SEAGA Sector Guide: Irrigation

Socioeconomic and Gender Analysis Programme

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SEAGA

Sector Guide:

Irrigation

Seek the differences between the two pictures! - Extension poster for the discussion on women's involvement in the Cidurian Project, Indonesia

Introduction

This document is a guide on the integration of socio-economic and gender issues in the sub-sector irrigation. The guide has been developed in the context of the Socio-Economic and Gender Analysis (SEAGA) programme of the FAO/ILO.

GUIDE PURPOSE

The SEAGA Sector Guide on Irrigation is written for professionals who are involved in the planning, design and implementation of irrigation programmes. It is thus intended for irrigation engineers, members of multi-disciplinary identification and formulation missions, staff of rural development projects, government employees, staff of NGOs, and engineering and consulting firms.

The purpose of the guide is to support participatory planning of irrigation schemes and the integration of socio-economic and gender issues in the planning process. The ultimate aim is to improve irrigation scheme performance, while strengthening the position of rural women and disadvantaged groups.

LESSONS LEARNT

The volume of literature about lessons learnt from irrigation schemes is large. A number of studies has been conducted on the differential impacts of irrigation for various social groups, such as large landowners, subsistence farmers, share-croppers or landless labourers. These studies indicate that irrigation in general has increased agricultural production tremendously, but has benefited large farmers more so than marginal farmers.

Environmental impacts of irrigation have been many and varied. They include health impacts (increase of malaria and schistosomiasis), waterlogging and induced salinity. Land acquisition and resettlement have had some negative social impacts, such as the marginalisation of certain groups and a decrease in nutritional status.

Some of these reports specifically describe the impact of irrigation development on women, as compared to men. Irrigation projects provide some of the most striking examples of project failures caused by mistaken conceptions of the intra-household organization of production.

Women and men appear to have differential incentives for investing time, labour and capital in irrigation related activities reflecting gender differences in responsibilities, their access to and control over productive resources, including water, and the benefits from irrigated agriculture (Zwarteveen, 1994).

However, irrigation development will play an increasingly important role in the future. This guide summarises some of the lessons learnt, both positive and negative, which have been translated into guidelines for future irrigation development activities. The guide provides some practical tools to allow development agents to integrate socio-economic and gender issues into irrigation planning. It is thus a document that complements existing guidelines and manuals on irrigation development.

Practical translation of these guidelines into specific activities will largely depend on the interest and needs among the beneficiaries, women and men farmers, based on their constraints and opportunities. On the other hand it will also depend upon the willingness, motivation and creativity of the user. As each irrigation programme, field situation, region and country differs, not all issues will be relevant for each particular situation. There may also be other important considerations not mentioned here.

THE SEAGA APPROACH & PRINCIPLES

SEAGA stands for Socio-Economic and Gender Analysis. It is an approach to development based on an analysis of the socio-economic factors and participatory identification of women's and men's priorities and potentials. The objective of the SEAGA approach is to close the gaps between what people need and what development delivers. For that purpose three different levels are distinguished: field (household and community), intermediate (structures, institutions, river basin) and macro (legal and national and international policy) levels.

SEAGA Definitions

Socio-economic Analysis:
the study of the economic, social, institutional, political, environmental and demographic patterns, and their linkages, that compose the context for development.

Gender Analysis:
the study of the different roles of women and men to understand what they do, what resources they have and what their needs and priorities are.

Participation:
a process of communication among local people and development agents during which local people take the leading role to analyse the current situation and to plan, implement and evaluate development activities.

The SEAGA approach has three guiding principles:

- Gender roles are key;
- Disadvantaged people are priority;
- Participation is essential.

The SEAGA Package

The Sector Guide Irrigation, which addresses application of SEAGA to the irrigation sector, is just one piece of the complete SEAGA Package. Three Handbooks are available that describe specific tools. **The Field-level Handbook** is written for development agents who work directly with local communities. **The Intermediate-level Handbook** is for those who work in institutions and organisations that link macro-level policies to the field level, including government ministries, trade associations, educational and research institutions. **The Macro-level Handbook** is for planners and policy makers, at both national and international levels. All three Handbooks draw upon the concepts and linkages described in detail in the **SEAGA Framework and Users Reference**.

The SEAGA approach therefore, with its focus on understanding both socio-economic and gender differences in the development process, at the field, intermediate and macro level, is especially appropriate for the irrigation sub-sector.

GUIDE STRUCTURE

The sector guide Consists of two parts. Part A applies socio-economic and gender analysis to the different steps in the project cycle. The second part consist of ten tools that can be used for participatory and gender sensitive irrigation planning. References to these tools are indicated in the text (linkages are indicated as follows: ◘ and the number of the tool). For more in-depth socio-economic and gender analysis, the guide indicates linkages to specific tools described in the three SEAGA handbooks (linkages are indicated as follows: ☞FH = link to Field-level handbook, ☞IH = link to Intermediate-level Handbook, ☞MH = link to Macro-level Handbook).

Part A of the guide follows the four stages of the project cycle: 1) identification/preparation, 2) design, 3) implementation and 4) monitoring and evaluation. Socio-economic and gender implications are linked to each activity and some examples are provided. Each paragraph concludes with a list of key questions to answer during each stage of project development.

In part B ten participatory and visual tools are presented that can be used in the planning and design process. The tools are adapted to an irrigation context and include a short description of the purpose and the process and presents an example. Each tool concludes with a list of key questions to answer while facilitating the PRA sessions.

The guide should be used side by side with other manuals and guidelines on the technical, environmental, economic and institutional aspects of irrigation planning. Some suggestions for manuals and guidelines are provided in Annex 1.

TABLE 1 - Irrigation project development stages and activities

Project stage	**Main activities (Paragraph number)**
1. Identification/Preparation	• Development context analysis (1.1) • Livelihood analysis (1.2) • Stakeholder analysis and participation (1.3) • Collection and review of data (1.4) • Mapping (1.5) • Selection of Technology (1.6) • Available water resources (1.7) • Irrigation Water Requirements (1.8) • Institutional Capacity (1.9) • Options Assessment (1.10) • Comparison of likely Costs and Benefits (1.11) • Achieving consensus (1.12)
Output	**Project goal and purpose defined**
2. Design	• Detailed studies (2.1) • Design choices (2.2) • Water Management (2.3) • Credit/Saving (2.4) • Monitoring indicators (2.5) • Project Costs (2.6)
Output	**Project outputs and specific activities (inputs) defined**
3. Implementation	• Construction (3.1) • Operation and Maintenance (3.2) • Training and Extension (3.3)
Output	**Achievement of the project purpose**
4. Monitoring and Evaluation	• Monitoring (4.1) • Evaluation (4.2)

Part A

IDENTIFICATION / PREPARATION

Development Context Analysis

Development context analysis is the study of the environmental, economic, political, institutional, demographic and social patterns and their linkages, that compose the context for development. Analysis of constraints and identification of opportunities for irrigation interventions must include information about the context for development as a whole. A number of general patterns in the context of irrigation development at the macro, intermediate and field level are described below.

At the **macro** level, the decline in world market prices for staple crops and typically high per hectare capital costs, has resulted in new irrigation development becoming increasingly difficult to justify economically. In many countries the better irrigation sites are already developed, and new projects could be expected to cost even more per hectare than those developed in the past. As existing irrigation systems tend to perform below potential, the emphasis in recent years has shifted from new irrigation development to the **upgrading and improvement** of under-performing irrigation schemes. Nearly 40 percent of the world's food at present comes from the irrigated 17 percent of the total cultivated land. It can be expected that the world's food supply will depend to an even larger extent on irrigation and that water will become globally a scarce resource over the next century. Transition from an era of plenty to a situation of scarcity requires a review of existing policies for water development and allocation among users.

Furthermore the number of female headed households is increasing significantly in rural areas in many developing countries as rural men migrate due to lack of employment and other income generating activities. This leads to a **feminization of agriculture.**

At the **intermediate** level the objectives of structural adjustment policies, economic efficiency and fiscal sustainability, have initiated in many countries a **privatisation** process. Privatisation policies have had a tremendous impact on the irrigation sector in developing countries. The policy often results in i) turning over of the operation and maintenance responsibilities and costs of all or parts of irrigation systems to water users' associations of various kinds, ii) pricing of water on the basis of quantity

and quality used, and iii) establishment of water markets for buying and selling water, both among individual users and the agricultural, urban and industrial sectors (cf. Seckler, 1993). Consequently the role of the government and the involved ministries changes from operation and maintenance of schemes to overall planning, monitoring and evaluation. Projects are also increasingly planned to match local capacity for implementation, which implies specific attention to an analysis of **institutional capacity.**

At the **field** level, intensification of traditional, **low-cost irrigation** developed on the initiative of farmers, receives increased support for its scope to increase food production. Successful implementation requires **participation** in planning and implementation by all stakeholders, in order to create a sense of ownership and consequent commitment to the project. Participation also helps to ensure that the design is appropriate, which will attract commitment because it adequately addresses the various needs of the participants. As part of the privatisation policies, water users' associations are created, and all or part of the operation and maintenance responsibilities are transferred to these organisations[1].

Key Questions for Analysis & Summary

- What are the environmental supports for irrigation development? What are the environmental constraints?
- What are the economic supports for irrigation development? What are the economic constraints?
- What are the social supports for irrigation development? What are the social constraints?
- What are the institutional supports for irrigation development? What are the institutional constraints?
- Is the overall development context favourable for irrigation development? If not, what should change?

Livelihood Analysis

For an irrigation project to have a positive and sustainable impact, stakeholders must be committed to the project, and their priorities should converge with those of the irrigation scheme. Participatory livelihood analysis can assist in assessing farmers' perceptions and likely response to the opportunities of the project, as well as the demands the project may place on them, such as operation and maintenance of the scheme.

1: *Adapted from TCI, 1996.*

People engage in irrigation to secure their basic needs and to earn income; but their activities depend greatly on their access to land, labour, water, markets, knowledge and capital: the main resources in the context of irrigated agriculture. Within any given culture, access to resources varies by gender, age, wealth, caste and ethnicity, and therefore so do livelihoods.

It is necessary to assess the resources available to each stakeholder group, and the constraints they face or that may exist for implementation of an irrigation project. Planners must be aware of resources and constraints at all three levels, in order to determine at each level which changes are needed.

At the **macro** level, international and national policies determine resource availability and distribution, such as Water Resource Policies, international funding and loan agreements, legal arrangements, etc. (☞ MH Policy Process).

At the **intermediate** level, resources, as well as constraints, may include number of field staff, transport facilities, annual budgets, etc. (☞ IH Resource and Constraint Analysis).

At the **field** level, an analysis of the farming system highlights the on-farm activities such as crop production, off-farm activities such as drinking water collection, and non-farm activities such as marketing. It shows the flow of resources to and from the household and who is involved, by gender. (☞ FH Farming System Diagram). In addition more information can be collected on the gender-based use and control of resources within the household, with variation among the different socio-economic groups. ◐ Tool 3 Task Analysis by Gender and ◐ Tool 4 Access to and Use of Resources included in Part B of this guide may be useful in this process. (☞ FH Resource Picture Cards).

Key Questions for Analysis & Summary

- What is the place of irrigated agriculture in relation to rain-fed agriculture and livestock: share of income from each, average acreage, role in provision of household food security, intra-household allocation of resources?
- What is the involvement of women and men in irrigated and rainfed agriculture, across different socio-economic categories?
- Summarise women's and men's use and control of resources and benefits. How do they compare? How do resource patterns from the different social groups compare?
- Can households afford to adopt the proposed technical packages?
- Are assumptions about labour availability consistent with what is known about the gender division of labour and migration?
- Can the returns from proposed technical innovations compete with those of

Stakeholder Analysis and Participation

The planning of new irrigation development or upgrading of existing systems is increasingly based on the process of stakeholder participation. A stakeholder is anyone who has a direct or indirect interest in, or is affected by or can affect the outcome of, irrigation development. A stakeholder approach to irrigation development requires an understanding of priority problems and recognition of the stake of all participants in achieving success. Stakeholders may be identified through answering the questions: who has or needs resources, like land and water, who is affected by the use of these resources by others, and who influences decisions about these resources? (☞ FH and ☞ IH: Venn Diagram of Stakeholders, ☞ FH Stakeholder conflict and partnership matrix; ☞ MH: Stakeholder analysis).

A key stakeholder in many irrigation programs is the government, as a primary decision-maker and implementor of policies. Officials from a core ministry, such as Irrigation or Agriculture, and from other levels of government, including state or provincial authorities and local or municipal level officials virtually always have a stake.

Many individuals or institutions may be indirectly involved or affected because of their technical expertise and private interest in irrigation policies and programs. Or they may be involved through linkages to those who are directly affected. Such stakeholders may include NGOs, various intermediary or representative organisations and private sector businesses.

Those directly affected by a proposed intervention are clearly among the key stakeholders. They are the ones that stand to benefit or lose from irrigation programs. They may include subsistence farmers, commercial farmers, land owners, tenants, cattle-herders and other water users. The poor and marginalized, women and men, are among these groups. In most irrigation systems, few women have official rights to land and water, which is why they are seldom identified as key stakeholders.

The priority constraints that stem from the current situation can be identified. Priority problems of women and men may differ, but also overlap. Similarly, the priority needs of members of different socio-economic groups may partly differ, and partly overlap. ◐ See Part B for Tool 7 Problem Ranking and Problem Analysis Chart. (☞ FH Pairwise Ranking, Problem Analysis Chart).

All different stakeholder groups should participate actively in discussions, to raise priority problems that concern them specifically, in the interest of achieving greater efficiency and equality. However, often there are specific restrictions which often prevent women farmers, and especially female heads of households, and marginal groups to voice their opinion in stakeholder consultations. These need to be recognised and

strategies developed to tackle them in order to facilitate their participation from the early stages of the planning through implementation.

In the rehabilitation of Bauraha Irrigation system in the district of Dang in Nepal, women farmers were not involved in the planning and the design of the rehabilitation activities. The result was a male-dominated problem identification, i.e. the high labour requirement for maintenance and repair. The constraint identified by women, i.e water-shortage that resulted in competition for water with male farmers was not considered. Consequently the project replaced the brushwood intake structure by a solid trashrack-intake, that would require less maintenance in future. Although the intake could easily have been expanded to increase the water flow, it was built with exactly the same dimensions (Bruins and Heijmans, 1993).

Contributions from members of marginalized groups may need to be especially sought. Some methods for ensuring their participation are: to form separate groups by gender, socio-economic group or age; to ask uninvolved observers whether or not they agree with what is being said or by engaging a dominant person in a conversation away from the group.

In most cases it can be assumed that women farmers, especially women heading their households and women from poor households, need and want a secured and independent access to land and water.

Key Questions for Analysis & Summary

- Who are the stakeholders having a stake in the planned irrigation development? How big is their stake?
- What are the priority problems identified by women? By men? What are the different problems identified by the socio-economic groups?
- What are current coping strategies? What are the gender implications? E.g., women go further and further to fetch water.
- Are there conflicts among the stakeholders? Are there existing partnerships between stakeholders?

Collection and Review of Data

Data collection normally consists of gathering existing, or secondary, data. However, a constraint is that existing data often lack sufficient detail about gender and other important socio-economic variables. Own data collection efforts in the form of surveys, case studies and rapid or participatory appraisal techniques may be necessary to supplement existing data. In part B of this guide ten tools are included for data collection in a participatory and visual manner at community level.

A proper planning of data collection starts with answering the question: what do you need to know? Secondly, planning of the processing and analysis of the data should include both the required time and capacity.

Methods for triangulation of information must be used in order to cross-check information for accuracy. Information may be collected from different sources and different groups of people, or several different tools can be used to gather information on the same issue.

For development of new irrigation schemes the following information may be required, in addition to technical data[2]:

- details of existing land use, farm size, land tenure and water rights for both women and men farmers;
- demographic data, disaggregated by sex, age and ethnicity;
- number of male and female headed households;
- farming system: local agricultural and livestock production systems data, including crop yields (for rainfed and irrigated crops) and technologies used, for both women and men farmers and households from different socio-economic groups;
- the gender-based division of labour for the different crops;
- resources used by women and men, and households from different socio-economic groups to carry out their activities;
- assessments of market and price prospects, and access to these markets for women and men;

In the case of an existing irrigation project that is being considered for rehabilitation and upgrading, in addition to the above, the following information may need to be collected:

- the social history of the scheme;
- the impact of the irrigation scheme on different socio-economic groups and women and men farmers;
- existing cropping patterns, yields and trends, for both women and men farmers of different socio-economic groups;
- existing allocation of land within the scheme, female and male landowners and female and male land users of different socio-economic groups;
- water allocation to, and use within the scheme, with an assessment of efficiency, for both women and men farmers of different socio-economic groups;
- farm income and off-farm employment data, by sex;
- organisation and management structure of the irrigation scheme, gender-disaggregated; and

2: *Adapted from TCI, 1996.*

- constraints faced by women and men (technical and organisational) that influence scheme performance and benefit distribution.

Only part of the above information is likely to be available. Specific studies and surveys may be required. Apart from collecting information on the current situation, insight should be gained about ongoing processes of change. This can be obtained through collecting the above information for different periods in time, e.g. 20 years ago, 5 years ago and the present situation. ◐ See Tool 5 Trendlines in Part B (☞ FH Trend lines).

Also, some insight could be generated in possible impact of the irrigation activities, and farmers' expectations and attitudes. The following hypothetical questions may be asked:

- If water supply would increase, how would this change their cropping pattern? What other changes can be foreseen?
- What is their interest in participating in water users associations?
- What is their ability to pay water fees?

Key Questions for Analysis & Summary

- Is the existing information disaggregated by gender and by other important socio-economic variables? If not, what information is lacking?
- What method is most suitable to collect the missing information?
- Is the information collected from the different sources and methods accurate? How can contradictory findings be explained?
- What is the percentage of female headed households for the different socio-economic groups? Is their number growing or decreasing? If so, why?
- Is there a need for further socio-economic study? If yes, what should be the scope and focus?

Mapping

Existing maps and aerial photographs are intensively used in the irrigation planning process. In addition, women and men farmers' detailed local knowledge could be mapped for information for example on:

- existing water sources and water use;
- hydrological units and drainage system;
- agricultural lands , crop varieties and locations; and
- soil characteristics.

The primary concern is not with cartographic precision, but with getting useful information about local perceptions of resources. Maps can for example be produced of a village, an irrigation scheme, a swamp area or a

watershed. ◐ See Tool 1 Resource Mapping in Part B. (☞ FH Village Resource Maps, Transects).

Key Questions for Analysis & Summary

- What is local people's opinion about the water sources and soil condition? What is their opinion of the historical trend?
- Is the map produced by villagers identical to the official maps? Are there differences? How can these differences be explained?
- What new information results from the local level mapping and consultation?

Selection of Technology

The type of irrigation technology selected needs to correspond with the practical situation of women and men farmers. During selection of a certain irrigation technology, all handling and maintenance requirements need to be realised, to ensure that the technology is matched to the operational capacity and strength of both the male and female users. This can best de done in close consultation with the users, to avoid decision-making based on pre-conceived and possibly mistaken ideas.

Technology selection must take into account the following criteria to be appropriate for both women and men farmers:

- investment costs in line with farmers' financial means, including availability and access to credit (for women/men);
- investment costs that consider farmers' returns (women/men);
- the available cultivable area (women/men);
- type of crops to be grown (women/men);
- amount of labour required, amount of labour available (women/men);
- maintenance requirements, expenses for spare parts, availability of spare parts;
- the durability of the technology;
- physical strength needed for operation (women/men).

In Zimbabwe women adopted sprinkler irrigation and they were among the first to acquire a good knowledge of it. However the inconvenience of sprinkler irrigation for them was that it required frequent moving of heavy sprinkler laterals and thus permanent presence for the women who live far from the schemes (Chimendza, 1989). Recognising these problems, the sprinkler laterals were successfully replaced by drag-hose sprinkler systems. Drag hoses do not require frequent moving and are much lighter to handle.

A greater acceptance of a certain technology will benefit more farmers and help realise a project's full potential.

Key Questions for Analysis & Summary

- Is the type of irrigation technology matched to the operational capacity of the users, in terms of demands on physical strength, maintenance requirements, time needed,

Available Water Resources

The volume of water reliably available for irrigation should be determined. After establishing the hydrological availability, the suitability of the water sources and competing water needs within the basin should be assessed.

Suitability Of The Water Source

In determining the suitability of the different water resources a consideration is the distance from the irrigated fields to farmers' homesteads. Whether a certain distance is acceptable to both women and men farmers could be discussed in meetings. The quality of the water also determines the suitability of the water source.

Competing Water Needs

In addition to the irrigation water requirements, the estimated need of water for other purposes, for example drinking water for humans and cattle and irrigation of homestead agriculture and trees, should be considered in the calculations to avoid possible conflicts between different water users. Also important is to identify and anticipate hydrological, infra-structural and social linkages between the different uses of water (☞ FH Village Resource Map). ◘ Tool 6, the Water Use matrix in Part B of this guide analyses the different sources of water and their relative importance for the various uses.

Apart from quantifying the **amount** of water to be used for different water uses, the **timing** of water provision needs consideration. Non-irrigation uses require a different, often more frequent, timing than irrigation uses. Further the **quality** of water is important, especially when used for drinking water. A health impact of an irrigation scheme may be the depletion or pollution of groundwater, in many areas used for drinking water and washing.

The watering of livestock needs to be seriously included in the overall water plan. Livestock might be competing for scarce water, and might be equal or more important for people's livelihoods than irrigated agriculture, thus deserving priority when water is scarce.

A water crisis is increasing throughout the Usangu plains of Tanzania. The decreasing supply of water is caused by degradation of the upper water catchment area, combined with upgrading and expansion of traditional irrigation schemes, a high influx of cattle (estimated now at one million cattle heads) and a growing population in the plains.

In the Mahango scheme, FAO has assisted in the construction of an intake in a small river for the irrigation of women farmers' fields. In 1995, and again in 1996, a serious water management problem arose, not within the village, but with the village downstream whose inhabitants are predominantly cattle herders. In the dry season there is not enough water for all the different user groups. Conflicts centre around the gates that control the water flow; gate handles have been stolen, the gate has been demolished. The downstream villagers are in the process of digging upstream from the intake a deep trench that will divert the water to their village. As a result no crops were cultivated during the 1996 irrigation season (Jordans, 1997).

In discussion with stakeholders all water uses need to be discussed and a preferential ranking needs to result in a comprehensive water use plan. Important to guarantee is also the **reliability** of the water source, especially for drinking water.

Two dimensions need to be addressed: the identification of means to address differences in need and priorities that arise from differences in the activities and responsibilities; and the identification of opportunities to address inequalities in access to and control over water resources (SIDA, 1997).

Key Questions for Analysis & Summary

- Is the irrigation scheme planned at a reasonable distance from the villages?
- What are the different water sources in the area? Is the water availability from these sources increasing or decreasing over the years? If so, why?
- What are the different uses of water in the area? What amount? What timing? Is quality and reliability important? If yes, why and how?
- How can the competing uses of water be combined?
- How much can people afford to pay for water fees?
- Do all socio-economic groups, women and men, in the area have equal access to water? Which groups have a constrained access? How could their access be

Irrigation Water Requirements

For new irrigation developments, estimates of irrigation requirements need to be assessed for the range of possible crops and planting dates being considered. Calculations of irrigation requirements is done from climatic and crop data, if necessary these can be verified using computer

programmes. The following considerations should be kept in mind while making assumptions on cropping patterns, including planting and harvesting dates, and calculations of peak water use.

Cropping Pattern

It is usually best when schemes are designed to allow for production of different crops instead of for mono-cropping. Crop diversification allows women and men farmers to spread their work-load. Crop diversification also caters to the need for small farmers to minimise risks, satisfy household nutritional needs and flexibly respond to market demands. ◘ See tool 2 Seasonal Calendar in Part B (☞ FH Farming System Diagram, Seasonal Calendar).

Where women are responsible for different irrigated crops than men, they may also have different water needs regarding quantity, frequency and timing. These various water needs must of course be reflected in the design, the cropping plan and consequently in the water requirement calculations.

> Overall scheme performance can be negatively affected if women are not consulted on water schedules for different crops. Women farmers in Pak Cheng in the Mekong Irrigation Programme in Lao PDR stated that in the last dry season their second harvest of cucumbers was damaged because the water supply was stopped too early. A second vegetable crop was not listed in the cropping calendar and thus not included in the water rotation plan (MIP, 1991).

Peak Water Use

The peak water need is often calculated by engineers with the objective to minimise water use leading to a maximum area to be irrigated. Resulting designs are, for example, based upon the assumption that maximum use is going to be made of the available rainfall by the farmers, resulting in a certain planting date. This will for example result in a scheme that prescribes the time to start the irrigated production, and requires that farmers adopt the system of transplanting in case of rice farming.

In practice, farmers might have a different objective, like minimising labour peaks or distributing their time and energy over irrigated and rainfed agriculture. With that objective in mind, farmers may not want to work in irrigated fields at times when it is raining, as that is the best time to work on rain-fed fields. They may also not be able to adopt transplanting methods as this requires more labour than broadcasting (☞ FH Farming System Diagram, Seasonal Calendars).

In the Jahaly-Pacharr project in the Gambia water requirement calculations started from the assumption that the peak water use should be as low as possible. This resulted in a cropping calendar based on transplanting, optimal use of the rainfall and a peak water need that does not coincide with the land preparation period. Women farmers strived to minimise labour peaks, resulting in broadcasting of rice and a tendency to perform most tasks in stages, like weeding and harvesting. This resulted in more water use and at different times than the scheme was designed for (van Hoof, 1990).

The net effect of taking certain constraints, e.g. labour, into consideration may be that peak water use is higher and thus a smaller area can be irrigated.

Key Questions for Analysis & Summary

- Will farmers be able to grow any crop they want, or are there certain restrictions? If so, why?
- What are the periods when there is labour shortage due to competing activities? How will this influence people's allocation of labour to irrigated production?
- What effect will this have on water need, and thus on peak water use? Would this lead to a reduced maximum area that can be developed?

Institutional Capacity

In recent years increasing emphasis is placed on participatory planning and implementation of irrigation schemes and on management transfer. Irrigation institutions need to transform from execution and operation and maintenance, to a more coordinating and facilitating role.

To estimate institutional capacity for integration of socio-economic and gender issues and participatory irrigation planning:

- assess at the macro and intermediate level the capacity of irrigation and agricultural service institutions to work in a participatory manner with all different groups of stakeholders;
- assess their motivation to work with and support male and female farmers and farmers from resource poor households;
- identify constraints and propose remedies, such as training of existing staff or recruitment of additional staff;

Namibia's Ministry of Agriculture, Water and Rural Development has over the past few years trained agriculture extensions workers to use a participatory approach to "The Analysis of Difference" with technical support from FAO. The emphasis was on learning about communal /farmers' activities, resources, needs and priorities, and how these differ by gender, age, wealth, ethnicity and farming system. Some extension workers were selected to become trainers themselves. As a result, most Namibian extension workers will be trained on the basic concepts of gender analysis and participatory methods (Wilde, 1996). The training in the "Analysis of Differences" will become a compulsory component of the Annual In-service Training Programme, as indicated in a letter from the Permanent Secretary of Ministry of Agriculture, Water and Rural Development dated September 6, 1996.

- assess at the field (scheme) level the opportunities and constraints for establishing or strengthening WUAs for new or rehabilitated schemes, and the opportunities for various social groups, and women and men, to actively participate in decision making processes.

An analysis of the performance of existing local institutions could serve as an indicator for capacity and indicate fields for improvement (☞ FH Institutional Profiles and Community Capacity Building).

Key Questions for Analysis & Summary

- Are the concerned institutions able to coordinate a participatory planning process?
- What is the attitude towards women farmers, and farmers from disadvantaged groups, among the extension staff?
- What is needed to improve their ability to support the different needs of the various socio-economic groups?
- What mechanisms or committees for water management and control exist?
  How many women and men are members?
  Are the chairman and secretary women or men?
- How can these local water management systems be strengthened?

Options Assessment

On the basis of an initial review of the data collected so far, and stakeholder consultations, a preliminary assessment of the various options for irrigation development can be made.

Options can be compared on their impact on agricultural productivity, stability, sustainability, and equitability. Further criteria could be the cost, the feasibility and the time needed for implementation. ◐ Tool 8, Options Assessment Chart, in part B of this guide can be used.

Key Questions for Analysis & Summary

- Are certain options more favourable to women? To men? To certain socio-economic groups?
- Will there be losers and winners? Who will benefit? Who will not benefit?

Comparison of Likely Costs and Benefits

The main aim at this stage is to compare the likely social, financial and economic performance of the available options, to confirm that these are likely to be attractive to, and adoptable by most farmers, and to support the selection of preferred options.

Estimates Of Project Benefits

Assessments should be made of the key parameters of yield expectations, cropping intensities, and prices for inputs and outputs resulting in a simple farm model. Typically the benefits to all project beneficiaries are aggregated together, but techniques can be applied to disaggregate the benefits by different types of individuals. For example, an irrigation project may increase the value of land within the project perimeter. The benefits can be disaggregated between women and men on the basis of the proportion of land owned by each sex. (☞ MH Project Analysis).

It is important to base estimates of yields and cropping intensities on the estimated amount of labour and other resources that will be devoted to the irrigated production. In producing the farm model, the assumption that households pool all resources of land, capital and labour, and allocate resources where they are most useful to the household as a whole, must be avoided. Instead, it must be recognised that male and female members within farm households may have shared, separate and conflicting interests, and may wish to use resources in different ways.

An irrigated rice project in North Cameroon failed to attract sufficient farmer interest, with the result that about a third of the developed area remained uncultivated. A contributory cause was the inability of the project to adjust to intra-household conflicts between women and men with regard to labour allocation, control of crops and monetary rewards (Jones, 1986).

In estimating the benefits it is important to assess the market and price prospects, to establish that market openings exist or can be opened up for the incremental output expected to result from the project, and how this will impact producer prices. Note should also be made of the adequacy of crop processing practices, distribution and storage facilities, as well as the presence and current utilisation of agro-industries.

The distribution of benefits is also critical to watch. If most benefits accrue to certain individuals, such as large landowners, local politicians, men, while other groups lose out, such as marginal farmers, female headed households and certain ethnic groups, the overall impact may be negative. It is however increasingly recognised that poverty and unemployment arising out of the unequal distribution of benefits will compromise sustainable growth, and should thus be avoided.

Preliminary Cost Estimates

Capital and operating costs should be estimated. As a result of privatisation processes it is expected that farmers will pay part of construction, operation and maintenance costs. It is important to consider whether the level of farmer contribution and water fees are reasonable. Unreasonable high costs could lead to the selection of other technologies that are cheaper to construct, operate and maintain.

Key Questions for Analysis & Summary

- What are the main benefits of irrigation development for each socio-economic group, and for women and men?
- Are there groups that do not benefit at all? Are there groups that will be affected negatively? How are these groups going to be compensated?
- What incentives are needed for each socio-economic group, and women and men, to invest resources in irrigated agriculture?
- What is the domestic and export demand and market prospects for irrigated crops?
- What are the implications of the current marketing system for potential cropping patterns?
- How is marketing of agricultural produce carried out?
  What is women's role herein? And men's?
- Do appropriate post-harvest technologies and facilities exist?

Conclusion: Achieving Consensus

The output of the identification and preparation stage as described in the above paragraphs will lead to the definition of the project goal and purpose.

Irrigation may be a feasible option if there is a broad base of support, substantial pressure for agricultural change, and it is among the top priorities of many of the stakeholders identified. Consensus at the macro-level is required to assure that irrigation is a justifiable option for use of available water in a particular area according to the national or regional Water Resource Policy plan, and consequent water rights will be guaranteed (☞ MH Types of Policies).

At the intermediate level, institutions are responsible to implement the policy decisions taken at macro level, as well as to incorporate the priorities and plans of women and men farmers. They form the link in the decision making process, and instrumental to reaching a consensus.

At the field level, within the communities concerned, the whole process of participatory irrigation planning needs to result in a concrete and realistic goal and purpose, meeting the needs of both women and men (☞ FH Preliminary Action Plan, Best Bets Action Plan).

It is often desirable to conclude the identification/preparation phase by holding a workshop, which should be attended by as many stakeholders as possible. The objective should be:

- seek opinions from the stakeholders, to arrive at or advance towards a consensus on the project goal and purpose
- discuss the work involved in further design, the responsibilities for undertaking this, and to agree to a time-frame for the work.

Key Questions for Analysis & Summary

- What consensus is reached on the irrigation project goal and purpose?
- What activities need to be implemented in the design stage? Who will do this?
- How will further stakeholder participation be organised?

DESIGN

The challenge of the design stage is to ensure that the design reflects the views expressed by the different groups of participants. Modern irrigation design criteria are, amongst others intended to:

- match design to users' wishes, because irrigation is a service to farmers, which should be as convenient and efficient as possible;
- complement the organization of labour;
- allow for freedom of crop choice; and
- optimise local decision-making of technical issues such as site, plot size, methods of field irrigation and number of participants, using participatory approaches in the context of local farming systems and conditions (Wolter and Burt, 1997; FAO, 1996).

In addition the design should ensure that it is:

- institutionally workable;
- unlikely to result in any adverse social impacts without adequate compensation; and
- technically, environmentally and fiscally sustainable;

A translation of information into **project outputs** and specific **activities** or inputs to be implemented is needed, through a continuation of the participatory planning process. Provided that the planning and design process is truly participatory, and all socio-economic groups and women and men have an equal say, it is more likely that gender aspects will be better integrated in irrigation programs from the early stages of the design process (Facon, 1995).

Detailed Studies

More in-depth socio-economic information is required in order to be able incorporate socio-economic and gender issues into the design of the project. Depending on the nature of the project the following studies and surveys may be required.

Socio-Economic And Production Systems Survey

This survey is used to verify the assumptions underlying the project, as well as any perceived problems, priorities and areas of convergence/divergence between government and the intended users. The survey should assist in assessing the farmers' perceptions and likely response to the opportunities and demands of the project. The survey may employ rapid rural appraisal techniques and should be a continuation of the participatory planning initiated during the identification/preparation stage (TCI, 1996). The should thus supplement the data collected during the identification/preparation phase. The investigations should be designed to establish, amongst others:

- the extent of farmer interest in the project and implications for project planning; problems, constraints and means of overcoming them, from the farmers' perspective;
- gender relations and disaggregation of labour; access to and control over land, labour and capital; control of crops and income from their sale;
- the household economy;
- conflicting or competing demands for labour;
- the likely impact of the project on any of the above;
- the scope for cost recovery, including contributions towards capital costs and recovery of O&M.

Land Tenure And Water Rights

The existing arrangements, customary or otherwise for land tenure and water rights should be examined in detail. This should establish whether there might be any obstacles to successful implementation, such as lack of secure tenure or water rights, which could inhibit participatory development and capital cost contributions by the users. There may also be a need to examine and inventorise water rights (TCI, 1996).

The land tenure and water rights arrangements should be examined for each socio-economic group, and for women and men. If there are differences in access to land and water between these groups, or between women and men, it should be assessed what will be the effect on the implementation of the irrigation programme. It could also be assessed vice versa: what impact an irrigation project may have on existing land tenure and water rights arrangements in the area.

In situations with **existing land ownership** patterns the participants in the scheme are partly determined by landownership and by the topography that determines the command area. Landless people and farmers who own land too far away or on high areas are thus excluded. Participants will thus most probably be landowners from various socio-economic groups with land in the command area. However, there is some scope to involve those excluded through redistribution of land ownership or arrangements for leasing or share-cropping of land.

On the other hand, many large irrigation or resettlement schemes are planned in areas with **no previous land ownership** patterns. In those cases newly developed irrigation plots need to be allocated, or sold, to farmers. Equality considerations are important in these situations. Existing land legislation and customary rights related to land use, as well as national policies on land tenure, need to be examined and followed. For example in Tanzania an Amendment to the Land Law in 1997 guarantees equal access to land for both women and men.

Strategies identified to promote more equitable access to water and irrigated land for women and men could, depending on the local situation and in coordination with the community, include measures to:

- conduct more in-depth research into the local legal position of women and men concerning their access to and control over natural resources;
- support national, regional and local advocacy groups that aim to enhance and enforce legal rights of women;
- provide legal education to women and men, as well as government and other organizations' staff;
- allocate irrigated plots to women identified as heads of farm households;
- put the title to irrigated plots in joint names of the couple or divide family land between husband and wife/wives with individual titles;
- promote collective land and water rights for women, especially for women from marginal groups;
- stimulate organization of women groups to claim and protect their rights; and

- pay attention to measures that secure the land and water rights of women in male-headed households, so they are able to continue to farm the land upon the death of the husband or after divorce (Fong and Bushan, 1996, Benda-Beckmann et al., 1996).

With irrigation increasingly a private investment, access to capital becomes a determining factor for access to land and water. Water markets are being established where water is for sale. A strategy to increase women's access to land and water should comprise the increase of their access to capital and credit. In addition, access to capital and credit is crucial for a productive use of land and water, once rights are established and influences the ability to control land on the long-term.

Proper compensation mechanisms need to be developed and implemented for people who:

- will be displaced, because their land or houses will be flooded by a reservoir, or their land will be needed for construction of embankments, canals and roads;
- whose livelihoods, trade or occupation will be adversely affected, e.g., cattle herders, women farmers who used to produce vegetables on wetlands following the rainy season.

It should be made sure that the description of 'affected people' includes all categories of people, not only landowners, but all land users, women and men, adult children, etc.

It is considered normal practice to register plots in the name of the head of the household, the majority of whom are men. However, a number of studies in Africa suggest that individual plots might be more efficient, as allocation and registration of irrigated plots to men appears to be one of the main causes for the disappointing performance of irrigation projects in West-Africa (e.g. Carney, 1988; Dey, 1990; Jones, 1986).

The Dakiri irrigation system is one of the few systems in Burkina Faso where women obtained irrigated plots on an individual basis: 60 women (or 9% of the total number of plot-holders) have an individual plot. Most of their husbands also have plots. A case study carried out in 1995 showed that both the productivity of land and the productivity of labour are higher where both men and women have a plot, than households where only men have been allocated plots. The study further shows that women are equally good or even better irrigating farmers as men, while their motivation to invest labour in irrigated production significantly increases when they have their own irrigated plot (Zwarteveen, 1996).

Thus specific attention needs to be paid to documenting land rights, especially of vulnerable groups and female heads of households. Also securing the rights of women in male-headed households to continue farming the land on the death of their husbands or after a divorce needs attention. This is especially important to offset the occurrence of 'property grabbing', whereby in-laws or other groups in the community obtain the property of widows or vulnerable groups. Where there is much resistance to land rights for women, a first strategic step can be the allocation of land to groups of women.

A discussion should be started with the farmers, village councils and government representatives on the allocation of plots on an individual basis as compared to a household basis. Consequently a decision needs to be taken on an equitable and efficient plot distribution.

Key Questions for Analysis & Summary

- What is the existing land tenure pattern in the area? Are inheritance patterns matri-lineal or patri-lineal?
- How are water rights obtained and distributed?
- What equality measures are needed? Will newly developed land equally distributed? On what basis will land be allocated? Will some groups be privileged over other groups?
- Are previous users of the land compensated?
- Have provisions been made for female headed households and women in male-headed households to obtain land titles? Have provisions been made for women to register as tenants on the death of their husbands?
- What is men farmers' preference: household plots or individual plots? What is women farmers' preference?
- What is the most equitable and efficient plot distribution?

Design Choices

In each irrigation scheme design several 'technical' issues need to be decided upon. Increasingly, it is considered best to decide technical issues, such as plot size, infrastructure lay-out and facilities for other uses through participatory approaches.

Important thus, is that draft designs need to be prepared, presented and discussed with the stakeholders at various stages, in order to arrive at a design that is acceptable to them. Some of the following issues could be discussed.

Size Of Plots

As indicated above, the feasibility of 'family plots' that utilise all available family labour must not be automatically assumed. Calculation of an optimal plot size needs to take into consideration the actual division of labour, access to the income as well as competing demands for labour for other farm and household enterprises. Women and men farmers need to be consulted on their opinion on the optimal plot size.

Important is to design for plots of different sizes, or possibilities for subdivision, to increase flexibility of the system.

Infrastructure Layout

Final decision on canal lay-out, drains and feeder roads should be based on consultations with all participants. All landowners as well as land users must be present in meetings on infra-structure lay-out, as land may need to be acquired for construction. Equally all landowners and users must be informed of, and benefit from, the compensation mechanisms if land or homesteads are lost due to acquisition by the irrigation development agency.

A survey in the Mekong Irrigation Project in Laos found that a quarter of the plots in the irrigated area were inherited and managed by women. However women did not attend meetings where the design of the canal system was discussed, even though in these meetings it was decided through whose plots to construct the canals. Had they been able to be present, female landowners might have been able to influence the canal lay-out decisions, as well as know more details about compensation processes (MIP, 1991)

Design For Other Uses

- **Drinking water:** In cases of groundwater utilisation for irrigation, for example two wells could be constructed or drilled simultaneously: one for irrigation and one for drinking water, for hygienic reasons and convenience. Otherwise facilities could be made that water can be drawn from the same well in a hygienic way. Important to guarantee is the reliability of the drinking water well, especially in the dry season when all irrigation wells are running at full capacity.

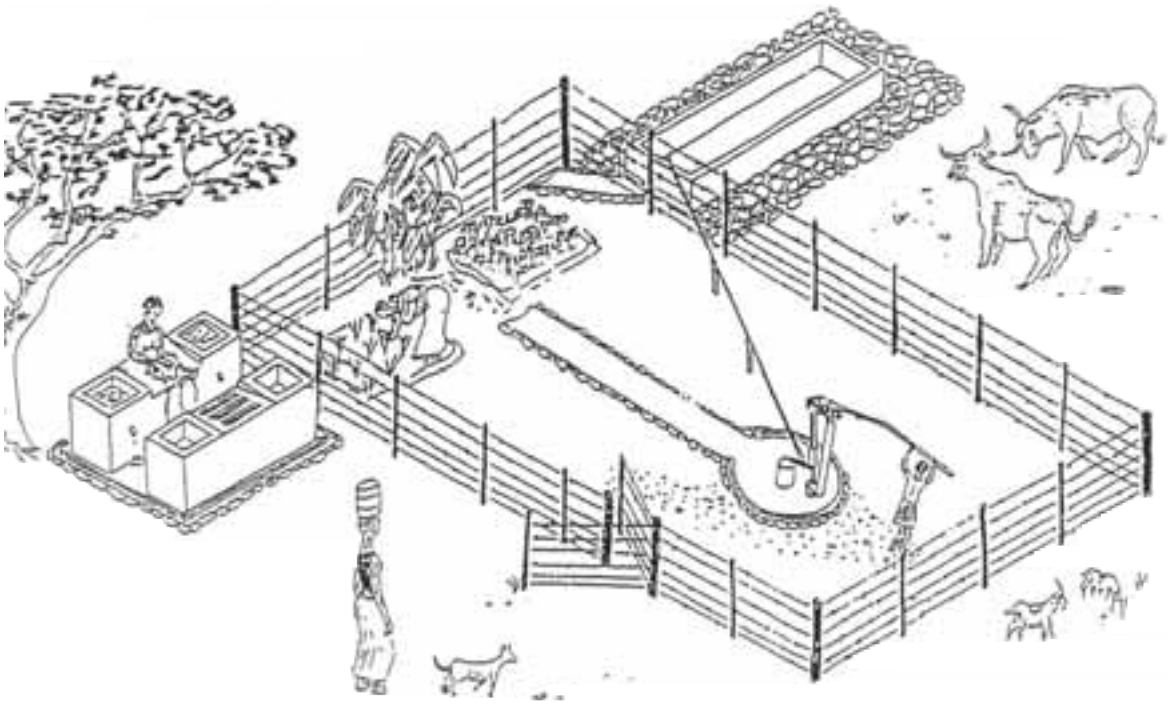
- **Irrigation of homestead agriculture/trees:** possibilities could be studied to construct extra inlets or pipe connections to facilitate and optimise homestead and tree production.

- **Livestock:** It can be expected that small animals and livestock are attracted by irrigated areas because of the abundance of water and weeds growing around irrigation and drainage canals and irrigated fields, in an otherwise dry area. Therefore it may be wise to study and

plan some permanent structures for livestock watering, for example concrete or metal water troughs that are filled automatically. Additionally access routes may have to be planned to allow livestock to move freely between their usual grazing grounds and the watering places. In addition fencing might be necessary. It can also be studied whether there is land/water available to irrigate fodder crops. These measures might avoid part of the disturbance expected to be created by the animals.

- **Washing of clothes and utensils and bathing:** Possibilities could be studied to construct special washing sinks, slabs or other constructions to facilitate washing activities, if possible also the bathing of livestock. In addition, steps could be constructed at a few places to make it easier to reach the water level in the main canals.

The picture for Zimbabwe shows multiple water uses combined in an effective and hygienic way



Source: (DANIDA/DDF, 1988).

Key Questions for Analysis & Summary

- In determining the plot size has the household pattern of labour allocation and distribution of benefits be taken into account?
- Have all stakeholders participated in decisions on the infra-structure lay-out?
- Does the design cater for multiple uses of the water?

Water Management

A proper design of the technical and social water management structure is a crucial step in the design of an irrigation scheme. Water management includes the design of a water delivery system, and social organisation of water management, e.g., through Water User Associations.

Water Delivery System

Apart from the actual water availability and technical considerations determining the optimum water delivery system to efficiently irrigate all plots in the scheme, the planning of irrigation schedules could take into consideration the following issues.

It should be kept in mind that irrigation schedules must be simple, in particular in irrigation schemes where many farmers are involved. It will often be necessary to discuss with the farmers the various alternatives and come to an agreement which best satisfies all parties involved (FAO, 1989). Important to guarantee is that in these discussions all groups of farmers, small and large, head-end and tail-end, women and men, are properly represented.

On-demand water delivery ensures the farmers an adequate and timely water supply, in cases where water is not a limiting factor. Given the work load of women in agricultural activities, on-demand rotation is often convenient for them in terms of flexibly planning their work. A disadvantage might be that influential, male irrigators can better defend their interests than vulnerable or female irrigators, whose 'demand may not be heard'. Especially during peak periods such as land preparation or transplanting, less influential farmers, notably women farmers, could have problems to secure their water turn.

A woman farmer in the Bauraha Irrigation system in the district of Dang in Nepal described the period of peak demand as follows: "When I want to transplant my rice I have to go to the water distributor and ask him for water. I have to convince him and all the other male farmers that I too need water. It is difficult for me to get my turn. For us, the women, this is a major problem" (Bruins and Heijmans, 1993).

A scheduled water delivery or rotation system has the advantage that it guarantees a regular supply of water to each plot, although timing might be less convenient and quantity not always adequate, especially in the tail-end of the scheme. If possible a design that plans for night irrigation should be avoided, as especially for women it might not be socially acceptable or dangerous to go out at night for their irrigation turn. During planning meetings with the farmers these issues need to be discussed, and a decision reached on what type of water delivery suits everyone best.

In a scheduled rotation system it is crucial for all groups of farmers to have access to information regarding the timing of their water turn. Women may have less access to this information than men. Not having access to the right information results in sometimes losing all, or part, of their water share.

Water Users Associations

In the context of privatisation processes and decentralisation, irrigation management transfer entails the turning over of operation and management responsibilities from government agencies to the private sector, in practice very often to water users' associations (WUAs) or water companies.

In most irrigation projects women appear to be virtually absent from water users' groups, or if they are members they may not have much decision making power, even in situations where their role in water management and use is very substantial. This is partly because membership is often confined to one member of each irrigating household, either the official landowner or the 'head' of the household. Both landholder and household head criteria apply to men more often than to women (Zwarteveen, 1995).

An IIMI study of a farmer-managed irrigation system in Nepal showed that the discrepancy between women's involvement in irrigated agriculture on the one hand, and their absence in water users' organisations on the other, negatively affected management performance. The female heads of farms used more water than their official entitlement, while at the same time contributing less labour to maintenance than they should. This occurred because it was difficult for the system's organisation to enforce their rule on women, who were not members. Although non-membership is thus in the interest of female farmers, because it allows them to become free riders, the long-term sustainability of the irrigation system is at risk (Zwarteveen and Neupane, 1995).

Mechanisms are needed to ensure that women are included in the membership, decision-making committees, and among irrigation professionals of the WUAs. Specifically, WUAs can:

- abolish the one member per household rule, and allow dual or multiple membership within a single household;
- reserve positions for women farmers in WUAs to ensure proper representation of the needs of all farmers;
- allow men to designate their wives as members and vice versa and establish liberal membership recruitment procedures;
- set targets for the percentage of women members in Water Users' Associations that correspond to the actual participation of women in irrigated agriculture;
- ensure that the women members also play a decision-making role in the associations. This may require, for example, specific training and support to overcome cultural constraints, e.g. women who are not used to speaking in public or in mixed groups. It may also require separate preparatory meetings in which women prepare their point of view and reach consensus on certain issues, which they can then present in the mixed meetings; and
- give both women and men responsibility for water management, such as the operation of gates, guarding the water flow or the distribution of water.

The definition of membership has important implications for equity. Organisational structures that provide for the representation of tail-enders, small farmers, women farmers and tenants increase equity. It may also result in an increased efficiency.

In Tanzania the involvement of women in decision-making positions in WUAs has resulted in fewer operational problems and better financial recovery of operating and maintenance expenses, compared to WUAs where solely men are involved (Masija, 1996).

It could further be assessed whether it is appropriate to include a number of users of water for other than irrigation purposes in the Water Users Associations. This might lead to a more formal group that can coordinate the different uses of water and resolve possible conflicts among various groups of users. For example a representative from a village council could be included, when they are responsible for proposing and enforcing by-laws that regulate livestock grazing and agricultural activities (☞ FH Stakeholders Conflict & Partnership Matrix).

The above options for action may be more feasible in some socio-cultural contexts than in others. The question should be asked: what is feasible and practical in the current context, and decisions should be based on discussions with the women and men water users.

In the Philippines several irrigators' associations insisted on including both husbands and wives in the association. One reason for this was that it allowed more flexibility; either the woman, the man or both would be able to attend the meetings. Another reason was that, even though agricultural decision-making is very much a joint affair of both husband and wife, women and men have distinct domains of influence. As most women control the cash flow within the household, it was found that unless the women were involved in formulating policies regarding irrigation and membership fees collection schedules, associations encountered problems when collecting irrigation fees. Community organisers also learned that unless women were encouraged to participate, financial obligations of farming households could not be guaranteed (Illo, 1988).

Key Questions for Analysis & Summary

- Does the rotation schedule suit most farmers? Does it allow vulnerable groups of farmers and women to receive enough water, and at adequate moments?
- In the selection of members for the Water Users Associations, is attention being paid to equally involve all farmers? Are women farmers equally represented? If not, why not? How can their participation be enhanced?
- How can women's role in decision making processes be enhanced?
- How can representatives from different user groups be involved in water management?

Credit/Saving

Limited access to credit and agricultural inputs is often one of the main constraints for smallholder farmers to increase their productivity. Expected results of irrigation schemes, i.e. increased crop production and thus increased income, will not materialise if certain groups of farmers are excluded from access to credit. Without access to credit they may not be able to invest in irrigated production, such as the procurement of inputs and payment of water fees.

Women's access to credit is more restricted than men's, as credit is often disbursed on the basis of land titles or other guaranteed resources that are often in the name of men. Therefore women's group credit and saving schemes can be extremely important in order to provide collateral for future loans and to enable women to resist claims from men on their savings.

Access to agricultural credit needs to be facilitated and group savings schemes for both men and women could be promoted.

Field experiences with credit schemes have shown that, in general, rural women are good credit 'risks'. Their loan repayment record has usually been high and invariably better than that of men in similar circumstances. They have proved to be more responsive to self-discipline in repayment, to take their loan obligations more seriously and are more afraid of defaulting compared with men (Tilakaratna, 1996).

Key Questions for Analysis & Summary

- Are there both men's and women's credit and savings group? Or are women and men involved in mixed groups?
- Are there any special obstacles for marginal farmers or women to obtain agricultural credit? If yes, how can these obstacles be removed?

Monitoring Indicators

Specific outputs of the project need to be formulated. The log frame approach to project planning uses "objectively verifiable indicators" to measure success. These indicators provide an objective basis for monitoring progress and evaluation of final achievements. A good indicator should define the level of achievement specifically: How much? - Quantity, How well? - Quality, By when? - Time (☞ IH Objectively Verifiable Indicators).

Example:

Step 1: Identify indicator: Small farmers increase rice yields

Step 2: Add quantity: **15,000 men farmers and 15,000 women farmers with land holdings of 2 hectare or less** increase their rice yields by 30%.

Step 3: Add quality: 15,000 men farmers and 15,000 women farmers with land holdings of 2 hectare or less increase their rice yields by 30% **while maintaining the same rice quality existing in the 1995 harvest**

Step 4: Specify time: 15,000 men farmers and 15,000 women farmers with land holdings of 2 hectare or less increase their rice yields by 30% **between October 1996 and October 1997**, while maintaining the same rice quality existing in the 1995 harvest

Indicators need to be formulated to monitor and evaluate the **process.** Indicators could be for example farmers' participation rate, amount of credit received, amount of credit repaid, crops grown, training attendance, etc.

Another set of indicators need to be formulated to monitor and evaluate **impact** of the project activities. Indicators could be for example yield increase, income gains, environmental effects, changes in workload, the relation between investments and benefits, etc. Indicators can of course also include both process and impact aspects at the same time, as is evident from the above example.

The indicators also need to disaggregate the information by gender and different socio-economic groups explicitly. In practice this means, instead of monitoring the number of farmers participating in the irrigation scheme, data need to be gathered on the number of male and number of female farmers from different socio-economic groups participating. Equally, information on yield increases needs for example to be distinguished on the basis of gender of the household head, large versus small holding farmers, and distinguished by different ethnic groups if applicable.

The definition of monitoring indicators could also be decided in close consultation with the women and men farmers as the initial step in a participatory monitoring system. See tool 10 in Part B.

The aim of collecting disaggregated monitoring data is that it may yield valuable information that can lead to measures to improve the programme, and especially the performance of specific groups of cultivators.

Key Questions for Analysis & Summary

- Is it possible to disaggregate the indicators by socio-economic groups? By gender? If so, how? If not, why not?
- What are the best indicators to measure progress?
- What are the best indicators to measure impact?

Project Costs

At the end of the design phase a consensus has been reached on project outputs and specific activities. These can now be budgeted.

Cost estimates need to be prepared for the various project outputs and specific activities. Costs estimates for inclusion of activities in the field of socio-economic and gender issues could include:

- institutional support to increase the capacity of institutions to plan and implement the project, e.g. experts on gender issues in irrigated agriculture and on participatory planning;
- crop development aimed at both irrigated and rainfed crops grown by women and men farmers;

- training to improve staff and farmers' capabilities, e.g., gender and irrigation training;
- research support aimed at proper inclusion of socio-economic and gender issues in all research and data collection efforts;
- water supply, sanitation and other infrastructure which facilitates use of water for non-irrigation purposes; and
- project coordination specifically for the implementation, management and monitoring of the project, e.g., additional staff and transport, and costs for a socio-economic and gender disaggregated monitoring system.

It is important to include additional costs in the budget to facilitate socio-economic and gender-responsiveness of the project. Even if precise costs are unknown at the time of formulation, inclusion of estimated budget items is important. In fact, availability of a budget is often a determining factor in the extent to which an irrigation programme can respond to specific constraints for vulnerable groups or for women that surface later.

Key Questions for Analysis & Summary

- Are additional costs for socio-economic and gender activities included in the budget? If yes, what is the percentage of the total budget? If no, why not?
- Is gender expertise budgeted for?
- Are mitigating measures for social and environmental effects included?

IMPLEMENTATION

Construction

Stakeholder commitment to water management and maintenance of the irrigation system can be increased by involving participants in actual construction activities.

Groups of farmers could carry out these activities under contract arrangements with the project in a way that they get paid for their contribution. In other arrangements 'free' labour contributions are expected from farmers, that lead to subsequent plot or water rights during implementation. Explicit attention needs to be given to how property and use rights to irrigation water and land are created and enforced, with an emphasis on gender differences in willingness and ability to invest labour or other resources in construction work and maintenance. Female headed households often face a serious constrained labour availability, especially for these kinds of additional activities. In addition, women farmers who participate in construction activities need to get compensated equally as men farmers.

In other cases contractors, who employ paid labour, are engaged for construction work. 'Equal pay for equal work' should be promoted, which entails that for the same type of work male and female labourers should receive the same wage. Proper and safe working conditions need to be ensured. Proper quality control systems are essential.

Thousands of women and men were employed as construction workers when a large irrigation canal was built in Andhra-Pradesh in India. In construction, as in agriculture, the sexual division of labour is explicit: women carry headloads of earth and concrete, sieve sand, and so forth, whereas men dig, mix the concrete, and perform other such tasks. However, women were paid a lower wage than men. (Ramamurthy, 1991).

Extension poster for discussion of the involvement of women and men in construction activities in the Cidurian Project, Indonesia

Key Questions for Analysis & Summary

- How much labour do male participants want to contribute to construction? How much labour do female participants want to contribute to construction? Is the labour contribution fairly distributed over the various participants?
- Does contribution of labour lead to land or water rights? What is the penalty for not contributing? Could exceptions be made for single headed households who have less labour to spare?
- Can an "equal pay for equal work" system be enforced?
- What quality control mechanisms are in place?

Operation and Maintenance

The lack of direct interaction and dialogue between irrigation agencies and users in the operation and maintenance of irrigation systems has been identified as a major cause for their poor performance. Increased water user participation in water acquisition, water allocation, system maintenance and resource mobilisation is now widely advocated as a means of improving irrigation performance. Until now the need for women farmers' involvement in operation and maintenance is not automatically recognised, even though their role in actual water management might be very substantial.

The Cidurian Upgrading and Water Management Project in Tangerang, West Java, Indonesia conducted a survey that highlighted women's active role in the management of irrigation water, such as:

- monitoring of water conditions in the field;
- intake and outlet of irrigation water to the field;
- arranging the distribution of water between their fields;
- contacting the other water users and the water master;
- the payment of the water master when he comes to their houses to collect his share of rice;
- the control of buffaloes which are the main cause of damage to the canals;
- the use of tertiary irrigation water for household purposes (Dok et al, 1992).

Extension poster for discussion of the role of women in buffalo control, Cidurian Project, Indonesia

One or more of the measures described in paragraph 2.3 could be implemented to make women farmers more 'visible' as users and irrigators, and consequently increase their participation and decision making role in water user associations.

➲ The functioning of water users' groups could be assessed and discussed using tool 9 Water Group Functioning in Part B.

As participating farmers are increasingly responsible for managing the irrigation scheme, this involves maintenance activities as well. Sometimes WUAs collect water fees that are used to pay labourers for maintenance activities, such as clearing canals or drains. In other cases farmers themselves contribute their own labour according to certain agreements. Similar to labour for construction activities it might be sometimes difficult for women heading their households to contribute labour, as they face a labour constraint in their households.

The operation and maintenance system that suits most users best should be decided upon through consultation with the users.

The norm in Santa Rita and San Marcos in Peru is that men participate in canal cleaning and system maintenance. Widows and women with absent partners are expected to send a family member, hired hand or cash contribution, to fulfil their labour obligations. Women heads of households who cannot send a family member or afford to hire labour or make a cash contribution, have to violate cultural norms. They are forced to participate in the community labour force themselves, to safeguard their water right (Lynch, 1991).

Key Questions for Analysis & Summary

- Is the WUA active in the operation and maintenance of the scheme? If not, what are the reasons for poor management?
- Are women farmers and farmers from vulnerable farmer groups equally represented in the WUA? If not, why not? What is the effect?
- What is the quality of the maintenance of the scheme? Could maintenance be improved?

Training and Extension

Training and extension are almost always an integral part of an irrigation project. It may also be that the main strategy to upgrade a scheme is through technical training of farmers and technical staff involved. Training often focuses on improved technical practices and on-farm water management practices. It is necessary that participation of different socio-economic groups and women farmers in these specific training sessions is ensured, and that training programmes are flexible.

The Special Programme on Food Production in Support of Food Security in Nepal, SPIN, recognises a number of reasons for women's participation in irrigation training:

1. women provide an essential input in the irrigated farming system and have a decisive voice in the planning of the cropping and farming system;
2. women representatives will inform other women and thus a much larger group of farmers can be reached;
3. women convinced of the benefits of the programme will be more supportive of the SPIN activities and their participation will be increased;
4. water fee collection will be more successful if the programme is supported by women (Smith, 1995).

Both women and men farmers need to be involved in the planned extension and training programmes, including the operation and maintenance of pumps, water rotation, water management, etc.

Preconceived ideas about the training needs for different groups of farmers need to be avoided. Instead training requirements should be assessed through a "training needs assessment". Training could be organised for women and men separately, or they could attend jointly the same training. Ways need to be found to achieve active participation by both women and men in the training. For example the Ministry of Agriculture and Livestock development in Malawi is putting a major emphasis on the establishment of on-farm demonstrations on women farmers' fields. Experience had learned that there is a general low attendance of women farmers to training sessions or demonstrations, but that their participation increases tremendously once their own fields are included in a training and demonstration programme.

Important is also whether the timing of training suits women farmers' other activities. The most appropriate time for meetings and training could be very early morning or late afternoon, when women have completed most of their tasks. Again, this needs consultation with the farmers before training sessions are organised.

In order to improve functioning of the Water User Committees, and make the women members of these committees more confident, it is possible to include a general training programme on leadership, covering aspects like legal status of the committee, running a meeting, elementary bookkeeping and public speaking.

Labour Saving Technology

In general, irrigation causes an increase of workload of women and men, and the creation of new labour peaks. One of the ways to reduce the workload is to introduce labour saving technology for the most labour intensive tasks.

In this respect attention could be given to the development, demonstration and extension of technologies that save labour in planting, weeding, harvesting and post-harvest crop processing activities. Especially weeding is a very time consuming activity, which in many countries is done by women. It should be made sure that the equipment developed and demonstrated is in line with the following criteria:

- investment costs compared with farmers' financial means, including availability and access to credit;
- maintenance requirements, expenses for spare parts, availability of spare parts;
- the durability of the technology;
- physical strength needed for operation.

Key Questions for Analysis & Summary

- What are women farmers' training needs? What are men farmers' training needs? Do their training needs overlap?
- Are there differences in training needs across the various socio-economic categories?
- Are certain groups excluded from the training and extension activities? If so, for what reason?
- Is there a need for certain labour saving technologies? What type of technology?

MONITORING AND EVALUATION

Monitoring

The planning of irrigation development should include arrangements for the collection and analysis of gender-disaggregated data for monitoring and evaluation. This includes the definition of clear and gender sensitive indicators, against which to measure changes. These monitoring indicators were formulated during the design process (see paragraph 2.5).

Monitoring normally serves one or more of the following purposes:

- establishing progress;
- establishing impact;
- accountability;
- establishment of the need for measures to mitigate environmentally or socially negative impacts;
- identification of problems and constraints obstructing implementation;
- establishment of the need for adapting plans and additional activities or modification of ongoing activities.

Regular data collection and analysis could be done by field staff who are directly involved in the implementation of activities. Monitoring can also be carried out in a participatory way, e.g., through regular meetings or workshops with farmers, field staff, government representatives and community organisers. Topics for discussion could be: the progress of activities, constraints encountered, suggestions for adaptations in the planning, suggestions for changing certain activities, suggestions for adding certain new activities, etc. It may also encompass self-evaluation methods for women's and men's groups and WUAs. See tool 10 in Part B.

It is important to monitor participation of women and men and the impact of the activities on their positions in order to establish the need to adapt plans and additional activities or the modification of ongoing activities. At the same time the collection and analysis of gender-disaggregated data and participation in monitoring and evaluation

meetings can increase the gender awareness among the staff. They may become more attentive to differences between women and men in their daily work.

Proper measures for monitoring changes and side-effects, such as a decline in the quantity and quality of the water, need to be included, as well as the planning of mitigating measures such as additional or separate drinking wells and water purification facilities.

Key Questions for Analysis & Summary

- What is the overall progress of the implementation of activities?
- Are the participants actively involved in the monitoring of progress? If yes, how? If no, why not?
- What constraints are faced in the implementation of the programme? How can these be removed?
- Do the participants investing labour and other resources actually benefit from the activities? Do all groups of farmers, women and men, equally benefit? How can differences be explained? Is there anything that can be done to make benefits more equally distributed?

Evaluation

Data collected while monitoring on the basis of the monitoring indicators selected provides the basis for evaluation analysis, which concerns the assessment of the effects of the irrigation programme on or for the intended beneficiaries. These may include benefits in the medium term, and in the case of an evaluation carried out ex-post (long after project completion) the full impact of the irrigation activities may be assessed.

Implementation completion reports, impact studies and evaluation reports specifically need to identify gender-differentiated results, and draw out the lessons learned. They should also describe and evaluate special efforts used to increase the participation of women (Fong and Bhushan, 1996).

Evaluation of irrigation development should include an assessment of success of the gender strategy and its impact on the program. Useful lessons can be drawn from strategy evaluations for future irrigation programs. It can also serve as a justification for the inclusion of gender issues in the planning and implementation of irrigation activities.

The positive impact of paying attention to gender issues is detailed in the project completion report of the Philippines Communal Irrigation Development Project. This project exceeded physical development targets and appraisal estimates of irrigation intensity and paddy yields. The project's success has been attributed to the full participation of the farmers-beneficiaries. The project partly draws on a tradition of farmer-built irrigation systems and responds to a cultural context in which women exercise independent land rights in the community by:

- recruiting community organisers, two-thirds of whom are women;
- ensuring membership of both spouses in water user associations; and
- actively encouraging women to assume leadership roles.

It was also noted that women's membership facilitated the payment of fees, because women controlled family finances. (Quinsumbing, 1994).

An analysis could also be made of the evolution of a gender strategy, or of any changes that took place during the course of a project.

The Grameen Krishi (Agricultural) Foundation (GKF) was established in 1991 by the Grameen Bank in Bangladesh. GKF supports agricultural development through irrigation, credit and services. The Foundation's gender strategy evolved over time. At first only men were included in GKF's crop production activities, while women were supported in their traditional homestead-based activities, such as rice processing and small husbandry. Gradually, GKF recognised women's important and actual roles in crop production. This recognition, combined with a serious commitment to women, led GKF to shift its gender strategy to one that involves women farmers in its irrigation and agricultural activities. Agricultural production became more accessible and productive for women, who gained access to land, irrigation water, credit, seeds, fertilisers and marketing facilities. Women were also able to earn more from the agricultural activities, than the traditional activities (Jordans and Zwarteveen, 1997).

Key Questions for Analysis & Summary

- What is the effect of the irrigation project on women's and men's income (cash and kind) from dry land? From irrigated plots? From other income-earning activities?
- What have been the benefits for women? For men? What have been the adverse effects for women? For men?
- What are the effects of irrigation on land-tenure and property ownership?
- Was the gender strategy successful? What were the constraints?
- What are the main lessons learnt?

ANNEX 1: RECOMMENDED GUIDELINES AND MANUALS

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Part B

10 PRA TOOLS

Introduction

The following ten PRA tools have been included in the SEAGA Sector Guide on Irrigation as they can facilitate the participatory planning and monitoring of irrigation activities. Through use of these participatory and visual tools some data can be collected (tool 1-6), problems and options identified (tools 7-8) and participatory monitoring activities initiated (9-10).

These ten tools do by no means intend to form a complete package for irrigation planning, but rather indicate some ways for participatory planning of small-scale irrigation projects. The information obtained through using these tools may be rudimentary and preliminary, and thus may need to be supplemented with data from other sources and methods.

Some of these tools may also be useful in a training context, to create awareness on gender differences and their implications for the irrigation planning process.

Five of the ten tools have been adapted from the SEAGA Field Handbook, prepared by V. Wilde. Three tools have been adapted from the Participatory Development Tool Kit, that was developed by D. Narayan and L. Srinivasan, published by the World Bank and one tool was adapted from the Participatory Rural Appraisal Handbook, published by the World Resources Institute.

Resource Mapping

Purpose

Resource Mapping is a tool that helps us to learn about a community and its resource-base. Maps can be drawn for example of a village, an irrigation scheme, a small watershed or a swamp area. The primary concern is not with cartographic precision, but with getting useful information about local perceptions of resources.

Maps may include:

- infrastructure (roads, houses, buildings)
- water sources (wells, rivers, springs, irrigation canals) and water use
- agricultural lands (land tenure, crop varieties and location)
- hydrological units, drainage system (drains, waterlogging, salinity)
- agro-ecological zones (soils, slopes, elevations)

Process

Plan and organise a meeting for the entire community. Make sure that it is scheduled for a time when both women and men can attend and that all socio-economic groups have been invited.

A large open space should be found and the ground cleared. It is easiest to start by placing a rock or leaf to represent a central and important landmark. Participants are then asked to draw other things on the map that are important. Participants should not be interrupted unless they stop drawing, in which case questions can be asked such as whether there is anything else of importance that should be added. Use the SEAGA Questions to deepen the discussion. When the map is completed, facilitators should ask the participants to describe it and to discuss the features represented. Ask questions about anything that is unclear.

Finally, the facilitator may want to ask participants to draw a map of how they would like to see the future. This allows for some preliminary planning ideas and encourages people to begin contributing their thoughts in the participatory planning process.

Some SEAGA Questions to Ask While Facilitating

Tool 1: Village and Watershed Resources Map

- What resources are in ample supply, which ones are in shortage? What resources are used? unused? Which are degrading or improving?
- Who makes decisions about who can use land? water? other important resources? What are the main land tenure structures?
- Are the rights of access to land and water different for women and men, or for people from different ethnic or other socio-economic groups?
- What are present water management practices? What is the present farming system?

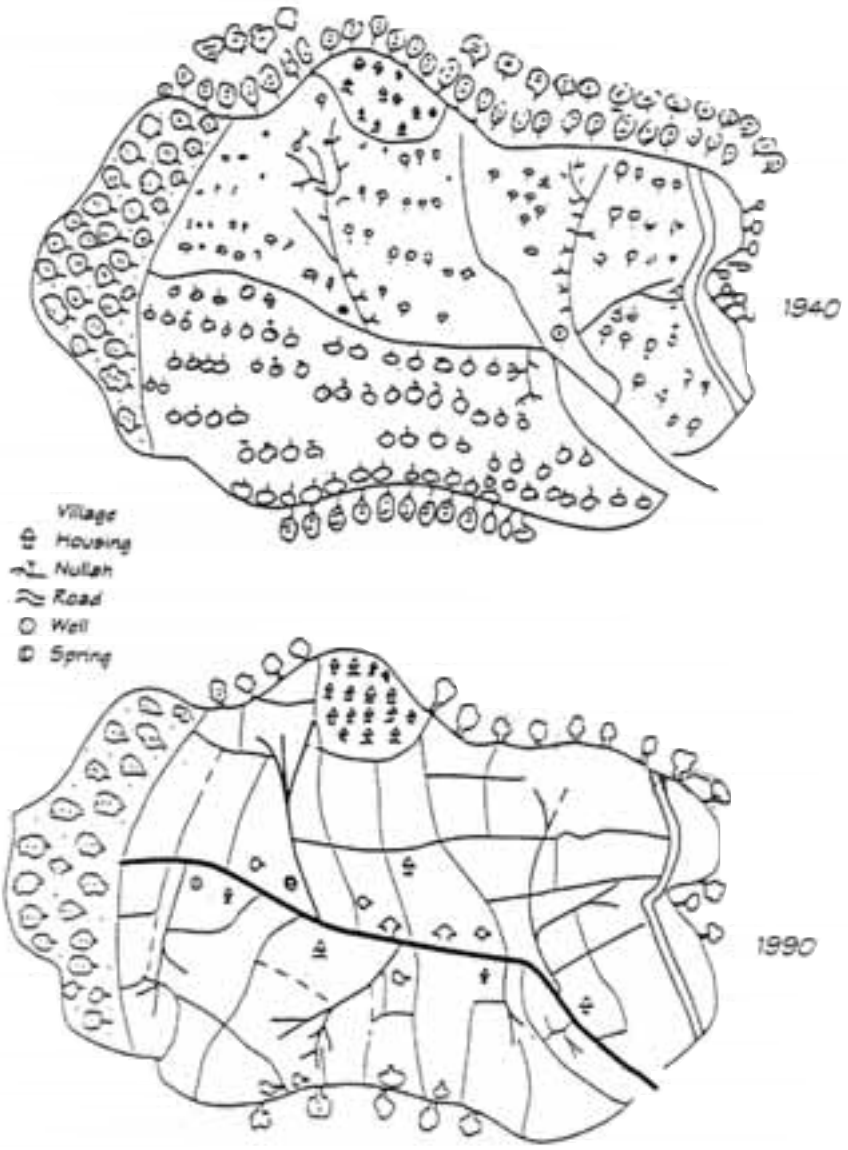
Materials

Sticks, pebbles, leaves, sawdust, flour or any other local material. Flip chart paper and markers also may be used.

Example

The historical maps produced by the people of Ardanarypura village, India, show the type and location of forest, crop lands, housing, wells and springs. The maps have been drawn for a small watershed, both for 1940 and 1990.

FIGURE 1 A - Tool: Small Watershed Resource Map
Example: Two watershed models, for 1940 and 1990 in Ardanarypura village, India

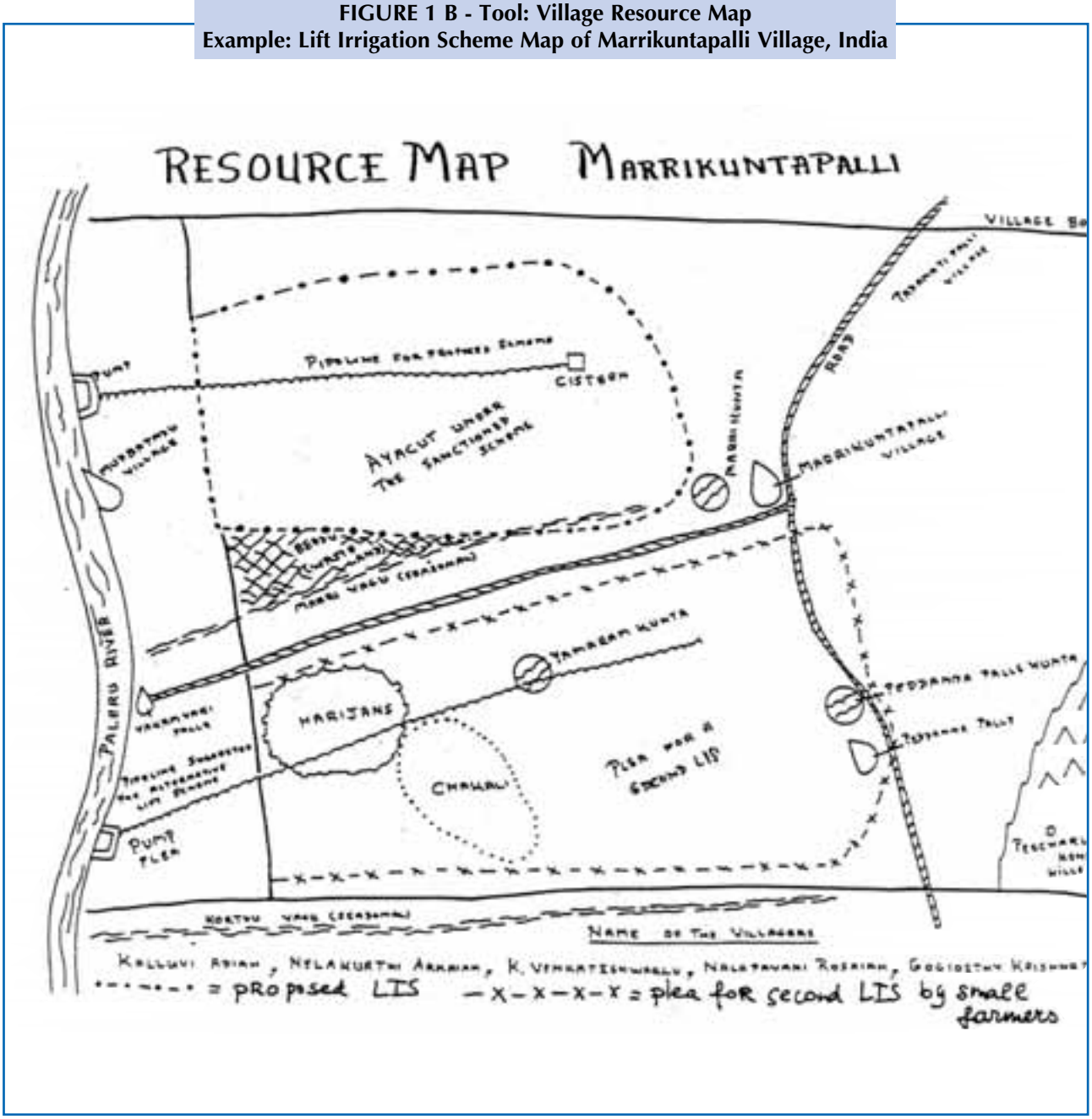


Source: Mascarenhas, J. and Prem Kumar. P.D. 1991, IIED.

Example

The following map was drawn by a group of men. It shows existing irrigation facilities and the command area of the proposed Lift Irrigation Scheme. The group pointed out that many small and marginal farmers have their land on the other side of the village, e.g. Harijans and Chakali. They therefore plea for a second Lift Irrigation Scheme at that side of the village.

FIGURE 1 B - Tool: Village Resource Map
Example: Lift Irrigation Scheme Map of Marrikuntapalli Village, India

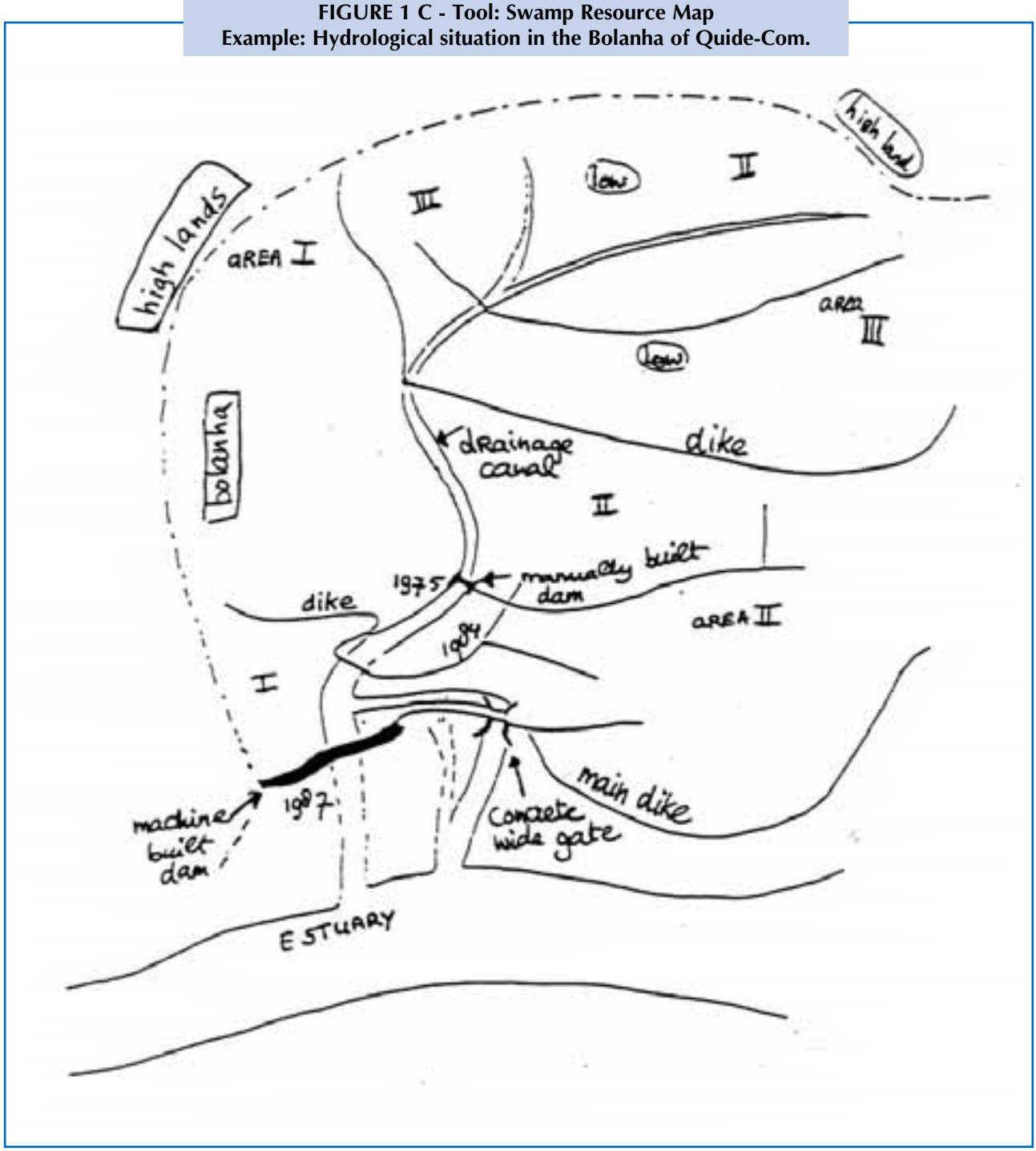


Source: Walsum, E.M. et al. 1993. ETC

Example

The following map of a swamp area was drawn by a group of farmers in Guinea-Bissau. It shows that hydrological units in a swamp area can be zoned accurately by farmers.

FIGURE 1 C - Tool: Swamp Resource Map
Example: Hydrological situation in the Bolanha of Quide-Com.



Source: Neefjes, K. 1991

Seasonal Calendar

Purpose

Seasonal Calendars are tools that help us to explore changes taking place over the period of a year. Calendars can be used to study many things such as how much work people have at different times of year or how their incomes change in different periods. It can also be used to show the seasonality of other important aspects of livelihoods such as food and water availability.

Process

Work with focus groups of women and men. Find a large open space for each group. Calendars can be drawn on a large paper or can be traced in the sand or on a dirt floor using stones or leaves for quantification.

Draw a line all the way across the top of the cleared space (or paper). Explain that the line represents a year -- and ask how people divide up the year, i.e. months, seasons, etc. Ask the participants to mark the seasonal divisions along the top of the line.

It is usually easiest to start the calendar by asking about rainfall patterns. Ask the participants to put stones under each month (or other division) of the calendar to represent relative amounts of rainfall (more stones equal more rain).

Once the rainfall calendar is finished, you can draw another line under it and ask them to make another calendar, this time showing their labour for agriculture (putting more stones over the time periods of high labour intensity). Make sure the labour calendar, and all subsequent calendars, are perfectly aligned with the rainfall calendar.

This process is repeated, one calendar under another, until all the seasonal issues of interest are covered. Be sure that calendars include those for food availability, water availability, income sources and expenditures. Ask the participants to put a symbol or sign next to each calendar to indicate the topic. As much as possible ask the participants also to describe the sources of food and income, etc.

Some SEAGA Questions to Ask While Facilitating

Tool 2: Seasonal Calendars

- How do women's calendars compare with men's? What are the busiest periods for women? for men? Are there daily, seasonal or yearly labour peaks and shortages?
- How does food availability vary over the year? Are there periods of hunger?
- How does income vary over the year? Are there periods of no income?
- What are the key linkages among the different calendars? e.g. water availability and food supply, rainfall and labour or food availability and disease occurrence.

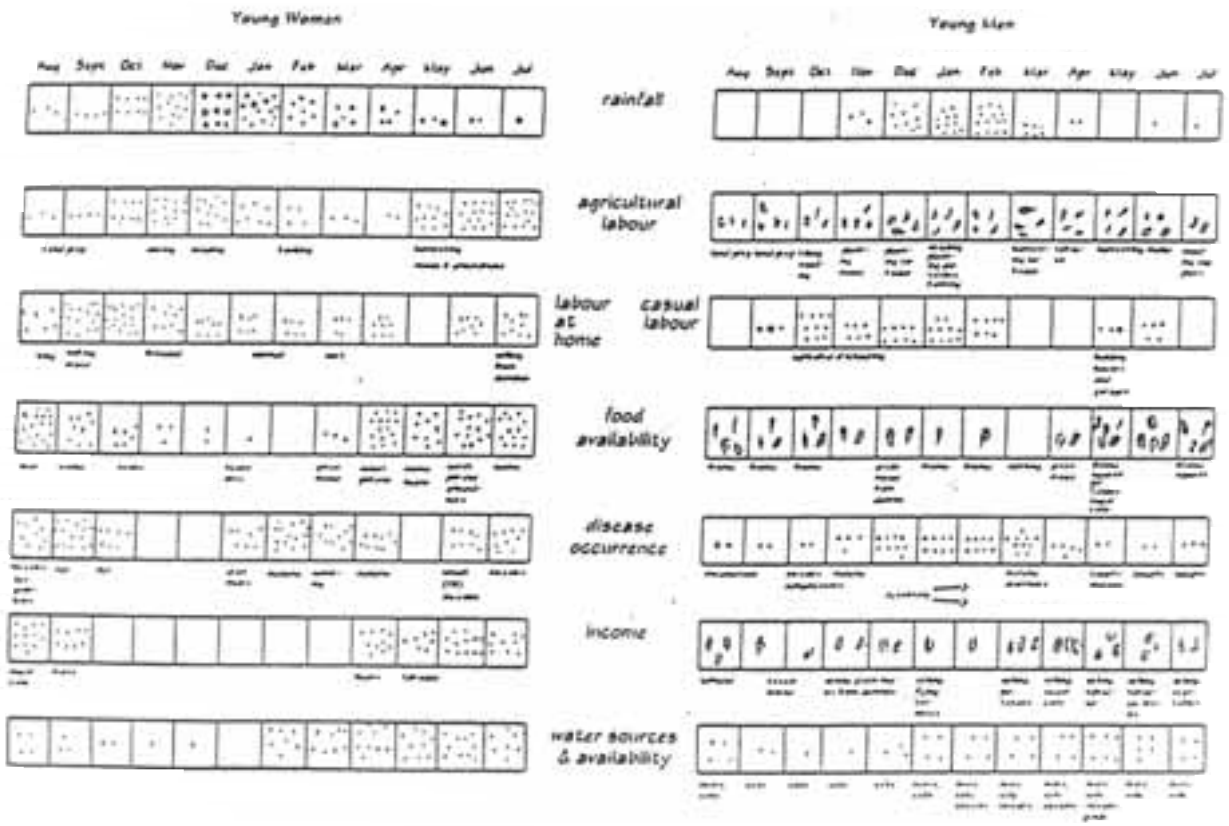
Materials

Sticks, pebbles, leaves or any other local materials may be used. Paper and markers also may be used.

Example

Groups of young women, young men, old women and old men, each produced their own seasonal calendars during PRA exercises held in Pemna Village, Malawi. Shown here are those for young women and young men. This example illustrates how Seasonal Calendars can be used to look at the linkages among several different patterns: rainfall, agriculture labour, other labour, food availability, disease, income and water availability.

FIGURE 2 - Tool: Seasonal Calendar
Example: Seasonal Calendar for Pemna Village, Malawi



Source: Welbourne. 1992. PRA Materials on Gender, IIED.

Task Analysis by Gender

Purpose

To collect information, raise awareness and understand how household and community tasks are distributed according to gender.

Process

Place three large drawings of a man, a woman and a couple on the ground in a row. Below these drawings, scatter smaller cards depicting various kinds of activities. Include some blank cards so that participants can add activities.

Ask the participants to sort the cards by categorising them under the three large drawings in columns, according whether the task is generally performed by a man, a woman or both. A start could be made with the cultivation of different irrigated and rainfed crops, e.g. rice, wheat, etc., then livestock keeping, then household tasks and lastly community tasks.

Let the participants take over the exercise and conduct the discussion. Ask the group to analyse the workloads, both the relative amount of work involved in each task and the division of labour between men and women. Link the tasks and workloads to irrigation activities; focus the discussion on the constraints and opportunities for participation by women.

Alternatives:

- Use the same method, but then in household interviews and compile and analyse the findings later. Findings could be validated and discussed in a group meeting.
- Include labour of children in the analysis, if necessary specify tasks for boys and tasks for girls. Include hired labour in the analysis, if applicable in a situation

Some SEAGA Questions to Ask While Facilitating

Tool 3: Task Analysis by Gender

- What is the actual involvement of women and men in crop production (rainfed, irrigated)?
- Are there any changes in the gender division of labour, compared with what their mothers and fathers used to do? What caused these changes?
- Considering the gender division of labour, who should be involved in irrigation planning activities?
- How does the task distribution in female headed households differ from the above division of labour?

Materials

Three large drawings of a man, a woman and a couple. A number of cards depicting agricultural activities, daily household and community tasks. Blank cards should also be provided so that participants can draw tasks not already included in the set.

Example

Below is a compiled table of the gender division of tasks as perceived by villagers in 38 households in Purbi Shankar Nagar, Nepal (W = Women, M = Men, B = Both).

FIGURE 3 A - Tool: Task Analysis by Gender
Example: Division of tasks in Purbi Shankar Nagar, Nepal

	Activities	W	B	M
Rice	Preparing seeds	•		
	Preparing seedbed			•
	Sowing			•
	Plowing			•
	Leveling			•
	Preparing food	•		
	Transplanting	•		
	Weeding	•		
	Irrigating		•	
	Harvesting	•		
	Bundling	•		
	Transporting			•
	Treshing			•
	Storing straw			•
	Storing grain		•	
	Manual winnowing			•
	Fan winnowing	•		
Wheat	Plowing			•
	Leveling			•
	Sowing			•
	Irrigating			•
	Fertilizing		•	
	Harvesting		•	
	Treshing	•		
	Cleaning	•		
	Storing	•		
Maize	Transporting Manure	•		
	Applying manure		•	
	Plowing			•
	Leveling			•
	Broadcasting			•
	Line sowing	•		
	Weeding	•		
	Harvesting	•		
	Removing kernels		•	
	Storing		•	

FIGURE 3 A (cont'd) - Tool: Task Analysis by Gender
Example: Division of tasks in Purbi Shankar Nagar, Nepal

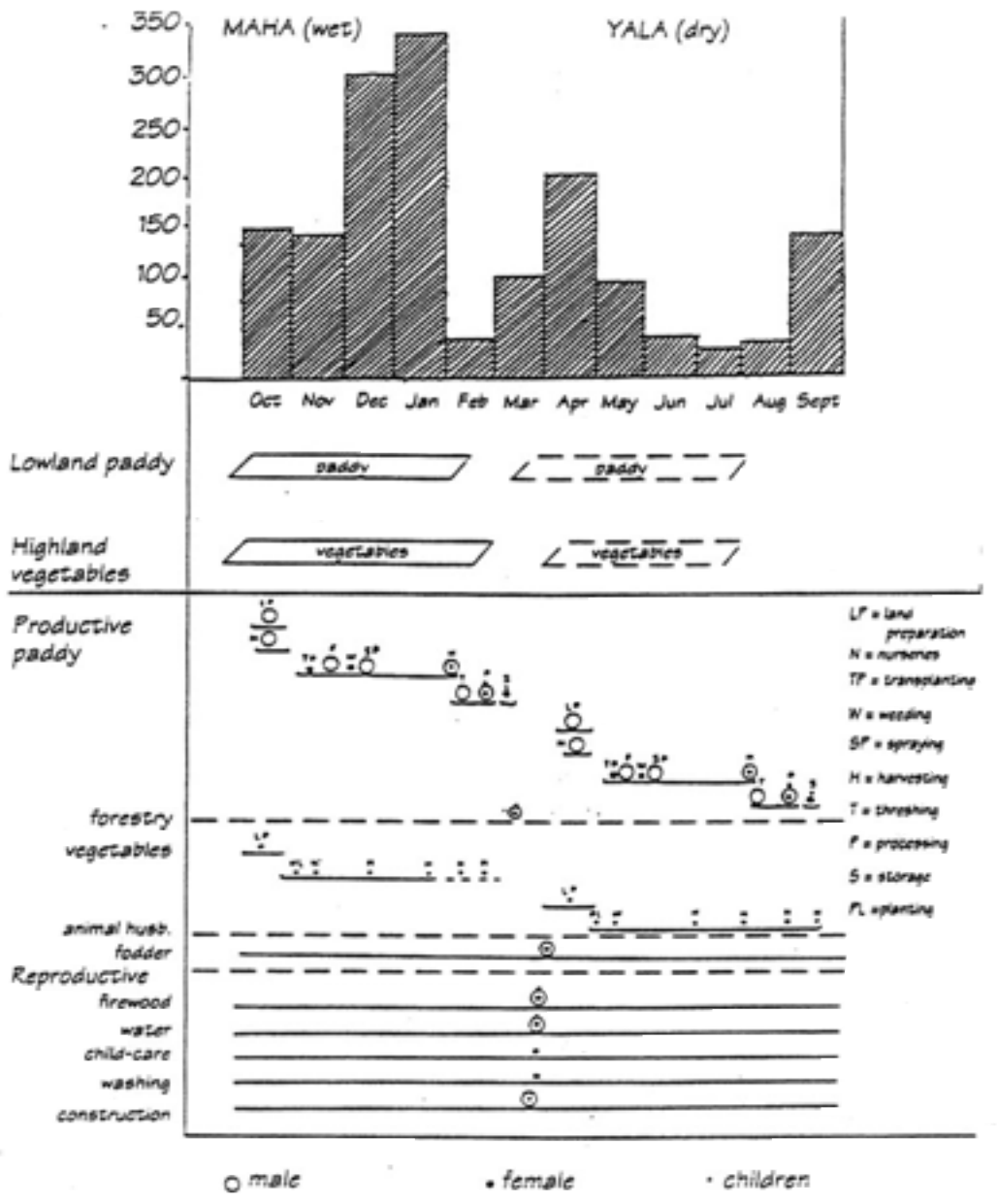
	Activities	W	B	M
Lentil	Broadcasting		•	
	Harvesting	•		
	Treshing		•	
	Storing	•		
Mustard	Broadcasting		•	
	Transporting manure	•		
	Applying manure		•	
	Irrigating		•	
	Harvesting		•	
	Treshing		•	
	Storing	•		
Livestock	Milking		•	
	Cleaning shed	•		
	Watering		•	
	Feeding		•	
	Cutting grass	•		
	Herding			•
Other	Collecting fuel	•		
	Cooking	•		
	Cleaning	•		
	Child caring	•		
	Kitchen gardening	•		
	Maintaining irrigation			•

Source: Zwarteveen, M. and Neupane, N. 1995.

Example

Below is an example of the seasonal calendar (tool 2) and the gender division of labour (tool 3) combined on one page, which facilitates the analysis of linkages.

FIGURE 3 B - Tool: Seasonal Calendar & Task Analysis by Gender
Example: Rainfall distribution, cropping pattern and gender-disaggregated activities in Illlukterna, Sri Lanka



Source: Anoja, Wickramasinghe, 1995, FAO.

Access to and Use of Resources

Purpose

The access to and use of resources by men and women can be made visually clear using Resources Picture Cards.

Process

Place the three large drawings, one of a man, one of a woman, and one of a man and woman together, on the ground in a row with adequate room between them. (Alternatively they can be taped up on a wall.) Underneath these drawings scatter the smaller cards, each picturing a different resource, at random. Include some blank cards so that participants can add resources. Included in the exercise could be resources such as irrigated land, rainfed land, capital, credit, livestock, poultry, knowledge/information, means of transport, water pump, watering can, etc.

Ask the participants to sort the cards by placing them under the three large drawings, depending on who uses the resource, whether women, men or both. Facilitate the discussion among the participants about why they made the choices they did.

Then put the second set of drawings and cards on the ground, close by to the first set. Repeat the exercise but this time focus on who has **control, ownership or decision-making power** concerning each resource. Again, facilitate the discussion among the participants about why they made the choices they did.

N.B. Specify that only the resources used or controlled 50-50% by women and men are put under the drawing of both; otherwise they should put the pictures under either the woman or the man to indicate who has majority use or control.

Ask the participants to compare the way they have arranged the two sets of Resources Picture Cards.

Materials

Two sets of large drawings of a man, a woman and a couple. Two sets of Resources Picture Cards, small stones to hold them in place if the exercise is carried out outdoors, or masking tape if using a wall.

Some SEAGA Questions to Ask While Facilitating

Tool 4: Access to and use of resources

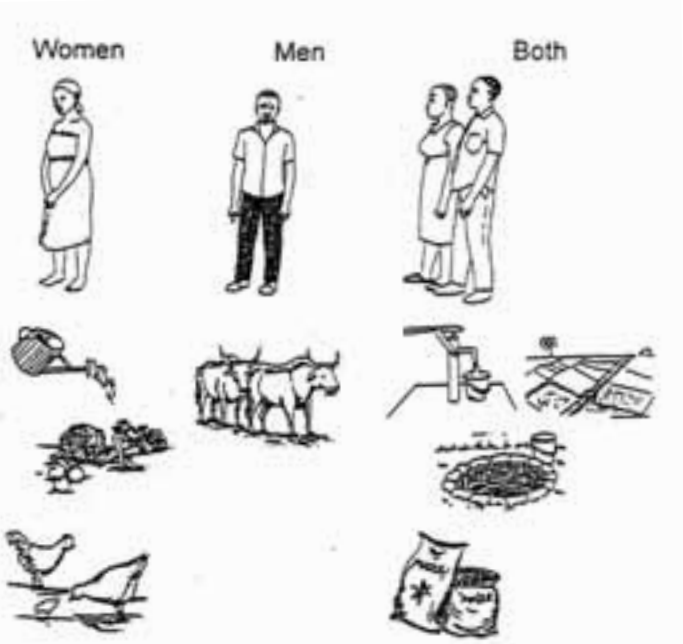
- Which resources do men use? Which resources do women use? Which resources do they both use?
- Is it women, men or both who use the resources of high value? e.g. irrigable land, irrigation technology. Is it women, men or both who make the decisions about high value resources?
- Which resources do women have control over? Which resources do men have control over? Which resources do women and men both have control over?
- What are the linkages between women's labour and their use and control of resources? What are the linkages between men's labour and their use and control of resources?
- Is it women, or men, or both who uses credit? Who makes the decisions on credit use? What are the experiences with credit?
- What is the resource use and decision-making pattern in female headed households?

Example

On the next page a fictional example is presented. The Resource Picture Cards reveal amongst others that while men and women share the use of the water wells, irrigated land and maize, only men have control and decision-making power and control over these resources.

FIGURE 4 - Tool: Resource Picture Cards

Resource Use



Resource Control

Trend Lines

Purpose

Trend lines are tools that help us to learn about community perceptions of change in the local environmental, economic, social or institutional patterns. It is a tool for looking at what is getting better and what is getting worse. A trend line is a simple graph depicting change over time.

Process

Organise a group of older women and men. Involving the elderly in developing the trend lines is essential because they know more about past events.

Ask the participants about important changes in the community, for better and worse. Use the SEAGA Questions to probe about changes in natural resources, population and economic opportunities. Ask about what other changes are important to them. Of specific interest is how irrigated agriculture has influenced certain trends, e.g., deforestation, waterlogging, yield increases, etc.

Draw a large blank graph on paper for each trend to be explored. Explain how the far left of the horizontal axis represents the past and the far right represents the present. Ask what intervals (years, events in history, etc.) should be used along the bottom axis, e.g. 1950, 1960, 1970. Explain how the estimates of increase and decrease are to be shown on the vertical axis.

Ask the participants to produce a trend line for each issue. If the trend lines are placed directly above one another it will be easier to facilitate discussions about interactions and linkages among the different trends. Look also for intermediate- and macro-level causes for the trends.

Alternatives:

Time permitting, the trend lines can be expanded upon to include the future. Ask the participants to show what they would like the future to look like for each issue. Discuss what changes would be necessary to achieve them.

Materials

Flip chart paper and coloured markers or chalkboard and chalk.

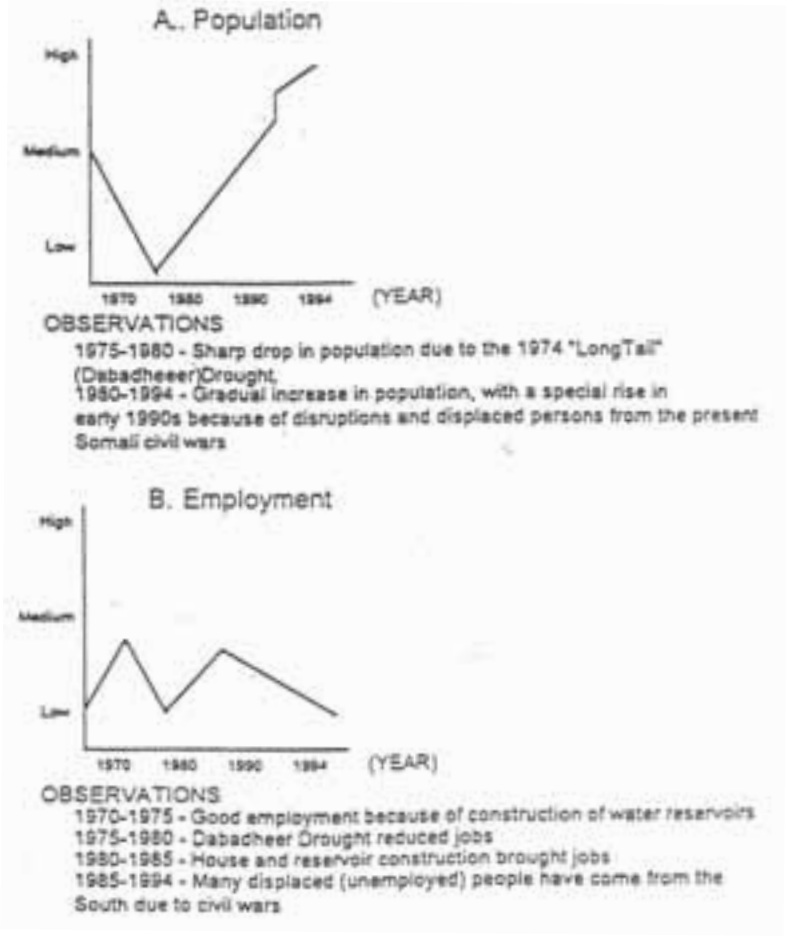
Some SEAGA Questions to Ask While Facilitating

Tool 5: Trend Lines

- What are the most important environmental trends? e.g. drought, deforestation, erosion, irrigation. Is the water availability increasing or decreasing? Why?
- What are the most important economic trends? e.g. jobs, wages, prices, costs of living, crop yields, livestock population.
- What are the most important demographic trends? e.g. birth-rates, infant mortality, in-migration, out-migration, increases in female-headed households.
- What are the linkages between the trends?
- What trends impact women and men differently? What trends impact the poor more so than the rich?

Example

FIGURE 5 - Tool: Trend Lines
Example: Trend Lines from Jeded Village in Somalia



Source: Ford, Adam, Abubaker, Fard and Barre. 1994.

Water Use Matrix

Purpose

To help community members analyse their situation with regard to various water sources and different uses of water. To help plan changes in water uses, e.g., introduction of irrigation.

Process

Work with one group of women and another group of men. Begin by asking the group to list their main sources of water. Start drawing the matrix on the ground, or on a large piece of paper, by indicating each source of water across the horizontal axis. The group may want to select pictures or symbols to represent each water source.

Then ask the group to list their main uses of water. Place the different water uses, represented by pictures or symbols, across the vertical axis.

Then asks the participants to distribute stones, or leaves, in the matrix, to indicate form which water source they draw water for each water use: more stones equal more importance for that particular use.

Discuss in a plenary the matrix of the women's group and the men's group. Discuss the importance of the different water sources, and differences between women and men regarding their use of water.

Alternatives:

- The Water Use Matrix can be filled out twice. Once for the rainy season, and once for the dry season.
- Likewise the water use matrix can be completed by a group of poor women, and by a group of rich women, by poor men and by rich men.

Some SEAGA Questions to Ask While Facilitating

Tool 6: Water Use Matrix

- What are the major water use constraints for women? For men? What are the main causes? How could these constraints be overcome?
- Is quality and reliability of each water source important? If yes, why?
- What are the differences between the water use matrix prepared by women and the one prepared by men? Equally between poor and rich people?
- Is lack of water a limiting constraint in the farming system? How will the planned irrigation activity affect water uses?
- How much can people afford to pay for water? For what uses do/will they pay?
- Do all socio-economic groups have equal access to water? Which groups have a constrained access? How could their access be improved?

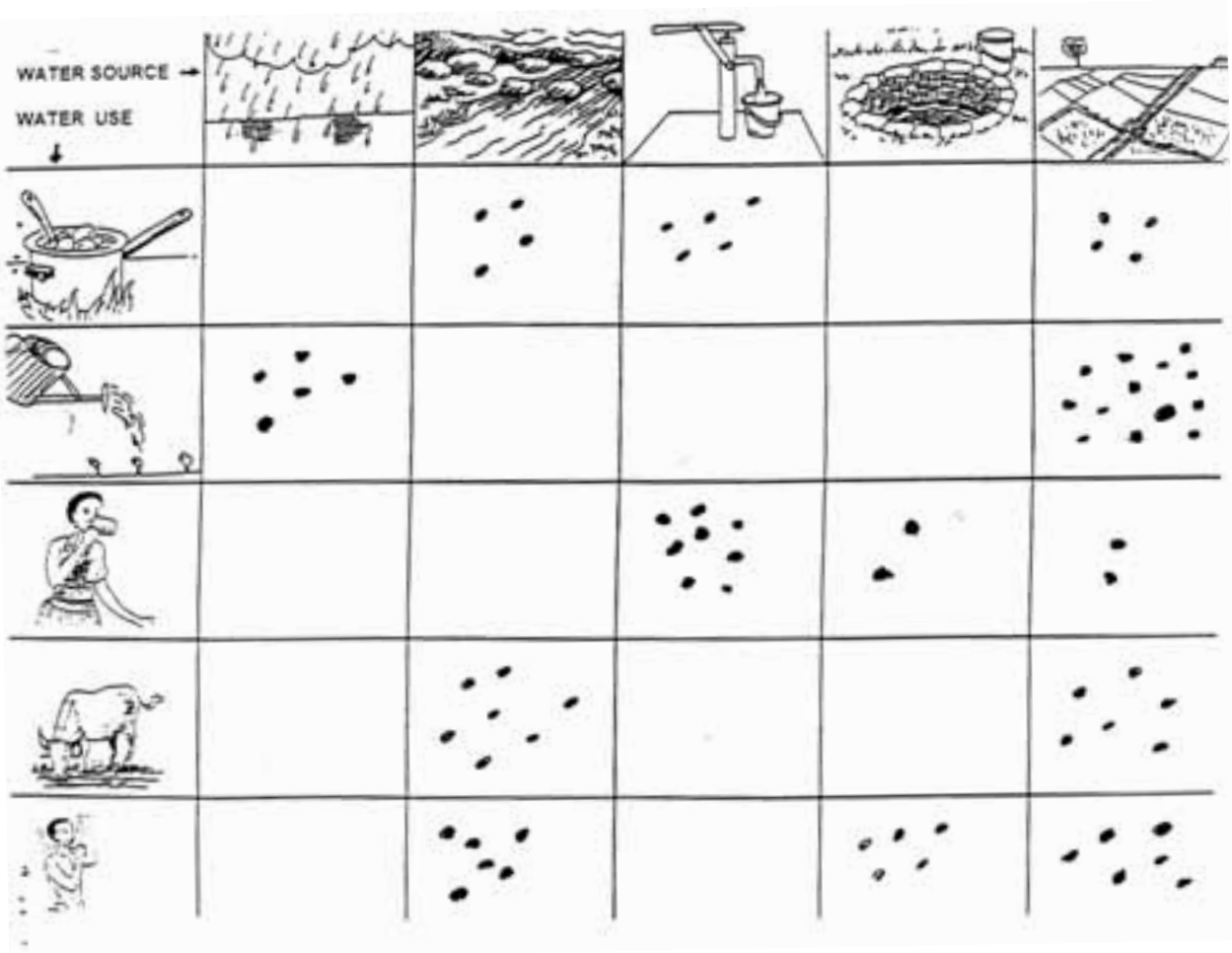
Materials

A set of picture cards depicting the different water sources in the area, and another set of cards representing the various uses of water. Some blank cards. Stones, leaves, etc.

Example

The following fictional example shows a matrix made by a group of women. Five different water sources are placed across the horizontal axis, and five uses of water on the vertical axis. More stones equal more use and importance of a certain water source for that particular use. One finding is that water from the irrigation canals is used not only for irrigation, but also for cooking, drinking water, livestock watering and bathing.

FIGURE 6 - Tool: Water Use Matrix



Problem Ranking and Problem Analysis Chart

Purpose

The different problems are presented and discussed with the community as a whole, showing where different people's constraints overlap and where they differ. This also allows for an expanded discussion of the causes of the problems, as well as current coping strategies. Coping strategies are important to learn about because they may be strategies that can be built upon for improvement. We can also learn if efforts to address a particular problem have already been made, and have failed or have not addressed the problem completely.

The Problem Analysis Chart also looks at **opportunities** for development. For this reason it is important that technical "experts" from outside agencies and organisations, such as irrigation engineers, extension officers and NGO workers, be invited to participate as well. While local people may have very good ideas about what they need, they may lack information about the options that irrigation development can offer.

Process

Problem Ranking

Organise two separate groups: one of women and another of men. Make sure that a mix of socio-economic groups is included in each. Ask the participants to think about their problems, especially in relation to water management. In discussion, ask them to list the 6 problems that are most important to them.

Rank the problems according to importance. Stones could be used: more stones equal more importance. Select the three main problems. Discuss the causes and effect of these problems.

If applicable, organize a second set of groups - this time according to socio-economic group. Make sure that both women and men are in each. Repeat the exercise.

Problem Analysis Chart

Plan and organise a meeting for the entire community. Make sure that it is scheduled for a time when both women and men can attend, including a mix of socio-economic groups. Ahead of time you must also invite at least two or three technical experts from outside agencies and organisations.

The plenary meeting should begin with a presentation of the priority problems (and their causes and effects) of women and men, and the different socio-economic groups. This provides the entire community and the outsiders with a complete overview.

Prepare the Problem Analysis Chart listing down the far left column the priority problems identified by each of the different groups. Where a problem has been identified by more than one group, list the problem only once. In the second column, list the causes of the problems as identified. Present the Problem Analysis Chart to the entire meeting.

Then ask people to explain what they currently do to cope with their problems. List the coping strategies in the third column. Finally, with specific reference to each problem discuss opportunities for improvement asking both the local community members and outside experts to contribute their ideas. List the solutions in the fourth column.

Some SEAGA Questions to Ask While Facilitating

Tool 7: Problem Ranking and Problem Analysis

- What are the priority problems identified by women? by men?
  Which problems are the same for everyone?
- What are the different problems identified by the different socio-economic groups?
  Which priority problems were shared by different groups?
  Which priority problems are related?
- Who are the stakeholders having a stake in the planned irrigation development?
  How big is their stake?
- Are there conflicts among stakeholders?
  Are there existing partnerships between stakeholders?
- Did the outside experts identify additional causes of the problems? What are they?
- What are the current coping strategies? What are the gender implications?
  e.g. women go further and further to fetch water in the dry season.
- What are the opportunities to solve the problems?
  What opportunities were suggested by the community members? by the technical experts? Which can be implemented locally? Which require external assistance?

This tool is especially useful in the planning of rehabilitation or upgrading of existing irrigation schemes. A similar process as described above should be followed, but the discussion should focus on an analysis of problems concerning the irrigation scheme, present coping strategies and opportunities for improvement.

Some SEAGA Questions to Ask While Facilitating

- What are the technical constraints faced by women farmers? By men farmers? What are the opportunities for technical improvement of the irrigation scheme (at the on-farm and system level)?
- What are the organisational constraints faced by women farmers? By men farmers? What are the opportunities for organisational improvement of the irrigation scheme (at the tertiary and system level)?
- Do all farmers receive enough water for irrigated production? If not, which groups of farmers does not receive enough water? Why? How could this be solved?
- What are the arrangements for Operation and Maintenance? Do these work? If not, why not? How should these arrangements be changed?

Materials

Flip chart paper, easels or walls or fences to hang up the maps, diagrams and charts, masking tape or tacks, markers and a prepared Problem Analysis Chart.

Example

The problem analysis chart produced by the people of Uttor Maria village in Kishoreganj Thana, Bangladesh shows three important problems and the causes, current coping strategies and development opportunities for each. The first problem was identified by both men and women, the second problem was identified by women from the village, the last problem by the men.

FIGURE 7 - Tool: Problem Analysis Chart
Example: Problem Analysis Chart from Uttor Maria Village, Kishoreganj Thana, Bangladesh

Problem	Causes	Coping Strategies	Opportunities
Poverty / Food insecurity	Landlessness; small acreage land; lack of off-farm employment	• restrain from taking nutritious and costly food • take loans from moneylender • receive food aid	• creation of job opportunities • savings and credit schemes • intensification of homestead and field production (irrigation) • more food aid
Large family size	Lack of awareness; Lack of family planning methods	• try to reduce family size • economise family budget, save on education, clothing and ceremonies	• use family planning methods • not to get married early • remove illiteracy
Lack of capital and inputs, such as irrigation water and fertiliser	Poverty; lack of credit sources; non-availability of inputs	• use own seeds • leave land fallow • reduced use of fertilisers and water	• access to credit to buy fertilizers and irrigation pumps • seed multiplication at local level • training on low external input agriculture

Source: UNDP/FAO, TSS-1 on Household Food Security, April 1997

Options Assessment

Purpose

The Options Assessment Chart is a tool that helps us to make choices between different options, resulting in concrete and realistic plans for implementation.

Process

Organise a community meeting with people who share a development priority: e.g., rehabilitation of an irrigation scheme or increase of water availability. Make sure both men and women are represented, as well as different socio-economic groups. Explain that the purpose of the Options Assessment Chart is to select the best development option, and start planning its implementation.

Start with listing the opportunities and solutions, as identified in the Problem Analysis Chart, in the first column. Then discuss and reach consensus on the impact (negative, no impact, positive, very positive, unknown) of each solution on:

- productivity
- stability
- sustainability
- equitability

Further assess the time before a solution will be implemented (long, medium, short), the cost (high, medium, low), and the feasibility (low, medium, high).

On the basis of the chart discuss the 'Best Bet'.

Some SEAGA Questions to Ask While Facilitating

Tool 8: Option Assessment

- Are certain options more favourable to women? To men? To certain socio-economic groups?
- Does the option chosen, the 'best bet', addresses constraints identified by women? By men? By all socio-economic groups? If not, why not?
- Will there be losers and winners? Who will benefit? Who will not benefit?
- Can the solution chosen be implemented locally? What external assistance is required?
- What are the necessary investments, organisational and technical capacity to implement the Best Bet?

Materials

Flip chart paper, an easel or wall, masking tape, and markers.

Example

FIGURE 8 - Tool: Options Assessment Chart
Example: Options to increase water availability, Mbusyani Village, Kenya

Mbusyani options assessment chart

Best bet or Innovation	Productivity	Stability	Sustainability	Equitability	Time to benefit	Cost	Technical & social feasibility
Boreholes	?	0	-	0	3	3	3
Roof catchment	+	+	++	+	1	1	2
Natural springs	+	+	+	++	1	2	2
Rehabilitate dams	++	+	++	++	1	2	2
Shallow wells	+	+	++	0	2	1	2
New surface dams	++	+	++	++	1	2	2

Key:

			Time	Cost	Feasibility
?	*Unknown*	3	*Long*	*High*	*Low*
-	*Negative impact*	2	*Medium*	*Medium*	*Medium*
0	*No impact*	1	*Short*	*Low*	*High*
+	*Positive impact*				
++	*Very positive impact*				

Source: Participatory Rural Appraisal Handbook. 1992

Water Group Functioning - The Three Star Game

Purpose

To enable water users' groups to rate their overall performance, and to evaluate the contribution of key people and activities to the functioning of the group.

Process

Place each of the three stars on the ground in descending order of size. Explain to the water users' group that, depending on the context, the stars represent excellent, average , poor; or very important, important, not important.

Then display the cards depicting water group functions and key people associated. Explain the pictures. Ask the participants to discuss the effectiveness of each person or activity in their own group.

Ask the group to place each of the pictures underneath the appropriate size star to rate its functioning. Once consensus is reached, ask the group to explain and discuss its ratings. Ask the group to give itself an overall rating.

Encourage the discussion to focus on follow-up planning to take corrective action where needed.

Some SEAGA Questions to Ask While Facilitating

Tool 9: Water Users' Group Functioning

- Who is paying water and maintenance fees? Who is not paying? What is the general payment rate?
- Are women equally represented and involved in the group functioning (membership, meetings, management tasks)? Are men? Are certain socio-economic groups? If not, why not?
- How could participation of women and certain socio-economic groups be enhanced?
- What are the problems in the cooperation between the water users' group and the irrigation agency, the field worker, the bank? What are the supports?

Materials

Three stars, big, medium and small. A number of cards depicting water group functions and key people associated with water users' groups, such as:

- group cooperation
- sanctions
- angry group members/conflict
- extension worker/irrigation engineer
- fee collection
- planning and design
- maintenance work

Example

The following is a fictional example of the rating of the functioning of a Water Users' Group.

FIGURE 9 - Tool: Water Users' Group Functioning

Participatory Monitoring and Evaluation

Purpose

To maintain and evaluate progress whereby the local people are active participants, and this process builds commitment to implement any recommended corrective action.

Process

Participatory approaches to monitoring and evaluation can take many forms and can involve different levels of participation. Methodologies include stakeholder workshops and participatory assessments, as well as regular data collection by the participants themselves. A start should be made with the definition of indicators, that measure change or results brought about by an activity, or an output from an activity.

It is important that a consensus is reached within the group on the selection of the indicators, so that everyone is monitoring the same thing by the same standards.

Also a regular interval for monitoring activities needs to be decided upon, whether it are group meetings or data collection efforts.

Some SEAGA Questions to Ask While Facilitating

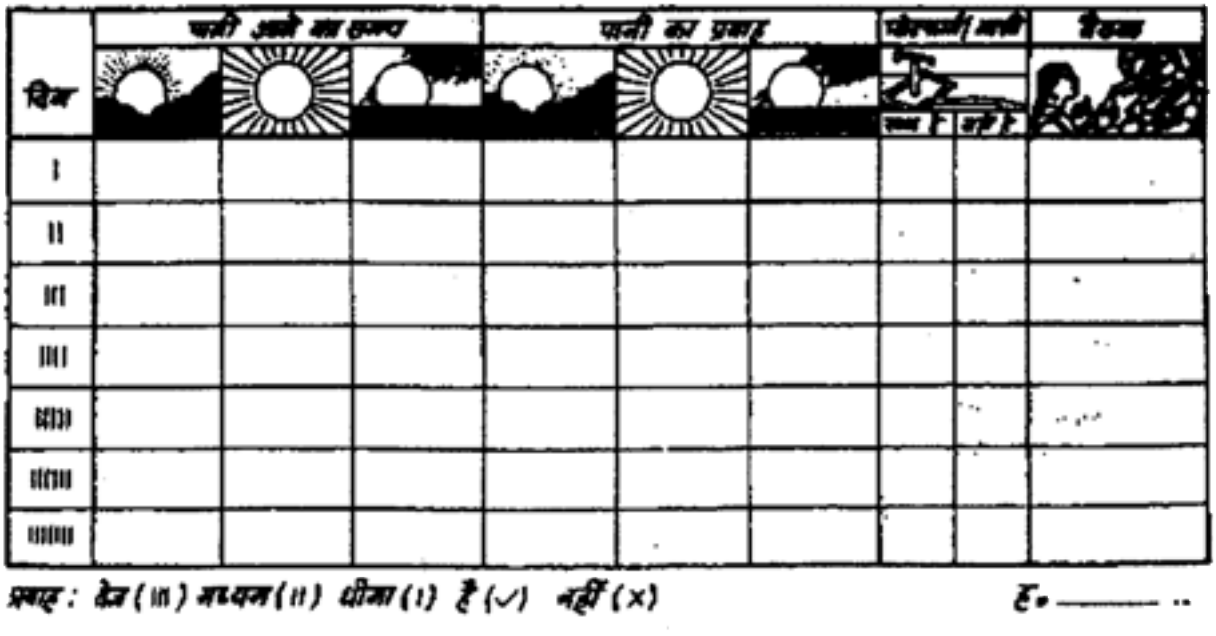
Tool 10: Participatory Monitoring and Evaluation

- Is it possible to disaggregate the indicators by socio-economic group? by gender? If so how? If not, why not?
- What process indicators can be formulated? E.g., participation rate, repayment rate?
- What impact indicators can be formulated? E.g., increased income, empowerment?

Example

The following example from a drinking water supply and sanitation project in India is a data collection sheet that is filled in by women participants. It monitors the time water is being supplied (morning, noon, evening), the flow of the water at the different times of the day (fast, medium, slow, if at all) the condition of the standpipe platform (clean, not clean) and whether women have organized meetings on water use issues. The figures I - IIIIIII represent the seven days of the week.

FIGURE 10 - Tool: Participatory Monitoring
Example: Monitoring water collecting patterns and women's participation, India



Source: Bolt, 1994

Tools adapted from:

Tool 1: SEAGA Field Handbook, Wilde, V. 1997, FAO/ILO
Tool 2: SEAGA Field Handbook, Wilde, V. 1997, FAO/ILO
Tool 3: Participatory Development Tool Kit, Narayan, D. And L. Srinivasan 1994, WB
Tool 4: SEAGA Field Handbook, Wilde, V. 1997, FAO/ILO
Tool 5: SEAGA Field Handbook, Wilde, V. 1997, FAO/ILO
Tool 6: Participatory Development Tool Kit, Narayan, D. And L. Srinivasan 1994, WB
Tool 7: SEAGA Field Handbook, Wilde, V. 1997, FAO/ILO
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