

Water management in Household farming systems

Unit 2: Participatory
planning and design
of water
management in a
household farming
system.

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Introduction

This unit introduces you to the concept of a situation analysis in a village and household context. It provides methodologies and techniques to assess socio-economic, natural resource and physical planning issues.

This unit introduces you to concepts related to hunger and apathy, and the facilitation of Mind Mobilisation processes and practical pathways to help food insecure households combat hunger and malnutrition.

Aims

To provide learners with the necessary tools to be able to conduct a situation analysis on a village and household level.

To understand the relationships between poverty, hunger and apathy.

To be able to apply Mind Mobilisation facilitation and counselling techniques to help food insecure households find pathways out of hunger and malnutrition, through affordable family food production techniques that maximise resource use efficiency.

Learning outcomes

By the end of Unit 2 you should:

- | | |
|---|---|
| ❖ | Understand the Sustainable Livelihood Framework and the use of this framework in conducting a situation analysis |
| ❖ | Have an understanding of various participatory tools (PLA techniques and methodologies) that can be used in a baseline survey/ situation analysis and know how to apply these tools |
| ❖ | Design and conduct a baseline survey/situation analysis |
| ❖ | Understand the basic aspects of a natural resource assessment and be able to undertake a basic assessment at village and homestead level. |
| ❖ | Construct resource flow diagrams for homesteads as an analysis and planning tool |
| ❖ | Conduct a helicopter visioning and planning exercise at a household level. |
| ❖ | Nutrition as an indicator and planning tool |
| ❖ | Have a basic understanding of the complex nature of poverty, hunger and malnutrition, and their psychological effects on food insecure individuals |
| ❖ | Have a basic understanding of community level facilitation techniques and their purpose in reaching and supporting the vulnerable individual |
| ❖ | Have an understanding of the key steps that an individual experiences in the Mind Mobilisation process and how it might help her towards improved self-reliance |

Learning outcomes

Assessment criteria

Done ✓

Can't do it ✗

Explore the meaning of water management at a household level from a number of different perspectives

Successfully completing class work and individual assignments related to the analysis of different homestead farming systems, using the resource use and conservation concepts introduced.

Successfully complete class work and group assignments related to the analysis of livelihoods situations using the Sustainable Livelihoods Framework, conducting baseline surveys and physical resource assessments and conducting and overall development plan.

Learning outcomes	Time for assignments	Assessment criteria	Done ✓ Can't do it ✗
Have a basic understanding of the complex nature of poverty, hunger and malnutrition, and their psychological effects on food insecure individuals	?hrs ?hrs	Successfully complete class work and individual assignments: 1) 2)	
Have a basic understanding of community level facilitation techniques and their purpose in reaching and supporting the vulnerable individual	?hrs	Successfully complete class work, group and individual assignments: 3)	
Have an understanding of the key steps that an individual experiences in the Mind Mobilisation process and how it might help her towards improved self-reliance	?hrs	6)	
Summary of learnings	?hrs	7) Summary of learning regarding Mind Mobilisation facilitation	

1. The Socio-economic situation

Introduction

Before it is possible for people to intervene in a situation and work together around changing or improving that situation, it is important first to understand the situation.

Facilitators who are not from an area and will need to explore the situation in detail to gain adequate understanding, whereas people from the area should only need a perspective that contextualizes the specific situation within the broader environment.

Interventions and projects are thus mostly initiated by conducting socio-economic or situation analyses.

There are various ways in which we can explore the world using facts, values, opinions and concepts.

Here we will introduce the Sustainable Livelihoods Approach as a way of conceptually understanding the issues involved. This is followed by the introduction of various participatory methodologies for information gathering. Then a coherent approach to an actual intervention will be introduced through mind mobilization and the Water for Food Movement.

The Sustainable Livelihoods Approach

What is Sustainable Livelihoods?

Sustainable Livelihoods is a way of thinking about the objectives, scope and priorities of development, in order to enhance progress in poverty elimination/reduction. It also aims to help poor people achieve lasting improvements against the indicators of poverty that they themselves define. The thinking/idea is that the effectiveness of development activity can be improved through:

- Systematic analysis of poverty and its causes,
- Taking a wider and better informed view of opportunities and their likely impact on livelihood priorities and
- Placing people and the priorities that they define firmly at the centre.

People need to choose for themselves what an improvement in their life would be

Background

After decades of limited success in eliminating poverty, new ideas about development are emerging. Sustainable Livelihoods represents one way of doing this. In particular, participatory approaches have highlighted great diversity in the goals to which people aspire and the livelihood strategies they adopt to achieve these goals. Poverty assessments have also highlighted the importance of assets and social capital in determining well-being. At community level, the importance of institutions and processes has been recognised.

Poor people cannot always make use of opportunities presented to them in ways that others may think is obvious - Thus the presence of a resource (physical or social) per se, does not mean it will be used.

Despite stated commitments to poverty reduction the immediate efforts of many donor and government groupings have been in the supply of resources and facilities (water, land, clinics, and infrastructure), rather than focusing on people themselves. Other concerns have been around the un-sustainability of many development efforts: Isolated sectoral (e.g. agriculture, health,) initiatives have limited value while complex cross-sectoral programmes become unmanageable.

Success can only be achieved if a good understanding of the household economy is combined with attention to the policy context.

For this, it is important to understand various livelihood components and factors, including:

- ❖ The priorities that people identify;
- ❖ The different strategies they adopt to fulfil these priorities;
- ❖ The institutions, policies and organisations that determine their access to assets/opportunities and the returns they can achieve;
- ❖ Their access to physical, human, social, financial and natural capital; and
- ❖ The context in which they live, which includes external trends (economic, technological, demographic...), shocks (such as unemployment, natural disasters ...) and seasonality.

Sustainable Livelihoods (SL) Approaches

SL approaches are underpinned by a set of core principles' draw on many different development and participatory tools, including the SL frameworks and can be applied in different ways.

The original concepts were coined by Chambers and Conway (IDS,1992). Most organisations that have embraced this way of thinking (e.g. Care, DFID, UNDP and Oxfam) use a version of the original definition of sustainable livelihoods

A livelihood:

Comprises the capabilities, assets (stores, claims, resources and access) and activities required for a means of living

A sustainable livelihood:

When it can cope with and recover from stress and shocks, maintains or enhances its capabilities and assets and provide sustainable livelihood opportunities for the next generation (and which contributes net benefits to other livelihoods at the local and global levels in the short and long term).

The part of the definition in brackets has been removed by most other groupings due to it seeming unrealistic. CARE for example emphasises household livelihood security linked to basic needs and rights over sustainability. See handout (SL guidance sheets: the sustainability of livelihoods, DFID) for a discussion of sustainability.

Very few livelihoods are sustainable across all dimensions; physical, environmental, economic, social and institutional; but that is the overall goal.

Principles

These have been adapted to each organisation that has taken on the SL approach to deal with their particular beliefs and focus areas, but generally are similar. Some of the NGOs' that have taken none this approach have included empowerment and rights in these principles.

(See handout: SL guidance sheets: Core concepts; DFID)

The sustainable livelihoods framework

The framework helps to organise various factors which constrain or enhance livelihood opportunities, and to show how they relate to each other. It is an attempt to introduce a way of thinking that is more representative of a complex, holistic reality, but also manageable. The framework helps us to break the complexity into pieces so that we can gain a better understanding of:

- ❖ how people build their livelihoods, and
- ❖ how livelihoods change over time;

in order that we can support people more effectively.

It provides a summary of the main components that influence livelihoods and needs to remain flexible so that we can adapt it as necessary to our own realities and situations.

Use of the SL framework on its own will not necessarily enhance development activity. We need to keep the core principles central to our approach. The framework is a useful tool for:

- ❖ analysis of complex situations (This can be done even during existing projects);
- ❖ designing new projects;
- ❖ input into policy;
- ❖ cross sectoral team work; and
- ❖ monitoring and evaluation.

Most development activity is still conducted within sectors (e.g. water, land, health etc). It is important to understand the impact this work has on the overall livelihoods of people and to be able to integrate efforts meaningfully.

There are a few different frameworks presently in use. The “**soft framework**” (CARE-Oxfam) is built up around the concept that household livelihoods are **built up around people** using resources and carrying out activities. Diversity between people in households and between households is shaped by different factors- e.g. gender, age and race. Different factors in different levels of the outside environment influence household livelihoods.

The “**hard framework**” (DFID) offers a powerful analytical tool is ordered around **representation of elements**, factors issues and relationships and influences. See handouts (coloured), for the DFID framework, explanation of elements and examples.

Further breakdown of framework elements

Vulnerability context

Usually this is defined in terms of:

SHOCKS; - diseases, natural disasters, economic shocks (e.g. stock market crashes), conflict, crop or livestock disease and death.

Shock generally can destroy assets directly and force people to dispose of what assets they have prematurely to cope with the situations.

TRENDS; - population, resource trends (e.g. erosion, land access), economic, trends in governance, technological trends.

Trends could be less harmful and are generally more predictable.

SEASONALITY; of – prices, production, health, employment opportunities, labour.

These shifts in prices, availability of food and the like are some of the most enduring

Unit 2: Participatory planning and design of water management in a household farming system
sources of hardships for poor rural people.

Livelihood assets/resources

These are building blocks or means of achieving livelihood outcomes.

HUMAN RESOURCES; this can be an outcome in itself in terms of better well-being but is also important to support all other types of assets and resources. These can be direct as in training programmes and primary health care for better nutrition and health. Or indirect in terms of reforming organisations (local and other) and influencing policy debates. These kinds of support are most appropriately tackled within a sector focus.

SOCIAL RESOURCES; this can provide a resource of last resort for the poor and vulnerable and is likely to be very important to them, but mostly unseen in terms of "project work". Most attempts to build social resources focus on strengthening local institutions.

NATURAL RESOURCES; for these it is important to consider access and quality and how both are changing. It includes issues also of biodiversity, erosion control, communal resource management and the like.

PHYSICAL RESOURCES; infrastructure is very important, but must be led by demand from the intended users. But infrastructure is only an asset as far as it facilitates better service provision. Access is also a key concern.

FINANCIAL RESOURCES; this is probably the most versatile of the assets. It is usually supported through indirect means such as organisational support to increase productivity of existing savings, institutional support to increase access to financial services and legislative support to help governments for example to create better safety nets for the poor (e.g. pensions).

Transforming structures and processes

These are the organisations, policies and legislation that shape livelihoods. They operate at all levels from the household to international and they determine access, terms of exchange and return to any given livelihood strategy.

Social structures are important because they facilitate (or prevent!!!) processes to function well. This is a particular problem in remote rural areas. External support can help solve these problems through building structures for the poor, but these have to be linked to other levels of structures and processes, to have any effect on overcoming isolation and lack of access.

Livelihood strategies

We need to understand the factors that lie behind peoples' choice of livelihood strategy and then support the positive aspects, rather than promote (push) a particular strategy that we like. It is about promoting choice, opportunity and diversity. Structures and processes can greatly assist in this process. But there will always remain the tension that different livelihood strategies that people choose may compete with each other. And a safety net may need to be designed for those who can not compete.

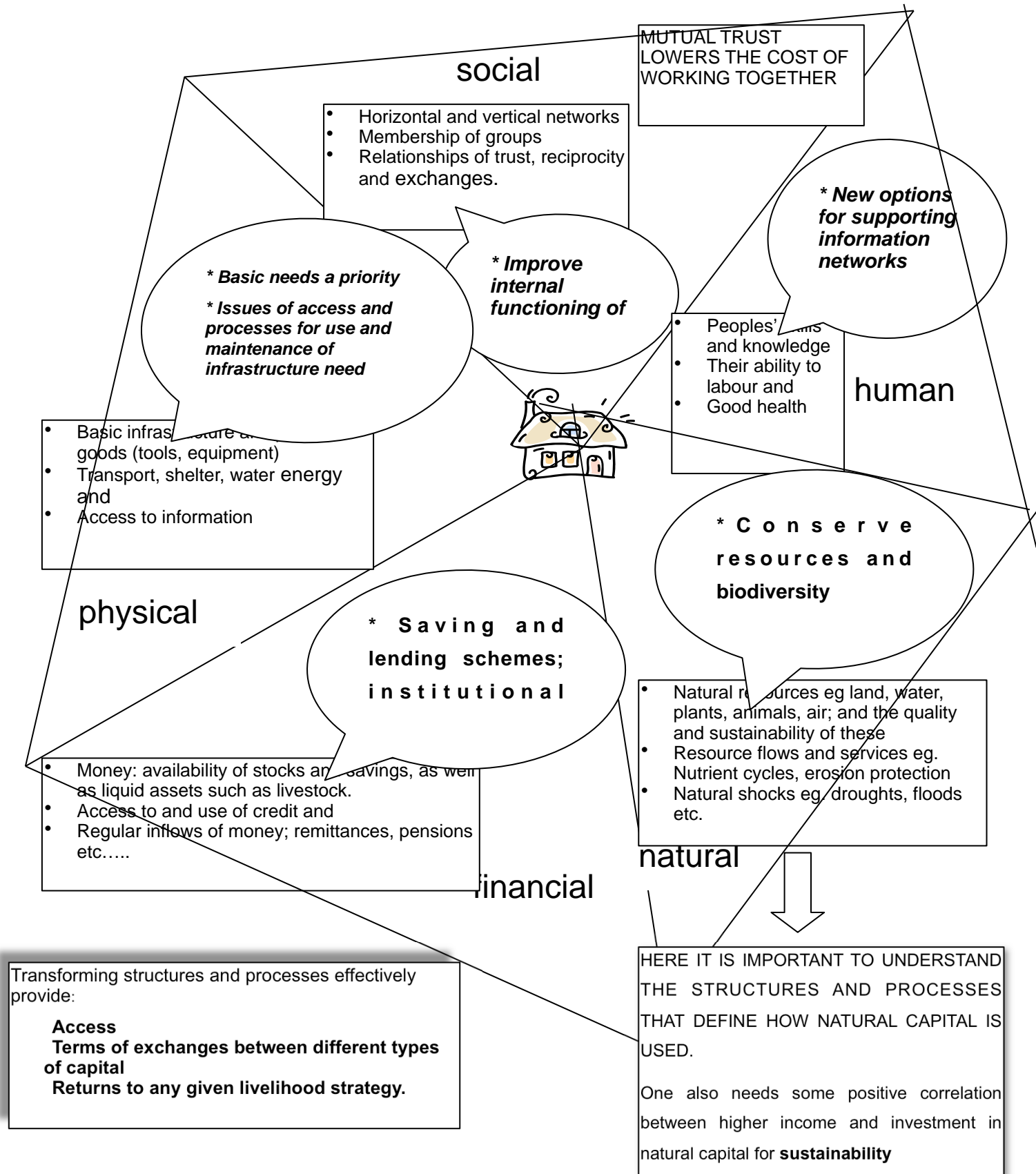
Livelihood outcomes

The outcomes presented in the framework are broad categories. Each one may or may not be relevant in a given situation. Livelihoods programmes should be judged on whether they contribute to the achievement of outcomes that people consider important. One way of ensuring this is to negotiate indicators with particular groups and to draw these groups into monitoring processes.

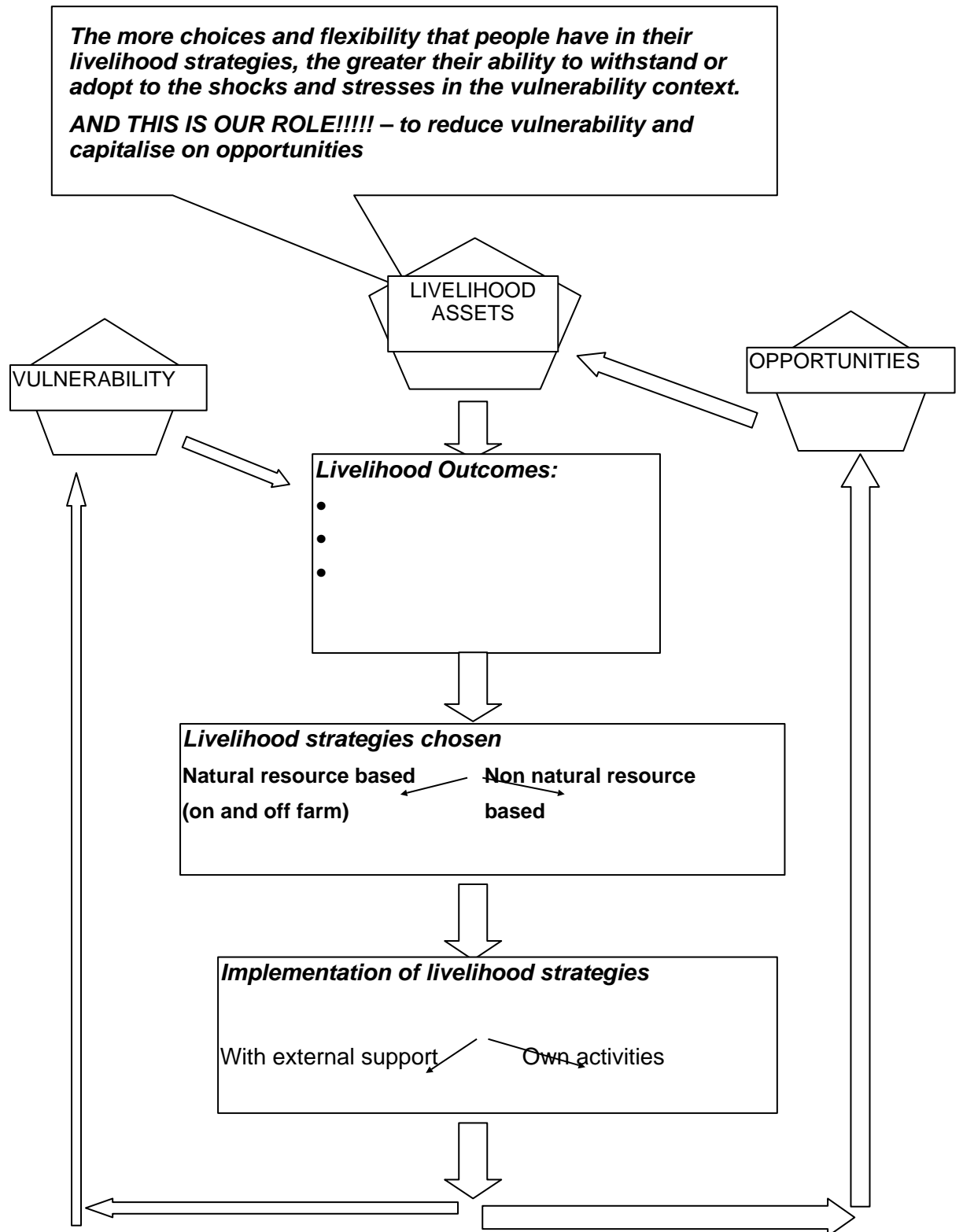
References:

Chambers, R. and G. Conway (1992) Sustainable rural livelihoods: Practical concepts for the 21st century. IDS Discussion Paper 296. Brighton

Analysis of Livelihoods Assets



Analysis of Livelihood Strategies



Some questions to consider in an analysis of livelihood strategies:

- ❖ What does the livelihood portfolio of different social groups look like? E.g. % income from different sources, amount of time and resources devoted to each activity by different household members, etc.
- ❖ How and why is this changing over time?
- ❖ How long-term is peoples' outlook?
- ❖ Which combinations of activities appear to be working best in terms of breaking poverty cycles?
- ❖ Which livelihood outcomes/objectives are not achievable through the current strategies?

Doing a Situation Analysis

Our aim is to understand the reality and the community/clients' needs from their perspective, as if we are in their shoes and their situation. This means that we have to become familiar with the situation.

At this stage we aim to gather as much information about the situation within which the problem or need is found, or where changes are envisaged. We need to explore the situation from as many angles as possible. The Sustainable Livelihoods Approach and framework has emerged as an important guide for such an analysis. We gather information about the important actors/stakeholders, beneficiaries and so on and get their views and perspectives on the situation. It is important to remember that we will be dealing with their perceptions and understandings of the situation, which are shaped by their values, concepts and opinions. The facts are often hidden amongst these.

There are a number of different participatory methods and tools that can be used to assist with a situation analysis. These will be described below. Once we have looked at the broader situation, we can focus more directly on the problems mentioned by people and the potential appropriate interventions for these. Again participatory methods are very useful.

Group Activity 1: Doing a Sustainable Livelihoods analysis

Aim

To build understanding of the issues involved

Instructions

Sit in pairs or groups of three. Use the two pages above; "Analysis of Livelihood Assets" and "Analysis of Livelihood strategies" as guidelines and do these analyses for your home situation or a rural situation that you know.

Include also:

Which government policies and programmes impact on this situation and how.

Which vulnerabilities, stresses and shocks are people subject to

What specific opportunities are there in the environment.

Write these up on the sheets provided

Also prepare a short group presentation for reporting back to plenary.

Time: 3h

Participatory methods

These broadly fall within approaches and concepts that are now generically called Participatory

Learning and Action (PLA). PLA enables rural communities to do their own investigations through modelling, diagramming, ranking and quantification; to share their knowledge and teach outsiders or investigators; to do the analysis and presentations and to plan and own their outcomes – Chambers, 1993. In PLA processes, knowledge is generated and articulated in more participatory ways and information is gathered and shared in a non-threatening manner.

Four Classes of Participatory Methods

Source: Jules N. Pretty and Simplic D. Voudouhe (1995). Using Rapid and Participatory Rural Appraisal. In Improving Agricultural Extension: A reference manual.

GROUP AND TEAM DYNAMICS	SAMPLING
Team contracts	Transect walks and direct observation
The night walk	Wealth ranking and social maps
Work sharing	
Rapid report writing	
Shared presentations	
SENSITIVE INTERVIEWING AND DIALOGUE	DIAGRAMMING AND VISUAL CONSTRUCTION
Semi-structured interviews	Participatory mapping and modelling
Types, sequencing and chains of interviews	Seasonal calendars and activity profiles
	Time lines and local histories
	Venn and network diagrams
	Matrix scoring and pair-wise ranking

Group Activity 2: exploring participatory methods

Aim

To introduce various participatory methods that can be used in a situation analysis.

Instructions

Watch the video provided called “Common Affairs” based in Ghana in a village where a situation analysis was done. PLA methods were used.

Then in pairs or small groups of 3 people, list and describe the techniques that you saw. Give an indication of what each method can be used for.

Also prepare a short group presentation for reporting back to plenary.

Discuss and analyse findings in the plenary

Time: 1.5h

Principles of PRA

If PRA is the methodology used, then the principles here refer to the paradigm within which we are working and encompasses those values needed to be able to work within this paradigm or approach.

The principles of PRA can be summarised as the following:

Learning is from, with and by local people, eliciting and using their criteria and categories.

Learning is rapid and progressive, building through flexible and interactive methods.

Handing over the stick: Practitioners facilitate, the community investigates, analyses and

presents, so that they own the outcome.

Triangulation; by comparing information using different methods, sources of information and disciplines and cross checking to get to closer approximations of the truth

There is a focus on analysis of diversity, rather than seeking a simplification of the complexity.

Biases are recognised and offset.

Team composition is balanced and team interactions are consciously managed

There is critical self-awareness as practitioners examine their own behaviour, use their own best judgement and embrace error.

Exercise 1:

Divide into three groups

Read through the principles presented and discuss these to ensure a shared understanding in the group. Rewrite these principles in your own words if necessary.

Then, take one of the principles and describe an example of this that you have seen in the work that you have done. If this is not possible, take one of these principles and think into how you would ensure this principle is upheld in a field work environment.

Summarise your principles and examples on flipcharts and present to plenary.

Methods used in PRA

The facilitator briefly peruses the PRA reader with participants.

Exercise 2:

Divide into pairs.

Each pair choose one RPA method (different to the other pairs) , chooses a topic to explore and “implements” the method, consciously using methods of visualization described. Use the PRA “toolkit” provided.

Present briefly to plenary- gallery style.

A focus on semi-structured interviewing and pair-wise ranking

Semi-Structured Interviewing:

This is a guided conversation in which only the topics are predetermined and new questions and insights arise as a result of the discussion and visualized analyses.

Semi-structured interviewing appears informal and conversational. It is a well defined and systematic activity with a set of clearly defined goals and guidelines. SSI's concentrate not only on the questions asked, but also on the context in which the interview takes place.

SSI's can be used for individual interviews, key informant interviews and focus group discussions.

Key components of SSI's

Team preparation: the goals of the interviews need to be defined – What is important to understand more about and how will we find this out? The preparation should focus on developing an interview guide or checklist, assigning team roles and responsibilities and ensuring good group dynamics and behaviour.

Interview context: This includes giving attention to the setting (where?), timing (when?), body language, seating arrangements (how?) and biases (why?, who?)

Sensitive interviewing: Attention needs to be given here to sensitive listening and questioning. It is difficult to ask open-ended, non directive questions and to probe answers. Yet effective interviewing will only occur if this happens.

Judging and cross checking responses: Information that is generated needs to be cross-

checked, rather than accepting the first answer one hears. This is part of probing.

Recording the interview: Recording the detail of interviews is vital. Ask permission. Use a recorder if discussing and writing at the same time is difficult for you. Record the detail of what is said and also what is NOT said and observed. Make follow-up notes and record personal impressions.

Self critical review: After the interview it is important to assess critically which questions were effective and which were not, how some questions could have been phrased differently and how the context influenced the flow of information.

Sensitive questioning

- ❖ Open ended questions (non-directive)
- ❖ Non-ambiguous questions
- ❖ Simple questions (not a sequence of 2 or more together)
- ❖ Lead from broader more general topics into the specific
- ❖ No abrupt changes of topic
- ❖ Probe! Use the 6 helpers, what? When? Where/ how? Who? And why????
- ❖ But why? (do not overdo this – threatening)
- ❖ Use visualization!!!

Facilitator reads out a short list of questions and asks for comment. What is “wrong” with the question.

Exercise 3:

Tricky transcript: PLA; A trainers guide. 1995. Jules N. Pretty.

Divide into 3 groups

Read the transcript. Identify one “good” and “one” bad question and why you think so.

Rephrase the “bad” question in a better way.

Report in plenary and discuss.

Exercise 4:

Brainstorm “good” and “bad” aspects of interviewing and write on a flipchart

Divide into 2 groups. Each is to role play an interview situation for 5 minutes

Discuss in plenary

Pairwise Ranking

Pairwise or preference ranking follows a similar process to matrix scoring; semi-structured interviews are first conducted to identify peoples’ options and criteria. Next, a matrix is developed by them, in which the items or alternatives are compared and contrasted.

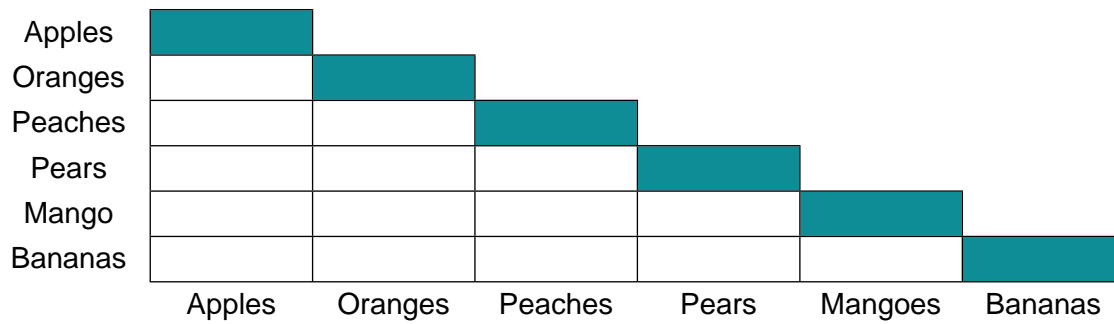
In pairwise ranking each individual item is compared directly against the others until they are ranked from highest to lowest. (In matrix scoring the items are compared with selected criteria and judged accordingly).

Pairwise ranking is used:

- ❖ To determine the main preferences and priorities of individuals or small groups for a set of items (such as trees, seed varieties etc); and
- ❖ To compare the priorities of different individuals and groups against one another.

A pair-wise matrix has two identical lists of items or alternatives, one across the top and the other down the left side. Each cell represents a paired comparison of two items or alternatives.

An example is shown below.



The informant is asked pair by pair which she prefers. Once the choice is made, it can be recorded in the matrix. The informant should then be asked why she has made this choice. These reasons should be recorded. The process continues for all possible combinations.

Exercise 5:

Divide into groups of 3 or 4. One recorder, one interviewer and one or more interviewees.

Choose a theme and elicit 5-6 items to compare

Start the pair-wise ranking exercise, with one person recording the reasons for choices

Present to plenary as a gallery.

2. War on Hunger through Mind Mobilisation and Water for Food

Mind mobilisation and visioning

Introduction

The term 'Mind Mobilisation' was first used by researchers of the International Water Management Institute (IWMI) to describe both the *philosophy* and the collection of facilitation *methods and approaches* used by MaTshepo Khumbane. Mrs Khumbane is a social worker by training and devoted more than four decades of her working life to help women with malnourished children to stand up to apathy, helplessness and scorn, and to take control of their lives.

Why is Mind Mobilisation necessary?

When the mother of a house consistently fails to put food on the table for her dependants, this has deep and severe impacts on her psychological well-being. She feels ashamed of herself, helpless and powerless to do anything about the situation. When this persists long enough, she loses hope and becomes apathetic, because she no longer believes there is anything she can do to change the situation. She often withdraws from community life to avoid the contemptuous glances and nasty remarks of neighbours. This is one of the reasons why the most needy are seldom to be found in village meetings where external poverty relief programmes are introduced and discussed. Even when sufficient effort is made to ensure that she hears about opportunities, the battle is far from won. She may have been in a state of apathy for years and would need counseling and encouragement to change her outlook on life and her patterns of behaviour – and even then there is no guarantee. Mrs Khumbane's methods are based on her deep understanding of these realities in the lives of food insecure women.

As a young social worker, MaTshepo realised how utterly pointless and indeed counter-productive it was when nurses at rural clinics would scold a mother because her child has 'kwash'¹ and would angrily instruct her to 'go and give the child milk!'. Even today, many rural mothers dread going to the clinic. They cannot understand how their children could have 'kwash' if they are feeding them in the traditional way², and anyway, no matter how scared they may be of the nurse, they simply don't have milk to give the child – not on that day, nor on the many days to come until the next clinic visit.

¹ Kwashiorkor – (describe)

² Refer to Erna report, 2006.

Alcoholics Anonymous

12 steps toward God

We admit helplessness in one or more specific areas of our lives.

We believe that there is a Power greater than ourselves.

We make a decision to turn our lives over to the care of God as we understand Him.

We make a searching and fearless inventory of ourselves.

We admit to God, to ourselves, and to another human being the exact nature of our wrongs.

We are ready for God to change us, to remove these defects of character.

Humbly we ask Him to do so.

We make a list of all the people we have harmed, and we become willing to make amends to them all.

We make direct amends to such people when possible, when to do so would not injure them or others.

At intervals we continue to take personal inventory, and when we are wrong, promptly admit it.

Through daily prayer and meditation, we seek to improve our conscious contact with God as we understand Him, praying only for the knowledge of His will for us and for the power to carry it out.

We try to carry this message to others and to practice these principles in all our affairs.

Extract from: 'Beyond Our Selves', by Catherine Marshall. 1961.

Through her life's work, Mrs Khumbane has shown that instead of scolding and scorn, people need hope and encouragement, coupled with practical skills to overcome hunger. Mind Mobilisation aims to rekindle the hope and open the mind to absorb the practical skills of low-cost organic production methods and rainwater harvesting to fight hunger at home. This is the women's "War on Hunger".

How does Mind Mobilisation work?

IWMI studied Mrs Khumbane's approaches for several years, in an attempt to identify each method, understand its application and relevance, and to establish whether there was a typical sequencing in the use of the methods that is most likely to lead a person to self-reliance, food security and a more stable and fulfilling personal and family life.

IWMI's research found a strong correlation between Mrs Khumbane's approach and the counselling approaches which were first developed by Alcoholics Anonymous and later adopted to assist individuals on their difficult journey out of substance abuse of all kinds.

The original Alcoholics Anonymous (AA) process was called "12 steps toward God", and involves an intensive process of self-reflection, action and refocus.

It is important to understand that Mind Mobilisation (MM) is essentially a personal growth process. Several important steps need to take place in the individual's mind, and for this the sequencing is important. However, depending on the individual case, more or less intervention may be necessary to guide and support the individual through various parts of this painful but liberating process.

It is a well accepted fact in substance abuse counselling that the healing process cannot start until a person **admits to him/herself that he/she has a problem**. When the individual reaches this point of admission, it is usually followed by feelings of helplessness and fear. A significant feature of both the AA and MM processes is that at first it focuses the individual's attention on **herself**, then strengthens her by creating a small **support group** around her of people who are facing the same problems she does; and next gives her a greater purpose by shifting her focus to the **plight of others**.

The personal process of Mind Mobilisation is set within a broader framework of community and leadership mobilisation, which creates an environment to recognise and morally support (instead of scorn) the efforts of those trying to gain control over their livelihoods.

A person facilitating food insecure households needs to be aware of the difficulties faced by the person shouldering the responsibility for the household's food security – both in her view of herself, and in her interactions with others, such as members of her household, her neighbours and community leadership. Each step in the facilitation process has a specific purpose, but every step builds up to the ultimate aim of enabling the food insecure individual to lead her household to food security and stability. Some steps take place in community meetings, some in small group situations and yet others only through personal reflection. 'Milestone steps' are special steps which must be completed before subsequent steps can take place meaningfully.

Finally, it is critically important to realise that this is not a mechanical step-by-step process or 'cook-book recipe'. It is a process of care and nurturing, and the facilitator must stay sensitive to the mind processes of the person as they unfold, so that she can provide the right support as and when it is needed.

The facilitator cannot shoulder this alone, and she cannot be everywhere at once, especially for follow-up support after the Mind Mobilisation workshop. Thus, it is critical to create a local support group. A strong bond usually forms among participants during the shared experience of the Mind Mobilisation workshop, which provides a good starting point for a mutual-care support group when they return home. The facilitator aims to create a culture and practice of mutual care between participants during the Mind Mobilisation workshop, so that this can form the basis for future behaviour among them. The candle ceremony establishes a burning candle as a symbol of hope and a regular reminder of their pledge to stay committed and to notice and care for each other and for others in the village who face similar problems.

Overview of community and individual facilitation processes for Mind Mobilisation

In Table 1.4 below, an overview and detail is given of a typical (NB: typical, but NOT fixed) sequence of events to enable food insecure households in a village to undergo Mind Mobilisation and engage .

In Table 1.4 below, first, '**village level processes**' are described. The objectives are:

- ❖ To enlist the support and understanding of village **leadership** and other organisations involved in support to households
- ❖ To create awareness and understanding among the broader **community**
- ❖ To create interest among **target households** and elicit their participation

In the second section in Table 1.4, '**individual processes**' are described. This covers **personal experiences** of the food insecure individual, and therefore includes all the processes in the Mind Mobilisation workshop, and other processes that touch the individual. The following is covered:

- ❖ Finding target participants and eliciting their participation
- ❖ Mind Mobilisation workshop
- ❖ Follow-up household visits
- ❖ Follow-up workshops and training

Third, '**follow-up support group activities**' are described. This covers the group's **support to each other** and their **outreach to others** suffering from the same problems.

Fourth, '**follow-up and report-back to village leadership and other organisations**' are described.

Table 1.4 Overview of community and individual facilitation processes for Mind Mobilisation

TIP: THIS TABLE IS FULL OF INFORMATION AND VERY IMPORTANT!! *How to read this table:*

First read through the ‘**Steps**’ column to get a quick overview of what happens during each ‘event’. You can also note who is involved in that step, to better understand the step.

Next, you can study the detail in the last three columns for each step. These columns give you more detail on:

- **what is done** during each step;
- the **purpose** of that step (i.e. how this helps the food insecure individual towards self-reliance); and
- typical **pitfalls** to look out for during each step, which should help you to facilitate that step better.

Event	Who is involved in this step?	Step	What is done during this step?	How does this step help the food insecure individual towards self-reliance?	Pitfalls during this step
VILLAGE LEVEL PROCESSES (to create an enabling environment in the village for support to food insecure individuals)					
Meeting the community leadership	Facilitator(s), community leadership	“Open the door”	Meet community leadership; tell them about the initiative; explain how Mind Mobilisation works; explain how rainwater harvesting works; ask if the leaders would support this; ask what else you should know about that could influence the initiative; get contact details for others involved in household support initiatives; explain what the leaders can do to help and what they should please try to avoid	Help leadership understand the significance of hungry family’s own efforts; help leadership realise the power of their own actions in encouraging/discouraging food insecure households; get leadership’s help in convincing broader community not to undermine the target HHs efforts	1. There is a danger that well-meaning leaders want to take over and do things for households, instead of allowing them to do things for themselves so that they can grow in confidence and self-reliance; 2. Leadership rejects facilitator(s) and/or proposed initiative
Meeting(s) with organisations active in supporting food security or other household support programmes in the village	Facilitator(s), representative s of organisations involved in household support programmes in the village	Create partnerships Raise awareness	Same as above. Informs organisations of the planned initiative and seeks their support and/or collaboration. If there is a good match of objectives, plan how you can work together to make sure potential target HHs join the initiative.	Improves coordination between different initiatives; seeks synergies; avoids confusion and overlaps that would be to the detriment of the progress of the food insecure households	1. Other organisation(s) reject facilitator(s) and/or proposed initiative 2. Incompatibilities between existing and proposed new initiatives
Community mass meeting	Facilitator(s), community leadership, representative s of other organisations, community (especially struggling families)	Awareness raising; HHs register to participate in the initiative	See “Introducing the idea”		
Meeting with interest group/ target households	Facilitator(s), representative s from collaborating organisations, target HHs	Awareness raising; HHs register to participate in the initiative			
INDIVIDUAL PROCESSES (all processes that the individual experiences on her journey to food security. Focussed on own skills – personal and technical – for household survival)					

Unit 2: Participatory planning and design of water management in a household farming system

Event	Who is involved in this step?	Step	What is done during this step?	How does this step help the food insecure individual towards self-reliance?	Pitfalls during this step
Household visits	Facilitator(s), representatives from collaborating organisations, target households	Find food insecure households; HHs register to participate in the initiative			
Mind mobilisation workshop	Facilitator, maximum 10 target household members	Introduction	Opening Prayer & Welcome, Housekeeping rules, Introductions & Expectations		
	Each participant	Self-reflection	Draw own "Present situation analysis": Each participant reflects on her own situation, honestly and in detail. She captures this on flipchart in a detailed drawing of her homestead, who eats there and how they survive.	Reflecting on her situation, she confronts herself with the stark reality. In day-to-day life people get so used to their situation that they stop questioning whether this is what they want from life, and stop looking for alternatives.	
	Facilitator, participants	Admit problem to self and others	Plenary report-back and joint discussion on each workshop participant's "Present Situation Analysis"	Healing cannot start until a person admits to herself that she has a problem. In presenting and discussing her 'Present day analysis' she admits to herself and others that she has a serious and overwhelming problem, which, for a long time, she has been unable to overcome. This is a very hard, but very important step.	
	Counsellor/facilitator, individual participant	Extra support	Individual counselling (where necessary)	Most people find talking about their present situation painful and many break down and cry. Some individuals are traumatised and inconsolable. If there is only one facilitator, she may want to call for a break at this point and spend some time alone with the individual to support her through this very difficult experience. Ideally there should be a second counsellor/facilitator available to work with the individual separately while the rest of the group continues.	

Unit 2: Participatory planning and design of water management in a household farming system

Event	Who is involved in this step?	Step	What is done during this step?	How does this step help the food insecure individual towards self-reliance?	Pitfalls during this step
Mind mobilisation workshop	Storyteller, participants	Receive hope	“Tshepo’s Story”: Listen to the life-story of someone (Tshepo or other) who was in the same position and succeeded in getting out	By hearing first-hand from someone who ‘made it’, she receives hope that there is a way out – a way that is difficult and which will require great personal sacrifice, but which is not impossible	
		Decide to change	She decides that she wants to change	At this point people experience a mixture of fear and excitement. Once she has taken the decision to change, energy levels are usually high and she is eager to take practical action. This energy is next channeled into a visioning and planning exercise	
	Each participant	Vision and plan	Draw own “Helicopter Plan” (also called the “five-year food security plan”). This is done by “flying over” her yard in her mind’s eye and drawing onto flipchart paper her vision of what she would like it to look like in five years’ time.	She develops a vision of how she wants to be, and draws up a doable plan of action of how she can get there. This becomes her ‘roadmap’ for the next five years. She takes this home and henceforth plans her daily activities towards achieving the Helicopter Plan in five years. This helps to keep her focused and motivated in periods of low morale, and also helps avoid that she becomes discouraged by trying to do too much in the beginning	
	Facilitator, participants	Take action; learn practical skills	Practical demonstration: deep trenching for intensive gardening	Adults learn best by doing. By practically measuring out a new trench bed, digging it, placing the organic stuffing, and planting some seedlings, she becomes less likely to put off starting her own when she gets back home. Preparing the demonstration bed with other participants binds the support group closer together and helps them remind each other how to do it once they get home.	
	Facilitator, participants	Learn how to amend wrong behaviour; learn new skills	Learn about any of a range of topics, depending on the immediate need and interest of the particular group	Some topics can be covered during the MM workshop, others can be done in follow-up trainings, which may take place in the village, e.g. at one of the participants home, or in rotation at several homes	
	Participants, facilitator	Establish mutual-support group & learn to share	Discussion on how to support each other henceforth	The individual establishes supportive ties with others who are going through the same process and together they pledge to motivate and counsel each other	
	All		Celebration party	Cement good relationships and goodwill among the participants	
	Facilitator, participants		Seed or seedling sharing	Participants witness and experience how to share, discuss how it is better to give and receive, rather than to grab and hide	
All	Learn to notice and care for others	Candle lighting	Each participant commits to notice others who are in similar trouble, and to draw them in too, and share the message of hope		

Unit 2: Participatory planning and design of water management in a household farming system

Event	Who is involved in this step?	Step	What is done during this step?	How does this step help the food insecure individual towards self-reliance?	Pitfalls during this step
Participants return home	Target households	Return home and get started	Discuss and refine Helicopter Plan with other HH members		
		Start intensive gardening	-Prepare first trench bed and plant seedlings. -Water with grey water.		
Follow-up household visits	Facilitator(s), target households	First visit: Moral support & limited technical advice	-Visit the household. -Ask her to show her helicopter plan and explain what changes her family have suggested. Praise and encourage her! -Ask her to walk and talk through her garden, and to explain her future plans for it. Praise and encourage her!	-The main objective of the first household visit is to praise her, so that her hope and determination can be strengthened. -Limit your technical advice at this stage: give simple responses to specific questions she may have, or give some small pieces of key advice to point her in the right direction.	DON'T criticize! Praise her every effort. DON'T get carried away and overwhelm her with lots of technical advice! There will be lots of time to shape and refine the practices in the months ahead.
		Later visits	-Ask her to walk and talk through her garden. -Notice and praise progress, new ideas, etc. -Give technical advice as appropriate -Ask to see her helicopter plan and notice whether she uses it regularly (or is it kept only to please you?). -Ask her to show her monitoring tools and tell everyone what interesting things she has learnt from using them	-Showing interest in what she does and in her ideas strengthens and encourages her, and gives everyone a chance to learn from each other's ideas. -Through your behaviour you can remind and show her how the helicopter plan is a living planning document that helps the whole family to keep the dream alive and plan and replan their activities from day to day. -The same applies to her monitoring tools.	
Follow-up workshops	Facilitator, participants	Learn how to amend wrong behaviour Learn new skills	Learn about "Family Time Management Charting"	She recognises the wrong behaviour that got her into trouble in the first place, and implements mechanisms to counteract this in future	
	Facilitator, participants		Input and group discussion on Self-reliance		
	Facilitator, participants		Moral regeneration charting		
	Facilitator, participants		Family nutrition		
	Facilitator, participants		Food processing and storage		
	Facilitator, participants		Planting calendar		
	Facilitator, participants		Harvesting calendar with harvest estimates		
	Facilitator, participants		Monitoring tools		
	Facilitator, participants		Other topics, according to needs identified by participants		
FOLLOW-UP SUPPORT GROUP ACTIVITIES (group members' support to each other and outreach to others with similar problems)					
During household visits by the facilitator	Facilitator and participants	Visit each other	Encourage everyone to walk together from house-to-house to look, listen and learn from each other during household visits	Learn from each other, get new ideas Get motivated to do as much or more than neighbours Cement good neighbourly relationships Notice each other's hardship and discover ways to help	Avoid too much attention being lavished all the time on the 'star' in the group. Avoid jealousy and unhealthy competition (healthy competition is good, though!) Protect the spirit of mutual care.

Unit 2: Participatory planning and design of water management in a household farming system

Event	Who is involved in this step?	Step	What is done during this step?	How does this step help the food insecure individual towards self-reliance?	Pitfalls during this step
Other group meetings	Participants, sometimes facilitator	Visit each other, cultivate friendship	Share ideas, sorrows, joy. Give feedback to those who may have been unable to attend the facilitator's household visits, or training workshops. Discuss how to draw in others with similar problems. Discuss problem cases in the village and how to help (e.g. child headed HHs, injured or disabled individuals, etc)		
FOLLOW-UP AND REPORT-BACK TO VILLAGE LEADERSHIP AND OTHER ORGANISATIONS (further building the enabling environment for moral and other support for households' efforts)					
Report-back to community leadership	Facilitator and participants				
Report-back and further collaboration with other organistaions	Facilitator and participants				

Further background information and/or examples for some of these steps are given in the sections below.

Village level facilitation processes

Introducing the idea to the community

Example of input from facilitator, when introducing the idea to target households:

"In our area we have a problem of poverty, and within poverty, the worst part is hunger. In this area, for how many months of the year do people have food?"

People here plant seasonally, only when the rains allow, and this does not give enough food for the year.

This idea is about being able to plant all the time, around the year, to get a lot more food.

First, you 'make your own river in the yard', by digging a furrow to channel the rainwater when it comes, to where you want it.

Second, you dig a trench to plant in.

This trench will drink from your 'river-furrow'.

When you dig the planting trench, you put the top soil to one side, and the other soil to the other side.

Dig 1m deep, or if you hit rock, no problem, then you will just raise the bed (heap it up) to get it 1m thick.

Each trench you can make as long as you wish, one or two or more spades long.

The width must be narrow enough so you can reach everywhere in the bed without ever stepping into it, so that the soil can stay soft and lovely for the plant roots to grow easily. The bigger the roots, the bigger the plant.

Third, you fill the trench with any rubbish that will rot over time:

Put in: dry grass, leaves, rusting tins, ash from the cooking fire, wet or dry manure

Do not put in: plastic, glass, rubber, tins that won't rust

Heap up above the ground, to compensate for subsidence as the rubbish rots away. This looks just like a grave. It is a grave for hunger. We are going to bury the hunger.

Your last layers will be a layer of manure, with a layer of top soil over that. Don't mix these two last layers if you want to plant immediately.

Fourth, you can plant immediately, rain or no rain. Keep your plants wet with any little water you can find, like water from washing the dishes and bathing.

Later, you can think about water storage to help during dry periods.

Whoever is interested to plant throughout the year, can do this. If you are willing to use your ten fingers to work hard, you can do this. Fortunately, each trench you have to dig only once in your life, after that they keep on providing food for you, even into your old age. That is why people call them their 'special pension'."

Individual Mind Mobilisation processes

Mind mobilisation: introduction

Base information for facilitator(s):

❖ *Water for Food Movement Charter (see Appendix A)*



The Charter was developed by women of Water for Food Movement during a celebration held in Lesotho. The Charter expresses the women's determination to take control of their own lives through simple practical activities, to support each other in the fight against hunger and poverty, and to take note and draw in others around them who face the same problems.

❖ *Water for Food Movement Vision* (see Appendix B)
In the Water for Food Movement's vision of the future, active households in communities are taking responsibility for their own livelihoods, starting with food as a priority to liberate the minds and rebuild the family as the primary institution for the re-socialisation of the youth. It envisages communities progressing by caring for each other. It emphasises three "layers" in the development process of a household, namely household food security, then participation in community projects, then participation in business enterprises, and urges all not to get in trouble by trying to skip a step.

Example of input from facilitator, when introducing the idea to target households:

"If you don't change your situation, no-one else will.

Why is this a movement? Because it costs nothing, you don't even pay five cents. Yet you benefit a lot, therefore you pass the benefit forward to others around you, again without cost to yourself.

Now, when someone asks if you have a job, you will no longer be saying: 'No, I'm not working'. You will be saying: 'Yes, I work at home'."

Household present situation analysis

Each participant finds a quiet place to sit and draws her/his own present yard and household situation (as detailed as possible) on flipchart paper

Present back to other participants in plenary

The facilitator and other participants ask questions about household well-being and yard features (taking hints from the drawing)

Notes can be made of the report-back

This drawing and notes on the household's present situation analysis is effectively a baseline study of that household.

Example to read:

Appendix E: Mind Mobilisation Household Report

Visioning ('Helicopter planning')

Participant draws her/his Helicopter Plan on flipchart (as detailed as possible) showing how she/he would like her/his yard to look in five years' time

She presents this back to other participants in plenary

The facilitator and other participants ask questions to lead the thinking towards interim goals and reality checks.

Example questions:

- ❖ “Are you sure the water flows in that direction on your yard during a rainstorm?”
- ❖ “You already have 2 beds, how long did that take you? How much would you realistically be able to do by (target date) (Christmas, next month, etc)”

Example of Mrs Khumbane’s original household Helicopter Plan.

Note how sections have been changed over time and pasted in over the original.

Practical demonstration: deep trenching

Practical demonstration on how to fill the trench bed
(Refer to Module)

Seed/seedling sharing

Seedling supply to facilitate immediate planting.

Follow-up workshop: how to harvest your own seed and grow your own seedlings

Further follow-up trainings

Garden layout design

- ❖ Practical house-to-house support in follow-up to the helicopter planning.
- ❖ Initial thinking about placement of water storage
- ❖ Relationship between the 'planting trenches' and the 'furrows the trenches drink from'
- ❖ The furrow the tank will drink from.
- ❖ Etc

Family nutrition

The problem of poverty, of which hunger is the worst

- ❖ Months of food available here to households unable to meet their daily food needs

What are we eating?

- ❖ What we eat daily/weekly/regularly/hardly ever
- ❖ Special foods we eat for special needs (e.g. high blood pressure, young mothers)
- ❖ Foods we feed weaning children and under five-year olds

What would we prefer to eat if there was no limitation?

- ❖ What we would eat daily/weekly/regularly/hardly ever
- ❖ Special foods we would eat for special needs (e.g. high blood pressure, etc.)
- ❖ Foods we would feed weaning children and under five-year olds

Participatory diet gap analysis

(analyse 'foods we regularly eat' into three main food groups: go, grow & glow foods)

- ❖ Men
- ❖ Women
- ❖ Children

Which diet gaps can we fill from homestead agricultural activities
(list of achievable foods in our area)

- ❖ U5 children
- ❖ Young mothers
- ❖ High blood pressure
- ❖ Others

Follow-up workshop:

Good, low-cash food preparation, processing and storage methods

(How to prepare and store food to get the maximum nutritional benefit from it)

Planting calendar

Participatory planning of the homestead planting calendar to fill the diet gaps identified:

- ❖ Crop choices to yield a wide variety of 'go, grow and glow' foods year-round
- ❖ Cultivar choices: open-pollinated, long-yielding, pest/disease/drought resistant, and adapted to the local climate
- ❖ Successional planting to yield a constant supply of fresh food to the household
- ❖ Seasonal planting of winter/summer crops
- ❖ Rotational planting to avoid plant diseases

Harvesting calendar with harvest estimates

- ❖ Participatory analysis of the harvesting calendar
- ❖ Estimates of food flows (weekly and seasonally)

Monitoring tools

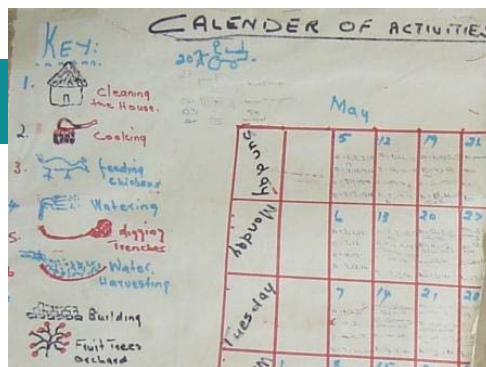
Mrs Khumbane has developed a range of Self-Evaluation Tools for Households and Mutual-Care Groups, including:

Household self-monitoring tools:

- ❖ Household baseline tool: Present situation analysis
- ❖ Household visioning tool: Helicopter plan (see example above)
- ❖ Family time management tool/ Daily household activity charting

Example: “Calendar of activities”

- ❖ Moral regeneration charting (see Appendix C)
- ❖ Household action planning tool: Planting calendar
- ❖ Household food flow planning: Harvest calendar
- ❖ Water and weather calendar (daily charting of climate, rainfall, water use and storage)



Mutual-Care Group self-monitoring tools

(see Appendix E: Evaluation Tool)

- ❖ Self-evaluation of mobilisation and own creative mobilisation techniques
- ❖ Self-evaluation of mobilisation impacts: participants and support structures
- ❖ Self-evaluation of own technology initiatives and support received

Programme recording and reporting tools (Implementing Agents)

- ❖ Homestead layout drawing
- ❖ Gardening monitoring form (planting; consumption/gifts/sales; watering; diversification; family togetherness; care and assistance supplied to others, attendance of mutual-care group/ workshops /cross-visits)

Summary of Principles for Mind Mobilisation

To be added.

3. Physical planning aspects

Introduction

It is assumed that the subsidy submissions to the Department will be channelled through approved ALEs. In order to ensure that the scale of the operation will be such that the provision of organisational structures for the implementation of the processes can be economically justified applications will have to be submitted on behalf of villages or communities and activities may extend over several years.

The emphasis on all facets of the process will inevitably have to be centred on mobilising local organisations and people and submissions to the Department will need to include a clear outline as to how and by whom this is to be achieved. In common with other similar projects community members will have to be trained to fill supervisory, administrative and technical roles. These will be over and above the important role that will have to be played by community facilitators.

The initial submission to the Department should include a “scene set” and suggestions follow as to how this can be approached as well as notes on the content and nature of training that may be required.

Setting the scene

Location and maps

The locality can be shown on a scan or photocopy of a road atlas map. The next level of detail is a 1:50,000 topographic map (now available on CD) that provides an indication of the layout of the village or villages, land slopes, roads and land use as well as streams and dams. Ortho-photos, large scale aerial photographs with contour lines, can be used for identifying individual residences and plots, while the “Google Earth” satellite images have even further extended possibilities. What has become evident is that GPS is an essential management tool when working in the deep rural areas. The importance of good mapping cannot be overestimated; it forms the basis of virtually all the overall planning actions that follow. There is no better way of presenting what is happening in the villagers than by annotating the photographs or maps with short texts.

Wards, population, incomes, economic activities, infrastructure etc

Information is available on CD at electoral ward level from the compilations developed by the Municipal Demarcation Board (SA Explorer) that are now in their third edition. The data is derived from the latest population census and provide the information required for decision-making concerning the selection of applicants for grants. Apart from income estimation statistics are provided on the availability of electricity, potable water, and sanitation.

Natural resources

Climatic conditions, particularly rainfall, have a significant impact on the likely role to be played by the programme in promoting food security and income augmentation. There are two valuable sources of information. The ARC Atlas that is in the process of being released in electronic format in AGIS, the DOA website, is a condensation of the maps and databases comprising the Land Type Survey of South Africa compiled over the past 25 years. The Atlas is a valuable resource in that once the coordinates of the sites have been established the planner is well informed about the circumstances of the natural resources available to the villages. The second edition agro hydrology Atlas developed with WRC funding by the KZN University, also in the process of release, and is comprehensive and includes detailed information on climate and water resources.

Construction resources

It is important that the building methods and materials being used in the area be established and recorded. Allied to this every effort should be made to establish the prices of local materials, or

locally available materials, and the transport facilities currently utilised. Obviously this can have a major impact on the construction materials and methods recommended for the tanks. The need to establish the position of the soils in respect of both the establishment of gardens as well as the excavation of the tanks by digging test pits has been stressed. Normally this would not be necessary on each site but sufficient test pits would be required to ensure that the overall properties of the soil in the village was established.

On site planning

First principles

People want to grow vegetables, fruit and maize next to the house where they know they will be safe. What do they need to do this successfully?

For high production and good-quality it may be necessary to “create” deep fertile soils for the vegetable beds best achieved by trenching and back filling with organic materials. Then for this effort to be rewarded an adequate supply of water is essential. This is where rainfall harvesting comes in because it does not require complex infrastructure to transport it over long distances. But people must know how to capture this water and how to use it. It is very often possible to get by in the rain season even when there are dry spells but in the typical long South African dry season production of vegetables is only a proposition if water can be stored. And this of course is the objective of the present scheme, tanks to store water for the dry season.

The combination of trenching for good soils, finding sources of rainwater that can be led on to vegetable beds or into storage tanks without running the risk of flooding and damage and the siting of storage that will not be a danger to children or to health means that very careful attention must be paid to planning how the plot should be planned so that the it is utilised effectively in the long-term. It is most important that the storage tank be sited so that filling it with available rainwater and delivering the stored water to the garden beds requires a minimum of attention.

Sketch plan of the immediate vicinity of the plot

It is important that the position of the house and plot relative to roads, other gardens and fields and of course neighbouring houses be established. This does not have to be a survey with accurate dimensions. All that is required is a simple diagram with paced distances. Levels are, however, very important because it is levels that determine where water flows. Approximate but adequate levels can be established using simple apparatus such as a builders line level. Remember that water will be received from adjoining plots and roads and passed on to other plots.

Sketch plan of the plot itself

Ultimately it will be desirable that each plot has a helicopter plan, a detailed sketch showing the position of each vegetable bed and fruit tree and the planting pattern for the seasons and the paths and channels that supply them with water. This is not required at the initial planning stage, what is required is a sketch that enables various ideas to be pencilled in and evaluated with attention being given to the origin of the water and the position of the tank relative to the beds. Should it be decided that a file be maintained for each site, then this should include the final sketch plan showing the position of the buildings, proposed garden and infrastructure.

Garden layout

This is probably where planning should begin, and seldom does. The harvesting of water during the rain season and the way in which this is distributed to the beds is important. The process is entirely dependent on the gravity flow of water in paths that double up as earth channels so is dependent on the micro topography of the garden as well as the infiltration characteristics of the soil. For all practical purposes the beds can be considered as small level basins. Planning and setting out these beds is as much an art as a science but there are principles that should be followed that can be demonstrated and learned. It is absolutely essential that these basin beds be set out in accordance with contour lines scratched out on the soil surface but initial planning can be done on a sketch plan provided these include at least approximate contour lines.

During the dry season plants will largely be dependent on irrigation. Because in the dry season water is a scarce commodity the transport of the water from storage to the beds will normally be by pipe, hose, bucket or watering can. Irrigation water supply is consequently flexible and can be applied to beds originally set out to facilitate the distribution of run on water during the rain season.

Selecting RWH catchments

In the case of water to be stored and used for irrigation or household applications priority should be given to clean water from roofs and paved areas. If the roof area is large enough to provide all the water that can be stored this may obviate the need for underground storage. Water can be run direct from gutters and down pipes into the storage tank. Gutters are frequently a problem but there is merit in catching the water in shallow cement-screeded channels around the bottom of walls and channelling it into underground tanks. The areas of impervious surfaces should always be noted and the yield during the summer months estimated. The expected rainfall for the area should be established at the outset, this information is readily available. The computer program Planwat includes default values for the percentage yield from a variety of catchment surfaces ranging from corrugated iron roofs to grazing areas.

Once the catchment area and the position and area of the vegetable beds have been established the potential locations for the storage tank become fairly obvious.

Run-on water for summer production is usually gathered from higher lying areas of the plot or adjacent lands and veld while roads are an obvious source. There is a tendency to overestimate the area required and this may result in unnecessary flooding of the garden. The furrows dug to gather and distribute the water can be sized and arranged to limit damage in heavy storms and while there are some elementary rules that can be followed experience in a specific area is important. Depending on topography and soil characteristics it may be possible to dig interceptor ditches deep enough to catch the base flow and prolong the delivery period after a storm.

Estimating water requirements

It is quite possible to make fairly accurate estimates of crop water use and consequently of irrigation requirements anywhere in the country and to relate these estimates to water harvesting. The Sapwat / Planwat computer programs make this feasible. These processes will be facilitated when Sapwat3, an interactive merging of the two programs, is released. For reasons, that will now be explained, it is preferable to utilise the programs at the feasibility studies stage to develop tables and graphs for specific areas for use by field personnel.

Irrigation quantities during the dry season are a function of the reference evapotranspiration (short grass) calculated by means of the Penman-Monteith equation. During the winter in the summer rainfall region where most of the villages are located the temperature and humidity do not vary widely and consequently crop water requirements reflect this trend in uniformity. However, crop water and irrigation requirements can vary considerably and are influenced by the following factors:

- ❖ Crop growth characteristics, particularly length of growing season,
- ❖ Crop selection and planting dates,
- ❖ Intensity of occupancy of the beds throughout the season,
- ❖ Crop management including weed control and planting density,
- ❖ Irrigation method and management and
- ❖ Methods of augmenting and monitoring soil profile water content.

The objective is intensive production on a limited area with a restricted water supply. Some householders aim to plant more than one crop in the winter season on each bed while others prefer one crop per season. They may not be able to afford the additional cost of seed. Some crops such as spinach are picked for six months or longer, and require watering throughout the full period. Facilitators must understand the principles of vegetable and fruit production, and must obviously receive adequate training. They should be consulted on the conditions and practices that influence planning.

Irrigation deserves greater attention than it normally receives. There is a perception that vegetables have very shallow rooting systems and require daily irrigation. Seedlings do require

particular attention initially but when grown in the deep beds created by trenching most crop varieties develop deep roots and research has shown that irrigating once a week or even once every two weeks can be a satisfactory practice during the winter months in an intensive system.

Similarly there is a perception that innovative new methods of irrigation can achieve miracles in respect of water saving and production. Flood irrigation has come to be regarded as an undesirable method that wastes water while drip is believed to be the modern approach that saves water. Nothing could be further from the truth. Both methods, and a number of other approaches, can produce excellent results and many factors including personal preferences and circumstances can influence the decision. Opting for any particular technology per se will in any event not guarantee success.

To illustrate this point there is no more effective way of providing plants with the water they require than by planting them along a shallow level furrow the two metre length of the vegetable bed and filling the furrow with a watering can or bucket. Similarly a small level basin can surround a tree. This procedure ensures that one knows exactly where the water is being placed and how much has been applied. If a hose, fed from a manual pump or even a tap, is affordable this can cut the drudgery. Normally in a small household garden watering is not a major chore especially if it can be spread over several days. When water is in extremely short supply this is the approach that can help it go much further than one would have thought possible.

Implementation

Sketch plan of plot

The general dimensions, buildings, existing gardens or other facilities can be sketched in and distances can be measured by tape measure or by pacing. What is important, however, is that the contour lines be sketched in as well. This is not a difficult procedure but facilitators will require some training. Probably the simplest procedure is to scratch out the contour lines on the ground and then to sketch them in using other features to position them on the drawing. These contour lines can then be used to plan the position and orientation of the garden beds and water channels and pipelines.

It is not necessary to use survey instruments to establish levels. This can be done using a simple builder's line level suspended on fishing line or alternatively by constructing an A-frame with a plumb bob providing the vertical reference line. Conventional boning rods can then be used to project levels from reference pegs across the plot.

Irrigation

Facilitators will need to understand the basic principles of irrigation. These are not complex and are largely concerned with the availability of water in the soil profile within reach of plant roots. Only too often people believe that it is essential to keep the water content of the soil at the magic "field capacity" level, now referred to as "upper limit" in order to eliminate plant stress. Unfortunately this only too often leads to over irrigation that is not only a waste of water but as often as not leads to the roots being starved of oxygen resulting in plant wilting. The golden rule of irrigation is to know what the water content of the profile is and at what depths the roots are extracting water.

The difficulty is that the ebb and flow of soil water is hidden below the soil surface and it is not easy to establish its situation. Successful irrigation scheduling is based on the dipstick principle rather like measuring the level of the oil in the sump of a motor engine at regular intervals. This can be done by means of sophisticated equipment or very simply by digging a hole with a spade and looking and feeling! Practical alternatives include homemade probes and gouge augers. Generally once irrigators have followed one of these methods for a period and have got to know their conditions they develop a feeling for when irrigation is necessary.

Assignment

To be added