

Work on development of a revised comprehensive evaluation system for CADU was given its first impetus with the visit to CADU in December 1970 by professor Bo Wickstrom of the University of Gothenburg. It was then recognized that the project had grown to such a size that the narrow activity level approach would have to be abandoned in favour of a wider approach focusing on CADU as a system of several interrelated programmes, paying more attention to overall project impact and to evaluation as an aid to management. It was agreed that the P & E Section should be more integrated in the management process and generate control impulses to the project direction on a routine basis.

Concrete proposals were made on these lines in July 1971. These proposals, which form the basis for the present plan for CADU's evaluation, stressed the need for setting out a clear schedule or system for reporting on the discharge of short-term activities as well as measuring more long-term impact of these activities (c.f. SIDA's definition of evaluation of two types: built-in evaluation and special evaluations, p. 5). These proposals also emphasized the importance of a regular flow of control impulses for project steering purposes and they endeavoured to put forth a detailed schedule for collection of requisite data. Aspects of the proposals were tested during November/December 1971 and reviewed in detail during a second visit by professor Wickstrom in February/March.
1972. After some modifications the proposals were then accepted by the project direction and put in force as from 1 April 1972. The present paper incorporates all experiences gained during 1971/72 from the discussions and implementation of the proposals of July 1971.

CADU is one autonomous unit with the Extension and Project Implementation Department (EPID) of the Ministry of Agriculture, and the Division includes other units (projects) similar to CADU. Since CADU is the only project where evaluation methodology has been developed and where resources for systematic evaluation exist, it was in March 1972 proposed that CADU should integrate its evaluation function more closely with EPID and that the essential aspects of CADU's new evaluation system should be applied also to other units within EPID. It is hoped to achieve a personnel union between CADU and EPID for evaluation during the first half of the 1972/73 budget year in the form of staff who would devote time to CADU as well as to EPID and its other units.

While the priorities for the evaluation work naturally may change until the termination of present project period (7 July 1975) i.e. due to staff shortage, the present master plan for CADU's evaluation is intended to complete the P & E Section's work on development of evaluation methodology and to set forth a schedule for the work ahead. The ultimate success of the master plan will in large measure depend on the availability of Ethiopian staff interested in continuing work on evaluation.
4. SOME CHARACTERISTICS OF THE GOAL HIERARCHY OF CADU

The starting point for any evaluation is an analysis of the goals that provide the standard against which evaluation is carried out. A brief review of CADU's goal hierarchy is therefore warranted prior to a detailed presentation of a system for the evaluation of CADU.

CADU's three main goals are reproduced from the Plan of Operation in Appendix I. The Plan of Operation also specifies in some detail "subgoals" for each section, which more serve the purpose of setting out the functions of the sections (1). The Plan of Operation also specifies certain supporting measures to be undertaken by the Imperial Ethiopian Government (2), resource requirements and costs per department/division (not per section), and administrative systems and procedures to be followed by CADU.

A budget is prepared each fiscal year in conformity with the goals and financial ceilings of the Plan of Operation. This budget specifies in detail each activity to be discharged by each section, the timing and duration of each activity over the budget year, and the production target of each activity. In all there are several hundred activities and production targets. Efforts have been made to state these production targets in operational rather than in general terms and to quantify them to the extent possible. The Plan of Operation states that the "work programme and resource requirements shall be related through a system of programme budgeting" (3). CADU's budget does not, however, specify resource requirements per activity per section, which is all but impossible, but provides on the one hand a detailed work programme per section, on the other hand a specification of the total cost requirements of each section.

(1) The organization chart of CADU is reproduced in Appendix II. All budget units, i.e. organizational units with their own budgets, are henceforth referred to as "sections" although they may be autonomous divisions ("CADU Seed Division"), departments ("Veterinary Department"), or sections ("Catering Section") in the organization chart.

(2) Below referred to as "the IEG"

(3) Plan of Operation, article 4.3.
Reference is made to e.g. CADU publication No. 67 for an illustration of the forms used in the budget.

There is thus a goal hierarchy main goal - subgoal - production target governing the work of each section. The main goals and subgoals are found in the Plan of Operation and the production targets in the annual budgets. While the main goals and the production targets are very explicit and clear, the role of the subgoals for evaluation purposes is somewhat diffuse. The Plan of Operation actually show in respect of each section its terms of reference or main functions (termed "subgoals") and to which of the main goals these are related. However, in many cases this is done somewhat too categorically and the link between the functions shown and the main goal they are considered to influence is sometimes rather tenuous. One of the functions of the Crop & Pasture Section is the "establishment of methods for pasture improvement" which is considered to have an influence on the main goal of economic and social development. Its direct link with the first main goal is somewhat moot and it should presumably be more important in the context of the second main goal of methodology development.

CADU's package approach to development entails offering assistance to the target population in virtually all aspects of agriculture and related fields. This assistance is offered through a great variety of activities in agricultural extension, livestock, infrastructure, marketing etc., and it is the interrelationships of these activities that are the sine qua non of the CADU package approach to development. In the 1972/73 Work Programme & Budget an attempt was made to group related activities together into sectoral or functional programmes which in their turn would be considered to have an impact on the main goals (these programmes are then the subsystems of the "CADU system") and ten such programmes were defined (1). One or more sections may constitute a programme and all these programmes taken together would be CADU.

The goals of the programmes would then be the proper subgoals of the goal hierarchy. While the departments of the organization

(1) CADU Publication No. 67, p. 221
chart conform fairly well with the functional programmes, it is the sections that are of administrative import and for the sections their own activities and production targets shown in the budget are of foremost importance. For the sake of co-ordination of efforts within CADU it would perhaps have been fortunate if the Plan of Operation had stressed more the functional relationships of activities of different sections or, alternatively, the goals of the departments.

The CADU goal hierarchy can be summarized by the following figure:

- Three main goals shown in Plan of Operation
- Ten programmes for which no explicit subgoals are specified
- 23 sections with their terms of reference ("subgoals") shown in Plan of Operation
- Several hundred production targets, one per activity per section, shown in annual budgets

The Plan of Operation of CADU warrants the general comment that it is a vague and apparently somewhat hastily written document that only with some difficulty can be used for evaluation purposes. Its definition of "economic and social development", the first main goal, leaves room for several different interpretations. No attempt has been made to make the goals operational or to specify indicators of goal achievement. No mention is made of any basic assumptions underlying the formulation of the goals. It contains generalities of the type "the infrastructure department shall be responsible for the provision of necessary infrastructure ..." (1)

(1) Plan of Operation, section 2.3.4
The document may be rather harshly criticized on such points because it was not prepared at the very outset of the project, when the dearth of data and knowledge of the target population would have necessitated vague formulations, but after CADU had been operational for more than three years and a considerable amount of background knowledge had been acquired.

The evaluation system for CADU to be presented in the remainder of this paper is designed to adhere to the goal hierarchy of the project. Systems of evaluation measurements will be introduced at three levels: the project level (main goals), the department/division level (subgoals), and the activity level (production targets). The measurements on the project level will be of the type SIDA calls "special evaluations" relating to the effectiveness concept. Measurements on the two other levels will be "built-in evaluations" in the nomenclature of SIDA more connected with the efficiency concept. The difficulty of the absence of clear subgoals for CADU's functional programmes or for the departments is circumvented simply by considering the departments by inference working for achievement of the main goals directly and imputing implicit subgoals in the light of the main goals. The three levels of evaluation measurements will in the following be discussed starting from the activity level.
5. BI-MONTHLY REPORTS ON THE ACTIVITY LEVEL

The detailed specification of the work programme of each section by activity in the annual budgets is an excellent basis for assessing the progress of the sections towards the completion of these activities during the budget year. To date such an assessment has only been possible at the end of the budget year when the work of each section is summarized in the annual report. Through the financial statements issued monthly by the Administration Section it is possible to have a fairly good control over the budget utilization of the sections. However, since these financial statements only show the cost totals by type of account and since no division of costs by activity is possible, they do not provide much indication of the progress of the work programme itself.

Cases of failures of sections to reach certain production targets are as a consequence often brought to the attention of the project direction post factum. It is difficult to have an overview of all sections' activities at the same time, and some sections may well lag behind in the execution of their work programmes but remain unnoticed by the project direction. Some activities need to be closely monitored on a short-term basis with a view to facilitating decisions of considerable economic consequences affecting future periods (Example: the development of the credit programme in year t will affect the order for fertilizer that should be placed in year t in respect of year t + 1). Other activities are more long-term in nature (Example: cattle breeding) but their evolution nevertheless needs to be controlled to avoid "organizational slack" (1) within a section. Decisions affecting resources of all kind (staff, equipment, construction) are facilitated by the availability of a "data base" on the progress of the work programme of the sections. The need for this data base particularly manifests itself in connection with the preparation of the annual budget.

The need for this data base has grown with the increasing complexity of CADU. While the project was in its initial stage it was relatively easy for the project direction to control all its activities fairly closely. Such control is becoming increasingly difficult.

The remedy has all too often been exhaustive meetings between the project direction and senior staff concerned, meetings that more often than not may be regarded as fairly unproductive in relation to the time spent by participants. It would appear that the frequency and length of meetings has increased during later years.

CADU would then require some kind of short-term reporting system on the execution of the work programme in order to provide the project direction with the requisite data base. Systems of this kind are generally referred to as "management information system."

A management information system has been defined as "an automated system which presents information, both internal and external to the business, that aids in making a specific set of routine decisions" (1). In connection with this definition it should be noted that

- a management information system is a control system oriented to decision making;
- it is designed to facilitate routine decisions but it may also aid unique and nonprogrammable decisions by providing the "data base" required to make these decisions as sensibly as possible;
- it should be automated in the sense that it should provide a regular flow on a short-term basis of easily retrievable information;
- it should not be confused with a data retrieval system, but it might serve the function of one.

A management information system in a firm would operate with quantified, unequivocal and readily accessible data on costs, sales statistics, production and stock volumes etc. A development project does not generate the same kind of conveniently expressible information. While some of CADU's activities lend themselves to quantification and are eminently suitable for inclusion in a system of this kind, many others are not. The ultimate purpose with all technical assistance is to convey technical skills and knowledge and progress in this respect is difficult to measure within the scope of a short-term information system. Some activities involve research and development work which over the short term

hardly yield any indicator of progress. "We are working on it" is often all that can be said.

A reporting system to assess the progress of activities could be purely qualitative and provide merely a verbal description of the work discharged during a reporting period. Such a description could be defined to include only deviations from the preestablished plan and could also include assessments of the financial implications of such deviations. The budget follow-up system introduced in October 1971 by SIDA is built on these principles.

However, a purely qualitative budget follow-up has certain undesirable features. It is inexact and leaves most of the responsibility for the assessment in the hands of the reporter. It does not provide any measure or standard of what is satisfactory or unsatisfactory progress. What to include or exclude from the report is entirely left to the discretion of the reporter. Given the character of the work programme of CADU, it would appear that the best approach would be to use both quantitative and qualitative information in the system. Those activities that do provide quantitative indicators of progress should be measured in terms of these indicators. For those activities the progress of which cannot be measured in terms of quantifiable progress towards a production target, a verbal assessment of progress would have to suffice.

However, it is believed that even verbal assessments should be accompanied by some indicator of resource inputs into each activity. The input of overriding importance in a technical assistance project is staff. By showing the amount of staff resource inputs into an activity during a reporting period, the system would, given total staff resources available to a section, show the relative weight accorded to the activity during a reporting period within the overall work programme of the section. If "we are working on it" is all that can be said, at least it should be possible to indicate to what extent work is carried out.

The sheer mass of data collected by management information systems may easily make these systems self-defeating unless the systems are geared to collection of relevant information only, i.e. information
relevant for the kind of decisions made in the organization concerned. The principle of "management by exception" is therefore important. The information to be solicited should focus on deviations from the work programme and the reasons for such deviations.

A management information system would serve the managerial objective of evaluation and focus on assessment of efficiency. It would meet the needs for an internal information flow within CADU for the purpose of facilitating decision making by the project direction (the semi-annual reports on the department level described in the next chapter are also part of the management information system).

The initial proposals of July 1971 conceived of a system where all sections would submit reports to the project direction via the P & E Section every other month. While arbitrarily established a two month period was thought best to combine the conflicting aims of the system of maximum information at a minimum of administrative effort by all concerned. Reporting would be carried out on forms where each activity shown in the budget would be preprinted and every section would report in detail how many man-days per staff category had been spent on each activity, relate these to estimates made before each reporting period and explain differences. According to one version of the initial proposal, the sections should also endeavour to allocate major items of cost to the various activities in order to establish true input/output relationships for each activity. After a trial held with a few sections in November/December 1971 it was clear that while the rough outline of the initially proposed system should be maintained, its level of ambition with regard to data would have to be considerably reduced and there could be no question of establishing any meaningful input/output relationships within the context of this system for every activity. The forms used for the bi-monthly reports from the sections were therefore simplified.

The starting point for the construction of a management information system is to establish the data requirements of management for control purposes. This was done by way of a scrutiny of the work
programme of the budget. All activities that could conceivably provide quantifiable progress indicators were looked at against the question "is this information of value to the project direction?" Those activities considered to be of significant importance and yielding suitable progress indicators were to be presented and analysed in fully quantified terms. Those activities that although equally significant could not be analysed in numerical terms were only to be commented upon. A form to be used for summarizing the reports from the sections to the project direction was designed. The bi-monthly forms were to be issued by and returned to the P & E Section, which would analyse the information and reproduce it on this form for transmission to the Project Direction. (1)

While the extensive time reporting entailed by the initial proposal was considered impractical, it was believed necessary to retain some form of control over staff utilization per activity. For those sections the activities of which have quantified production targets this would be less important since progress towards the production target would be easy to assess (Example: production target 2,500 vaccinations; during the two-month period 500 vaccinations corresponding to 20% of the production target were carried out), and rough estimates of staff resource inputs were therefore regarded adequate. However, sections mainly concerned with research work should be requested to keep a more careful check of the utilization of staff resources. Since increase in knowledge is something very intangible and difficult to measure, since these sections usually only yield a concrete output in the form of a report over their trials at the end of the year, and since the purpose of the reporting system would be to acquire information regarding the work carried out during the year on the various activities in the work programme, it was suggested that all senior staff (i.e. all expatriate and Ethiopian high level staff) should be requested to keep monthly time records of how their time is spent by activity. This procedure is normally followed by consulting firms and also by various Swedish governmental institutions using programme budgeting. A system of time reporting could conceivably enable more

(1) All forms designed for the bi-monthly reporting system are shown in Appendix III. The form to be completed by the section heads is designated "Form A" while the form submitted to the project direction by the P & E Section is designated "Form D".
efficient work planning by the sections involved and be regarded as a useful tool by the heads of these sections. The time and effort required from the concerned staff would be minor although the obvious problem would be to impress on all the need for keeping the time records up to date. The form devised for these time records is shown in Appendix III as Form B. (1)

The experiences so far gained from this system of time recording suggest that it is necessary to preprint the forms as far as possible, lest two different staff members interpret the same activity differently. Many would be inclined to include virtually all office work under the heading "administration", whereas the office work naturally should be divided by activity. The activities preprinted on the form would be taken from the budget but whenever relevant also additional activities would be added. (Example: "guidance of visitors" would be added for some sections for which this is particularly time consuming.) So far it has not proved to be very difficult to induce staff members to complete the form although there have been the inevitable comments on "expanding bureaucracy." It has been stressed that the time cards are not to be used for personnel evaluation.

In principle, the time cards are only to be completed by the P & E Section itself and by the sections in the Experimentation Department responsible for research and development work. All other sections are requested merely to indicate roughly in terms of man-days how much staff has been devoted to each activity during a reporting period. This does not need to be more than estimates made by the head of the section at the end of the reporting period. The rationale underlying these estimates is that each section head will have - or at least should have - some rule of thumb in the back of his mind regarding the amount of staff inputs required for the execution of the activities of his work programme. By providing estimates of these staff inputs throughout the year he will be able to give some indication of the seasonal variation of his work load and of the priorities he assigns to the various activities he is working on. It is of interest for the project direction to be aware of these seasonal variations and of these priorities which may not have been made very explicit in the budget, but which may

(1) Nyberg has suggested a very similar system to be tried on a FAO/UNDP project in Korea. See Nyberg, C., op. cit.; Part II.
The agricultural extension activities present a special problem. The agricultural extension programme is of central importance to the operations of the entire project and it is the success of this programme that will largely determine the project's impact on its target population. The work of the agricultural extension agents is akin to that of the expatriate specialists in that they convey knowledge and skills in new techniques to people having less training than they. There is some evidence that the agricultural extension agents have been overburdened with duties and that they do not always have sufficient time to devote to what should be their foremost duty, i.e. demonstration of crops and implements to farmers. During part of the year the agents are almost exclusively working for the credit programme; they also have to spend considerable time working on "service to other sections," i.e. sections outside the Extension & Training Department depending on the agents for field work. There is a need to supervise the evolution of the agricultural extension programme over the entire project area and to be able to make comparisons between the four development districts regarding e.g. progress in collection of credit applications. It is necessary to be able to follow closely the agents' activities and to direct them by way of some kind of control system.

After discussions with the Extension & Training Department a form was designed for this purpose and incorporated in the management information system (see Appendix III, Form C.) The form is based on time reporting by the agents in respect of eight specified activities which cover the conceivable work load of an agent. The agents are also to report on certain indicators specified on the form (number of credit applications completed, number of field days held, number of model farmers etc.). These forms are collected monthly by the agricultural extension supervisors, who every other month will compile the forms and calculate totals and averages on the form to be submitted to the P & E Section (i.e. form A). The information that may be obtained from this system is shown on pp. 2 - 5 of Form D in Appendix III. This information is considered sufficient to enable satisfactory control of the activities of the agents.
Form A is thus to be used by all sections for reporting every other month to the P & E Section. The P & E Section preprints all activities of the sections from their work programmes adding wherever appropriate other activities not included there. All known modifications of the work programme are included in addition to "administration", "miscellaneous", "guidance of visitors"; reference may be made to the instruction to Form A in Appendix III for details. On this form in the column for "achievement indicators" all indicators shown on Form D are also preprinted, and figures in respect of the reporting period should be completed by the section heads. Analysis of these figures is carried out by the P & E Section when the "raw data" from all the Forms A are transferred to Form D for submission to the project direction; it is in this process that cumulative totals, percentages etc. are calculated.

On Form A section heads are encouraged to be brief and precise, to avoid "literature" and to concentrate on deviations, delays and problems. If an activity is being carried out on schedule they are encouraged not to provide any comments at all but the estimates of staff inputs and, when required, figures for achievement indicators.

The bi-monthly reporting system on the activity level may thus be summarized as follows:

1. Form B (a time report) is completed on a continuous basis by expatriate and senior Ethiopian staff in the P & E Section, the Crop & Pasture Section, the Agricultural Engineering Section and the Animal Husbandry & Breeding Section.

2. Form C (a time report) is completed by all agricultural extension agents on a continuous basis.

3. Form A is completed by all section heads on a bi-monthly basis.

   Form B and Form C is then used by concerned section heads to complete Form A; these two forms need not be forwarded to the P & E Section.

4. The P & E Section receives the bi-monthly Form A from the sections and compresses the contents of these forms into
Form D which is subsequently submitted to the project
direction; in this process the various achievement
indicators will be analysed in accordance with the
requirements of Form D.

The information received by the Planning & Evaluation Section on
Form A will contain

1. brief statements of deviations from the work programme,
delays and major problems encountered during the report-
ing period,

2. statements of quantifiable achievement indicators when-
ever applicable,

3. more or less (depending on the section) rough indications
of staff inputs per activity.

The collection of a variety of data on the activities of all sec-
tions of CADU is also an important end in itself. A large project
like CADU should at all times have available certain basic sta-
tistics on its activities and the absence of the "data base" has
long been felt, particularly perhaps by the P&E Section, for
reference purposes. Much of the data on the achievement indica-
tors shown on Form D is being collected by the sections although
only some of it reaches the project direction. Particularly im-
portant is this in the case of the CADU Marketing Division, where
the absence of regular reports on sales, stocks, purchases etc.
has been felt since the Division became an autonomous unit within
CADU in July 1971.

A reporting system of the kind indicated here is clearly very
ambitious and only the future will tell whether it is overly
ambitious. Below some conceivable problem areas are indicated :

1. Indifference of repondents. There are few staff members
who are very motivated to complete forms and complaints
are often heard of increasing "paper work", particularly
from expatriate staff. (Their case is a dubious one since
CADU's paper work hardly is more laborious than that of
any given Swedish governmental institution.) This may
result in late submission of forms, nonsubmission, failure
to complete the forms fully, inaccurate data, outright
falsification of forms etc.

2. Increased workload of respondents. While the forms do not require more than grammar school arithmetic (and a certain amount of common sense) to complete, some respondents may complain that filling them is difficult and time consuming. Lest it forfeit its purpose a system of this kind should be "automated" and require a minimum of effort from the respondents. However, only the three sections of the Experimentation Department using Form B and the Extension & Training Department completing Form C and filling Form A from these base forms might make the case that this is somewhat time consuming.

3. Staff absences. As is the case for most development projects, CADU has no broad layer of senior and responsible staff and many important matters depend on the personal attention of section heads. Whenever they are absent much work is simply left undone. Thus prolonged absences of section heads may cause some reports to be nonexistent or, at best, inaccurate.

4. Increased workload of the P & E Section. While the system purposely has been designed to minimize the analytical work to be done by the Section, time has still to be spent on reminding section heads, collecting and distributing forms, preparing new forms, analysing achievement indicators etc. It is believed possible to delegate much of this work to the statistical assistants of the P & E Section and the total resource requirement of the bi-monthly reports is put at five man-days per two-month period.

5. Timeliness of information. All Forms A should be submitted to the P & E Section by the 15th of the month following each reporting period. For some sections it might be difficult to meet this deadline if data have to be collected from the entire project area; this applies particularly to the marketing and agricultural extension activities and during the rainy season when communications are difficult.

The success of a reporting system of this kind will depend on the attention that the P & E Section is able to give to it initially.
on how it can be introduced to the section heads and to what extent the work of the section heads can be minimized. The P & E Section has to devote continuous attention to the reports reminding section heads and other staff involved and checking that the time reports are being completed. The Section should be prepared to provide assistance to section heads in computing data on mandays and indicators for Form A from Forms B and C for those sections that use these forms. There is not much to do about non-response from sections in cases of staff absences except trying to ensure that the reporting work is continued by someone else; in any case nonsubmission of reports might be as useful an indicator as any of a section head's ability to delegate his work. The increasing workload of the P & E Section can only be met by the assignment of sufficient resources within the Section. It is important that one statistical assistant be made responsible for much of the work. (Preparing new forms, distributing the forms, calculating achievement indicators.) It is equally important that one expatriate and one Ethiopian economist share the supervision of the functioning of the system. To ensure timeliness of submission those sections requiring computation of data from a variety of sources should conclude each reporting period on the last calendar day of every other month (while still submitting their reports by the 15th of the following month), while the other sections conclude their reporting period by the 7th of every other month. (While a system of this kind does not have many features that any programme budgeting system in a developed country would not have, it is relatively rare to encounter such systems in developing countries and particularly in technical assistance projects. Whether the system proves workable in CADU or not will hinge on the kind of attention it will receive from section heads. Results obtained to date indicate that the system would appear to stand a good chance of survival provided that the P & E Section and also the project direction are prepared to devote a sufficient promotional effort.

(1) The Ethiopian fiscal year runs from 8 July through 7 July the following year. Hence the first bi-monthly reporting period of the year will run from 8 July through 7 September.
6. SEMI-ANNUAL REPORTS ON THE DEPARTMENT LEVEL

The bi-monthly reports on the activity level constitute half of CADU’s management information system, the other half being semi-annual reports on each department and division in CADU prepared by the P & E Section. It is only in these reports that an element of evaluative comment will enter. While the bi-monthly reports convey a variety of facts in connection with the execution of the work programme and essentially leave the evaluative assessment to the project direction, the semi-annual reports are intended to contain evaluative commentary of the P & E Section on the work discharged by a department (1). These semi-annual reviews were part of the original proposal of July 1971.

These reports shall focus on the functional programmes of the CADU package that ideally should have been made more explicit in the Plan of Operation. Since this has not been the case, since no explicit subgoals exist for these programmes and since CADU’s organization chart in any case adheres fairly closely to these programmes, the semi-annual reports are written on the eight departments and divisions of CADU. There will thus be a total of 16 such reports to be prepared per annum.

The semi-annual reviews are intended as purely qualitative assessments prepared by the P & E Section and issued in the name of the Section. They should have the following purposes:

1. They will serve as internal work audits of sorts with a view to trying to discover aspects of the work requiring correction in some respect. They will have a "troubleshooting" function and try to focus the attention on issues and raise them for discussion. Knowledge of these internal work audits might induce staff to perform with more stringency at times and would serve as an element of control.

2. They will try to enhance co-ordination and co-operation within CADU that is a prerequisite for the CADU package design.

(1) The word "department" is below used to include also the autonomous divisions
3. They would provide a forum for regular scrutiny of all the project's activities in lieu of ad hoc studies carried out when a problem has already arisen. Any special study required of a section could be carried out or commenced within the purview of these reports. As appropriate the report could be complemented with cost analyses, limited sample studies, scrutiny of work methodology etc.

4. They would contribute to the establishment of a data base and a "memory" for CADU by placing on record for future reference events of importance as well as the considerations and decisions prompted by these events. This is essential in a technical assistance project where the turnover of staff on short-term contract assignments is high.

5. As part of the management information system the reports would provide information for decision making purposes to the project direction.

6. They would offer an opportunity for consideration of alternative approaches to avoid that "only 'one best method' for each activity be developed and that no information will be obtained on alternative approaches" (1).

The main advantage of these reports is believed to be that they would provide a forum for internal discussion of issues that might otherwise have been glossed over by a department or, for that matter, by the project direction. Since they are ultimately prepared for use by the project direction, the latter is obviously free to disregard parts of a report it disagrees with and to base discussions on the parts with which it agrees. However, to the extent that the reports can uncover what might already have been regarded as fait accompli with a view to improvement of future goal achievement they would be useful. It should be granted that the views expressed in these reports are those of the P & E Section, and that these views may and may not be shared by neither the department reported upon nor the project direction. Only in this way can a true built-in evaluation function at CADU be said to deserve its name, namely if the P & E Section is granted freedom of independent comment expressed with candor and objectivity.

(1) Wickstrom, Bo, Comments on CADU. CADU, Asella, 1972 (stencil) p. 4
It goes without saying that this will place certain demands on the maturity of all parties involved and that reports of this nature might place the P & E Section in a very tenuous position easily exposed to criticism. In a small community like that of CADU in Asella, candor is not to be lightly dismissed. However, it must be understood that the reports in the first instance are designed as a basis for discussion. Further, it must be clear that a certain error margin, i.e. a hopefully limited discrepancy between what information the P & E Section is able to collect and what the obviously more initiated staff in the department under review has access to, will be all but inevitable, given the time that the P & E Section can devote to each report and that subsequent discussions therefore should focus more on issues than on petty detail (1).

It is believed to be important that somebody takes the time to pause and reflect on established practices within CADU and to pose the question whether there might be some quite different way of discharging an activity. While some alternatives thus suggested might appear outlandish to the technicians, pronounced as they would be by laymen economists, it is assumed that it will rarely be harmful, but sometimes quite valuable, to view activities in a different light.

The reports would be written on the basis of scrutiny of files and other available written material prepared by the department under review. The bi-monthly reports would form a basis for formulation of hypotheses to be analysed in the semi-annual reports. Interviews should be held with all senior staff concerned. The reports should be prepared in accordance with an established check-list and follow a uniform format and the guidelines for these reports are found in Appendix IV. With a reasonably experienced reporter one report should take 3-4 days to complete with normal report format of about three typed pages.

(1) Whether detail is "petty" or not is obviously what would then be discussed. However, the gist of the paragraph is simply that the reports should be received in the right spirit, i.e. a willingness to be introspective and reflect on past and future actions, in order to improve efficiency and effectiveness.
The reports should also be prepared in accordance with an established schedule and this schedule is found in Appendix V. It is essential, that the reports not be improvised but that their format and submission be standardized to the extent possible.

Obviously the value of the reports will hinge on the ability of the P & E Section to make these assessments in an unbiased and initiated manner. The Section has an overview of the project's activities surpassed only by that of the project direction. However, contrary to the project direction it has the resources to probe into issues at some depth and to carry out any requisite complementary study. In order to enhance the quality of the reports more than one economist in the P & E Section should participate in the preparation of each report, the contents of which should not be attributed so much to Mr. X or Ato Y but to the P & E Section as a whole. Clearly the Section will have to exercise considerable judgment in expressing in conservative terms its views on controversial issues.

In general, the reports should be more concerned with the entirety of a work programme of a department rather than with isolated activities. Their attention should be directed towards matters of policy and on the role of the department in relation to CADU's main goals. At the same time they should provide a summary of major activities discharged and an assessment of their adequacy in comparison with the main goals as well as the production targets. These reports would be efficiency measurements oriented primarily to the immediate output of a department.

It would be presumptuous to assume that the P & E Section would have access to information on major problems that would not already be known to the project direction, and it is possible that further experience with these reports will reveal that the Section does not have much to add to the knowledge of the project direction. A case could therefore be made for making these reports public and circulate them to, say, all section heads within CADU and to the two participating governments in order to disseminate knowledge on the work of the project. Conceivably this could improve the understanding of the project's efforts which at times is found to be remarkably poor even among senior staff. However,
in this case the evaluative commentary of the reports would have to be so cautious as to be all but meaningless and although probably of some value for information purposes, the reports would be of little use as instruments of evaluation. Only if truly frank views may be expressed in them can they fill any function in this respect. It follows that they should have as limited an audience as possible and be circulated only to the project direction and to the department concerned. While it is objectionable on several grounds to prepare a great number of reports labelled confidential, a "restricted" circulation might be more appropriate. Under this formula the P & E Section would issue a copy of the report to the head and assistant head of the department under review and intend the report to be for them only; it would be left to their discretion to discuss the contents of the report with other staff.

The effort required to prepare these reports would be prohibitive unless their scope was relatively limited and obviously it will be impossible to scrutinize exhaustively every aspect of every activity of a department. At a maximum time per report of four full working days the reports would during an entire year consume a total of 64 working days of professional economist time, and these reports cannot be permitted to occupy much more of the P & E Section's resources. However, it would be desirable if reports on departments with cost accounting systems could be accompanied by analyses of these systems. While such cost analyses tend to be somewhat time consuming it should be possible to conduct them more expediently as more experience is gradually gained and the analytical procedures standardized. If required a report on one department could focus more in detail on the activities of a certain section or subordinated unit. It would also be possible to conduct an analysis of office routines, work procedures, or some other specific matter warranting special study at the time of preparation of the report. Prior to embarking on a semi-annual report the P & E Section should consult with the project direction to explore if there are any such special aspects considered to justify special scrutiny in the context of the report. The guidelines in Appendix IV should therefore be interpreted quite freely on the understanding that they provide a framework for the amount of work that can be
devoted to each report.

In summary, the semi-annual reports are qualitative assessments written by the P & E Section as an integral part of the management information system. They are to provide the Section's independent judgment on performance and are mainly intended as a forum for discussion around past and future activities. They will be prepared in accordance with an established schedule and following a format that may be modified as required.

These reports have above been estimated to consume some 64 full working days of professional time per annum. The bi-monthly reports on the activity level may be estimated to consume around a maximum of one working week per reporting period or a total of 30 working days per annum. The total resource requirement of the management information system outlined here would thus be 94 working days or, assuming 20 working days per month, around 4.7 months of professional time per year. Provided this can be shared between two economists it can hardly be termed excessive.
7. EVALUATION ON THE PROJECT LEVEL

Efficiency in the short-term conduct of CADU's work programme is a necessary but not sufficient criterion for the project's effectiveness, i.e. achievement of its main goals. However high the performance of project staff, the project would never be able to meet its main goals unless it was correctly designed, unless the underlying basic assumptions were correct and unless external influences, as exerted e.g. by the participating governments, continued to be favourable and in conformity with plans. It is measurement of effectiveness that essentially serves the political purpose of evaluation and thus answers the truly important questions relating to the success of a project. A discussion within the Swedish government regarding the question of whether or not to continue assistance to CADU after the expiration of the present project period would focus not so much on the efficiency of the work performed by CADU but on its effectiveness and the questions put would be of the type "what kind of social development has been achieved?" "what negative social effects has the project had?" "by how much have incomes been raised?" The evaluation function of CADU would not have succeeded in its work unless it was able to provide answers to questions of this kind.

Assessments of project effectiveness are made on what is here called the project level, i.e. the level where all project effects in respect of the goal variables are taken into account. An analysis of how such assessments may be carried out would have to start from a specification of these goal variables and a determination of the where, when, and how of the assessments. If CADU is to have an effective plan for its future evaluation work, it is necessary to schedule in some detail the studies necessary to obtain an overview over overall goal attainment. With a multi-faceted goal structure like that of CADU it would be impossible to incorporate measurement of all main goals within one large study, but each goal has to be analysed by turn and it has to be established, in respect of each goal, how goal achievement is to be expressed and measured. While chapter 4 gave a general presentation of CADU's goal structure, the three main goals of the project will in the following be discussed more in detail with a view to determining which
components of the CADU package contribute to which goals and how this contribution may be measured in terms of impact on the goal variables. The aim is to "programme" the evaluation work as far as possible and to make it systematic in the sense that no major variables should be neglected.

The three main goals are therefore analysed by turn. This analysis should immediately be provided with the proviso that it is naturally impossible to completely isolate the effects of an activity on one goal from those on another goal and to say that the activity only affects one particular goal. It is the multiplicity and interrelationships of goals and activities that is the most important characteristic of CADU's package design. Nevertheless, it is believed to be possible to discern the most important variables of each goal and to define those programmes and sections that are of dominating importance in relation to those variables.

CADU's overall effectiveness will, strictly speaking, only be assessed by the totality of the studies that will be suggested below in sections 7.1 - 7.3. One study in isolation might only provide information on the effectiveness of a particular activity, although certain key activities may well serve as useful albeit incomplete indicators of CADU's overall effectiveness.

7.1. First Main Goal: Economic & Social Development

In chart 1 of Appendix VI an attempt has been made to provide a graphical analysis of CADU's first main goal. The chart only shows those sections and programmes considered to have any significant effect directly on the first main goal and indirect and external factors have been disregarded.

The notion of functional programmes within the CADU package has previously been mentioned and it was pointed out that although these programmes have not been explicitly recognized in the Plan of Operation and thus do not have clearly expressed goals, they implicitly form the basis for the project's organization chart and for the practical way in which the work programme is executed. The relative weights of these programmes in the overall work programme vary considerably, and the chart is therefore incomplete without an indication of their relative priorities as indicated (how-
ever inadequately) by the financial resources allocated to them.

In the 1972/73 Work Programme & Budget (1) a calculation was made of the gross costs of the programmes of the CADU package; gross costs were for this purpose defined to include all types of costs, irrespective of source of financing and before deduction of revenue. While the programmes shown are arbitrarily chosen and the computation very rough (2) this tabulation provides some indication of the priorities that CADU gives the various components of its package in connection with achievement of the first main goal:

<table>
<thead>
<tr>
<th>Functional Programme</th>
<th>Gross Cost (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Provision of supplies and services</td>
<td>4,863,334</td>
</tr>
<tr>
<td>2. Incentives promotion</td>
<td>3,448,325</td>
</tr>
<tr>
<td>3. Supporting services</td>
<td>1,952,559</td>
</tr>
<tr>
<td>4. Provision of credit</td>
<td>1,724,162</td>
</tr>
<tr>
<td>5. Infrastructure</td>
<td>1,520,052</td>
</tr>
<tr>
<td>6. Employment promotion</td>
<td>1,228,957</td>
</tr>
<tr>
<td>7. Research and development</td>
<td>1,152,625</td>
</tr>
<tr>
<td>8. Dissemination of research results</td>
<td>645,599</td>
</tr>
<tr>
<td>9. Local participation</td>
<td>458,061</td>
</tr>
<tr>
<td>10. Training</td>
<td>363,154</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17,356,828</strong></td>
</tr>
</tbody>
</table>

If complemented with the above table, chart 1 in Appendix VI shows that the main thrust of the CADU package follows the chain Marketing Division - Provision of Supplies and Services; Incentives Promotion; Provision of Credit - Level of Income of Individuals - Economic Development - Economic & Social Development. Obviously this does not negate the value of the other components of the package since all programmes are heavily interdependent and complement each other. However, the nature of the marketing activities, their rapidly proven favourable effects on the farmer's yields and income, their fast expansion, and their high costs, have all con-

(1) CADU Publication No. 67, p. 221
(2) The work programme of each section has been analysed to determine in which functional programme(s) the section was involved; for some sections this may only be one programme while for others again several programmes may be concerned. The gross cost of the section has been divided by the number of programmes concerned by the activities of the section, and the shares of gross costs per section have then been aggregated for all programmes.
tributed to focusing CADU's efforts on raising the level of income of the farmers and hence on the economic development aspects. With the evolution of the project it readily became apparent that the farmers were very responsive to improved agricultural inputs and could derive substantial and rapid benefits from purchasing them on credit on the terms offered by the project. The marketing activities also proved to be relatively straightforward to operate, since they were not marred by the fundamental conceptual and organizational problems that have affected certain other major activities, one prominent example being the co-operative activities.

While rarely admitted officially, social development in the CADU package has been subordinated to economic development. The project has, more or less implicitly, adopted the view that social change, in isolation within the context of CADU's development effort, cannot conceivably precede economic development, hence the line from the box for economic development to social development in the chart. Significant social change can be expected only when the static peasant society has been stirred by innovations that serve to enhance the farmer's opportunities for economic freedom of choice and hence his welfare. By proving correct the basic assumption that peasant farmers are responsive to economic innovations, the project has paved the way for social development in the project area. The increasing attention now being devoted by CADU to the establishment of co-operative societies is a reflection of this view: the economic incentives will induce the farmer to become a member of a co-operative society where he will be exposed to new social values like democratic elections and decision making. As the chart and the previous tabulation show, social change in isolation is mainly propelled by the local participation programme which is of minor financial importance.

It is naturally difficult if not impossible in actual practice to distinguish so clearly between economic development and social development. Certain social change may be assumed to follow in the wake of the introduction of economic innovations. A great variety of CADU programmes and activities have some social impact although this may not be their primary purpose. The very existence of CADU
is of social significance in Chilalo. However, it would certainly be correct to state, without any value judgment, that CADU to date has placed heavy emphasis on the aspects of economic development and given it priority over social development (1). One CADU publication discussing plans for the 1970-75 period states that "the only measure if the project has succeeded or not and if thus a new and improved method of agricultural development has been established will be the achievement of reasonable cost benefit ratio. An internal rate of return ... of 15% should be regarded as acceptable." (2) Although this statement was never allowed to guide the preparation of the current Plan of Operation, it is symptomatic of the view that has guided the general direction of CADU's work.

Since the programmes concerned directly with economic development have received the bulk of the project's financial resources, it is justified, considering i.a. the political purpose of evaluation, to devote relatively more attention to these programmes in the context of a plan for the evaluation of the project. One earlier CADU study indicated that "the economic development achievements should be measured in terms of changes of the per capita income, income distribution, propensity to invest, production structure." These would then be the indicators of CADU's goal achievement regarding economic development. The study takes the view that these indicators could not at that time (March 1969) be meaningfully quantified (3).

Per capita income must clearly remain a primary variable to be studied. Incomes may be assessed either from the consumption side or from the production side. The P & E Section has to date completed two case studies (4) where a small panel of respondents

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(1) Both of CADU's executive directors have been economists. All three members of the present project direction are economists. As of July 1972 the P & E Section, which as a staff organ is attached to the project direction, has three incumbent economists and vacancies for three more.

(2) CADU Publication No. 26, p. 19

(3) CADU Publication No. 26, p. 16

(4) CADU Publications Nos 22 and 78. Two additional case studies are being conducted along similar lines.
have been asked to state their expenditures every week throughout an entire year. A study of consumption patterns has been carried out during 1971/72 and is expected to provide data on the farm household's consumption during a year. However, these studies tend to be of limited validity for the entire project area since they use limited samples. On the production side it is possible to estimate, albeit more inaccurately, income increases generated by CADU's marketing and extension activities. When applying for purchase of agricultural inputs on credit from CADU the farmer is asked to complete a "farm plan" with the assistance of the extension agent. This plan shows in detail the farmer's cropping plan as well as the areas he rents and/or owns. The annual crop sampling surveys of the P & E Section provide estimates for all extension areas of yields with and without use of CADU-provided inputs. The data from all farm plans are tabulated by computer per extension area. (In 1972 there are estimated to be some 13,000 such farm plans.) By multiplying areas under crops with yields and prices it is thus possible to obtain an estimate of incomes from sales of cash crops for all farmers participating in CADU's activities affecting economic development. When adjusted with estimates of incomes from other sources as obtained from the case studies (Income from other sources is believed to be minor in relation to incomes from crops sold) fairly reliable estimates may be obtained of incomes of "CADU farmers." The major source of error using this method is believed to be that farmers in describing their land use pattern to the extension agents for recording on the farm plan may be inclined to understate their holdings in order to obtain more favorable credit terms from CADU (1). However, CADU officials concerned with the credit activity estimate this bias to be relatively minor; in any case the bias may be considered relatively uniform from one year to another.

(1) Landowners cultivating more than 20 ha and tenants cultivating more than 50 ha are excluded from credit purchases from CADU. A landowner purchasing fertilizer and cultivating less than 5 ha pays a downpayment of 25%, whereas he pays a downpayment of 50% if he cultivates more than 5 ha.
To enable this computation of farm incomes it is thus necessary to have access to the results of two studies: the crop sampling survey and the computerized farm plan analysis. Both these studies are of high importance for CADU's evaluation programme and should be repeated annually. They are therefore included in the schedule of project level evaluations shown in Appendix VII.

The P & E Section has been carrying out the crop sampling surveys measuring changes in yields as a result of CADU's marketing and extension activities annually since 1968. With experience it has been possible to standardize these rather comprehensive surveys, improve their statistical design and enhance their accuracy. The statistical assistants are by now so well versed in work on this particular survey that they are able to carry out its field work almost independently and the field work of the 1971 survey required but a minimum of professional assistance. On the other hand this survey requires all the Section's capacity in terms of surveying staff and vehicles and no other field surveys can therefore be conducted at the same time.

CADU is fortunate in having excellent data on all farmers participating in its major activities on the computerized lists of farm plans. These lists will provide per extension area information on area per crop, land tenure, livestock owned, seed variety and fertilizer purchased and payments made. Farmers are classified into five groups by size of holding (0 - 5 ha, 6 - 10 ha etc.) and the figures provided are averages per group. To date the service bureau contracted to provide the lists has had some problems with the computer programme, but it is expected that the first list, covering the 14,146 credit applications of 1971, will be available shortly.

If complemented with benefits accruing from activities not connected with the marketing and extension activities, these data on income may be used for an estimation of benefits for a computation of the project's overall rate of return. Current estimates of CADU's internal rate of return lie in the range 23 - 25% or safely above the criterion of 15% set up in 1969. The P & E Section should annually, as the farm plan analysis has been made
available, revise the cost/benefit analysis endeavouring to incorporate any new innovations made by CADU. In this analysis due attention should be paid to the decline in benefits accruing from repeated use of fertilizer on the same land by farmers: yield increases per ha due to fertilizer will taper off towards a maximum and it would not be correct to add gross benefits from previously not fertilized land in respect of all fertilizer sold. The assumption could be made that only the net increase in fertilizer sold from one year to the other is used on previously not fertilized land and that all other fertilizer is used on previously fertilized land yielding relatively less benefits. This point is important since fertilizer use accounts for over two thirds of all benefits generated by the project. However, in the computation the Section should also include benefits and costs of all new innovations introduced by the project, and in order to do this it has to monitor the development of these innovations and consult with the technicians regarding their estimated effects.

The fallacy of relying only on a certain internal rate of return as a criterion of project goal achievement is brought to the fore in connection with the indicator income distribution. If CADU was only to be concerned with a maximum internal rate of return it would be well advised to deal only with the wealthiest farmers of the target population. However, the Plan of Operation clearly specifies that the project’s activities shall be directed towards farmers in the lower income strata and it is to this end that upper limits have been placed on the size of farmers’ holdings as a criterion for them to purchase inputs on credit. It is clear that economic development as a result of CADU’s efforts would be of little value unless it also improved income distribution in favour of small farmers and reduced economic and social disparities. Achievement of a more even income distribution within the target population is thus of importance also for the goal of social development. A study carried out by the P & E Section has shown that in 1968 and 1969 the main beneficiaries of CADU’s credit sales of agricultural inputs were the large farmers, but that the situation from 1970 onwards has been greatly impro-
ved (1). However, the study also shows that there are two con-
straints on the possibilities of achieving a much improved income
distribution, namely the uneven distribution of land (Which becomes
a constraint when CADU-provided inputs have been applied to the
land at optimum rates.) and the share-cropping system. (Since te-
nants pay part of their yields to their landlords, the tenants' in-
creased yields will serve to increase the landlords' incomes.)
Neither the Plan of Operation nor this study indicate by how much
income distribution among the beneficiaries of CADU's activities
can or shall be improved. By working with small farmers only CADU
can strive to bring about a more even income distribution, but not
only the two previously mentioned constraints but also the ineffi-
ciency of the tax collection system, under which large farmers pay
a proportionately much lower share of their income in tax than do
small farmers, will probably prejudice major income redistributions
within the target population. CADU's main concern as regards income
distribution should be to ensure that benefits continue to be gene-
rated mainly to small farmers including tenants. The P & E Section
can monitor the distribution of benefits among the beneficiaries
of CADU's credit programme through the annual farm plan analysis
which shows the size of holding (income level) of all credit appli-
cants.

While it is known that CADU has been able to generate increased in-
comes, little is known regarding the farmers' consumption and its
change as a result of the income raise. The 1971/72 consumption pat-
tern study has been designed to shed light on this matter and to
provide indications of propensities to save and invest. It would
clearly be in CADU's interest to divert part of the income increas-
es from conspicuous consumption to investment. To stimulate saving
and investment CADU is offering the farmers a range of capital goods
like improved ploughs, harrows, oxcarts, cross-bred heifers, to be
sold on credit, and obviously the rate of sales of these items is
one indicator of the propensity to save and invest. However, it is
necessary to obtain a more complete picture of the farmers' con-
sumption patterns as an indicator of their standard

(1) CADU Publication No. 66, pp 36 - 41
of living (1). The case studies mentioned previously will provide baseline data on consumption. The consumption pattern study will add knowledge of consumption and investment and saving propensities. These studies should then be followed up with (a) time series analysis of sales within the project area of a few commodities selected as suitable indicators and (b) an annual limited survey of household inventories (akin to pantry audits). Such a survey may be carried out in the vicinity of Asella in the "old" project area where the project has been active longest and would thus yield an estimate of maximum effect. Continuous study of consumption patterns will also be facilitated by the opening of a rural general store in Kentere by CADU (2). Study of consumption will also provide the requisite market information for the industrial programme CADU is planning to launch in 1973. Following completion of the consumption pattern study in 1972 it is thus proposed to monitor consumption on a continuing basis by limited annual surveys of household inventories and continuous study of sales developments of some selected goods.

By production structure is here understood the size of holdings, land tenure patterns and land use. Detailed tabulations of size of holdings for all participants in the credit activity will be obtained from the farm plan analysis. This analysis will also group these participants into tenant/landowner categories. However, it is necessary to subject the issue of land tenure to more detailed analysis within the auspices of a separate study. This is probably the single most important area where the project indirectly may have caused negative effects and the social cost of tenant displacement should strictly speaking be deducted from the benefits generated by CADU. To some extent tenant eviction, it is believed, will follow all but inevitably in the wake of increasing crop yields and land values as the holdings will be

(2) CADU Publication No. 72
(1) A minor research task to be written by a Swedish student on the subject "Mobilizing savings in Chilalo" is scheduled for August - October 1972
consolidated into more rational production units. In the absence of any land tenancy legislation and given structural factors like e.g. the prevailing subsidy to agricultural mechanization through reduction of import duties it will be difficult for CADU to bring any strong influence to bear on this matter. However, CADU's efforts to curtail tenant displacement in the form of model lease agreements, imposing restrictions on landlords when they wish to participate in the credit activity, and also possible schemes to enable the tenants to compete with large-scale contract farmers are important in that they impart to the target population the project's concern for the tenants and thus might serve to increase the landlords' awareness of the tenants' plight. With the development of Ethiopia tenant eviction is over the long term a probably inevitable phenomenon. CADU has caused economic growth and thereby indirectly accelerated this phenomenon in the project area. The extent to which tenant displacement has taken place in the northern part of the project area has been subjected to one study which projected the rate at which tenant displacement would continue to take place. (1) Given the importance of this matter and its negative effect on CADU's goal achievement as regards social development, a follow up of this previous study should be given high priority within CADU's evaluation programme. The purpose of the second study would then be to verify empirically the findings of the first study as well as to extend the analysis to other parts of the project area. It is suggested that this study, which would entail extensive field work, be launched after completion of the 1972 crop sampling survey.

Methods of production on small farms are in general more labour intensive than on large farms and by concentrating on small farmers CADU is therefore creating or maintaining employment opportunities. Since there is in the peasant farming community a considerable supply of under- or unutilized labour resources, it is important that the project promotes labour intensive methods at the expense of machinery in accordance with prevailing rela-

(1) CADU Publication No. 74
tive factor costs. The project's efforts in increasing employment are an important aspect of the goal of social development since the social opportunity cost of increased unemployment would be considerable. The problem of tenant displacement is, of course, a part of this general problem area and moves CADU's employment effects in a negative direction. It is considered possible to incorporate employment effects into a study of tenant eviction. Such a study could, for instance, be carried out on tenants sampled in, say, a crop sampling survey done a few years ago, and such an analysis could be coupled with a survey of methodology used by peasant farmers in general.

Such a study will devote more attention to the social than to the economic development aspects. However, it will be necessary to study CADU's efforts in causing social change not only from the relatively narrow perspective of tenant eviction and employment effects but also to study social change from the perspective of social value systems and perceptions. A strong case may be made that regardless of whatever economic growth CADU is able to achieve in the project area, this economic growth may rapidly lose its momentum after the withdrawal of the project personnel unless the attitudes and values of the target population were changed. It is to this end that the Plan of Operation stipulates that the target area population should assume increasing responsibility for the conduct of the project's activities. It has so far been generally believed that this would be best achieved through the establishment of primary co-operative societies around the existing trade centres and hence through the adoption of the target population of general co-operative principles and ideals. While CADU's efforts in forming co-operative societies to date have not met with much success, continued work on active involvement of the local population in the conduct of CADU's activities is vital for the project's replication. This work may ultimately be successful only if attitudes towards development, authority, and ingrained social value systems are changed and made conducive to transformation, not just growth. Of parti-
cular importance in this connection are the opinion makers in the rural society, the "elites" whose actions and attitudes tend to mould the views of individuals: local public administration officials, prominent traders, farmers, businessmen, golnasas etc. In the establishment of a hierarchy of "farmer committees" CADU has made an attempt to involve the local rural elites into the activities of the project and possibly this is the most promising course of action to pursue to elicit the participation of the target population in the conduct of the project. (1) It is necessary to conduct a depth study of these social leaders with a view to exploring the project's effects on values and attitudes and investigating the conditions for the project's replication as evidenced by such social variables and also by the success of CADU's more explicit efforts towards this end (e.g. formation of co-operatives). An important piece of work in this area has already been carried out in Asella (2), which will form valuable hypotheses for further study. Given the preponderance of economic knowledge within the P & E Section such a study should be carried out by a social-anthropologist contracted from outside the project, a thorough base-line study was carried out in 1966/67 (3). A study of social effects of CADU is proposed for implementation during the first half of the 1973/74 budget year.

This would be the major study launched by the P & E Section of CADU's achievements affecting the "social development" aspects of the first main goal. Although SIDA has always attached overwhelming importance to this aspect of the first main goal, it has never evinced any operational definition thereof apart from the general stipulations of increased involvement of the project area.

(1) Four layers of committees will be established: model farmer area development committee, extension area development committee, district centre development committee, awraja development committee. In all layers local leaders on the appropriate level would participate in addition to CADU staff.

(2) A Ph.D. dissertation on social attitudes of elites in the Asella area will be completed by Mr. John M. Cohen in 1973. The P & E Section has access to the basic data collected by Mr. Cohen during 1971/72 which will be most useful for further study of this matter within the entire project area.

(3) CADU Publication No. 7
population, direction of CADU's activities towards farmers in lower income brackets etc. The first task of the consultant assigned to carry out this study would therefore be to define the goal of "social development" and to reformulate it in operational terms. This illogical albeit necessary process is a perfect example of poorly defined goals as discussed above on p. 10. There is also a certain goal conflict built into the first main goal since economic economic development in itself in the context of Chilalo may not be fully compatible with social development. (The economically most efficient way of selling agricultural inputs would not be through a series of small co-operative societies.) However, it is difficult to specify this goal conflict in the absence of a clear definition of economic and particularly, social development. It should therefore be made clear that the important study of CADU's impact on social development will be hampered in the important respect that its findings cannot be related to any indicators specified ahead of time.

The project level evaluations proposed to be carried out in respect of the first main goal are thus the following:

- annual crop sampling survey;
- annual analysis of farm plans;
- annual revision of the cost/benefit analysis on the entire project;
- annual household consumption survey together with time series analysis of consumption of some selected goods;
- one study of employment effects and tenant displacement (January/April 1973)
- one study of social change including local participation (September/December 1973)

These studies are intended to provide an assessment of CADU's effectiveness in relation to its first main goal. Excluded from this discussion have been studies dealing more with the efficiency of particular programmes or activities which, like e.g. the marketing activities, may have an important impact on the first main goal, but which are considered to be more appropriate in the context of the second main goal of methodology development. The entire schedule of project level evaluations is shown in Appendix VII.
7.2 Second Main Goal: Development of Methodology for Agricultural Development in Ethiopia

Reference is made to chart 2 of Appendix VI for a graphic presentation of the second main goal. As is shown by the chart, CADU's work on development of methodology for agricultural development in Ethiopia may be analysed on two different levels.

Of primary interest in this connection is the ultimate question whether the CADU approach to agricultural development in the integrated "package" form is successful. It is both too early and too late to answer that question conclusively. It is too early in the sense that CADU's overall effectiveness cannot be determined until several years hence, when the Swedish assistance has been terminated and when it is possible to pass judgment on the adequacy of the initial project design and its underlying basic assumptions in the light of successful "Ethiopianization" of the project and of lasting effects on the project area population. If the last Swede were withdrawn from CADU in 1975, such an assessment might be carried out in, say, 1980.

It is too late in the sense that the principles of CADU's design have already been termed successful and been replicated in other agricultural development projects, e.g. the Minimum Package Project sponsored by the IDA, USAID, and SIDA and the Ada Agricultural Development Project sponsored by USAID. The Minimum Package Project is eventually intended to cover most of Ethiopia's provinces and the essential traits of CADU's design will thus receive nation-wide replication. While it is yet premature to say anything of the success of these projects, the very fact that the IBR and other donor agencies than SIDA have considered it justified to base them on CADU's design and experiences would tend to indicate that the second main goal in the broadest sense has already been attained.

Until time allows the CADU approach to be conclusively evaluated, the efficiency of CADU's major programmes and activities will remain the foremost indicator of the adequacy of the methodology used by the project. Of particular interest in this connection are perhaps the farm plan analysis and the cost/benefit analysis.
These studies and particularly the latter, incorporate most major programmes of the CADU package and give an indication of their efficiency. On the other hand, the distinction should be made that a rapid expansion from one year to the other of e.g. the marketing activities should not necessarily be interpreted as a success of the CADU design as a whole, i.e. as an indicator of CADU's overall effectiveness. The farm plan analysis and the cost/benefit analysis therefore provide indicators of the efficiency of the methodology chosen by CADU to attain its first main goal and thereby also of the second main goal.

On the second level (the second horizontal tier in the chart) is the programme within CADU that is more directly concerned with the development and new methodology, the research programme. While the P & E Section, the Water Development Section and also, from time to time, other sections not shown here conduct applied research as part of their activities, it is within the Experimentation Department that most research and methods development is being carried out. This is one of the more heterogeneous of CADU's functional programmes consisting of four rather disparate sections united only by their common concern for experimentation and research.

An agricultural implement, a seed variety, or a cattle feeding method etc. developed and successfully tried by any of these sections is in a sense already evaluated as it has been found technically viable. Whether it is also viable in the eyes of the project area population is readily apparent from its rate of adoption and specific investigations might be conducted to explore any unexpected sales resistance connected with a particular method (e.g. why there might be a reluctance on the part of the farmers to acquire a specific implement). The four research sections regularly publish their findings. It is therefore not considered necessary to subject them to any evaluation in addition to the regular semi-annual reports prepared on the Experimentation Department within the purview of the department level reports. These reports would provide the requisite scrutiny of the Department's activities and point at new fields into which research could expand. They would also provide a forum for discussion of particular innovations more in detail and within the context of these
reports the analysis of cost/benefit ratios for new innovations could be conducted (see p. 56 above).

The "charter" of the P & E Section quoted on p. 2 noted that the Section on the basis of its evaluations should be able to "suggest modifications in the programme" of CADU. This is perhaps an aspect which the Section heretofore has neglected although it is of particular importance in connection with the development of methodology. In reviewing the activities of a department or section the P & E Section should endeavour to suggest alternative approaches based on the general hypothesis that the method actually chosen by not be the only or even the best one.

This is particularly important when the Section devotes attention to the evaluation of CADU's major activities which because of their importance within the package should be scrutinized by special studies focusing on the methodology aspects. Of importance in this connection are especially the marketing, agricultural extension, the women's extension, and infrastructure activities which should be subjected to one separate study each. These studies may with reference to the chart in Appendix VI be termed large scale methods evaluations.

A study of the agricultural extension activities is in process and will be completed by autumn 1972. This study launched as a sample survey in three different extension areas at successive stages of development is intended to provide information on the adequacy of the information dissemination methods chosen for the agricultural extension activities, the adequacy of the information disseminated, the knowledge imparted to the farmers, and the characteristics of early and late innovation adopters respectively. The fact that the farmers have been successfully convinced of the value of using fertilizer and improved seed (the efficiency of the agricultural extension activity) does not necessarily mean that they have also been convinced of the value of other to them new farming practices like systematic crop rotation, contour ploughing, ditching, etc. Their use of wheat seed on marginal land may, in fact, serve to increase soil erosion and thus reduce the effectiveness of the activity unless it could be shown that soil erosion control methods had also been successfully disseminated.
A study of equal importance is a complete evaluation of the marketing activities scheduled for spring 1973. This study should endeavour to assess whether CADU's strategy for distribution of agricultural inputs and collection of outputs has been sound and whether specific components, e.g. the grain purchases, should be dropped or expanded. An important element of this study is a review of CADU's market influences around Kersa town in CADU's development district D that will be completed shortly. An evaluation of the marketing activities should devote attention to CADU's market share and its possible future developments, trading patterns and CADU's ways and means of influencing them, price fluctuations and CADU's possibilities of adapting to or influencing them. It should also study the implications on the organization of the CADU Marketing Division of any measures suggested taking into account the establishment of primary co-operative societies in the project area and the Division's future conversion into a secondary co-operative society. This study is likely to be most time consuming and the P & E Section should plan its execution accordingly. Since it is of major importance not only in connection with the second main goal but also with the first, since the marketing activities to date have suffered from some rather acute growing pains caused by their rapid rate of expansion, and since the organization of co-operatives will have profound implications on the Division's work, the study is fairly urgent and should not be postponed beyond the 1972/73 budget year.

A baseline study of the women's extension programme was carried out in 1970 (1) and should be followed up by a second study scheduled for spring 1974. While this is somewhat late it does not appear possible to carry it out at an earlier time. This study should focus on the programme's ability to reach women, to teach them relevant subject, the learning effects and the women's views of these effects. The various activities of the programme should be related to one another and the effects of e.g. the home visits in relation to the courses should be analysed. The bulk of the study should be carried out in the Chaffa area where the baseline

(1) CADU Publication No. 58
study was conducted. This study will also be an important indicator of CADU's effectiveness in relation to the goal of social development.

The construction of roads and houses within the infrastructure programme started in earnest during the 1971/72 budget year. Of particular interest from a methodological point of view is the road construction activity's use of labour intensive versus capital intensive techniques. It would appear to be a foregone conclusion that labour intensive techniques should be used, but there is evidence that labour is difficult to locate at current wage rates due to the increasing profitability of farming within the project area. Before further funds are committed to this programme it is necessary to review the relative merits of the two techniques as well as their costs to date in relation to benefits derived. This study which probably would require relatively little field work should be carried out during the 1972/73 budget year, preferably around June 1973. It should also take into account the house building activities using locally manufactured materials as well as the water supply activity.

Connected with methodology assessment although directed at efficiency rather than effectiveness would be the cost analyses the P & E Section should conduct of the various cost accounting systems within CADU. Elaborate cost accounting systems have been introduced in the CADU Marketing Division, CADU Seed Division, Equipment & Stores Section, and Catering Section. These systems are designed to enable precise cost calculations per product sold or service performed through complete distribution of cost elements to cost carriers over cost centres. However, using these systems is meaningless unless they are analysed periodically and information extracted from them. Experience has shown that there is no staff competent and willing to do these analyses outside the P & E Section. (This would change in the CADU Marketing Division with the projected recruitment of an expatriate cost analyst for service there.) The P & E Section should therefore allocate capacity for such cost analyses particularly following the termination of each budget year when it is of particular interest to be able to compute a correct economic result of the autonomous divi-
such cost analyses are usually also able to yield an assessment of the work methodology in use within the units concerned.

In addition to the farm plan analysis and the cost/benefit analysis providing indicators of project level efficiency from a methodological point of view, the measurements of CADU's work towards the second main goal would thus be centred around surveys to measure the effectiveness of four major programmes or activities:

- agricultural extension activities (June/October 1972);
- marketing activities (February/June 1973);
- infrastructure programme (June/August 1973);
- women's extension activities (March/June 1974.)

Methods development within the Experimentation Department would be reviewed within the context of the regular semi-annual reports. Attention should then also be paid to computation of cost/benefit ratios for new innovations. The P & E Section should also allocate capacity, particularly during August/September each year, for cost analyses in respect of the past budget year.

7.3 Third Main Goal: Replication of the CADU Experience

In chart 3 of Appendix VI a graphical analysis of the third main goal is also presented. As is shown by the chart, attainment of this goal is closely linked to attainment of CADU's second main goal. If CADU's approach were a proven failure as a method for suitable agricultural development in Ethiopia, then it would hardly have created a possibility for application elsewhere of the project's experience. An activity that is not successful in the context of CADU's work programme might well be successful elsewhere in Ethiopia, but there would be a high probability that it would never be replicated. Effectiveness in relation to the second main goal of either CADU as a whole or of an individual activity or method is therefore likely to be a necessary if not exhaustive criterion for effectiveness in relation to the third goal also.

Whether effectiveness in relation to the third main goal is to be assured will obviously depend on the relevance of the CADU experience to the Ethiopian environment into which it is to be
Introduced. CADU has been designed for work with peasant farmers in the central highlands of Ethiopia, and its findings may or may not apply in, say, the lowlands of the south-western part of the country. As discussed in the previous section, the third main goal may already be said to have been met in the sense that the principles of the CADU approach to agricultural development have been replicated in other development projects in Ethiopia. However, with reference to, particularly, the "research objective" of evaluation, it would be valuable to document an assessment of the possibilities for replication, in the widest sense, of CADU's experience for the benefit of future technical assistance in developing countries in general and in Ethiopia in particular. A study of this nature should be written on the basis of i.a. the evaluation studies prepared by the P & E Section. On the other hand it would require an overview of knowledge of CADU's work that the P & E Section probably is not endowed with. It is therefore believed that a study of the general relevance of CADU should be carried out, if at all possible, outside the scope of this master plan for CADU's evaluation. Neither would it be possible at the present time to schedule the execution of such a study since it is difficult to foresee the availability of suitable staff to undertake the study. A conceivable solution might be that the two participating governments towards the end of the project period agree to appoint one or more consultants for this purpose. This would be one case where the "wise men" approach should be used: for a study of this nature the considered judgment of an individual with long experience from technical assistance (and if possible from CADU) would be required.

The Plan of Operation specifies replication elsewhere in Ethiopia by means of (a) "creation of financial resources through an increase in the tax-paying ability of the project area population", and (b) the training of staff (refer to Appendix I).

In the chart analysing the first main goal it was shown that through an increase in the level of income of individuals the government's level of income is increased through taxation and that this will eventually lead to economic and social development. Through taxation of the project area population's increased
incomes the government's financial resources will be strengthened and its ability to undertake other development projects elsewhere will be enhanced.

For these relationships to exist it would be necessary that (a) a machinery exists that is able to collect the increased taxes at the same rate as increased revenues are generated through CADU's work, (b) the increased taxes collected actually accrue to the public treasury whether it be on central government or provincial government level, (c) the government uses its increased revenue either to improve the social services it provides in the project area (the first main goal) or to launch new development efforts elsewhere (the third main goal.) With respect to point (c) the government's (again, whether it be the central or the provincial government) good intentions would just have to be assumed. It would in any case be impossible within the context of CADU's evaluation programme to ascertain whether the government is using its increased revenues to improve the quality of social services or to initiate new development projects or whether they are being used for completely unrelated to economic and social development.

However, since explicit mention of this matter is made in the Plan of Operation (1), CADU should assess to what extent the project area population is actually taxed and to what extent some portion of the increased incomes flows back to the government. Whether this is in fact happening is yet a moot point. There are some somewhat startling indications that this may not be the case and that tax receipts have actually fallen in Chilalo since the inception of the project. The following series of figures, while subject to all kinds of errors and uncertainties, tend to

(1) Under "Supporting Measures" to be "undertaken or caused to be undertaken by the IEG as essential prerequisites for the satisfactory attainment of (CADU's) main goals" it is stated in section 2.4.5 of the Plan of Operation that "the tax administration machinery shall be improved with a view of ensuring that persons benefiting from the development activities of CADU also contribute to the efforts of the IEG to create possibilities for the application elsewhere in Ethiopia of the experience gained in the project area."
give some indication to this effect:

<table>
<thead>
<tr>
<th>Year</th>
<th>Total land taxes collected in Chilalo (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960/61</td>
<td>E§587,806</td>
</tr>
<tr>
<td>1965/66</td>
<td>930,833</td>
</tr>
<tr>
<td>1969/70</td>
<td>832,871</td>
</tr>
<tr>
<td>1970/71</td>
<td>541,542</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Total revenue, Chilalo awraja (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1966/67</td>
<td>E§3,133,023</td>
</tr>
<tr>
<td>1967/68</td>
<td>2,920,532</td>
</tr>
<tr>
<td>1968/69</td>
<td>3,722,436</td>
</tr>
<tr>
<td>1969/70</td>
<td>3,478,409</td>
</tr>
<tr>
<td>1970/71</td>
<td>2,903,433</td>
</tr>
</tbody>
</table>

While the error margin of these data precludes any categorical conclusions to be drawn from them, there would not appear to be any justification to surmise as might have been expected from the increased incomes that most certainly have been generated in Chilalo as a result of CADU's activities, that governmental revenues from taxation have increased. It is difficult to find a plausible explanation why this would be the case (3), but the mere possibility that tax revenues have not been significantly increased should be investigated by CADU.

The taxation system in Ethiopia is notoriously inefficient and corrupt. Enforcement processes are grossly inadequate and tax evasion is prevalent throughout all levels of society and particularly among those with the highest tax paying ability. Uncertainty as to whether government funds will be reallocated to taxpayers in the form of social services breeds distrust among the latter further strengthening the tendency towards tax evasion. However, in as limited an area as Chilalo the government would

(1) Data from Land and Agricultural Tax Department, Ministry of Finance, Addis Ababa. The figures include land tax, tithe, education tax, and health tax.
(2) Data from the awraja treasury, Asella.
(3) It has cynically been suggested that the farmers' increased incomes may simply have enhanced their ability to bribe their way out of taxation.
have a strong case for improving its tax collection machinery in accordance with the Plan of Operation of CADU. It is possible that Chilalo awraja as one of a selected few awrajjas in the country will be granted authority over the disbursement of certain tax revenues which at present are paid by the awraja treasury directly to the Ministry of Finance (1). If this is implemented it would mean that the increased tax revenues generated by the project's activities would directly benefit the project area population through an improvement over time of the social services of the awraja administration, which in turn would mean an impact on the first main goal (social development) rather than the third. If the tax paying ability of the local population were equated with the level of public social services it might be possible to do away with the prevailing notion that "we get nothing for our taxes so why pay them?" and hence reduce tax evasion.

It is believed that the question of taxation is sufficiently important to warrant a special study within the auspices of the project level evaluations. It may be argued that such a study would not primarily evaluate CADU but rather the abilities of the IEG to meet its commitments. However, in so far as CADU's Plan of Operation clearly states that one of its main goals is to be attained through creation of financial resources by way of taxation, CADU would be amiss if it neglected to follow up whether such financial resources were actually being created. The matter has an equally important bearing on the methodology of the project's approach to agricultural development: if it cannot be shown that CADU's activities have provided the government with incremental revenue, possibly future agricultural development projects should be designed to pay more attention to this aspect.

(1) If Order 43 (1966) is implemented the awraja administrations would be able to control the disbursement of revenues from land tax, health tax, education tax and cattle tax. Chilalo has been selected as one of a few awrajjas where this order would be implemented provisionally, but no final decision on when to commence this innovation appears yet to have been adopted.
The difficulties in studying taxation in Ethiopia in general and in Chilalo in particular should not be underestimated. Farmers are likely to be greatly on their guard and to hedge their answers carefully as soon as the word "tax" is mentioned in connection with a questionnaire. Officials in the awraja administration as well as in the Ministry of Finance are likely to be reluctant to divulge true data since they would realize that the figures could be used to illustrate the degree of corruption existing in the local provincial administration as well as the degree to which major land owners and local notables are successful in tax evasion. The sheer inefficiency of the taxation machinery may prohibit the finding of correct data. Nevertheless, the mere public knowledge of CADU's intention to launch a study of taxation might prompt reactions among the officials concerned which by themselves should be interesting to study.

A study of taxation might start by a survey of a sample of farmers, an assessment of their incomes and a verification (by way of tax receipts) of the taxes actually paid by them. Subsequently a review could be made of accounting and payment practices in the awraja treasury to obtain an assessment of the flow of resources in and out of the treasury. It is assumed that the IEG would co-operate by obtaining clearance at sufficiently high level for such a review to be undertaken, failing which only the first part of the study (the survey of farmers) could be carried out. The study has been scheduled for spring 1974.

The replication of CADU is also to be achieved through the training of Ethiopian staff. This training may take the form of informal on-the-job training as well as formal training through fellowships and courses.

The on-the-job training of CADU staff is very difficult to evaluate. Such training is one of those diffuse and intangible factors that are commonly presumed to be residuals of the presence of expatriate specialists in technical assistance projects although, as discussed above on p. 19, it may often be the single most important objective of such projects. While in the individual case it would be possible to assess the professional skills of a staff member before and after his assignment to the project, it would
be difficult to isolate and estimate the training effects directly attributable to the presence of expatriate staff. As CADU is successively being "Ethiopianized" it will be increasingly difficult to aggregate the effects of on-the-job training and to attribute them to a certain source and to do this within the auspices of a particular study. The only operational indicator of on-the-job training effects would be the extent to which the project can successfully be "Ethiopianized", i.e. to what extent Swedish personnel may transfer their duties to their Ethiopian counterparts.

To the extent that CADU is considered able to meet its first main goal even after the phasing out of Swedish personnel, appropriate on-the-job training must *ceteribus paribus* have been carried out. On the other hand, if Ethiopian staff prove unable to operate the project successfully in terms of attainment of the first main goal, it is likely to be an indicator of a failure also in terms of the second main goal: in such a case the design of CADU would have been proven overly ambitious and CADU would not be fully suitable as a method for agricultural development. The three main goals are thus inexorably linked over the aspect of training as a basis for replication.

It is therefore believed that CADU's possibilities of replication by way of successful in-service on-the-job training should be discussed within the context of a separate study. Again, the P & E Section would not be well equipped to carry out such a study which essentially would be an analysis CADU's personnel requirements in relation to the manpower supply available and the achievements of the expatriate staff in this connection concluded from the wide perspective of all CADU's goal structure. Possibly the "wise men" approach could be adopted also in this case since what would be required would be a common sense judgment expressed in the light of experiences elsewhere. This could be another case there the two participating governments might wish to have a consultant mission appointed towards the end of the present project period.

The award of fellowships and study tours and the attendance of courses by CADU staff will in each individual case have had a positive training effect that has created a marginally increased possibility for replication of CADU. Formal training will be econo-
mically justifiable as long as the marginal revenue accruing to
the sponsor of the training (normally society or the government,
in this case CADU) from the training exceeds its marginal cost.
The cost would be measured as the production value that the trainee
would have created during his time of training, i.e. the produc-
tion value foregone by his training together with the actual cost
of his training. This cost is usually readily assessable.

Revenues accruing from training may be measured as production
benefits and consumption benefits (1). By consumption benefits
are understood those benefits that accrue to the individual from
being in a better position to appreciate social and cultural
values and "enjoy life" as a result of his training. Such factors
are all but impossible to measure but it may safely be assumed
that they affect the benefit side in a positive direction.

The production benefits, however, may be roughly assessed. If
there is assumed to be a proportional relationship between an in-
dividual's level of income and his marginal productivity (2), the
benefits generated by his training may be measured as the discounted
value of the difference of his income with and without training
respectively and approximated by the following formula which
applies to one individual (3)

\[ V = \sum_{n=a}^{p} (Y^{X} - Y) \cdot P_{a}^{n} \cdot \frac{1}{(1 + r)^{n-a}} \]

(1) Mattsson, Bengt, Samhallsekonomiska Kalkyler. Akademiforlaget,
Lund, 1970, pp 136 - 141

(2) This is, of course, debatable. However, Mattsson indicates
that this proportionality appears to apply to the United States
and Western Europe according to studies made by the American
economist E.F. Denison. On an a priori basis it may be assumed
that the relationship is much stronger in a developing country
like Ethiopia. Cross section studies would have to be made to
determine empirically the parameters Y^{X} and Y in the equation
and, hence, this relationship prior to use of the equation.

(3) Mattson, op. cit, p. 137
where

\[ Y = \text{The discounted value of the difference in income between an individual aged } n \text{ years with a certain education and an individual without this education.} \]

\[ Y^X = \text{The income at age } n \text{ years for an individual with a certain education.} \]

\[ Y_n = \text{The income at age } n \text{ years for an individual without this education.} \]

\[ P_n = \text{The probability that an } a \text{ years old individual will live to be } n \text{ years old.} \]

\[ d = \text{The fraction of the income differential that can be explained by the difference in education alone.} \]

\( \text{(There is some empirical evidence to suggest that this constant in developed countries is around } \frac{2}{3}, \text{i.e., two thirds of salary differentials may be explained by education, but careful study should precede determination of this constant in the context of Ethiopia.)} \]

\[ r = \text{The socio-economic rate of interest.} \]

\[ p = \text{The age at which the individual's professional activity is likely to cease.} \]

The discounted value to CADU of training an individual is likely to be negative because of the short life span of the project. However, considering the importance of the training programme it is believed that a thorough assessment of CADU's achievements regarding formal training justifies a separate study. Cost/benefit analysis using if not the aforementioned formula itself but at least the principles underlying it should be carried out on a sample of individuals (who may or may not still be employed by the project) who have undergone formal training either on a fellowship abroad and/or at the project's own training facilities. Such a study should also endeavour to assess the adequacy of the training provided and the follow up, if any, of this training by CADU. This study should be conducted relatively late in the project period in order to have as long a time perspective as possible and it has therefore been scheduled for January - April 1975.

It has here been foreseen that the P & E Section would measure CADU's effectiveness in relation to the third main goal of replication by two separate studies, one on taxation to be carried out in spring 1974 and one on formal training to be carried out in spring 1975. In addition, it is believed that studies should be prepared on CADU's general replicability, but that these studies best should be carried out by outsiders to the P & E Section at periods of time to be later determined. They are regarded as falling
outside the evaluation programme since they are of interest more in a wider context than that of CADU and its effectiveness.

7.4 Methodology for Field Surveys

In connection with evaluations on the project level it will be necessary to conduct several surveys covering all or a large part of the project area in order to enable valid conclusions of project impact to be drawn. Many of these surveys would have to rely on some form of randomized sampling design. The following pages provide some indication of the methodological problems connected with statistical sample surveys in Chilalo.

Statistical surveys are subject to several types of errors normally classified into two groups, sampling errors and nonsampling errors. Sampling errors are connected with the method and manner of selecting the sample and can frequently be reduced by use of more judicious sampling procedures, increased sample size etc. Nonsampling errors are related to the collection of data in the field and to its processing. Errors of the different types can cause systematic biases to appear in the data. The following figure has been reproduced to illustrate the major sources of survey biases. (1)

Frame bias

Sampling biases

"Consistent" sampling bias

Constant statistical bias

Noncoverage

Nonobservation

Nonresponse

Nonsampling biases

Observation

Field: data collection

Office: processing

Frame biases refer to errors in the selection of the sample. They can distort the values of large as well as small samples and are

(1) For the following discussion, refer to Kish, Leslie, Survey Sampling. Wiley, New York, 1965; and Food and Agriculture Organization of the United Nations, Quality of Statistical Data. FAO, Rome, 1966.
linked to failure to adjust the estimate for unequal selection probabilities. In Chilalo where it is almost impossible to construct complete and reliable lists of respondents for use as sampling frames, this is an error source difficult to avoid. The P & E Section has developed a multi-stage sampling design whereby golnasa areas are drawn at random from lists provided by the woreda offices, the selected golnasas are contacted and asked to list all gashas in their area (normally 20 - 25), single gashas are drawn at random from the lists provided by the golnasas, and all farmers within the gashas thus selected are interviewed. Since there are normally about five farmers in each gasha, and since a gasha is only 40 hectares, travel costs may be kept low with use of this sampling design. Since communications within the awraja are difficult at best and well-nigh impossible during three to four months of the year, this is a major advantage. However, even with use of this method travelling would be prohibitively expensive unless the area to be surveyed were reduced by some arbitrary method. Golnasa areas in particularly remote locations are therefore deleted from the first lists, and the surveys cover only accessible areas with remote fringe areas excluded. Thus the P & E Section's 1972 general agricultural survey covers six woredas in Chilalo, but in all six woredas remote golnasa areas have been excluded (It was readily apparent that it would be impossible to carry out this extensive survey unless this was done.), and the survey should therefore most appropriately be called "general agricultural survey of accessible parts of ... woredas". A technical note on this type of sampling design is given in Appendix VIII.

Consistent sampling biases, caused by biased but consistent estimators, decrease with increasing sampling size. Since the mean square error will approach the value of the bias asymptotically only for greatly increased sample sizes, and since increasing sample size is costly, the P & E Section in its surveys usually can do no better than use the maximum sample size it can afford for each particular survey. Work on calculating "optimal" sample sizes usually is rendered all but meaningless in the light of the inadequate sampling frames and the nonsampling error sources that are very difficult to avoid. While increased sample size naturally will improve the precision of survey estimates, the Section should devote primary attention to the budgetary aspects and every time conduct as many inter-
views as it can reasonably afford. The essence of this simplistic and somewhat self-evident rule of thumb is that biases resulting from the two sources discussed so far should be kept as small as possible but that great effort in calculating and selecting an un-biased sample simply is not very rewarding.

By constant statistical bias is meant a bias in estimation affecting equally samples of any size as well as a population value based on complete coverage. An example would be use of the median to estimate the mean of a skewed distribution. This type of bias is often included in the sampling bias but can be avoided with use of proper statistical estimation procedures. In the surveys of the P & E Section "proper" procedures are usually not used since, as discussed above, budgetary considerations are of primary importance in determining sample sizes. This type of bias will therefore also be found in the survey variates.

Biases of noncoverage and nonresponse are not too frequent in surveys in Chilalo. The rate of nonresponse due to refusals is negligible. Nonresponse due to e.g. seasonal migration occurs but is compensated usually by selection of a sample that is "excessive" in the sense that it allows for a small percentage of drop-outs. Noncoverage in the sense of failure to locate respondents occurs but is also relatively rare since extension agents, golmasas, model farmers, and gasha leaders can all be relied upon to locate respondents.

It is probably in the data collection in the field that the major sources of errors are found. The interviewers translate the questions from Gallinya to English and back, in itself a major source of error. Further, the respondents frequently do not appear to have accurate knowledge of many basic factors concerning themselves and their farms or, alternatively, do not bother to give correct answers. The 1971/72 consumption pattern study in the Etheya extension area was conducted over four rounds of interviews from July 1971 to April 1972 using the same questionnaire on the same respondents on each of the four occasions. This survey design quite unintentionally provided an excellent opportunity for testing the consistency and reliability of the respondents' replies, and this consistency was found to be poor. Only 40% of the respondents stated the same age on all four rounds.
occasions, and 21% gave replies varying by \pm 5 years of more. The mean range of deviations per respondent (i.e., the mean difference between the highest and the lowest number of years mentioned by each respondent) regarding age was 2.8 years with a standard deviation of 3.6 years. The same inconsistency was found in replies to questions regarding family size, literacy, and land tenure. There was also found to be a definite trend in the replies to these questions over the four rounds (for instance, mean age steadily increased, number of respondents claiming to be literate steadily fell) which leads to the hypothesis that there may initially have been a strong interviewer effect which gradually disappeared as the farmers became accustomed to the interviews. It has also been found in other studies conducted by the P & E Section that farmers are notoriously inaccurate in estimating, for instance, the size of their holdings or the number of cattle they own. It would appear safe to assume that nonsampling biases traceable to the data collection in the field are major.

Apparently survey methods used and developed in the United States or Europe may have some serious deficiencies in a subsistence level peasant farmer community like Chilalo. Structured questionnaires solicit exact, often quantified information that the peasant may not have or, if he has it, may express in the very inaccurate local units of measurement. The frames of reference of the researcher and the respondents are often so different that the former runs a great risk of having validity weaknesses built into his questionnaire unless he takes great care in trying out the formulation of questions in pilot exercises. The farmer who cannot like a European respondent close his door in the face of the interviewer, will have little idea of the value of surveys, and is likely to be suspicious of strangers asking questions: he is likely to react by minimizing his risks and answering inaccurately.

The alternative to using conventional survey methods for collection of data would be more intensive depth studies allowing the respondents to talk more freely than they may within the auspices of a structured interview. This would entail smaller sample sizes, but obviously it is preferrable with a smaller sample of co-operative farmers than a large sample of indifferent farmers. The case study approach using very small samples or panels that are contacted re-
peatedly is probably an avenue worth pursuing. More attention has to be devoted by the P & E Section to the preparation of questionnaires than in the past, and pilot studies should always be carefully carried out to test the formulation of questions.

Errors due to processing, finally, naturally occur but are believed to be minor. Careful internal consistency checking of the data is usually carried out in order to minimize this type of errors.

The gist of the preceding discussion in this section is simply that the discipline of statistics and more particularly the theories of sampling should be employed most judiciously in Chilalo. The non-sampling errors in the form of inaccurate data collection in the field will tend to overshadow any gains made in careful sampling design. The cost of constructing and using a correct sampling frame covering the totality of the area to be surveyed is usually prohibitive and hardly justifiable in the light of the large non-sampling errors. For the same reason it is often not meaningful to stretch resources in order to achieve a better precision with a larger sample. Since many of the variables studied in the surveys are either normally or binomially distributed, sample sizes around 100 may for most surveys be considered adequate, (1)

However, this is far from a wholesale denunciation of statistics in connection with the surveying work of the P & E Section. On the contrary, efforts should always be made to estimate roughly the statistically correct sample size to determine the difference between the "correct" and the "practical" sample size. If the variance of the variable to be studied is particularly high and this difference large, additional resources may have to be allocated to the survey to increase the "practical" sample size. In Appendix VIII a technical note is provided on the computation of sample size using the range of observations obtained from a pilot study to estimate the standard deviation of the population.

(1) See Yamane, Taro, Statistics: an Introductory Analysis. Harper & Row, New York, 1964, table 6 of appendix. This table gives the sample sizes using the binomial distribution for calculation of a 95% confidence interval with varying degrees of precision and varying population size. For a precision of ± 10% the sample size never exceeds 100 even with an infinitely large population. For a precision of ± 5% the sample size for a population of 10,000 is 385; for a precision of ± 4% and a population of 10,000 the sample size becomes 588.
Often the variables studied will have relatively uniform variances within a given geographic area, and it is therefore important that the spread of the sample over the first stage sampling units (i.e. the golnasa areas) be uniform and random over the survey area, while the spread within each golnasa area will be relatively less important. The sampling units employed as convenient clusters in this sampling design, i.e. the gashas, typically will have some group homogeneity (the "consistent" sampling bias), and it is also important that this bias is not further reinforced by judgment sampling of gashas situated in clusters of their own merely for the sake of reducing travel costs. The arbitrary reduction of the area to be studied to the area to be surveyed (The two usually do not coincide.) should be done at the first stage when selecting golnasa areas. From there onwards the procedure should be truly randomized. The current field workers of the P & E Section are well familiar with this cluster sampling design and are not only competent enough but also conscientious enough to draw the sample correctly in the field on their own.

Another sampling design suitable for use by the P & E Section could be sequential sampling, where the sample size depends on the results of successive selections. This design is particularly suitable when the unit variance of the design may be difficult to estimate, when the population size is unknown, and when there is vagueness about the rates of nonresponse and noncoverage. (1) When travel in the survey area is particularly difficult, e.g. during the rains, this method could conveniently be applied by stationing interviewers at places normally passed by large numbers of farmers, say, at the main roads leading into a village on market days. The method is obviously practicable only when the population within a certain, limited area is being surveyed, and when it may be assumed that all farmers within this area possess the characteristics being studied. This sampling design was used for the first time by the P & E Section in the evaluation of the agricultural extension activities which was carried out during the 1972 rainy season.

The P & E Section should in presenting survey estimates be careful to stress how the sample was selected, and what error risks are connected with the sampling design. To the extent possible, means, 

(1) Kish, op. cit., p. 277
standard deviations, variation coefficients, and confidence intervals should also be presented of the estimates enabling the reader to draw his own conclusions regarding the accuracy of the data. Possibly it is the worst sin of a researcher in Chilalo to present data obtained from sample surveys while neglecting to provide complete information on the quite considerable errors that usually are associated with such data.
8. SUMMARY OF THE MASTER PLAN FOR EVALUATION AND ITS CAPACITY REQUIREMENTS

In chapters 5, 6 and 7 above a plan has been drawn up for the evaluation of CADU on three levels: the activity level, the department level, and the project level. The evaluations on the first two of these levels take the form of regular reporting adhering to CADU's organization chart: reports are prepared on the sections bi-monthly and on the departments semi-annually. These reports together constitute a management information system for CADU. On the third level, the project level, a series of measurements of overall project effectiveness has been conceived.

The bi-monthly reports are intended to follow up the discharge of the work programme of the budget. Sections are requested to report in respect of each activity shown in the work programme on major achievements as well as deviations, delays, and problems during a two month period and also to give an indication of the staff resources devoted to each activity. Where appropriate quantified indicators have been inserted by the P & E Section, and the sections are requested to complete the forms in respect of these indicators also. The P & E Section distributes all forms and collects them after each reporting period. The data received from the sections are compressed by the P & E Section on a special form for submission to the project direction. The bi-monthly reports have been designed to be as automated as possible, and they are therefore not expected to consume much professional capacity of the P & E Section; five man-days per two month period are estimated to suffice.

The semi-annual reports are judgmental reviews prepared twice per annum by the P & E Section on each of CADU's eight departments and autonomous divisions with a view to assessing the work of these units in a wider perspective than that of the bi-monthly reports. The basis for these reviews should be scrutiny of written material and correspondence connected with the department under review and interviews with senior staff concerned. While these reviews should follow a standard format, this format is intended to be fairly freely used, and the reports may if required focus on more narrow and specific as-
pects. These reports are given restricted circulation and are issued in the name of the P & E Section which alone is responsible for their contents. Preparation of these reports is expected to consume about four man-days of professional time per report.

These two series of reports are intended not only for control purposes but also to provide CADU with a body of basic data on the conduct of its current activities for future reference.

On the project level the foregoing discussion in chapter 7 envisaged a number of studies directed towards each of CADU's three main goals and the variables considered most important in connection with these goals. The objective of these measurements should be to provide a basis for an assessment of CADU's effectiveness or main goal achievement. While one of these measurements in isolation might not provide a sufficient basis for assessing CADU's overall effectiveness, it is submitted that all these studies together provide this basis. Many of the measurements will entail comprehensive surveys in the project area and will therefore be resource consuming for the P & E Section. These studies will generate data not to be used so much for control in the daily operations of CADU but more for future planning of the project's activities and for the goal adaption process described in chapter 2.

The entire evaluation system can be thought of as an annual cycle starting with the approval of the project's budget by the two participating governments and continuing with the implementation of the activities of the work programme. Control data are generated by the bi-monthly and semi-annual reports enabling requisite adjustments to be made to the work programme under implementation. These adjustments form the basis for the planning of new activities and programmes which in turn are used for the construction of the next budget. The project direction has through the project level evaluations received information on goal attainment which is also incorporated in the new budget proposal. The proposal is submitted to the participating governments for approval, it is eventually approved, and the cycle starts anew. The entire process is shown in the chart on page 86.
The place of the evaluation system with respect to CADU's goal hierarchy is pictured in the chart on page 88. The entire CADU programme consists of a large number of interrelated activities that are intended to be brought to bear on the main goals. The activities are discharged by sections organized into departments. To the extent that the activities "hit" the main goals they represent satisfactory goal attainment and vice versa. The project direction’s task of steering this unwieldy body towards the main goals is a trial and error process aided by the feedback data provided by the various evaluation reports.

It was indicated in chapter 3 that the evaluation group of the P & E Section would be staffed with two professional economists, one expatriate and one Ethiopian. Assuming an average of 20 full time working days per month per individual, the Section would thus have a total capacity for evaluation of 40 professional man-days per month. With a view to exploring whether this capacity will be fully utilized by the evaluation system, the duration of the reports and studies suggested has been estimated, and the results are shown in the chart on page 90.

It should immediately be stressed that the value of the exercise carried out on the chart on page 90 may be open to question. It is very difficult to foresee with any accuracy the time consumption of a major study. Subsequent priority changes may cause certain studies to be executed later or earlier. Staff shortages may occur making havoc of any detailed time schedule. In fact, there are all sorts of conceivable why a time schedule of this kind may prove untenable. Yet it is believed that such a schedule serves some useful purposes. It is possible to indicate certain basic characteristics of the evaluation system that cannot be altered and the capacity requirements of which are fairly easy to estimate. For instance, each bi-monthly report is unlikely to consume more than five man-days of professional time and each semi-annual report should not consume more than four man-days. The crop sampling survey has to be timed every year to coincide with harvesting time (October - December). With the present experienced field staff of the P & E Section it is possible to estimate the time requirements of professional staff
The Evaluation System in CADU's Goal Hierarchy

Project Direction

Departments

Sections

Main goals

(P & E Section relations: ______________)
(Other relations: ______________)

Only a few relations are shown by way of illustration.
to be fairly low during the first phase of any field survey, i.e. while the interviews are being carried out. It is also possible to assess the resource requirements of certain projected studies, e.g. the evaluation of the marketing activities, to be more time consuming than others. Although the schedule on page 90 strictly speaking represents little more than qualified guesswork, it also represents the best qualified guess possible at the present time.

The time estimates in professional man-days of full time work per month for the remainder of CADU's project period are shown in the row marked "Total, net" in the chart on page 90. These "net" estimates an allowance has been added of 25% for work that is unproductive in direct relation to the scheduled evaluation programme, e.g. staff meetings, travel time, administrative work etc., giving the "Total, gross" in the lowest row of the chart.

If the evaluation group is staffed with two economists, the capacity of 40 man-days per month will be exceeded only in a few cases (September 1972, January 1973, May 1974, January 1975). On the other hand, the professional staff requirements are well above the capacity of only one economist, the exceptions being October 1974 and February, May and June 1975. In other words, it is quite evident that the proposed evaluation system will not function if only one economist is assigned to evaluation within the P & E Section.

If CADU experiences difficulties in locating economists for the evaluation group it is suggested that some of the major project level evaluations (e.g. the studies of the marketing activities and of employment effects) be given priority, and that attention be devoted to the management information system only if capacity (= two economists) is available. The major studies will concern problems of fundamental importance for CADU and its future and must have priority within the evaluation programme.

Even with two economists the evaluation group will not have much surplus capacity. The average surplus per month according to the schedule is 9.3 man-days per month (May and June 1975 when the activities will have tapered off are excluded) which corresponds
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N.B. 1) The figures are man-days of professional full-time work.
2) Refer to Appendix VII for clarification of the code letters given to the studies.
to 23% of the supposed-to-be available capacity but which may yet easily be absorbed by, say, one recruitment delay. It is therefore recommended that the evaluation group be allowed to give priority to its work programme as set out in this paper, and that it be assigned new tasks only if capacity is clearly available or, alternatively, in exchange for studies already scheduled. It is also recommended that some constraint be exercised in assigning additional tasks to the evaluation group over and above the work programme outlined here, partly because this programme is supposed to cover the major aspects of CADU's evaluation and partly because the quality of the evaluation studies will suffer with too heavy a workload. Obviously it would be possible to allocate additional capacity to the evaluation group from any of the other two groups within the P & E Section if the evaluation work was considered more urgent and of higher priority, but this possibility has not been taken into account here.

With the schedule of CADU's evaluation work at all levels established, it is hoped that future work on evaluation may proceed without further consideration to its own planning and organization and focus on improving the methodology developed to date by the P & E Section.
THE THREE MAIN GOALS OF CADU
(Plan of Operation, Article 2.1)

Goals and scope of activities

Goals

The continued activities of CADU during the agreed four and a half year period shall have three main goals, each with its subgoals. The main goals are those stated below in order of priority. The subgoals are those stated in Article 2.3.

The first main goal shall be the achievement of economic and social development throughout the Project Area.

The activities towards this end shall be so conducted as to ensure the participation of the Project Area population in and their assuming of increasing responsibility for those activities.

CADU shall endeavour to avoid adverse employment effects and to observe opportunities to create additional employment.

The activities shall be directed mainly towards farmers in low income brackets.

The second main goal shall be the continued finding of suitable methods for bringing about agricultural development in Ethiopia when applied in an integrated manner.

The third main goal shall be to create possibilities for the application elsewhere in Ethiopia, as indicated in the third Five Year Development Plan, of the experience gained by CADU.

This implies the creation of financial resources through an increase in the tax-paying ability of the Project Area population and the training of staff.
THE PROPOSED ORGANIZATION CHART FOR CADU

PROJECT DIRECTION

Audit Section

Planning & Evaluation Section

Munessa Operations Unit

Legal Section

- Experimentation Department
  - Crop & Pasture Section
  - Animal Husbandry & Breeding Section
  - Agricultural Engineering Section
  - Forestry Section

- Veterinary Department
  - Agri. Extension Section
  - Social Dev't Section
  - Training Section
  - Information & P.R. Section

- Extension & Training Department
  - Road Section
  - Water Dev't Section
  - Building Section
  - Survey Section

- Infrastructure Department
  - Common Services Department
    - Administration Section
      - Equipment & Stores Section
        - Catering Section

- Munessa Operations Unit
  - Nutrition Development Unit
  - Marketing Division
  - Seed Division
  - Cattle Breeding Division
<table>
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1. The form is to be completed every other month in conformity with the reporting period indicated at the top.

2. The activities will be preprinted in column 1 by the P & E Section. For each section a few lines will be left blank for any new activities not included in the work programme of the budget.

3. Three additional activities have been included: "administration" (intended to include general office work, meetings, and travel not related to any particular activity), "miscellaneous" (intended to include other purposes for which time has been spent during normal working hours), and "guidance of visitors".

4. In column 2 section heads are requested to describe any delays, deviations or problems encountered during the reporting period. Please describe as fully as possible within the space provided any aspects affecting to a significant extent the work on the activity.

5. In column 3 appropriate achievement indicators will have been inserted by the P & E Section for some activities. Section heads are also requested to report on major achievements within this space: indicate reports submitted, courses completed, grains sold, important purchases etc.

6. Column 4 is intended to provide an indication of the amount of work carried out per staff category per activity. The staff categories are as follows:

   E - All expatriate staff (including consultants)
   HL - High level Ethiopian staff (incl. consultants)
   ML - Middle level Ethiopian staff
   LOC - Locally employed staff

   The column headed "No." should include the number of staff engaged in each activity during the reporting period per staff category.

   In the columns headed "Much", "Some", and "None" section heads should provide their own estimates of how much time has been spent per staff category on each activity during the reporting period. These measures are defined as follows:

   Much - More than one full working week, i.e. more than five full working days or 42.5 working hours;
   Some - One to five full working days inclusive, i.e. 6.5 - 42.5 hours of full time work;
   None - Less than one full working day for the reporting period.

   Section heads are requested to endeavour to make these estimates as correctly as possible by checking the appropriate boxes.

7. The completed form should be transmitted to the P & E Section by the 15th in the month following the reporting period.
### TIME SCHEDULE

**Form B**

1971/72

---

**Month:**  

**Report No.:**  

**Category (check one):**  

---

| Hours per Working Day | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | Total
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</tbody>
</table>

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**Appendix III**

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- 96 -
1. Form B, "Time Schedule", is to be used by high level staff for recording time spent on the execution of the activities of the work programme. It is only intended as an aid for the completion of Form A and will not be returned to the Planning & Evaluation Section.

2. The form will be issued to staff members in the following categories: expatriate staff (E); Ethiopian high level staff (HL); Ethiopian middle level staff (ML) in supervisory positions.

3. Staff members completing the form are expected to keep a record of the time of subordinate staff spent on the activities of the work programme. Form B may be used also by subordinate staff if required. This would depend on the nature of the duties of subordinate staff who may be engaged only in one or two activities at a time, in which case the form would hardly be necessary, or in several activities, in which case the form may be useful.

4. The Planning & Evaluation Section will, to the extent possible, complete the first column on the form with those activities shown on Budget Form 1 that apply to each particular staff member using the form. Some lines will be left blank at the end of the form for any activities initiated since the preparation of the work programme. The following catch-all activities have been introduced: "Guidance of visitors", "Administration" (intended to include general office work, meetings, and travel not directly referable to any particular activity) and "Miscellaneous" (intended to include other purposes for which time has been spent during normal working hours). It is important that the time is entered by purpose of activity and not by function (e.g., travel time spent for a particular activity should be charged to that activity and not to "Administration" or "Miscellaneous").

5. Enter the working time in respect of each activity in the column for the appropriate calendar day, leaving columns for holidays and other non-working days blank. While normal working hours are 8 ½ hours per day, the time shown should be the actual time spent on the job per working day.

6. It is not the intention that completion of the form should entail meticulous time checking of every action performed by the staff member. It is quite sufficient if an estimate is made in terms of full hours. A normal working day would be composed of work on, say, two to three activities, and it will be simple to enter these time estimates at the end of the day. It will sometimes occur that a day has been spent on activities which cannot be distinguished or separated from one another (e.g., when a trip has been made for the purpose of controlling several different activities in the field), in which case the time spent should be divided equally between the activities involved. If only very brief and intermittent work of e.g., supervisory nature is carried out, an estimate of the total time consumed during a week may be entered at the end of the week.

7. At the end of each month the completed form should be handed over to the head of the division/section/unit.
<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>No.</th>
<th>WORKING HOURS PER DAY</th>
<th>Total hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Model farmers</td>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31</td>
<td></td>
</tr>
<tr>
<td>2. Demonstration plot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Farm plans</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Field days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Contacts with farmers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Farmers' committees</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Service to other sections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Own training and miscellaneous</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total hours per day</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For instructions and necessary remarks, see overleaf
INSTRUCTION FOR COMPLETION OF TIME CARD FOR EXTENSION AGENTS

1. The form should be completed by the extension agent only. Complete the form in two copies, give the original to your extension supervisor immediately after each month and retain the copy for your records.

2. Enter after every day the number of working hours you have spent in respect of each of the activities listed in the column headed "Activity". The totals for each day should add up to the number of hours you have been working effectively.

3. In the second column headed "No." you should enter, at the end of the month, the following information in respect of each activity:
   1. Model farmers - the number of model farmers within your extension area;
   2. Demonstration plot - the area of your demonstration plot and its approximate distance from your office;
   3. Farm plans - the number of farm plans your office has completed during the month;
   4. Field days - the number of field days you have held during the month and the approximate number of participants;
   5. Farmers' committees - the number of meetings held during the month in which you have personally participated.

4. At the end of the month when you have completed the column for the last working day, you should add up the totals for each activity and for each day.

5. Remember that the form will be of value only if it is completed accurately and correctly. Your supervisor will carry out checks to ensure that you are making proper use of the form.
BI-MONTHLY REPORT TO PROJECT DIRECTION

Period: ____________
Reporting date: ____________

PLANNING & EVALUATION SECTION

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<th>Planning, hours</th>
<th>This period</th>
<th>Last year</th>
<th>Cum. this year</th>
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</thead>
<tbody>
<tr>
<td>(functional)</td>
<td>Evaluation, hours</td>
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</tr>
<tr>
<td></td>
<td>Economic analyses, hours</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Other, hours</td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time use:</th>
<th>Internal</th>
<th>This period</th>
<th>Last year</th>
</tr>
</thead>
<tbody>
<tr>
<td>(recipient)</td>
<td>Project Direction</td>
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<td>Marketing Division</td>
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Reports submitted:

Comments:

CROP & PASTURE SECTION (EXPERIMENTATION DPT)
Comments:

AGRICULTURAL ENGINEERING SECTION (EXPERIMENTATION DPT)
Comments:

ANIMAL HUSBANDRY & BREEDING SECTION (EXPERIMENTATION DPT)
Comments:
### FORESTRY SECTION (EXPERIMENTATION DPT)
(including Munessa forest operations and forest extension)

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<tr>
<th></th>
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<th>Last year</th>
<th>Cum. this year</th>
<th>% of prod. target</th>
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</thead>
<tbody>
<tr>
<td>No. of seedlings produced per year</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of seedlings sold</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of cu.m. of logs sold</td>
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<tr>
<td>Comments:</td>
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### VETERINARY DEPARTMENT

<table>
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<th>Last year</th>
<th>Cum. this year</th>
<th>% of prod. target</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of A.I. farmers</td>
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<tr>
<td>No. of pregnancy tests, farmers</td>
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<tr>
<td>Doses of semen produced</td>
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<tr>
<td>Total No. of vaccinations, farmers</td>
<td></td>
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<tr>
<td>Total No. of treatments, curative vet. service</td>
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<tr>
<td>Mileage per 100 A.I.</td>
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<tr>
<td>Comments:</td>
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### ASEELLA DEVELOPMENT DISTRICT CENTRE SECTION (EXT. & TRAINING DPT)

<table>
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<th>Last year</th>
<th>Cum. this year</th>
<th>% of prod. target</th>
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<tbody>
<tr>
<td>No. of farm plans completed</td>
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<tr>
<td>No. of farm plans per extension agent</td>
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<tr>
<td>Time spent per farm plan per extension agent (hours)</td>
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<tr>
<td>Total No. of model farmers</td>
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<tr>
<td>No. of model farmers per extension agent</td>
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<tr>
<td>Time spent per model farmer per extension agent (hours)</td>
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<tr>
<td>Time spent per demonstration plot per ext. agent (hours)</td>
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<tr>
<td>Total No. of field days</td>
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<tr>
<td>Time spent per field day per ext. agent (hours)</td>
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### ASELLA DEVELOPMENT DISTRICT CENTRE SECTION (ctd)

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<th>Cum. this year</th>
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<td>_____</td>
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<tr>
<td>Time spent per farmers’ committee per extension agent (hours)</td>
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Comments:

### BEKOJI DEVELOPMENT DISTRICT CENTRE SECTION (EXT. & TRAINING DPT)

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<tr>
<td>No. of farm plans per extension agent</td>
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<td>Time spent per farm plan per extension agent (hours)</td>
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<tr>
<td>Total No. of model farmers</td>
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<tr>
<td>No. of model farmers per extension agent</td>
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<tr>
<td>Time spent per model farmer per extension agent (hours)</td>
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<td>Time spent per demonstration plot per ext. agent (hours)</td>
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<td>Time spent per field day per ext. agent (hours)</td>
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<tr>
<td>Total No. of farmers’ committees</td>
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<td>Time spent per farmers’ committee per extension agent (hours)</td>
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Comments:
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<th>Cum. this year</th>
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<td>Time spent per farm plan per extension agent (hours)</td>
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<tr>
<td>Total No. of model farmers</td>
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<td>Time spent per model farmer per extension agent (hours)</td>
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<tr>
<td>Time spent per demonstration plot per ext. agent (hours)</td>
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<td>Total No. of field days</td>
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<td>Time spent per field day per ext. agent (hours)</td>
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<tr>
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<tr>
<td>Time spent per farmers' committee per extension agent (hours)</td>
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Comments:

### DHERA DEVELOPMENT DISTRICT CENTRE SECTION (EXT. & TRAINING DPT)

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<th>Cum. this year</th>
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<tbody>
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<tr>
<td>No. of farm plans per extension agent</td>
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<tr>
<td>Time spent per farm plan per extension agent (hours)</td>
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<tr>
<td>Total No. of model farmers</td>
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<tr>
<td>No. of model farmers per extension agent</td>
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### DHERA DEVELOPMENT DISTRICT CENTRE SECTION (EXT. & TRAINING DPT)

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<th>Cum. this year</th>
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</thead>
<tbody>
<tr>
<td>Time spent per model farmer per extension agent (hours)</td>
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<td></td>
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<tr>
<td>Time spent per demonstration plot per ext. agent (hours)</td>
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<tr>
<td>Total No. of field days</td>
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<tr>
<td>Time spent per field day per ext. agent (hours)</td>
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<tr>
<td>Total No. of farmers' committees</td>
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<tr>
<td>Time spent per farmers' committee per extension agent (hours)</td>
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**Comments:**

### WOMEN'S EXTENSION UNIT (EXT. & TRAINING DPT)

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<th>This per.</th>
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<th>Cum. this year</th>
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<tbody>
<tr>
<td>Total No. of participants in courses</td>
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</tr>
<tr>
<td>No. of participants per extension agent</td>
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**Comments:**

### TRAINING SECTION (EXT. & TRAINING DPT)

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<th>Cum. this year</th>
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</thead>
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<tr>
<td>Total No. of participants in courses</td>
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</tr>
<tr>
<td>No. of courses given</td>
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**Comments:**
INFORMATION & PUBLIC RELATIONS SECTION (EXT. & TRAINING DPT)

This Year | Last Year | Cumulative Year
--- | --- | ---

Total No. of visitors

Comments:

BUILDING SECTION (INFRASTRUCTURE DPT)

Comments:

ROAD SECTION (INFRASTRUCTURE DPT)

Comments:

WATER DEVELOPMENT SECTION (INFRASTRUCTURE DPT)

Comments:

CONSTRUCTION SERVICES SECTION (INFRASTRUCTURE DPT)

Comments:
### Administration Section (Common Services DPT)

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<th>Last Year</th>
<th>Cum. This Year</th>
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</thead>
<tbody>
<tr>
<td>No. of employees hired, EHL</td>
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<td></td>
</tr>
<tr>
<td>No. of employees hired, EML</td>
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<tr>
<td>No. of employees hired, LOC</td>
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</tr>
<tr>
<td>No. of employees dismissed, EHL</td>
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</tr>
<tr>
<td>No. of employees dismissed, EML</td>
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<td>No. of employees dismissed, LOC</td>
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<td>Comments:</td>
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</table>

### Equipment & Stores Section (Common Services DPT)

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<th>Last Year</th>
<th>Cum. This Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total No. of km, 4-WD vehicles</td>
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<tr>
<td>Total No. of km, standard cars</td>
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</tr>
<tr>
<td>Total No. of km, small trucks</td>
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<tr>
<td>No. of km per 4-WD vehicle</td>
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<td>No. of km per standard car</td>
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<tr>
<td>No. of km per small truck</td>
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<td>Cost of service and maintenance per vehicle km driven</td>
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<td>Comments:</td>
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</table>
### CATERING SECTION (COMMON SERVICES DPT)

<table>
<thead>
<tr>
<th></th>
<th>This per.</th>
<th>Last year</th>
<th>Cum. this year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total No. of meals served</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comments</td>
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</table>

### CADU MARKETING DIVISION

<table>
<thead>
<tr>
<th></th>
<th>This per.</th>
<th>Last year</th>
<th>Cum. this year</th>
<th>% of prod. target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total volume purchased from farmers (E$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total volume sold to farmers (E$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total volume sold to buyers (E$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total volume of grain purchased (tons)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total volume of grain sold (tons)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total volume of seed sold (tons)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total volume of milk purchased (litres)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total volume of fertilizer sold (tons)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total volume of implements sold (E$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total volume of concentrates sold (tons)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of heifers sold</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average price of grain paid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average price of grain obtained</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of supplying farmers (milk)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of supplying farmers (grain)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of credit takers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## CADU MARKETING DIVISION (ctd)

<table>
<thead>
<tr>
<th></th>
<th>This per.</th>
<th>Last year</th>
<th>Cum. this year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of credit granted (E$)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount of credit repaid (E$)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount of credit outstanding (E$)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount of credit per credit taker (E$)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount of sales per credit taker (E$)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume of milk purchases per supplying farmer (litres)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume of grain purchases per supplying farmer (qt)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume of grains in stock (tons)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume of fertilizer in stock (tons)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### Comments:

## CO-OPERATIVE UNIT (CADU MARKETING DIV.)

Comments:

## CADU SEED DIVISION

<table>
<thead>
<tr>
<th></th>
<th>This per.</th>
<th>Last year</th>
<th>Cum. this year</th>
<th>% of prod. target</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of ha under wheat, Kulumsa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of ha under maize, Kulumsa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of ha under rape, Kulumsa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of ha under barley, Kulumsa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of ha under other crops, Kulumsa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CADU SEED DIVISION (ctd)</td>
<td>This per.</td>
<td>Last year</td>
<td>Cum. this year</td>
<td>% of prod. target</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------</td>
<td>-----------</td>
<td>----------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>No. of ha under wheat, Asassa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of ha under other crops, Asassa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total No. of tractor hours, Kulumsa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total No. of machine hours, Kulumsa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total No. of tractor hours, Asassa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total No. of machine hours, Asassa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volume of cleaned seed, Kulumsa (qt)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Yield per ha of wheat, Kulumsa (qt)</td>
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<td></td>
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<td></td>
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<tr>
<td>Yield per ha of maize, Kulumsa (qt)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yield per ha of rape, Kulumsa (qt)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yield per ha of barley, Kulumsa (qt)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Yield per ha of wheat, Asassa (qt)</td>
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Comments:
### Appendix III

**CADU Cattle Breeding Division**

<table>
<thead>
<tr>
<th></th>
<th>This per.</th>
<th>Last Year</th>
<th>Cum. this Year</th>
<th>% of prod. target</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of heifers delivered</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of inseminations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of vaccinations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of local cows purchased</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total size of herd</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of inseminations per pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of calves born</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total cost per delivered heifer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:
Appendix IV

SEMI-ANNUAL REPORTS ON DEPARTMENT LEVEL
Guidelines and Checklist of Information
Items and Commentary to be Provided

0. Format

Each report should carry the following data on the department/division concerned at the top of the first page:

Title of department/division
Title of sections/units included in the department/division
Reporting period

Each report should normally not exceed five single-spaced typewritten pages. The information should be provided under the headings indicated below. It should be understood that all items listed below need not necessarily be included in each report, and that the checklist of information items is merely indicative.

1. Current Status

Brief and concise statement of developments and main activities within the department/division during the reporting period, noting inter alia:

(a) significant results achieved and major events occurred including reports submitted,

(b) major problems which have occurred or which have been carried over unresolved from the previous reporting period,

(c) timeliness of implementation of major activities on which future work depends,

(d) potential bottlenecks or problems,

(e) action pending by CADU Project Direction, DAO office, SIDA or the IEG on such matters as staff recruitment, fellowships, procurement/provision of equipment, etc.

2. Assessment of Progress

Brief and concise assessment of overall progress achieved during the reporting period within the department/division, as against planned objectives, indicating what action is being proposed in regard to specific problems and/or developments. In particular, this assessment should focus on:

(a) major deviations from planned objectives

By "planned objectives" are understood the goals and sub-goals stated in the Plan of Operation, production targets expressed in the current Work Programme & Budget, and any decisions subsequently adopted that amend or complement the work programme. Emphasis should here be laid on the entirety of the work programme of the department/division rather than on detail. Deviations should be described and analysed.
(b) **Impact of significant results, major events and problems**

This section should be analytical and not descriptive, the description having been provided under (1). Future implications should be discussed, including budgetary aspects for the current budget year.

(c) **New developments**

Discuss briefly any new developments that have occurred or that have begun to emerge during the reporting period and that have a bearing on the activities of the department/division. These developments may be external to CADU (climatic factors affecting crops and their yields; attitudes of local government authorities affecting the work programme; policy decisions by the IEG and its agencies) or internal (events occurring within the auspices of other units of CADU and affecting the work programme of the department/division; implications of policy decisions adopted by the CADU Project Direction). Attitudes of local communities within the project's target population, political, socio-economic and other background factors and their impact on the work programme may also be analysed under this heading; stress should be laid on changes in these factors and the effects of the change.

(d) **Contacts with the target population**

Do the people of the community where the department/division has been conducting its activities during the reporting period understand the need for and the general purpose of these activities? Has there been any particular resistance/support in new areas? Have there been any increases in the number of contacts with the target population? Are people in local communities in any way involved by CADU staff in project activities? If not, would such involvement be practical and useful?

(e) **Goals and objectives**

Provide a brief assessment of the continuing validity of the subgoals stated in the Plan of Operation in respect of the sections comprising the department/division as well as of the production targets listed in the Work Programme & Budget. Are any major changes in the subgoals/production targets contemplated or warranted?

3. **Inputs**

Discuss briefly whether inputs during the reporting period have been forthcoming as required and been of requisite quality and quantity. Whenever circumstances warrant, discuss whether the supply or non-supply of inputs have affected the work programme. When it appears that progress is being jeopardized by persisting difficulties stemming from CADU staff or from other inputs, discuss briefly the nature of such difficulties indicating what action has been taken or is to be proposed. Discuss the inputs under the following headings:
Appendix IV

(a) staff
Include here any relevant comments about expatriate as well as Ethiopian staff at all levels. Provide whenever appropriate an assessment of the efficacy of non-contract personnel provided to the department/division during the reporting period (consultants, EUS students, minor research task students, etc.) but avoid any direct judgment on senior contract staff. Discuss whether the phasing out of expatriate staff is proceeding on schedule.

(b) equipment

(c) services

(d) materials

(e) construction

4. Co-ordination

Indicate whether an active working-level relationship has been established or should be established with other sections/departments/divisions within CADU or with other technical assistance projects, research institutes, government institutions, etc. in related fields of activity. Note any particular areas of duplication which could be eliminated. Discuss also under this heading whether co-ordination within the department/division could or should be improved in any respect and whether the activities of the units/sections comprising the department/division are usefully integrated into a functional "programme".
## Appendix V

### Schedule of Reports on the Department Level

<table>
<thead>
<tr>
<th>Unit</th>
<th>Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
</tr>
<tr>
<td></td>
<td>J F M A M J J A S O ' N D</td>
</tr>
</tbody>
</table>

- **Experimentation**  
  Department: X X
- **Veterinary**  
  Department: X X
- **Extension & Training Dpt**  
  Infrastructure Department: X X
- **Common Services**  
  Department: X X
- **CADU Marketing Division**  
  X X
- **CADU Seed Division**  
  X X
- **CADU Cattle Breeding Division**  
  X X

**No. of reports per month:** 2 2 1 1 1 1 2 2 1 1 1 1 = 16 per annum
Local disbursements by the project

CADU (supporting services, research & development, training)

Extension & Training Dpt. (women's ext. unit)

Marketing Division (co-op unit)

Road Section

Water Dev.

Forestry Section

Planning & Evaluation

Local participation

Infrastructural development

Dissemination of research results

Promotion of credit

Incentives promotion

Employment promotion

Provision of supplies and services

Provision of research results

Provision of credit

Local participation
Level of income of government

Taxation

Level income of individuals

Income distribution

Economic development

Living conditions

Expectations

Social awareness

Participation in the project's activities

Attitudes to social factors

Social development

Economic & social development

First Main Goal: Economic & Social Development

Appendix VI
Initial project design (Plan/Op)

Annual modifications (budgets)

Planning & Evaluation Section

Crop & Pasture Section

Animal Husbandry & Breeding Section

Agric. Eng. Section

Forestry Section

Water Dev. Section

Research & development programme

Dissemination of research results (Extension & Training Dpt)
Rate and intensity of application
Method evaluation (cost/benefit analysis for methods)
Increase in methodological knowledge

Total programme:
Total programme evaluation (cost/benefit analysis for total package)
Methods evaluation (cost/benefit analysis for total package)
CADU total programme

Training programme

Taxation

In-service training of CADU staff

Fellowships and study trips for CADU staff

EUS students

Special courses (non-CADU staff)

Courses for CADU staff

Increase in methodological knowledge

See chart of second main goal
Third Main Goal: Create Possibilities for Application Elsewhere in Ethiopia

Chart 3

Appendix Y4

Training

Relevance of CADU experience

Creation of financial resources

Application elsewhere
<table>
<thead>
<tr>
<th>Type of study</th>
<th>Frequency (timing)</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Evaluation of agricultural extension activities</td>
<td>June - Oct. 72</td>
<td>Partial area</td>
</tr>
<tr>
<td>B. Evaluation of marketing activities</td>
<td>Feb. - June 73</td>
<td>Partial area</td>
</tr>
<tr>
<td>C. Evaluation of infrastructure activities</td>
<td>June - Aug. 73</td>
<td>Partial area</td>
</tr>
<tr>
<td>D. Evaluation of women's extension activities</td>
<td>March - June 74</td>
<td>Partial area</td>
</tr>
<tr>
<td>E. Study of taxation</td>
<td>Feb. - May 74</td>
<td>Partial area</td>
</tr>
<tr>
<td>F. Study of training effects</td>
<td>Jan. - Apr. 75</td>
<td>Present and former CADU staff</td>
</tr>
<tr>
<td>G. Crop sampling survey</td>
<td>Sep. - Jan. (annually)</td>
<td>Total area</td>
</tr>
<tr>
<td>H. Farm plan analysis</td>
<td>Oct. - Nov. (annually)</td>
<td>Total area</td>
</tr>
<tr>
<td>I. Cost/benefit analysis</td>
<td>December (annually)</td>
<td>Total area</td>
</tr>
<tr>
<td>J. Consumption study</td>
<td>July - Sep. (annually)</td>
<td>&quot;Original&quot; project area</td>
</tr>
<tr>
<td>K. Study of employment effects and tenant displacement</td>
<td>Jan. - Apr. 73</td>
<td>Partial area</td>
</tr>
<tr>
<td>L. Social-anthropological study</td>
<td>Sep. - Dec. 73</td>
<td>Partial area</td>
</tr>
<tr>
<td>M. Cost analyses</td>
<td>Aug. - Sep. (annually)</td>
<td>Some CADU units</td>
</tr>
<tr>
<td>Goal(s) to be measured</td>
<td>Subject Matter of Study</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td>Methodology</td>
<td>Innovation diffusion process, influence patterns, knowledge</td>
<td></td>
</tr>
<tr>
<td>Methodology; econ. dev.</td>
<td>Trading patterns, market shares, price development, operating efficiency</td>
<td></td>
</tr>
<tr>
<td>Methodology</td>
<td>Relative adequacy of techniques used</td>
<td></td>
</tr>
<tr>
<td>Methodology; social dev.</td>
<td>Relative adequacy of methods; knowledge; attitudes of trainees</td>
<td></td>
</tr>
<tr>
<td>Replication; econ. &amp; social dev.</td>
<td>Amount of taxes paid and relationship to income increase</td>
<td></td>
</tr>
<tr>
<td>Replication</td>
<td>Formal staff training</td>
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</tr>
<tr>
<td>Econ. dev.</td>
<td>Increases in crop yields</td>
<td></td>
</tr>
<tr>
<td>Econ. &amp; social dev.</td>
<td>Income changes; production structure; income distribution</td>
<td></td>
</tr>
<tr>
<td>Econ. &amp; social dev.; methodology; replicat.</td>
<td>Total benefits and costs generated by CADU</td>
<td></td>
</tr>
<tr>
<td>Econ. &amp; social dev.</td>
<td>Consumption effects of programme participation</td>
<td></td>
</tr>
<tr>
<td>Social dev.</td>
<td>Employment effects of programme; patterns of tenant displacement</td>
<td></td>
</tr>
<tr>
<td>Social dev.</td>
<td>Social change: attitudes, value systems, social relations</td>
<td></td>
</tr>
<tr>
<td>Methodology</td>
<td>Economic result of the units; adequacy of methodology used</td>
<td></td>
</tr>
</tbody>
</table>
Let the four "golnasas" A, B, C and D be L=4 strata.

In each stratum, regard the M gasha as clusters (in golnasa A M=15, in golnasas B, C and D M=13, 19, and 20 respectively).

Select n primary sampling units from the M clusters, using the simple random sampling technique.

For each of the selected clusters (gashas), all farmers shall be contacted.

Suppose a sample of n clusters selected with simple random sampling without replacement. Thus an estimator of the overall population proportion \( P \) in a golnasa is given by

\[
\hat{P}_c = \frac{1}{n} \sum_{i=1}^{n} p_i = \bar{p}
\]

where \( p_i \) is the proportion of units belonging to the specified category in the \( i \)-th sample cluster. The sampling variance of \( \hat{P}_c \) is (2)

\[
\text{Var}(\hat{P}_c) = \frac{M - n}{M - 1} \cdot \frac{s_b^2}{n}
\]

where \( s_b^2 \) is the variance between cluster proportions and is given by

\[
s_b^2 = \frac{1}{M} \sum_{i=1}^{M} (p_i - \bar{p})^2 = PQ - \frac{1}{M} \sum_{i=1}^{M} p_i Q_i
\]

Since \( s^2 = s_b^2 + s_w^2 = PQ \), the within-variance \( s_w^2 \) in this case is given by

\[
\frac{1}{M} \sum_{i=1}^{M} p_i Q_i
\]

It can be shown that an unbiased estimator of \( \text{Var}(\hat{P}_c) \) is given by

\[
\text{var}(\hat{P}_c) = \frac{M - n}{M} \cdot \frac{1}{n - 1} \cdot \frac{1}{M} \sum_{i=1}^{n} (p_i - \bar{p})^2
\]

Then the universal proportion \( P_u \) may be estimated by

\[
\hat{P}_u = \frac{\sum_{j=1}^{L} M_j (\hat{P}_c)_j}{\sum_{j=1}^{4} M_j} = \frac{L}{\sum_{j=1}^{4} M_j} = \frac{67}{15+13+19+20} = 67
\]

(1) Pron letter to P & E Section by Mr. Sigvard Nilsson of the Swedish Agricultural College, Uppsala, of April 1971.

(2) For typographical reasons the population variance is here denoted \( s^2 \) instead of the correct \( \sigma^2 \).
and the variance for \( \hat{P}_u \)

\[
\text{var} (\hat{P}_u) = \sum_{j=1}^{4} \left( \frac{M_j}{67} \right)^2 \cdot \text{var} (\hat{P}_c)_j
\]

If an error margin of 10% is considered satisfactory, i.e. \( \hat{P}_u \pm 0.1 \cdot \hat{P}_u \), a rough calculation says that the sample must be of the size \( n \geq 3 \) in each stratum. Totally the sample will then be \( 3 \cdot 4 = 12 \) gasha and about \( 12 \cdot 5 = 60 \) farmers will have to be contacted.
Note on Design of Sample Surveys in Chilalo Awraja, (II), (1)

This note presents a simple method for calculating sample sizes when a simple random sample design is desired. The method is, of course, limited neither to peasant farmers nor to Chilalo awraja. It is believed that the method may simplify the work of the P & E Section by readily yielding information on sampling rates, given data from a small pilot study, with which the "feasible" sample size may be compared.

The range \( R (X_{\text{max}} - X_{\text{min}}) \) of a set of observations can be used as an estimate in calculating the standard deviation \( S \) of a population (2). Therefore, it is not necessary to carry out calculations of the standard deviation for each set of observations. It has been proven mathematically that \( R/D \) estimates \( S \) where \( D \) is given below for specific sample sizes.

<table>
<thead>
<tr>
<th>Sample size ( n )</th>
<th>( D )</th>
<th>Sample size ( n )</th>
<th>( D )</th>
</tr>
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<tbody>
<tr>
<td>2</td>
<td>1.128</td>
<td>24</td>
<td>3.899</td>
</tr>
<tr>
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<td>4</td>
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<td>3.964</td>
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<td>2.326</td>
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<td>3.997</td>
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<td>6</td>
<td>2.534</td>
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To use the two graphs on the following pages, a measure of the standard deviation \( S \) and the mean \( \bar{X} \) for each set of observations is needed. A measure of \( S \) can be obtained from the method above. The graph will then give the size of the sample required \( (n) \) for either 90 \% or 95 \% confidence that the true mean will not vary more than either \( \pm 10 \% \) or \( \pm 20 \% \) (tolerance limits) from the sample mean.

Take, as an example, the time it takes for farmers to plough one hectare of land. (We assume that this time can be measured reliably.) The following procedure should then be followed to compute a sample size:

(a) Take a relatively small number of observations of the ploughing time, say \( n = 10 \), and record the length of time required for each.
(b) Subtract the minimum time from the maximum time to give the range R and calculate \( \bar{x} \), the mean of this set of observations.

(c) Divide R by the value of D corresponding to the size of the sample. In this case \( D = 3.078 \) (n = 10). This value \( R/D \) will be used in place of \( S \).

(d) Divide \( R/D (= S) \) by \( \bar{x} \) and locate this on the ordinate axis of the graph and read off the value of the actual sample size required to give either 90% or 95% confidence that the true mean will be within those tolerance limits (± 10% or ± 20%) of the sample mean \( \bar{x} \).

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(1) From Scott Wilson Kirkpatrick & Partners, Substitution of Labour for Equipment in Road Construction. Study under preparation for the IBRD, June, 1972, Technical Note 71020/19. The note is based on E.S. Pearson, the Percentage Limits for Distribution of Range in Samples from a Normal Population, Biometrika Vol. 24, pp. 404 - 417, November, 1932, which has been further elaborated by Mr. L.H. Miller of the IBRD.

(2) See footnote (2) on p. 119.
Graph of sample size required versus the ratio $s/\bar{x}$ for either 90% or 95% confidence that the mean will not vary more than ±10% from the sample mean assuming a normal distribution.
Graph of sample size required versus the ratio $S/\bar{x}$ for either 90% or 95% confidence that the mean will not vary more than $\pm$ 20% from the sample mean assuming a normal distribution.
LIST OF WORKS CITED
(for CADU publications refer to the list on the following pages)


Wickstron, Bo, Notes and Comments on CADU. CADU, Asella, 1970. (stencil)

Wickstron, Bo, Comments on CADU. CADU, Asella, 1972. (stencil)


LIST OF CADU PUBLICATIONS

A. Project Preparation Period

1. Report No. I on the establishment of Regional Development project in Ethiopia, October, 1966
   Part I General Background
   Part II Project Outline
   Part III Appendices
   (A reprint of the Summary is also available)


3. Trials and Demonstration Plots at Kulumsa in 1966, July, 1966


5. Creation of a Forestry Administration in Arussi Province, March, 1967


7. Results of Trials and Observations Plots at Kulumsa 1966/67 May, 1967

8. Sagure, a Market Village, June 1967


B. Implementation Period

1. Government Agreement on Plan of Operation

2. Some Reflections on Water Erosion in Chilalo Awraja, October, 1967

3. The Taungya Afforestation Method, November, 1967


8. CADU (Pamphlet in English and Amharic)


10. Cultivation Practices and the Weed, Pest and Disease Situation in Some Parts of the Chilalo Awraja, March, 1968

11. Introductory Agro-Botanical Investigations in Grazed Areas in the Chilalo Awraja, June, 1968
12. Results of Trials and Observations on Fields, Forage Crops at the Kulumsa Farm and in Asella 1967/68, June, 1968
15. CADU Statistical Digest, May, 1968
17. Field Trials and Observations 1968/69
18. Feasibility Study on a Farm for Breeding of Grade Cattle at Gobe, Arussi Province, September, 1968
24. Results of Demonstrations 1968/69
25. CADU Plan of Work and Budget 1969/70
27. Feasibility Study on Sunflower Protein Concentrate and Fafa Mining Plant, May 1969
28. Results of Trials and Observations 1968/69 May, 1969
29. CADU Evaluation Studies, Health Education (Base-line study) May, 1969
31. CADU Evaluation Studies, Training of Model Farmers (Base-line Study) May, 1969
32. Progress Report No. 1, Implement Research Section, June, 1969
33. Feasibility Study on Local Roads and Market Places in Chilalo Awraja, by Laro Leander August, 1969
34. CADU Annual Report 1968/69
36. Census in Golja (Ketar Genet), by Gunnar Arhammar, March, 1969
37. Sanitary Survey in Golja (Ketar Genet), by Gunnar Arhammar, April, 1969
38. Kap Study of Mothers in Golja (Ketar Genet), by Gunnar Arhammar April, 1969
39. Food Survey of Pre-school Children in Golja (Ketar Genet), by Gunnar Arhammar, April 1969
40. Health Survey of Pre-school Children in Golja (Ketar Genet) by Gunnar Arhammar, April 1969
41. Report on a Combined Food and Health Survey in Yelona Farming District, by Gunnar Arhammar, May 1969
42. Census in Bekoji Village, Asella, by Gunnar Arhammar, September 1969
43. CADU Preliminary Final Report for the Period 1967-70
46. Report on Surveys and Experiments, Crop Production Department, Asella, 1969
47. CADU Work Programme and Budget for the Period 8.7.70-31.12.70
48. Results of Demonstration, 1969/70
49. CADU Evaluation Studies, Crop Sampling 1969
50. Land Ownership, Tenancy and Social Organization in Wajji Area, by Arne Lexander, March 1970
51. CADU Annual Report 1969/70
52. Progress Report No. II, Implement Research Section, July 1970
53. A Master Plan for Water Resources and Supplies within CADU's First Project Area, Nov. 1970
54. Report for the Period 8.7.70-15.11.70
55. CADU Work Programme and Budget for the Period 1.1.71-7.7.71
59. CADU Work Programme and Budget for the Period 8.7.71-7.7.72
60. CADU Evaluation Studies: Training of Model Farmers, Oct. 1970
61. Sanitation Survey of Bekoji, September 1970
64. CADU Evaluation Studies: Crop Sampling 1970, July 1971
65. CADU Annual Report 1970/71
67. CADU Work Programme and Budget 1972/73, Asella, October 1971
68. Health Survey in Sagure Village and Yeloma Farming District, April 1968, by Gunnar Arhammar and Roland Eksmyr
69. Assessment of Status of Health in an Ethiopian Rural Community (Experience of Two Years' Public Health Work In Chilalo Awraja, Arussi), by Gunnar Arhammar, May 1970
70. Survey of the Consumption of Coffee, Tea, Tobacco and Alcohol in a Market (Sagure), Especially with Regard to cost, by Stig Lundin, September 1971
71. CADU Evaluation Studies: General Agricultural Survey 1970 (Base-Line Study for Evaluation of Impact of the Project), Planning and Evaluation Section, Asella, July 1971
73. Feasibility Study on the Establishment of Saw-Mill in Asella and Connected workshop for Wood Processing, Planning and Evaluation Section, November 1971
74. Investigations on Mechanized Farming and Its Effects on Peasant Agriculture, March 1972
75. CADU Work Programme & Budget 1973/74, Asella, October 1972
77. CADU Evaluation Studies Crop Sampling 1971 Planning & Evaluation Section Asella, July 1972
78. Case Study on Farm Households In the Asella Area April, 1972
80. Report on Surveys and Experiments Carried out in 1971 Crop & Pasture Section Asella April, 1972
81. Master Plan for the Evaluation of CADU, by Johan Holmberg, Planning & Evaluation Section, October 1972
MINOR RESEARCH TASKS AT CADU

1. Farm Management Studies of Model Farmers in the CADU Project Area, by S. Bergholtz, July, 1969

2. The Munessa Forest, a Plant Ecological Study, by Lill & B. Lundgren, June 1969


4. Local Varieties of Wheat in the Chilalo Awraja, by G. Widerstrom, November - December, 1968

5. An Inventory of Feeding System and Feed Stuff, Chilalo Awraja, Ethiopia, by Oscar Evaldsson

6. Comparative Study on the Possibilities for Different Farm Produce in the Chilalo Area in Ethiopia, by Bo Anselmsson, February, 1972

7. An agrobotanical investigation of leguminous species in Chilallo awraja, especially at higher attitudes, by Mats Thulin, May, 1972
Special Studies

S.S.1 A Preliminary Survey of Soil Erosion in the Chilalo Awraja, by Kebede Tato, September 1970

S.S.2 Decision Making in the Family, by Pia Bergman, Asella, July 1971

S.S.3 The Innovation - Diffusion Process, by Johan Toborn, Asella, March 1971