REPUBLIC OF KENYA

MINISTRY OF AGRICULTURE AND LIVESTOCK DEVELOPMENT

IRRIGATION AND DRAINAGE BRANCH

GUIDELINES

SMALLHOLDER IRRIGATION PROJECTS IN RURAL DEVELOPMENT

APPROACH
CONDITIONS
APPRAISAL
PROCEDURES

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FOREWORD

The purpose of this extension paper is to explain to district development planners and agricultural officers what smallholder irrigation means and how it can play a role in rural development. This paper will not deal with technical matters associated with irrigation development, as these will be dealt with in separate subject matter publications and training manuals.

Since the Districts have become the centres for rural development, it is important that the responsible officers understand the complexity of irrigation development, the mistakes that can be made and the conditions that should be met to minimize the risk of failure.

Chapter 1 of this paper discusses main selection criteria of smallholder irrigation development. It draws attention to the main conditions to be met to ensure successful development.

In chapter 2 the basic data, which will be needed to be able to make recommendations on the development have been presented.

Chapter 3 discusses the project appraisal and introduces the different feasibility tests which will have to be carried out.

Chapter 4 discusses the project procedures, which will have to be followed from the initiation of the project until project implementation.

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1. THE ROLE OF SMALLHOLDER IRRIGATION

1.1 A definition

In the field of irrigation one can distinguish formal and informal systems. Formal irrigation projects are often planned, constructed and managed by a structured government organization. They are generally established at a large scale with very little prior involvement from farmers.

In contrast, informal irrigation may be defined as **those schemes which are under local responsibility, controlled and operated by the farmers in response to their felt needs.**

While formal irrigation (central management) is mainly a "top-down" development process, informal or smallholder irrigation should fit the "development from below" criteria of being need-oriented, originating locally, self-reliant and self-sustaining.

One must however realize that there are also formal smallholder irrigation schemes which are centrally planned and controlled, such as the Kibirigwi, Katilu and Malka Daka irrigation schemes. On the other hand it is possible to implement large irrigation schemes on a smallholder basis, whereby only the major irrigation and drainage works are centrally managed and maintained (Yatta furrow for example).

In this paper, smallholder irrigation means the informal approach to irrigation development as part of a rural development initiated by the people themselves.

1.2 The place of irrigation in rural development

Large scale, formal irrigation schemes are expensive to build, to operate and maintain. Due to their high costs, these schemes are most often production oriented projects. Rural development however, aims in the first place at improving people's life. One of the means to achieve this objective could be, to develop their land and water resources.

Smallholder irrigation should be a real need to the farmer in the context of the total farming system. Especially in low potential areas, with erratic rainfall and a low degree of food security, smallholder irrigation can be a useful entry point to improve food production by the traditional farming community.

In many parts of Kenya, labour may be a limiting factor. This fact has been observed in many projects where the irrigated land takes second place to the rainfed land since rainfed systems require less inputs and are more flexible than irrigation systems in terms of labour. In the typical

rainfed agricultural areas of Kenya, the improvement of agricultural services is likely to be more effective and less costly. The introduction of irrigation in those areas as a supplementary activity will reduce the availability of labour for other activities.

1.3 The selection criteria

The possibility of smallholder irrigation being successful is not only related to physical and socio-economic factors, but also to the principles of rural development. As such they can be summarized as:

(1) farmers' participation
(2) the need for self reliance
(3) a low-key but open ended approach.

(1) Farmers' participation

If smallholder irrigation is seen as a development process rather than the physical implementation of irrigation works, it means that one has to deal with a dynamic and continuing process in which the farming population is involved. It implies, that the farmers feel that they need irrigation.

It also means that optimal use is made of local skills, be it technical or organizational. These local skills and existing social structures should be taken into consideration during project design. It is evident that assistance to the ongoing activities or initiatives of the farmers should have priority, since it means the reinforcement of an existing development process.

The participation of the farmers should be ensured during all stages of project development, thus from initiation and planning till implementation. Finally operation and maintenance will become a farmers' affair, with no outside interference apart from normal extension activities. Farmers should therefore organize themselves, whereby existing groups might become the basis of irrigation organizations as for example a water association. The new farmers' organization should be in harmony with and be based on existing social structures.

Women are playing a dominant role in agricultural production. It should be realized that a project might fail if the women are not capable to fulfill their additional anticipated tasks. They should play an active role in the farmers' participation.

As the farmers are asked to participate in and contribute towards the project it is important that the work fits in the normal daily and seasonal routine of the farmers. It will be necessary to decide with the farmers together how

the farmers will contribute and how to organize the work. If at any time the farmers' organization is not effective, or farmers do not participate it will be better to halt the works until all problems have been solved.

(2) The need for self-reliance

To be self-reliant, the farmers themselves should be able to operate and maintain their irrigation system. Therefore the selection and design of the water supply and distribution system should be based on its manageability and the costs (cash-flow requirements) for its operation and maintenance.

Irrigation technology should be appropriate and based on the existing knowledge of the farmers. Since irrigation development is a learning process, the pace of development may be slow and will have to be dictated by the farmers themselves.

The risk of failure is minimized when the water supply is based on gravity, by taking water from rivers or streams through a feeder canal to the proposed scheme site. Other low cost delivery devices, such as hand pumps and water rams, might be considered as well.

The unreliability or unavailability of external inputs in terms of funds, fuel, spares or expertise has caused the collapse of many irrigation schemes that rely on pumping or on overhead irrigation.

(3) A low-key and open-ended approach

Rural development is a learning process for all parties involved. Learning-by-doing or a phased development approach means that the initial target of a smallholder irrigation project should be modest.

For most farmers in Kenya, irrigation development means the introduction of a new technology. How it will fit in his existing farming system is often unknown. It is also unclear whether such a development will improve the living conditions for him and his family and whether the farmers' organization is strong enough to cope with their own scheme.

The first intervention should therefore be within the capacity of the farmers, preferably with a minimum of external inputs. Irrigation schemes should preferably not be larger than 100 ha in this phase. The next intervention (second phase), can be attempted when the first development is fully accepted. The lessons learned can be incorporated in further developments.

This approach might not be spectacular, but it will make a better use of the limited financial resources. It will furthermore reduce the risk of wrong project concepts and the consequent loss of development funds and efforts. It

will furthermore be possible to be flexible and to change plans and targets on the basis of the experience and results obtained.

Though the technical efficiency of the project will be low initially, there may still be a high economic efficiency as inputs are low as well.

It is clear that the advocated approach is almost impossible when large areas are irrigated. Here high initial investments have to be made, which must be matched by high and rapid returns. On the other hand the overheads would be prohibitive if each small area were designated as a separate project. One solution would be to designate a special region, with a potential for a large number of smallholder schemes (Kano Plains) as the project, leaving the order in which the schemes are implemented to local priorities.

1.4 Conditions

In addition to the selection criteria, which should be met to reduce the risk of failure, there are some important issues which should be solved before the scheme is implemented. Some conditions, which if met, would certainly improve the chances of success, have been presented below. It is recommended that no funds are allocated to a project before the conditions are met.

(1) Land issues

Land issues should be solved by the farmers before the start of project implementation. Furthermore, tenants should get a guarantee, that the contributions they make towards the implementation of the project, will be to their benefit for a certain amount of years.

On the other hand, farmers would have to agree, that there will be no compensation for land needed for the construction of irrigation canals, drains and structures.

(2) Land use

It is important, that the selected area is not used for other purposes (c.q. grazing) or by other people in order to avoid a conflict of interests. If such problems are expected, they should be solved before project start.

(3) Equitable water distribution

Since water is often a limiting factor, all farmers or landusers should benefit equally from the irrigation scheme and therefore an equitable water distribution should be guaranteed.

(4) Agreement

Before implementation is started an agreement should be elaborated and signed by all parties concerned. An important part of the agreement is, that the participation of the group in their own project is specified. It is recommended to state in the agreement, that the farmers will have to operate and maintain the scheme.

(5) Bye-laws

Each irrigation scheme and its farmer's organization needs its own rules and regulations. General or standardized bye-laws should be made available to the farmers, who could gradually elaborate the bye-laws according to their needs and wishes.

It is recommended, that the bye-laws contain specifications on membership, election and duties of the scheme committee, equal rights and obligations of members and the procedures to be followed if the obligations are not met. A project should not be started before members have accepted their own basic bye-laws.

(6) Water permit

A water permit has to be obtained by the farmer's organization.

2. BASIC DATA COLLECTION

For the appraisal of a project it is important to have those basic data available, which make it possible to give proper recommendations, allowing decision makers to either approve or reject the project. Alternatively a priority rating could be given to the project. Data on physical resources as well as socio- economic data will be required. The collection of these data is best undertaken simultaneously.

Although there are standard techniques for the collection and assessment of data, smallholder irrigation schemes are facing a problem of scale. It is often not justified to use a lot of time and effort to make detailed studies. A rapid appraisal is often all that is needed, while if constraints are met, a specialist could be called in. As indicated before, investments have to be low (low risk) and as the phased development approach is chosen, mistakes may be corrected and improvements be made continually.

2.1 Assessment of natural resources

(1) Soils

By looking at the crops grown or at the natural vegetation, the agriculturalist may find indications about any limitations in the area as for example the soil fertility and the suitability of the area for irrigation.

A site evaluation to determine the suitability of the soils is necessary and if questions arise, the advice of the Kenya Soil Survey (KSS) should be asked. Examples of rather unsuitable soils are sand and loamy sands as they cannot store sufficient water while water losses when irrigating with surface irrigation methods will be excessive. Also shallow soils, caused by hardpans, murram or rock are less suitable or unsuitable for most crops, rice often being an exception.

Alkaline soils usually require large amounts of chemicals for improvement and the costs are in general excessive. Saline soils require leaching of salts and an in-scheme deep drainage system may also be required. This increases the investment cost considerably.

(2) Topography

Knowledge about the condition of the terrain is indispensable in irrigation technology. A limited topographic survey of the scheme area by preparing one or more longitudinal sections is needed to establish the average slope in the scheme area, the alignment of the feeder canal and a suitable intake site.

There will be a constraint if the land is steep. Land with a slope of less than 1% is ideally suited for surface irrigation. Danger of erosion with subsequent cost increase in the construction of irrigation canals as well as the need of substantial levelling will probably render land unsuitable for surface irrigation when slopes are over 3%.

The presence of a micro relief will also increase the cost of levelling. Land levelling should be kept to a minimum, since it will have to be carried out by the farmer himself. Therefore smooth soil surfaces should have preference when choosing a possible site for an irrigation scheme.

The intake of an irrigation scheme has to be far enough upstream of the proposed scheme area to provide the difference in level required, to transport water from the water source through canals and structures to the plots of the farmers. The survey will show whether suitable intake sites and alignment of a feeder canal are available. It will also show the obstructions which will be met along the alignment as for example a gully crossing, which would mean that additional investment cost will have to be made. The feasibility of a water supply by gravity may thus be assessed.

The survey will also indicate if and how excess water can be evacuated to the river.

(3) Availability of water

If hydrological data of the water source can be obtained it will be relatively easy to make an estimate of the availability of water. An estimate can be made of the variability of the water supply. The discharges during floods and droughts will of course be of special interest.

Hydrological data of small rivers and streams, notably in remote areas, do unfortunately not often exist. In that case an estimate about the availability of water has to be made. This could be done by questioning the farmers about the periods and duration of high and low flows as well as on water levels observed during these periods. Discharges can be estimated on the basis of the slope and wetted cross-section of the river. A discharge measurement can be carried out as well.

The district water bailiff should be involved to investigate if water abstraction from the river is possible, taking into account the rights of other water users.

The water quality will have to be checked as well. Data on water quality are not always available and the water quality should then be tested. The testing of the water quality may be included in the soil site investigation. If it is not possible to test the water quality over the different seasons, estimates on the variability may be necessary.

(4) Water requirements

As soon as possible an application has to be made to obtain a water permit. It is therefore necessary to make a rough calculation on the amount of water needed for irrigation. It is good to take into account possible future expansions of the scheme or project.

It is important to realise at an early stage, that the amount of water needed for irrigation is quite high. Between 1.3 and 2.5 litres per second for each irrigated hectare of land will be needed, depending on whether irrigation is performed day and night or during day light hours only.

(5) Land use

Under this heading, a general description can be given on how the area of the proposed scheme site is used at present, agriculture, grazing or forestry and what the farm activities are. It is important to indicate the land tenure system, to describe who would be the beneficiaries of the scheme and whether there are present users who might suffer as a consequence from the scheme.

2.2 Socio-Economic Data

(1) Farming system

The farmer and his family are involved in many different activities in which each member plays his or her specific role. These various activities in a traditional farming system are based on the principle to spread the risks of failure as much as possible. The introduction of irrigation is a new activity and a new risk. It changes an existing system and affects the distribution of tasks and roles. The scheme may thus affect the household structure, the labour supply and the position of women and children.

As risk is an important factor, a description is required of how risky the present farming system is, for example due to unreliable rainfall. The impact of the proposed scheme may be described partly as a comparison between present and expected future income levels of the people

It will be clear, that the introduction of irrigation in areas where pastoralism is a dominant activity of the people serious socio-economic constraints can be expected.

(2) Motivation and organization

The willingness of the farmers to participate and contribute to the realization of their project is the best assurance,

that they really want the project and will see the project as their own. Farmers who already practice or try to introduce irrigation will certainly participate as they are convinced of the future benefits.

Existing communal activities do give an indication on the willingness of the village in self-help projects. It is of interest to study the results which have been obtained with any self-help projects in the area.

A request for assistance originating from the farmers themselves increases the chance that the project reflects a real need and that the farmers are motivated.

(3) Alternative possibilities

A further question that should be answered is whether the proposed scheme is really necessary and whether the required funds can possibly be used for irrigation development more effectively in another location. There may also be other development projects which have a higher priority than irrigation at present.

(4) Experience

The level of agricultural technology used by the farmer is an indication of his experience. It is of importance to know whether the farmer has proved to accept and to try new techniques. Since the introduction of irrigation means a novelty, the better the experience and know-how of the farmers, the more chance for a succesful introduction of this new technology is given.

3.0 PROJECT APPRAISAL

The collection and evaluation of basic data has to be followed by a project proposal and appraisal. The appraisal will show whether the project is feasible and indicate its chances of success. The project proposal can be compared with other proposals (for irrigation or other projects) and can be given a priority ranking. Recommendations for its implementation can be made.

In first instance it will be beneficial to compare proposals for irrigation projects only, in order to be able to present those projects to the decision makers which have the highest chance of success. Other criteria than the ones mentioned in this paper, may be used as well, so a list with criteria will have to be prepared in cooperation with the decision makers before the appraisal can be concluded.

One of the selection criteria will undoubtedly be the socio-economic feasibility of the project. The expected social and economic benefits of the project are compared with the cost of the project in this feasibility test. As stated before however, the chance a scheme has to succeed must be seen as equally important.

3.1 Socio-economic feasibility

(1) Investments

It is often suggested, that farmers should not be charged with the capital costs made during construction. The financial burden would be too heavy and carry on over too long a period of time for farmers being at subsistence level or having a very low income. It may very well result in farmers not adopting the scheme as their own. It is therefore recommended to ask a contribution from the farmers before and during the construction period. This contribution may be in labour, cash or both.

The problem, that investment costs will not be recoverable, need not be so large in smallholder irrigation projects, because with a low-key, low-cost approach, the external contribution can be limited (often less than Shs 20,000/ha) and can more easily be absorbed by the local community. A further advantage is that the overall contribution of the farmers is substantial compared to the overall investment cost.

Experience shows, that costing remains a difficult exercise. Very often project costs are under estimated, delaying project implementation because funds are not sufficient. A first cost estimate can be based on preliminary designs, but care should be taken to include all components of the project. The use of standard cost will facilitate the costing,

but it must be borne in mind that the cost of materials and transport costs will vary greatly from location to location. Contingencies reflecting the accuracy of calculations should be included.

A further requirement is to make an estimate of the contribution which will be made by the farmers. A realistic estimate has to be made taking into account the other farming activities of the farmers. This can only be done in cooperation with the farmers.

(2) Recurrent cost

If the need for self-reliance is taken seriously, it must be accepted that the farmers run their scheme themselves and pay for the operation and maintenance cost. Furthermore it will not be possible for the Government to continue subsidizing projects.

It is therefore necessary that project proposals do not include technologies beyond the operational and management capabilities of the farming community.

In gravity fed irrigation schemes, the cash requirement will in general be low and most works can be done by the farmers themselves.

The cash requirement will be much higher for sprinkler irrigation, while cash must be reserved to buy new equipment (depreciation). In case pumps are used, the cash requirements will again be higher and will be needed for operation (fuel), maintenance (repairs) and replacement of pumps. A further disadvantage will be the organizational requirement to get fuel to the site, which certainly will be very difficult in remote areas.

The rate at which individual farmers adopt the new technology and are able to make full use of its possibilities will vary greatly. Those farmers who do not make full use of the possibilities may not be able to contribute cash for operation and maintenance of the irrigation system.

This means that although economic calculations may show that the average farmer will be able to pay his contribution, it may not be true for many of the farmers. This will certainly be the case in the early stages of the project, but this problem may well continue over a prolonged period of time.

The scheme may thus run in financial difficulties because the better farmers will not be willing to pay the share of those farmers who perform less well. It may thus be concluded that the lower the cash requirements for operation and maintenance, the better the chances are for the farmers. Pump-fed irrigation schemes will for this reason have little chance of survival.

(3) Benefits

Benefits to the project will be both social and economic and cannot always be expressed in monetary terms. Even if it is possible to express the benefits in monetory terms, it remains difficult to make realistic estimates. Benefits are generally over estimated, due to the fact, that it is difficult to foresee how the farmers will perform and what problems may arise.

It is therefore suggested to add as a measure of expected benefits an estimate of the felt needs of the population. Objective estimates on felt needs can be made by evaluating how much the community is willing to contribute and whether the farmers have already started on their own or have made harambee contributions towards the project.

3.2 Technical feasibility

The technical feasibility will have to cover the natural resources, the implementation of the project and probably even more important, the operation and maintenance of the scheme.

(1) Natural resources

The assessment of the natural resources will show whether the implementation of the project is possible without major constraints, with constraints but still acceptable or that it is better to abandon the idea of a project, because there are too many constraints (see Chapter 2.1 for details).

(2) Design and construction

The design will have to meet the local needs and possibilities. It will further be of advantage if the scheme is easy to implement and that the contribution of the farmers is easy to incorporate. Whether the required materials are available locally or have to be transported over large distances will make a lot of difference in the cost. A detailed list of the required structures and materials has to be prepared.

Simple surface irrigation systems will meet the requirements and if basin irrigation is adopted, the farmers will be able to construct the in-field system and basins with little outside help. With respect to water distribution it is recommended that within each group of farmers, the individual farmers use the whole group flow in rotation.

To reduce operation and management, the water distribution between the groups is best done on a continuous basis. Self regulating structures, without movable parts may be suitable and will reduce maintenance costs as well.

(3) Operation and maintenance

Irrigation schemes can not be run by individuals. As the available water has to be distributed equally between farmers and each farmer has to contribute labour and/or funds towards the operation and maintenance of the system, the only way to operate a system will be as a group. A strong organization is thus required.

If a farmers' organization does not exist, the farmers should form a water association and elect a committee or representatives. Bye-laws will have to be established (see chapter 1.4). The capability of the farmers to organize themselves will help to decide whether the scheme may work or not.

3.3 Institutional feasibility

For the design of irrigation schemes, specialized staff will be required. Initial designs and planning of small scale irrigation schemes can often be handled by district staff in cooperation with the district irrigation engineers when they have been posted. Otherwise irrigation engineers from the provincial headquarters have to be consulted. The latter is only the case when constraints are expected, more sophisticated schemes are planned and for the final designs.

The question will then arise whether the Ministry has sufficient capacity to do the planning and later implement the scheme or supervise the implementation. Of course there is a possibility to give out the implementation to small contractors, but there are disadvantages. Small contractors are difficult to find for works in remote areas. There are often disputes, cumbersome tender procedures and close supervision will still be required. Furthermore it is very difficult to incorporate the contribution of the farmers.

The most important question will however be how much time will be required after implementation before farmers can run their scheme by themselves. It is doubtful, that the Ministry will be able to support the farmers a long time with specialized irrigation staff. There may however be longer lasting support from the extension staff in the districts.

In this respect it will be good to bear in mind, that the larger the project and the more sophisticated, the longer it will take before the farmers become self-reliant. Moreover the possibility of a staff shortage, and funds to let this staff operate, should be taken into account.

3.4 Financial feasibility

Before a project can be implemented, funds have to be ascertained to be able to carry out the project. These funds will be necessary to run the institution and for the implementation proper. The implementation of small irrigation projects may be financed with DDC funds, but sometimes these funds will not be sufficient.

In this case donor funds will have to be sought to supplement the implementation costs or to implement the scheme. It is however not always easy to interest donors in funding small scale irrigation projects, because some donors think that the sums involved are too small. If however too much funds are poured in, the farmers or the community cannot absorb them. A solution may be to plan clusters of small scale irrigation projects, which may be possible in those districts which have a large potential for irrigation.

The DDC will only fund the real implementation cost, but will not contribute towards the running cost of the irrigation staff who are involved in the planning and design (e.g topographical or soil survey) of the irrigation schemes as well as in the supervision of the construction. All these cost will have to be borne by the Ministry from the recurrent budget and this budget is restricted.

Running costs as transport and operation are in general not included in donor funding and these cost are very high if the works are carried out in direct labour, because in this case the transport of materials may come as a cost to the Ministry. When requests for funding are made it should be ascertained whether this kind of transport cost can be carried by the DDC or are accepted by the donor. Alternative solutions may have to be sought as for example the use of local contractors for the transport of materials to the site.

Any costs made after implementation of the project as for extension services to the farmers will have to come from the Ministry as well. Severe transport problems have made it often very difficult for extension staff to reach the farmers regularly and to provide sufficient advise, especially on organizational and management problems.

In schemes based on a higher level of technology or in larger schemes with smallholders where the required organization is difficult, a prolonged period of extension will be needed. It may be a necessity to seek donor funds for a follow-up period after implementation to be able to guide the farmers over a sufficiently long period to enlarge the chances of success.

4. PROJECT PROCEDURES

4.1 General

When there are no or only a few small constraints, the time required from project initiation until project implementation can be short. One could see this as an accelerated development procedure. However, as soon as there are more severe constraints (when certain conditions mentioned before are not met), additional study will be required to appraise whether the project will work and how and at what cost this will be achieved.

4.2 The project cycle

(1) Project initiation

In the best situation, the idea for the project originates from the local community and has been proposed by an organized group or by the local leaders. The "felt need" by the population or a part of the population, which has been mentioned several times before, therefore features strongly.

(2) Field visit and basic data collection

It is advisable to start with a field visit during which existing data can be collected and a first appraisal of the situation can be made. To facilitate the collection of data, a checklist has been prepared for senior irrigation staff which they can use during the visit. A field visit report should be prepared indicating development possibilities and expected constraints.

(3) Project profile - preliminary report

If it appears worth while to continue, climatic data, river discharges and topographical maps should be collected and analysed. A preliminary project plan and design should be prepared, describing in a broad context, how the project is supposed to work technically and what structures have to be constructed. Furthermore the proposed organizational set-up should be described and it should be indicated whether and how the farmers can manage their scheme by themselves. The report should also indicate which further actions and investigations are needed (incl. cost estimates for the studies).

The farmers' participation, organization and the ability to stand on their own is important. An estimate should be made on the requirement of outside help and over which period of time this help from outside is required after the project has been completed.

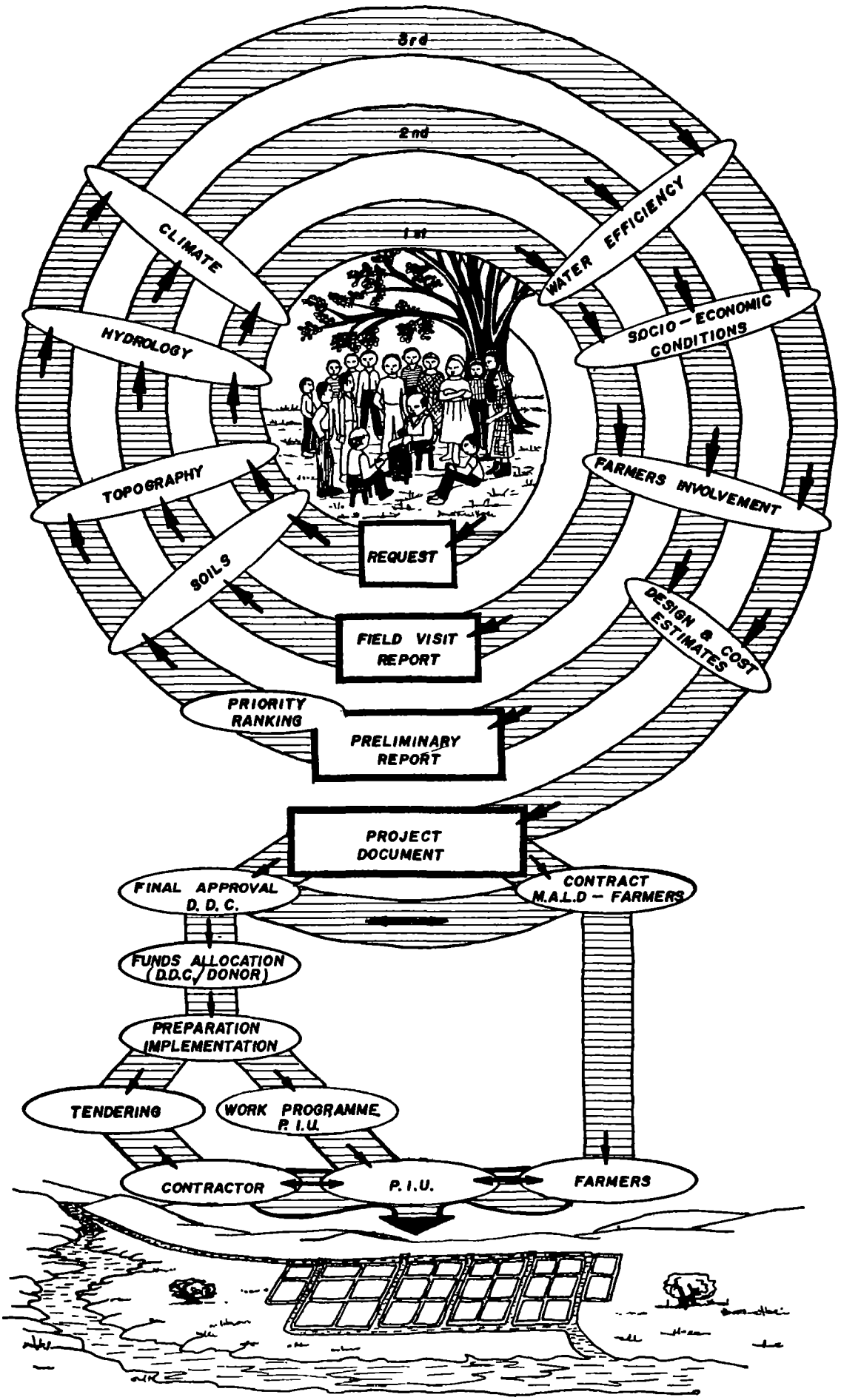

Fig.1: An overview of project procedures to be followed

A preliminary cost estimate has to be prepared, which shows the cost for the technical works, the farmers' contribution and the cost for operation and maintenance. Does the institution helping the farmers have to make considerable cash and manpower contributions after the completion of the project?

(4) Priority ranking

The initial project ideas have most probably been submitted to the irrigation staff in the District or Province via the Divisional Development Committee who may set their local priorities. During the preparation of the project profile it is often worth while to discussions with the members of this Committee. By doing so they may get a better understanding of the possibilities and problems of the proposed project.

The project proposal (profile), can be compared with other development proposals which have been made in the district. A priority ranking can be given. The priority ranking will be made by the Executive Committee of the DDC ideally taking into account the criteria presented in the guidelines for irrigation development and any other relevant criteria pertaining to the district.

It is recommended, that the irrigation staff in the district and province prepare for all smallholder irrigation projects in each district a priority ranking (based on preliminary investigations in cooperation with the Executive Committee), indicating which proposals can be presented to the DDC, for which proposals additional investigations are required before submission and which proposals are better temporarily or completely shelved.

(5) Conditional approval

Those irrigation projects, which have the best chance to succeed, will be discussed first by the DDC. The DDC will review all development proposals made, make any necessary changes to the priority rankings and endorse the portfolio of projects to be submitted to the different ministries.

(6) Final planning - scheme document

The final planning will result in a more detailed project document, including the final design, costing and the different feasibility tests, indicated below:

- Socio-economic; Will the project work as expected and serve the needs of the community?

- Technical; How the project will work, possible constraints, operation and maintenance, organizational set-up.

- Institutional; Who will supervise the construction and assist the farmers? Over what period of time is assistance required after completion of the project and are funds sufficient?

- Financial; Funds available in the DDC, the contribution made by the farmers and donor funds. Distinction is to be made between investments, overheads (during the study and the implementation) and recurrent cost.

The required funds have to be incorporated in the budgets of the ministry concerned. Often the project implementation will not be completed within one financial year. The budgetting should reflect an annual amount, which can be absorbed by the local community and the supervising party.

(7) Final approval

The final project proposals, which should be in compliance with the guidelines of the Ministry, will be submitted to the DDC for their approval. The DDC will forward the proposals, when approved, to the respective Ministries.

(8) Implementation

Project implementation can now begin. In the step by step approach a part of the project will be implemented. When succesful and if the farmers can handle the project, the next step will be carried out. Project plans can be adapted when necessary.

(9) Additional studies

The more difficult the project, the more additional studies are required before one can assume that the project will work. In general such additional studies should be made before the project proposal is submitted to the Executive Committee. The need for additional studies therefore increases the period of time required to start the implementation of the project.

This will be most apparent when a high level of technology is required in the project. It is then vital that the farmers are assisted over long periods and that they have a strong organization before the project is started.

(10) Monitoring

The foregoing does not imply, that additional studies are not required in "easy" projects (if they exist). In this case however farmers are learning while doing. In the phased development approach this is possible. This implies however, that progress has to be monitored and constraints become clear. The monitoring system should be simple and handled by the project fieldstaff and extension staff of the Ministry.