

Draft Training Units for Facilitators

- Unit 1 Introduction to rural household realities and homestead farming options
- Unit 2 Participatory planning and design of water management in a household farming system
- Unit 3 Fertility: optimise productivity of soil and water resources
- Unit 4 Health and Nutrition
- Unit 5 Irrigation Management and Principles

Agricultural Water Management in Homestead Farming Systems

Unit 1: Introduction to rural household realities and homestead farming options

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Introduction

This unit introduces you to issues related to water use and the rural context. We will look at the natural resources that are available for humans to use. We will also introduce different systems of farming, such as traditional farming, high external input and low external input systems.

Aims

To create an awareness of the issues related to water use in an agricultural environment. To create awareness also of the rural context as opposed to the urban context, issues of poverty and rural resources, including the farming systems within which people work. This will support your learning and decision-making around participatory planning and design of water and soil management options at a homestead level. You will explore the meaning of water management from a number of different perspectives.

Learning outcomes

By the end of Unit 1 you should:

- Understand the rural context and the particular opportunities and threats related to this context
- Understand the role of water in society and the environment
- Understand the concepts of farming systems and where homestead farming systems fit into these
- Do a SWOT analysis for a household or rural resource issue as a tool for planning and decision-making

Learning outcomes	Assessment criteria	Done ✓ Can't do it ✘
Understand the rural context – opportunities and threats	Successfully complete class work, group and individual assignments Defining the role of water (individual) Exploring concepts of water scarcity (group)	
Understand the role of water in society and the environment	Successfully complete class work and group assignments	

1. What is life like in rural areas?

Life in the rural areas of South Africa is not easy. Most **rural** households are poor and vulnerable to hunger, poor health, difficult family situations and crime.

More children now attend **school** – both girls and boys – and there are more opportunities for tertiary education. However, **employment** prospects remain poor for graduated youth, and are worse the more uneducated and unskilled a person is.

The main source of income for rural households are **old-age pensions**. Often, extended families rely for their survival on a single grandfather or grandmother's old-age pension, leaving them extremely vulnerable should such a person pass away.

More recently, the payment of a **child support grant** has brought some relief, but has also brought its own problems. It has resulted in a dramatic increase in teenage (and adult) pregnancies. This has placed further strain on households, worsening the dependency ratio (number of dependents per income earner) in the family structure. The aim of the grant was to increase the quality of life for children. Often this has not happened, as many small children still suffer from difficulties related to **malnutrition**. Further, the pressure gets worse when the child turns 13, as they then no longer qualify for the grant, yet are too young to start contributing to family income.

Contributions to household income in the form of **remittances** from employed relatives in the urban areas, has decreased over the last 20 years, for most families.

In contrast, a small number of large modern houses are arising among the typically bare homestead yards in the rural areas – showing those few families who have managed to win government contracts or other good income opportunities. Often, this leads to jealousy between the 'haves' and 'have-nots', which has a destabilising effect on society, and fuels the desire for material things, especially among the youth.

Through the migrant labour system, South Africa's rural areas have over the decades gradually turned into an almost entirely cash-based economy. Hardly any economic activity or value-adding takes place in the villages: typically, cash flows in through pensions, grants and remittances. It then flows directly out again, through the purchase of maize meal planted and refined elsewhere, bread, drinks and tinned food manufactured elsewhere, and cellphone costs, etc.

There is very little agricultural activity today. Former traditions where villagers used their homesteads, cropping fields and grazing areas for family food production have been lost. It has become almost **impossible in many areas for households to use their cropping fields**, due to high input costs, lack of mechanisation, increased crime levels and the disintegration of traditional rules and systems which ensured that crops in the fields were protected from roaming livestock. The threat of livestock theft is rife.

Group Activity 1: Life in rural areas - definitions

Aim

Make our own definitions for concepts used.

Instructions

Take the following terms and describe what you think they mean. Make sure that your group agrees on this description.

Present these descriptions to plenary (the larger group). Decide on one description for the whole group.

- Rural as opposed to urban
- Vulnerability and risk
- Dependency ratio
- Malnutrition
- Cash based economy
- Value adding
- Mechanisation

Group Activity 2: Life in rural areas - descriptions

Aim

Explore some of the concepts used in the introduction to gain a more personal understanding of what they mean to you.

Instructions

Discuss one of the following statements in your group.

- Does this statement make sense to you?
- Do you agree with the statement?
- How would you say it?

STATEMENT 1:

The aim of the grant (Child Support) was to increase the quality of life for children. Often this has not happened, as many small children still suffer from difficulties related to **malnutrition**. Further, the pressure gets worse when the child turns 13, as they then no longer qualify for the grant, yet are too young to start contributing to family income.

STATEMENT 2:

Often, this leads to jealousy between the 'haves' and 'have-nots', which has a destabilising effect on society, and fuels the desire for material things, especially among the youth.

STATEMENT 3:

Former traditions where villagers used their homesteads, cropping fields and grazing areas for family food production have been lost.

What is a household to do under these circumstances?

Jobs are scarce... money is scarce... field cropping is difficult, hard work and low value. There is little water and land available for agriculture....

Worldwide, poor people try to reduce their vulnerability by doing more and different things (diversification). Studies in the Eastern Cape have shown for example that there is now an increase in **agricultural activity in the homesteads**. This is because people are not able to use their cropping fields and do not have enough money even to buy the basic goods that they normally used to.

Households use the area around their homes mainly to plant vegetables and fruit (high value crops) as a source of nutritious family food. They also plant some maize (staple food) and keep livestock and poultry. When possible, surplus produce is bartered or sold to boost income. Vegetables are often given away as gifts, which helps strengthen social bonds of goodwill (social safety nets). This plays an important role as a social buffer for the family when they may experience hardship.

The homestead is preferred for production for several reasons, including the following:

- It is easier to **protect** against animals and theft. The yard can even be fenced in, often using a combination of available materials, scrap metal and fast-growing hedge-forming plants;
- People spend most of their **time** in and around their homes, often caring for the sick. Being able to produce without the need to walk long distances to the fields, is a clear advantage; and
- It is easier to **intensify** production close to the house, where it is easier to collect organic matter, vegetable peelings and animal manure from livestock pens in the yard. Through intensification, people's production efforts become worthwhile, which encourages them to keep up the effort.

As one young man in Ngqumeya (Eastern Cape) put it:

*'My whole family helps me in the garden now, because it is "double-double":
- double because we can now grow food in both summer and winter,
- and double again, because our yields are so much higher with these methods.'*

Individual Activity 1: Life in rural areas - concepts

Aim

Make our own definitions for concepts used.

Instructions

Take the following terms and give an example that will show what this term means.

- Diversification
- High value crops
- Staple food
- Nutritious food
- Social safety nets
- Intensification of production

Is home food production worthwhile?

Is it worthwhile for the country?

Case study: The value of water for household production – the need for Multiple Use Systems for rural water supply

In a study by AWARD in 12 villages in Bushbuckridge (6 with RDP levels of supply, and 6 with more water), it was found that there was double the levels of economic activity in the six villages with more than RDP levels of water availability. The importance of water as an enabler, if not catalyst, for development at these poorest levels of society is thus clear.

Household expenditure patterns

The Department of Welfare spent R76billion in 2008/09 on social development, of which R75.3billion was spent on "comprehensive social security", which has, as its overriding purpose, to:

- ❖ Provide income support to the elderly, the disabled and children in need through social assistance grants as provided for in law.

Specific activities include:

- ❖ providing social assistance to all eligible beneficiaries, notably the old aged in rural areas;
- ❖ improving income security for workers and their dependants;
- ❖ the child support grant; and
- ❖ improving the access of household beneficiaries of social assistance to economic opportunities.

How can home food production help to make this significant state investment more effective?

According to the national income and expenditure survey, 36% of poor households' income is spent on buying food. This means that poor households that depend largely on pensions and grants for an income, spent R24billion (36% of R75billion) on food items in 2008/09 alone. This number is set to rise, given the rising food prices.

Every amount a household can save on food expenditure, they can instead spend on the overall improvement of their livelihood. This increases the effectiveness of the social assistance provided by the state, and injects new cash into the local economy where the poor household resides.

If the state should invest an amount of R2.3bn (equal to 3% of the annual social security budget) in support of home food production, this would enable about 60 000 new households every year to start saving money on food, and invest in family development instead. Almost a million households could be reached over a 15-year period, resulting in a saving of up to R24bn – every year – on national household expenditure on food.

The importance of balanced nutrition

But home food gardening does not make economic sense in financial terms only. It also addresses – very directly – a silent but severe problem in South Africa. A quarter of all children in South Africa are stunted through malnutrition before they reach the age of five. Stunting means that such a child will never reach its full physical and mental potential in life, and is likely to earn low income. This creates a vicious poverty cycle, because the

likelihood of that person having stunted children is very high!

In South Africa, malnutrition is caused predominantly by a lack of micronutrients and protein in the diet, and both these can be found in vegetables and root crops that can be grown in home food gardens.

Therefore, home food gardening enables mothers to ensure that their children get balanced diets, preparing them to develop to their full potential. This is good for the country's economic growth potential.

Is it worthwhile at the household level?

There is a saying in development that "if it wasn't worthwhile, people wouldn't be doing it"

It is true that households often leave food gardening when they get formal employment, and this makes sense, but once they have been successful at intensive home food production, they always have the confidence that they can return to it should circumstances change for them.

For poor people with limited resources, and who cannot afford to take risks, home food production often provides a foot in the door – a manageable starting point from where they can grow.

Case study: the power of starting small

When Eva Masha, head of the first food insecure household to implement rainwater harvesting and build her RWH tank for home food production, became known for her success, she was offered a plot on the irrigation scheme in her village. She declined, saying: "I have not yet finished implementing my five-year plan for my own yard, and anyway I don't have time to sit in meetings" - which as a person who lived her lifetime in a village on an irrigation scheme, was her perception of participation in formal irrigation.

The sequel to her story is that she has since completed her work in her own yard and has now joined together with 7 or 8 other women in a joint irrigation project of some 8 hectares (independent of the irrigation scheme, which remains dormant to this day, despite several million rand investment by government in the past few years). Eva's humble beginnings in her own yard gave her the know-how and confidence to embark on larger initiatives - on her own terms.

Case study: the freedom to work from home

Ntombolundi Zitha and others in Eastern Cape have expanded quickly from a humble start in their backyards, and are still growing.

Ntombulundi had her bags packed, waiting at the door, putting off the inevitable: that she had to leave Ngqumeya and go to East London (some 2 hours away) to look for a job. She would have to leave behind four children and an ailing mother, not at all certain that she would find a job. Then Border Rural Committee (BRC) and Umhlaba introduced 'Water for Food' - home food gardening with deep trenching and run-on, followed by demonstration underground RWH tanks (30kl) for 3 households in March 2006. She got one.

Two years later, Ntombolundi has expanded her garden to probably 200m². BRC has helped her and other households to start marketing their produce in Keiskammahoek and even East London. The group now also has a small shadecloth nursery to grow their own seedlings, which is on Ntombulundi's yard.

Also see p14: "Impact of gardening"

2. Why was this learning material developed?

The Water Research Commission decided to develop this learning material on 'Agricultural Water Management in Homestead Farming Systems' to help support poor people in this coping strategy that households have identified to help protect themselves against the vulnerabilities of poverty.

This strategy of homestead production was voiced by poor people during the World Summit on Sustainable Development (WSSD) hosted in Johannesburg in 2002. Food insecure women from various provinces gathered at the WaterDome at WSSD and declared 'War on Hunger'. Calling themselves the Water for Food Movement, they vowed to do everything they could to achieve Millennium Development Goal 1a, namely: "to reduce by half the number of people living with hunger, by 2015."

To the Prince of Orange, diplomats, ministers, and officials at WSSD, they said: "We are the ones going hungry, not you. Therefore we are the ones who must beat hunger and achieve MDG1. Please don't block us. If you can, walk next to us, but not in front of us, dictating to us. We know our situation better than you, this is our war."

These women then returned home and showed practically at their homes what they had meant, by harvesting rainwater and digging underground rainwater tanks (or 'dams') to support their homestead production. Stemming from this, the Department of Water Affairs and Forestry approved a subsidy to introduce rural households across the country to this type of **low-cost, but intensive home food production**, and to finance the construction of **homestead rainwater dams** to enable people to grow nutritious food at home, throughout the year.

This learning material responds to people's initiatives, and is aimed at helping households grow more food at home, while using as little as possible of their scarce cash resources.

Overview of the learning material

The units contained in this learning material follow a certain logic, based on key questions the research team had to ask itself.

On household mobilisation:

Acknowledging that, while more and more households are starting home food gardens, many others don't believe it is possible or worthwhile, the research team asked itself:

“How can the significance of food gardening become a reality in people's minds?”

The research team developed and field tested the ‘**nutrition workshop**’, and found it a very effective method to ‘create discomfort’ – which is where all changes in habit springs from! The nutrition workshop enables the household to analyse their own diets, discover the gaps, and choose crops to plant in their home gardens to fill those gaps.

On ‘need-to-know’:

Deeply aware of the bewildering amount of information available on organic production methods, family nutrition, irrigation and water management practices, the research team asked itself:

“What is the minimum, essential knowledge a household would need to successfully grow an intensive, worthwhile home food garden?”

The topics of the units in this Facilitators' Toolkit stems from that analysis, namely:

- Unit 1 Introduction to rural household realities and homestead farming options
- Unit 2 Participatory planning and design of water management in a household farming system
- Unit 3 Fertility: optimise productivity of soil and water resources
- Unit 4 Health and Nutrition
- Unit 5 Irrigation Management and Principles
- Unit 6 ?
- Unit 7 ?
- Unit 8 Economic incentives

These units contain a lot more than the essential information, but enables a facilitator to select what is appropriate to the garden learning group in question.

On cash-scarcity:

Recognising that these households are growing their own food precisely because they have too little cash to buy enough nutritious food, the research team asked itself:

“How can we select the methods included in this learning material to be appropriate to the context they will be used in?”

For this reason, we believe the Low-External-Input Sustainable Agriculture (LEISA) farming system is appropriate to homestead production. This is discussed in brief below, and in more detail in later units.

Our world in context



When you look at the world from this point of view, you can see there is a real need for solidarity, understanding, patience and

If the population of the Earth was reduced to that of a small town with 100 people, it would look something like this:

- 57 Asians
- 21 Europeans
- 14 Americans (northern and southern)
- 8 Africans

- 52 women
- 48 men

- 89 heterosexuals
- 11 homosexuals

- 6 people would own 59% of the whole world wealth and all of them will be from the United States of America

- 80 would have bad living conditions
- 70 would be uneducated
- 50 underfed
- 1 would die
- 2 would be born
- 1 would have a computer
- 1 (only one) will have higher education

Also think about the following:

This morning, if you woke up healthy,

you are happier than the 1 million people that will not survive next week.

If you never suffered a war, the loneliness of the jail cell, the agony of torture, or hunger,

you are happier than 500 million people in the world.

If you can enter into a church (or mosque) without fear of jail or death,

you are happier than 3 million people in the world.

If there is food in your fridge, you have shoes and clothes, you have bed and a roof,

you are richer than 75% of the people in the world.

3. A Focus on Water

Water use in the world and in South Africa

Water is the source of life and human civilization. Now, the Earth, with its diverse and abundant life forms, including over six billion humans, is facing a serious water crisis (World Water Assessing Programme, 2003:4).

Water covers about 70% of the earth. Only 2% of this is fresh water. Although the amount of freshwater remains about the same from year to year, it is continually renewed through the water cycle, which is powered by solar energy and the earth's gravity. No new water enters the cycle and no water ever leaves the cycle. Water may be the resource that defines the limits of sustainable development.

Worldwide, 54 % of the annual available freshwater is being used. If consumption per person remains steady, by 2025 we could be using 70% of the total because of the projected population growth alone [UNFPA, 2001]¹.

World Population by Region (in millions)

Year	Africa	Asia	LA&C	Oceania	Europe	North America	Global
1990	615	3 180	441	26	722	282	5 266
2000	784	3 683	519	30	729	310	6 055
Increase (%)	27.5	15.8	17.7	15.4	1	9.9	15

Source: WHO/UNICEF, 2000

The availability of water varies considerably even within countries and the situation is further complicated by frequent droughts as well as inappropriate water management programmes (Ambala, 2002)². Veld management has a significant effect on available soil water – for example if overgrazing is allowed and areas become denuded, less rain water is absorbed, flash floods with erosion occur much more and vegetation regrowth is inhibited. On a large scale this will impact on weather patterns (Winpenny, 1999)³.

The water available for human use is also becoming less because of pollution from agriculture and industry. Water in many rivers, dams, lakes and **groundwater sources** (underground water) can no longer be used for human **consumption** (Livernash and Rodenburg, 1998: 34⁴). In developing countries, 90-95% of sewage and 70% of industrial wastes are dumped into surface water where they pollute the water supply.

¹ UNFPA. 2001. **The state of the world population 2001**. <http://www.unfpa.org/swp/2001/english/ch04.html>

² Ambala C. 2002. **Water resources**. Africa.unep.net/freshwater/content1.asp.

³ Winpenny J.T. 1999. **Managing water scarcity for water security**. www.fao.org/ag/aql/aglw/webpub/scarcity.htm

⁴ Livernash R. and Rodenburg E. 1998. **Population change, resources and the environment**. Population bulletin. 53(1):34

South Africa is a hot and dry country. The average annual rainfall is less than 500 millimetres per year, compared to the world average of 860 millimetres. South Africa's rainfall is insufficient:

- Firstly, because it is hot and dry, more water evaporates into the air than falls as rain; and
- Secondly, the rainfall is erratic and unreliable. Prolonged drought at critical stages of crop production occurs frequently. Dryland cropping is therefore quite risky.

Agriculture and forestry use 74% of South Africa's potentially available rainwater. By far the largest volume of this, 60%, is used to maintain the growth of forests and the natural vegetation that is utilised as grazing for livestock and game, while 12% is used for rain-fed cropping. Only 2% of the country's potentially available rainwater is used for irrigation. The average runoff (rainwater that runs off a surface, rather than sinking straight into the ground) for the country is around 8.5%. Irrigation is the largest single user of runoff water in the country.

According to the National Population Unit in South Africa, all major rivers have been dammed or modified to meet the demand for water, reducing water flow, causing many rivers to become seasonal (e.g. the Limpopo, Luvuvhu and Letaba rivers) and reducing the productive capacity of flood plains (e.g. the Pongola), (National Population Unit, 2001:33).

Many of the issues around access to water also have to do with how water is managed.

Group Activity 3: Water use exercise

Aim

To understand the proportions of water available for different uses.

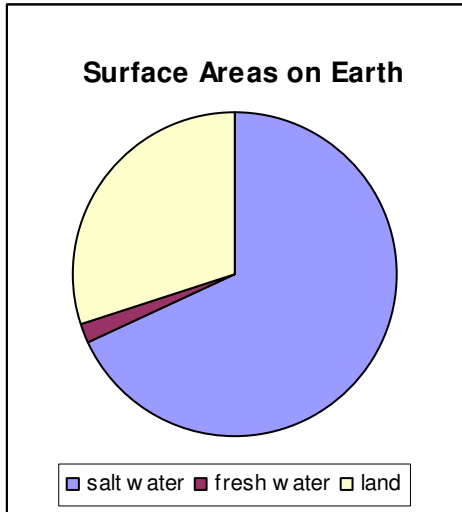
Instructions

Make a note of the percentages (%) of water that are available for:

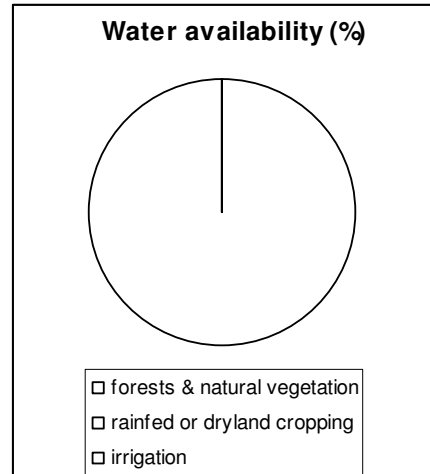
- forests and natural vegetation
- rainfed or dryland cropping
- irrigation

Now make a pie-chart to represent these percentages.

How to make a pie chart (example):



Now use your percentages and fill them into the pie chart given below:



Policies related to Water

Of all the major target-setting events of recent years, the United Nations (UN) Summit of 2000, which set the **Millennium Development Goals** for 2015, remains the most influential. Among the goals set forth, the following are the most relevant to water:

- 1. To halve the proportion of people suffering from hunger;*
- 2. To halve the proportion of people living on less than 1 dollar per day;*
- 3. To halve the proportion of people without access to safe drinking water;*
- 4. To ensure that all children, boys and girls equally, can complete a course of primary education;*
- 5. To reduce maternal mortality by 75 percent and under-five mortality by two thirds;*
- 6. To halt and reverse the spread of HIV/AIDS, malaria and the other major diseases;*
- 7. To provide special assistance to children orphaned by HIV/AIDS.*

All this needs to be achieved while protecting the environment from further degradation. The UN recognized that these aims, focusing on poverty, education and health, cannot be achieved without adequate and equitable access to resources – the most fundamental being water and energy.

The Hague Ministerial Declaration of March 2000 adopted seven challenges as the basis for future action. These provide broad actions for reaching the MDGs:

- 1. Meeting basic needs** – for safe and sufficient water and sanitation
- 2. Securing the food supply** – especially for the poor and vulnerable through the more effective use of water
- 3. Protecting ecosystems** – ensuring their integrity via sustainable water resource management
- 4. Sharing water resources** – promoting peaceful cooperation between different uses of water and between concerned states, through approaches such as sustainable river basin management
- 5. Managing risks** – to provide security from a range of water related hazards
- 6. Valuing water** – to manage water in the light of its different values (economic, social, environmental, cultural) and to move towards pricing water to recover the costs of service provision, taking account of equity and the needs of the poor and vulnerable
- 7. Governing water wisely** – involving the public and the interests of all stakeholders.

Individual Activity 2: Defining the role of water

Aim

To build understanding of the issues involved

Instructions

Take the paragraph below. Read through it. Then describe in your own words what this paragraph means to you. Try and think of examples of better water management in a rural context in South Africa.

Also give a few examples of what a new attitude towards water management would be.

"There is no doubt now that water is a scarce resource, and that demand will increase in the future. The question is, how will society react to this development? The key solution to mitigate water scarcity in the future is by changing to better management of water resources and to promote a new attitude to water management, based not only on scientific knowledge, but also on cultural ethical values"

Time: 2h

4. The Rural Context

Livelihoods in rural areas

The total "non-urban" population for South Africa is around 12.7 million, compared to 41 million people in the country as a whole, as estimated for 1997 (31%). Since then the total population of South Africa has increased to about 48 million people.

Population by category, province and sex (000s)

Prov	Total			Rural former homelands			Semi-rural settlement		
	Total	Fem	Male	Total	Fem	Male	Total	Fem	Male
EC	3,677	2,013	1,664	3,368	1,843	1,525	305	169	136
FS	299	163	137	281	153	128	19	10	9
KZN	1,778	980	797	1,695	939	755	83	41	42
Mpum	1,078	578	500	976	521	455	102	57	45
NW	1,813	939	874	1,625	847	778	188	92	96
Limp	4,084	2,252	1,832	3,562	1,952	1,610	515	297	218
Total	12,729	6,925	5,804	11,507	6,255	5,252	1,211	665	546

The importance of the households located in the deep rural areas of the communal land tenure areas is evident. It is only in the Eastern Cape and Limpopo that a significant number of people live in semi-rural or semi-urban areas. This position has been further complicated by the creation of wall-to-wall municipalities with responsibility for both sectors. In all provinces females are in the majority.

The availability of water for all purposes

Distance from homestead to water: Number of households (000s)

Distance	Total		E Cape		F State		KZN		Mpum		N West		Limp	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Inside dwelling	514	21.8	61	8.6	18	26.4	22	8.7	100	50.0	81	22.9	232	30.2
Less than 100m	420	17.8	119	16.7	32	46.6	17	6.7	38	18.8	83	23.5	131	17.0
100m - > 200m	419	17.8	131	18.4	14	20.3	53	20.9	31	15.4	89	25.1	101	13.2
200 m - > 500m	396	16.8	131	18.3	4	6.1	84	33.2	21	10.5	58	16.4	98	12.7
500 m - > 1 km	310	13.2	143	20.1		0.5	58	22.9	6	3.2	30	8.3	73	9.5
1 km or more	298	12.6	127	17.9		0.1	19	7.6	4	2.1	13	3.6	134	17.4
Total	2,356	100	712	100	68	100	253	100	199	100	354	100	769	100

Nothing brings out more clearly the difference between living in an urban area and living in a village, than the problem of water – the daily struggles for drinking water, water for bathing, water for cooking, and water for growing things. The table reflects the position in 1997 and although the Department of Water Affairs and Forestry and Municipalities continue with the campaign to provide potable tap water to all rural dwellers, it still reflects the problem faced by gardeners. No less than 42.6% of the 2.4 million households had to fetch water from further than the prescribed two hundred metres.

Agriculture and income

Spent at least 1 hour per week on “agriculture”?

This is an interesting question. One hour a week hardly qualifies a person as a gardener, let alone a farmer! The total population of the villages is 12.7 million and there were 2.4 million households so that a total of 1.4 million participant individuals seem low. This is the first indication we have that “agriculture” is not one of the prime concerns in the villages and that there are relatively few “farmers” amongst the village residents.

The workload appears to be fairly evenly spread over the age groups in all provinces, and family members aged from 15 to 75 years are participating!

Nationally, 750 000 households had a **household income** in the month prior to the survey of less than R400, and 1.5 million (65%) had less than R800. At the other end of the scale, 230 000 (10%) had incomes of over R1 500. The perturbing statistic is the 280 000 (12%) households that were estimated to have an income of less than R200. This is perhaps not a large proportion of the households, but the social and welfare implications are daunting.

Household income after tax in month prior to survey by province

(Among all households in the survey)

Net income	Total		ECape		FState		KZN		Mpum		NW		Limp	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
None	53	2.3	12	1.6		0.5	7	2.6		0.1	11	3.2	23	3.0
R1 - 200	226	9.6	70	9.8	10	14.8	16	6.4	15	7.4	47	13.2	68	8.8
R201 - 400	468	19.9	109	15.2	16	24.0	40	15.7	30	15.1	86	24.3	187	24.4
R401 - 800	789	33.5	227	31.9	24	35.5	110	43.5	73	36.4	100	28.2	255	33.1
R801 - 1 500	588	24.9	217	30.5	13	19.0	61	24.1	61	30.5	78	22.0	158	20.6
R1 501 - 3 000	182	7.7	61	8.6	4	5.7	13	5.0	17	8.4	28	7.8	59	7.7
R3 001 - 6 000	44	1.9	16	2.2		0.3	6	2.3	3	1.7	4	1.0	15	2.0
R6 001 - 12 000	5 344	0.2	1	0.1		0.1	1	0.3	1	0.3		0.1	3	0.4
R12 001 +	243	0.0		0.0		0.0		0.0		0.0		0.1		0.0
Unspecified	769	0.0		0.0		0.0		0.0		0.0		0.0	1	0.1
Total	2,356	100	712	100	68	100	253	100	199	100	354	100	769	100

Note that **the most important source of income** of households is not the source of **total income**. The damning figures here are that only 2.7 percent of households identified ‘farming activities’ as their most important source of income. These are villagers (residents) and very few are farmers! No account is taken of the value of garden or other produce.

Homestead food production and livelihoods

Below is a summary of the contribution of garden produce to people's livelihoods in Potshini, Bergville, KZN in 2007.

From this summary it can be seen that the actual income generated from a garden averaged R50-R100/month. Other slightly less direct livelihood advantages include savings of around R100-R300/month. These savings (money now not spent on food) increased the household's ability to buy other things. Many problems related to hunger and access to food were solved.

Impact of gardening

Savings of R1,000 (22% of respondents) and more (21%) have been made per season

Only learning group members (involved in training and follow-up) have been selling vegetables. 63% (n=27).

They have sold mainly cabbage, spinach and tomatoes (also green pepper, beetroot, carrots)

Incomes of between R100-R300/season were realized

63% of members reported an increased ability to purchase things and save money (7%) from Mudhara et al, 2008



Summary of successes according to gardeners

- We don't go hungry anymore and sell to the community
- We did not spend a lot of money on vegetables this year and had surplus to give to neighbours
- I saved money as there is spinach in my garden and I do not need to buy vegetables
- I got a lot of spinach and tomatoes. My family does not like the other vegetables
- I got food for my kids now
- Spinach and greens are always available
- We stopped buying vegetables for a while as we had our own
- I saved money that I used to buy vegetables with and sold the surplus. I have been able to buy a TV for my kids
- I got a lot of food for my family
- I do not need to go to the shop
- I had a lot of green peppers, but as people here do not know them, I could not sell them
- I learnt how to grow and store tomatoes

Group Activity 4: Analysing different rural contexts

Aim

To use the information provided in the tables and the above summary to analyse the situation in different provinces.

Instructions

1. Take KZN as an example.
2. Summarise the information about the size of the population, availability of water and income from the three tables in this section in a way that makes sense to you. Make at least 5 statements about this information.
3. Now take the information in the summary about gardening. Make a small table that can show how this gardening affects the income situation for one province, but for all the income categories. (NOTE: You will need to make a table here and work out the percentage increase in income for each category that a homestead garden can provide)

TIME: 3 hrs.

Poverty

Being poor is an unfortunate reality for millions and millions of people worldwide. There are many different factors that contribute towards people becoming and then remaining poor. A lot of it has to do with how countries and governments manage themselves and how they are affected by other countries and governments. The cases are therefor what we may term structural and global. Below is an exercise that can give you some clarity around your beliefs about poverty and how it is caused.

Group Activity 5 and Individual Activity 3: Causes of Poverty

- 1) Go through the worksheet on causes of poverty provided ⁵, first as individuals and then in groups. In the group you will need to negotiate which causes you think are more important, according to what you said as individuals.
- 2) Write 1 page on your understanding of the causes of poverty in the area that you live in or come from.
- 3) Make some suggestions, at least 2, of what you think needs to be done and what people can do/or are already doing in your area to alleviate poverty

Time: 4h

⁵ Timmel and Hope. **Community Workers Handbook, Book3, Chapter 9.**

No.	Individual ranking	Cause of Poverty	Group Ranking
A		Unemployment	
B		Unfair distribution/shortage of land	
C		Drought/lack of rain	
D		Lack of sustainable education and training	
E		No decision-making power for the poor	
F		Women and children deserted by fathers	
G		No trade unions, or ineffective unions, so low wages	
H		National debt and economic structural adjustment	
I		War and unrest	
J		Over-population	
K		Lack of personal initiative	
L		Wealth and power concentrated in the hands of a few	
M		Low prices for exports, expensive imports	
N		Corruption	
O		Banks and multi-national companies which export	
P		Capitalist development	
Q		Production of cash crops for export, not local use	
R		Destruction of environment (trees, soil, water)	
S		Lack of technology	
T		Other	

5. Farming systems

In this section we will introduce the concepts you need to think about and compare different farming systems. Farming systems are the ways in which farming is undertaken. There may be different reasons, different practices and different outcomes for each farming system.

Here, as with everything else, there are human values and principles that underlie each different farming system. We need an understanding of these values to understand the system.

The main element that we would like to use here to analyse farming systems is **sustainability**. This is a measure or indication of whether a system can maintain itself now and in the future, in a way that is not damaging, firstly to itself, and secondly to its broader surroundings. Below is a game we can play to explore the concepts in sustainability.

Group Activity 6: The Nuts Game

Aim

To build an understanding of the elements of sustainability

Instructions

A small group (4-5 people) of players gathers to sit around an open bowl containing 25 nuts. The rest of the group gathers around to watch them. The spectators may not interfere in the game or make comments.

GOAL: Each player's goal is to get as many nuts as possible during the game.

RULES: Upon the organiser's signal the players take out nuts from the bowl – all at the same time, but using only one hand. This makes one “round”. Players should remain quiet throughout the game. The number of nuts left in the bowl is doubled by the organiser, after each round, up to the maximum of 25 nuts. The game is over when the bowl is empty, or after 10 rounds. During the game, the harvest (number of nuts gained by each player in each round) is recorded. At the end of the game, the total harvest per person and the group total are recorded.

After the game the following questions are discussed in plenary:

- How did you feel about the game?
- What happened in the game and what do you think the game represents?
- What did you learn during the game?
- Make a list of the elements of sustainability that came out of your discussion.

Time: 1.5hrs

FACILITATOR'S NOTE:

Important items for discussion are co-operation, self-restraint, trust, the regenerative capacity of natural resources, depletion, total harvest and equity in division of harvest.

In this game, the bowl symbolizes the resource pool, the nuts the resources themselves, and the replenishment cycle represents the natural rates of resource regeneration.

From: Developing technology with farmers. Van Veldhuizen et al

Elements of sustainability

Below, the five elements that need to be considered when analysing a system for its sustainability, are explained:

- **Economically viable:** Farmers produce at an adequate and stable level and at a risk level which is acceptable to them.
- **Ecologically sound:** The quality of the environment is maintained or enhanced, and natural resources are conserved. Ecologically sound agricultural systems are healthy and highly resistant to stresses and shocks.
- **Socially just:** The agricultural system ensures equitable access to land, capital, information and markets for all people involved, whatever their socio-economic position, sex, religion or ethnic group.
- **Humane:** All forms of life (plant, animal, human) are respected and treated with dignity.
- **Adaptable:** Sustainable rural communities are able to adjust to constantly changing conditions, such as population growth, new policies and market demand.

Group Activity 7: Elements of sustainability

Aim

To build understanding of the elements of sustainability

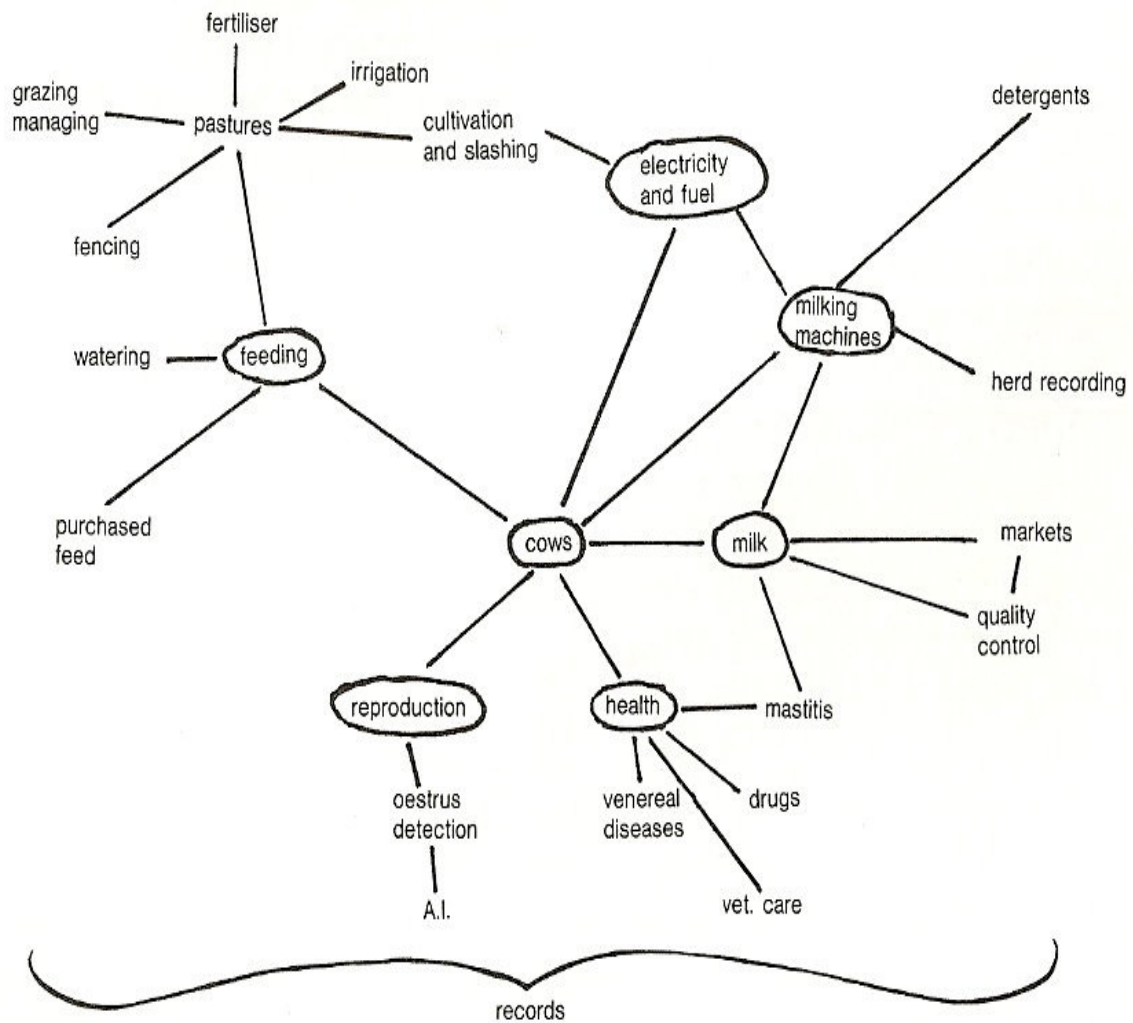
Instructions

In groups of 3 brainstorm your understanding of the elements of sustainability and report to plenary. Present your finding as a **mind map** or a **flow diagram**, after looking at the examples provided.

MIND MAPPING

Purpose: To cluster similar ideas, to see the links between them and pick out the most important issues when discussing or brainstorming. This is a good way of making sure all aspects of a situation have been considered.

Description: On newsprint or a whiteboard, start with the central issue or question and then build a dendrogram (like a tree) of ideas from the central questions. You can put down the most important things first and then build on these.



An example of a mind map of a dairy farm.

From: J. Wilson 1995. An introduction to systems thinking. Changing Agriculture. Kangaroo Press. Australis

Three approaches to farming

One can distinguish between three approaches to farming and their major characteristics⁶:

Traditional Agriculture

This is based on indigenous knowledge and practices that have evolved over many generations. It is generally orientated towards subsistence, uses locally available resources and makes little use of external inputs. Traditional agriculture is highly varied, as it depends on site-specific ecological and cultural factors.

Confronted with rapid changes such as increasing population pressure and greater needs for cash, farmers practising traditional agriculture cannot always increase productivity sufficiently. They may therefore expand farming into marginal areas, which increases the risks of over-exploitation, erosion and other forms of environmental degradation.

High-External-Input Agriculture (HEIA)

This is the conventional, "modern" approach to agricultural development. It puts great emphasis on the use of external inputs such as hybrid seed, fertilizer, biocides, mechanization and credit, to enhance productivity. HEIA is characterized as follows:

- It uses high levels of external inputs;
- It involves strong links between farmers and commercial and government services;
- It is market oriented;
- It is specialised in only a few crops grown in pure stands (mono-cropping) or single-purpose livestock kept in large numbers; and
- The biomass in the landscape is greatly reduced.

HEIA has certain advantages such as short term increase in production and cash income, uniform production processes and lower labour costs. However, it also has many disadvantages:

- It has limited applicability to dry and risk prone farming areas;
- It has negative impacts on water, air and human health;
- It tends to erode soils, genetic resources and local knowledge;
- It cannot be applied by many poor farmers in poor areas;
- It under-utilizes available local resources and over-utilizes non-renewable resources such as fossil energy and phosphorus; and
- It increases the dependency of farmers.

These and other disadvantages have stimulated interest in developing sustainable farming practices. New approaches have emerged such as organic farming, Permaculture and Ecological farming. We use the term LEISA.

⁶ Adapted from Van Veldhuizen et al. 1998. **Developing Technology With Farmers: A Trainers Guide for Participatory Learning**

Low-External-Input and Sustainable Agriculture (LEISA)

LEISA depends primarily on resources from the farm, village and region and is characterized as follows:

- It aims to integrate soil fertility management, arable farming and animal husbandry;
- It makes efficient use of nutrients, water and energy, and recycles them as much as possible, thus preventing depletion and pollution;
- It uses external inputs only to compensate for local deficiencies;
- It involves site-specific farming practices; and
- It aims at stable and long-lasting production levels.

Group activity 8 or Individual activity 4: Analysing a known farming system

Aim

Analysis of known farming systems in terms of the three approaches to farming

Instructions

Divide into groups of 4.

Read through the descriptions in your text on traditional agriculture, HEIA and LEISA.

Then complete the worksheet below as a group.

Worksheet on farming approaches

Variables	Traditional	HEIA	LEISA
Use of locally available inputs			
Variety/specialisation			
Use of external inputs			
Use of local knowledge			
Use of extension services			
Main production objectives			
Cash income			
Labour requirements			
Level of production			
Degree of recycling			
Level of water use			
Sources of water and RWH			
Degree of sustainability			

6. The homestead as a farming system

We will first look at the principles of low-external-input farming that can be applied to homestead food production, and then look at the homestead farming system within this context. We are now assuming that a low-external-input approach is indeed the best option at a homestead level.

LEISA Principles

Mimicking nature: All natural ecosystems without human disturbance manage to accumulate nutrients. This happens in a number of ways:

- Living plants form a continuous soil cover;
- A layer of decomposing plant material and leaves covers the soil;
- Roots of different plants are distributed throughout the soil at different depths; and
- Most nutrients are retained in living plants or animals.

Seeking diversity: Natural ecosystems consist of many different plant and animal species interacting with one another. These develop over a long period. In the LEISA farming system, the farmers try to develop similar processes, by diversifying the species of animals and plants that grow and interact with one another. This gives strength to the system, enabling it to resist disturbances such as erratic rainfall and attacks of pests and diseases.

Living soil: One of the most important components of soil, is **soil life**, including bacteria, fungi, protozoa, nematodes, beetles, centipedes and earthworms. This plays a major role in nutrient availability and recycling, and thus in agricultural productivity. Farmers have to create favourable conditions for soil life. Organic matter must be provided.

Cyclic flow patterns: In a natural ecosystem hardly anything is lost. In LEISA, losses are minimized through cover crops, deep rooting species that recycle nutrients, erosion control, and improved collection, storage and application of wastes from crops (residues), livestock (manure and urine), and the kitchen (water and food wastes). Similarly, water flows are managed so that optimum use is made of available water.

Systems thinking

Everything works as a system because of general interdependency and widespread effects of activities. A homestead is probably the most important system for humans. This is the place where we grow up, get educated and nourished. If the homestead is strong, nourishing and enabling, then our citizens would be likewise. If the homesteads are weak, impoverished and disempowering, the citizens would again be likewise. There are many facets to a household – spiritual, social, cultural, financial, etc – but in this training the emphasis will be placed on the household as a farming system, supplying balanced, nutritious and safe food to all family members. Production within the “four corners” of the residential plot could play a significant part in this objective.

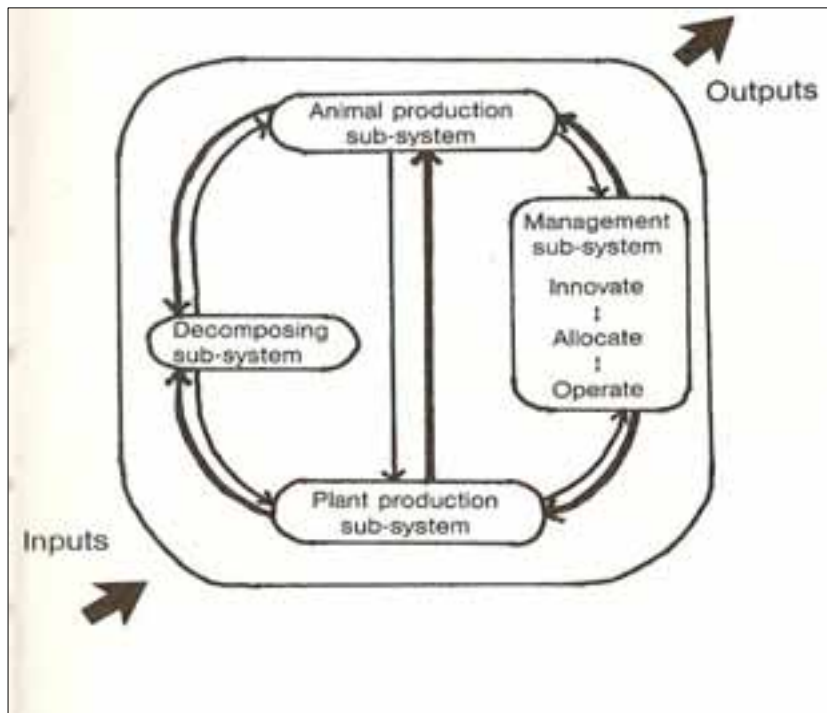
Generally a system has a **boundary**: This you define yourself; it could be the four corners of your yard, or an area that includes your homestead and field, or a number of homesteads relying on one water source, or a whole village, etc. It depends on what you want to investigate.

A system also has **inputs**: These are items or processes that feed into your system, that may

or may not come from outside the system. In the case of a homestead, inputs could be manure (potentially inside the homestead), seeds (often from outside the home, e.g. from town), etc.

A system also has **outputs**: This is what your system generates; in our case produce (food), but also fodder, money, etc.

Within your system there are **processes** that turn your inputs into outputs. Below is a small diagram to represent the sub-systems. The relationships are shown by using arrows. Note the different directions of the arrows.



From: Wilson J. 1995. Changing Agriculture. Australia

Individual Activity 5: The Homestead as a Farming System

Aim

Individual analysis of a known homestead as a system.

Instructions

Taking your own homestead or one that you know well, construct a flow diagram of the farming system. Make sure you clearly indicate the boundaries of your system, inputs, outputs and relationships:

- Make a comment about the present situation
- And then make a comment about future possibilities for this system, taking into account the LEISA principles mentioned above. Indicate these processes clearly on your systems diagram.

Time 3 hrs

SWOT analysis

A SWOT analysis is a way of analysing a situation that can help decision-making and planning, by highlighting the important issues in a concise form.

SWOT stands for the following:

<p>STRENGTHS: Make a list of the internal strengths of the situation – what is working well.</p> <p>WEAKNESSES: Make a list of the internal weaknesses, problems, difficulties – what is not working so well.</p> <p>OPPORTUNITIES: Make a list of the external possibilities, suggestions for action and change, new ideas that can be brought in – what could work well in the future.</p> <p>THREATS: Make a list of the foreseeable external dangers and problems related to the opportunities – what could jeopardise the situation in the future.</p>

Generally we present these lists in the form of a table. This becomes the basis of a discussion for the best possible interventions or actions for change in a particular situation.

Below is a quick example using food security as a topic:

FOOD SECURITY FOR A RURAL HOUSEHOLD

Strengths	Weaknesses	Opportunities	Threats
Access to land for farming and gardening.	Little money to pay towards farming.	Low external input farming.	Limited knowledge of how to implement these systems.
Natural resources for basic needs; water, fuel, grass, wild foods.	Many people using limited resources.	Use resources that the household has control over; eg rain water falling in the boundaries of the homestead. Cultivating your own resources; eg firewood, medicinal species, traditional crops.	Limited space, time and resources to initiate these activities. Immediate need may overshadow longer term production.
Family can be involved in a range of livelihood activities.	Lack of labour.	Labour saving technologies and processes; such as planning a garden that can self-maintain, growing fruit and nut trees that need little attention but can still provide food. Using appropriate tools.	Access to information and technologies.
Safe, healthy environment for children.	Lack of sanitation and diverse foods lead to diseases that are life threatening for small children.	Growing a diverse range of food crops that can supplement the diet of small children. Giving attention to sanitation.	Motivation for change may be limiting for poor people that are struggling to survive.

If one looks at this table it can be seen that there are many opportunities for increasing food security at a homestead level. Most of the threats to implementing these ideas relate to lack of access to information and resources to implement these ideas. This then gives one a strong clue of where to start with an intervention for change or a project: ***Training and learning processes that also bring in some resources to implement the new ideas.***

Group Activity 9: SWOT analysis for a homestead farming system

Aim

Group analysis of a homestead farming system

Instructions

Do a SWOT analysis in groups of 4 of the systems you have individually described. This requires you to combine the elements that are similar, and make a choice about including ones that are different.

- Produce a table of strengths, weaknesses, opportunities and threats that you have discussed for your 4 systems.
- Make a comment about the present situation: summarise what is coming out of the table.
- And then make a comment about future opportunities, taking into account the possible threats.
- And then come up with a potential intervention (project) that could change the situation for the better (based on your table).

Time: 2 hrs

7. Case study of a Homestead Farming System

Below is an example of a homestead farming system as practised by Mr Matlere in Lesotho. You will need to read through this case study carefully before you can do the exercises required.

CASE STUDY: A beautiful example of intensive food production and rainwater harvesting

Mr S S Matlere has been working with conservation agriculture for many years. He noticed a number of problems in the cropping fields in his work as an agricultural extension officer. These included soil erosion through run-off, declining soil fertility, a lack of water, and low production. Through long and thoughtful observation, he has now designed and implemented his own system of farming that solves these problems and has many other benefits as well.

His design consists of making furrows on the contour in the fields, with a mound all along the downslope side of each furrow.

Organic matter is continually incorporated into the mounds. A range of crops are grown, including maize, wheat and vegetables such as beans, tomatoes, cabbages, potatoes, rape, mustard spinach and onions.



Right: Mr Matlere is standing in one of his furrows. On the mound is a crop of maize, already harvested, with runner beans climbing up the stalks.

Left: In another row of the field, cabbages were planted on the mound next to the maize. These cabbages are now being left to produce seed for the next season. Note the

organic matter that is weeded out and placed as mulch in the furrow and on the mounds.



Why furrows and mounds?

- The furrows and mounds help regulate runoff water which would erode fertile top soil away.
- The furrows ensure that all the rain that falls on the field, remains there. The rain is caught in the furrows and sinks into the soil.
- The furrows help distribute rainwater evenly throughout the entire field.
- The mounds help increase the depth of soil, which in turn helps the roots of the plants to go deeper in search of plant food and moisture. With strong, deep roots, the crops yield better.
- The furrows and mounds also increase the fertility of the soil through the organic matter that is incorporated into the soil. The moisture in the soil and the heat of the sun striking the sides of the mounds, help speed up the breakdown of the organic matter.

Right: Maize was planted and then intercropped with beans and tomatoes. The mound was formed during the summer season by heaping the soil and weeds together up around the row of maize planted. Thereafter, beans and tomatoes were planted on the mound with the maize. In autumn, after the maize was harvested, wheat was planted at the bottom of the mounds and kale was planted on top of the mound.



Left: The maize residues have been worked into the mounds once the crop was harvested.

These mounds will be ready for planting again in spring.

In this way, the typical back breaking land preparation in hard, dry soil is avoided. Crops can now be planted earlier - as soon as the first rains have come. In many areas, this means that the crop can mature during the peak rainy season, avoiding the major risk of crop failure through late season dry spells.

Cropping in furrows

In this system of furrow cropping, crops are grown over a longer period of time, so that more than one crop can be harvested in a season. Cattle are not allowed to enter into the field at any time, as they will trample the furrows and mounds, and will eat the residues that need to be incorporated into the soil.

Different crops can be grown in the same field in a relay fashion. As some crops are maturing, other crops are planted. The maize plants for example, become a support for the tomatoes and beans that are planted later.



If a farmer wants to produce an early crop, seedlings can be raised in green houses, either in speedling trays, or in the case of larger seedlings like pumpkins and squashes, in old tins. The containers are filled with well rotted manure or compost. The seedlings are transplanted onto the mounds and furrows as soon as the last threat of frost is over.

Above: Materials for producing seedlings have been collected: A large pile of well rotted compost and a pile of tins for planting.

Right: Mr Matlere (left) and Mr Thulo (right) (CARE-Lesotho) inspecting Mustard Spinach seedlings planted in speedling trays. These seedlings are produced in the greenhouse towards the end of the hot period of summer, so that they can be planted in the field as soon as autumn comes. In this way, a good crop can be realised before the severe winter cold sets in.



Some interesting outcomes

- The continued absorption of rainwater into the furrows and mounds, tends to influence the moisture in the area over time. Mr Matlere has experienced that two days after some days of soaking rain, the sun that strikes the sides of the mounds creates a mist that rises up from the beds. This happens due to the warmth generated in the mounds from the decomposing grasses, weeds and maize stalks. It provides a warm, moist micro-climate in an area that would otherwise be quite dry. This provides very favourable conditions for the growth of vegetables and pumpkins.
- The silt that collects in the furrows during heavy rains provides some more fertility, moisture and a better foothold to the crops planted there. Mr Matlere has noticed that the stand of maize is much better with this system. The maize does not fall over in heavy rains and winds, as they do under normal conditions.
- With the mounds, the organic matter that has been incorporated decomposes faster than it would without the mounds. The climate in Lesotho is mild and many months are quite cold and dry. The mounds provide a surface that is heated by the sun and the organic matter holds more moisture. Thus decomposition happens faster.
- Because there is more organic matter in the soil, it becomes fertile without the need even to add manure, when that is in short supply.
- Mr Matlere has noticed that with the increase in fertility and organic matter (humus) in the soil, there are fewer problems with pests and diseases.
- Because the spacings of the crops are quite wide with this system, the maize matures faster, there are more cobs per plant (4-5) and cobs are bigger. So, even though fewer plants are in the ground, a

better harvest is achieved. This applies also to other crops like cabbage and wheat.

- The wide spacing of the rows facilitates early weeding which is important.
 - Spacings are generally up to 2m between the rows (on the mounds) and up to 60cm between plants in the row (on the mounds).
 - This wide spacing can also facilitate the use of animal drawn implements (oxen or horses) for weeding.
 - For smaller crops like kale and tomatoes, the spacing between the plants in the row is 30cm.
 - For row crops like wheat and onions, 2-3 rows are planted, with a spacing of 40-50cm between rows and 30cm between plants in the rows.
- In this system, seeds are planted by hand, rather than by animal drawn planters. Mr Matlere also only plants crops from which he can keep his own seed.

Individual Activity 6: Case study of a Homestead Farming System

Aim

Analyse the case study given in terms of the farming system used (TA, HEIA, LEIA) and in terms of the elements of sustainability.

Instructions

Discuss and summarise the case study of a farming system that you have been given; using some of the processes and concepts discussed in this section (sustainability, 3 farming approaches, SWOT, flow diagram and mind map).

Time: 3-4hrs