8 What is gender?[1]

Purpose

This series of activities aims to clarify participants' understanding of 'gender' as a concept that is crucial to vulnerability assessment and risk reduction.

Note

It is important that participants should not equate 'gender' with 'women'. This activity helps participants to make distinctions between 'gender' and 'women'.

Procedure

This session is composed of a number of different activities: after an input from the facilitator, participants are asked to list stereotypical features of men and women; this is followed by the construction of an 'activity clock' and discussion; finally, groups work with definitions of various gender terms.

Time

- 2 - 2½ hours

Materials

- a sheet of flipchart paper divided into two columns and entitled 'men are...', 'women are...'
- list of 'gender definitions', for each participant (see resources)
- an illustration of the 'I Ching' (optional)

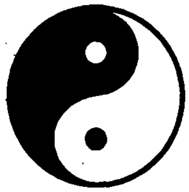
Process

Introduction

1. Outline the purpose and procedure of the activity.

2. Explain that 'gender' is not about conflict, but reconciliation: it is about two halves of a whole and the need for balance between the halves.

   Introduce an illustration of an image or concept that represents the whole, in two evenly balanced halves, such as the 'I Ching'.



> *Hint*
>
> In the SADMTP workshop the facilitator explained the 'I Ching' as an image of the energies in Yin and Yang: the eye in each half represents the other in each. She pointed out that this is an image of the universe, and that there is a need for balance in the universe, between opposites that complement each other; she explained the interdependence and reconciliation between the halves.

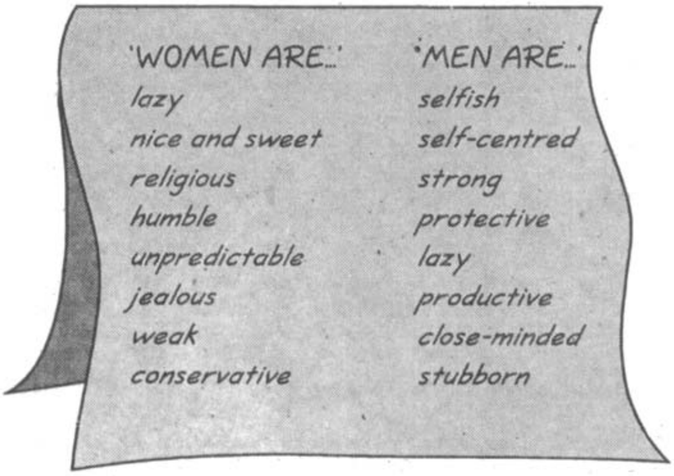
Participant Action 1

> 'Gender' is often equated with 'feminists' and facilitators might expect a degree of reluctance, resistance or even hostility to a session entitled 'gender'. In order to diffuse tensions it is advised to begin with a light-hearted investigation of popular stereo-types. This allows all participants to laugh with each other. Throughout the series of activities participants must remain aware that 'gender' refers to both men and women.

1. Divide participants randomly into two groups labelled 'men' and 'women'. Ask groups to think about 'typical features of men / women'.

2. Reveal the prepared flipchart and invite participants to describe men / women. List the adjectives in the appropriate columns.

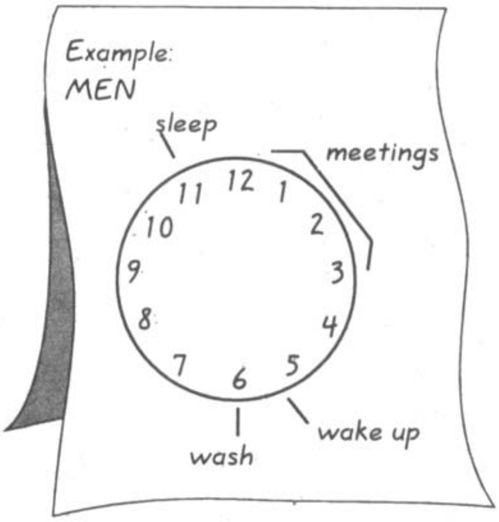
   (allow approximately 5 minutes for this)



3. Explain that you will review the lists later.

Participant Action 2

1. Draw the outline of a clock on the flipchart; include the numbers.



2. Ask participants to get into small groups made up of both men and women. Hand each group 2 sheets of flipchart paper.

3. Ask each group to draw 2 clocks and label one 'men', one 'women' and give the following instruction:

— *Use your own daily activities as a reference*

— *For each hour of the day/night fill in the typical tasks men perform.*

— *For each hour of the day/night fill in the typical tasks women perform.*

You have approximately 15 minutes for this.

4. Ask each group to briefly report back on the activity clocks recorded on their worksheets.

Review and Discussion

1. Suggest that you will now review the lists of 'typical features'.

   — Give examples from the lists to show that both men and women have been described with positive and negative qualities.

   — Give examples of features that are listed in both columns of men and women.

   — Point out that some features refer to the biological differences between men and women; explain that these are differences based on sex, while others refer to the different roles that men and women play in society. This is difference based on gender. Give examples for each, in order to illustrate the difference.

2. Ask participants to refer to their activity clock worksheets and compare the information from the clocks with the information on the newsprint.
   Ask questions such as the following:

   ? Are the features listed in keeping with the tasks and activities listed? For example, are women really lazy?

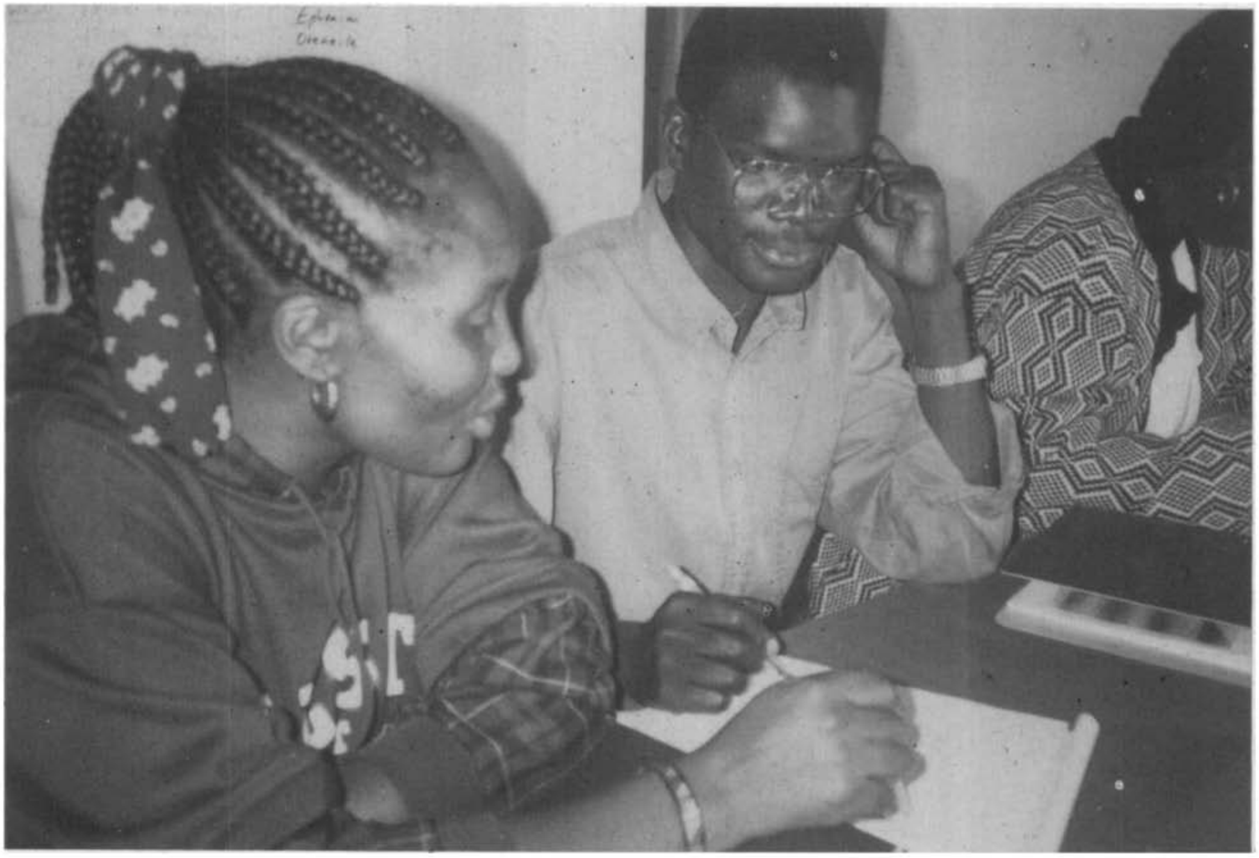
   ? Why do some people have the notion that 'women are lazy'?

   Refer to the task clocks and point out those tasks that are 'invisible'; point out how many activities of women are hidden; for example, refer to housekeeping / childcare activities that do not appear in labour statistics.

   — Point out that many of the features listed are stereotypes; ask participants to explore the origin of stereotypes: where do they come from, and how are they disseminated?

3. Compare the type of tasks listed for men and women and conduct a gender assessment:

   - could all the activities be done by either men or women? Why are some activities only done by men / women?
   - point out how men's tasks are often specific, and how one activity often occupies a considerable time-span;
   - point out how women are engaged in a wide variety of activities, and how they switch activities, eg. domestic tasks, income-generating tasks, mothering etc.
   - introduce the concepts of 'productive' and 'reproductive' roles. (see resources for definitions) Ask participants to give examples for both.
   - point out that household tasks such as cleaning, cooking and laundry management are sometimes listed as 'productive' and sometimes as 'reproductive' tasks. Discuss the reason for this categorisation.
   - ask participants to examine the division of labour in their households: who does the work in the home? Who performs income-generating tasks? What is the decision-making procedure over cash and other resources? Is there a balance in the distribution of tasks and responsibilities?
   - introduce the concept of 'community managing roles' (such as serving on committees or attending school meetings). Who participates in community decision-making bodies?



4. Ask participants to do a buzz around the following question:
   - What would make it easier for you to deal with your activities? What would you need to better manage your chores?
   - Note responses on flipchart.
   - Introduce the concept of 'gender needs': explain the difference between 'practical gender needs' and 'strategic gender needs' (see resources for definitions).
   - Ask participants to give examples of practical and strategic gender needs, for both men and women.

5. Suggest a brief break, stretch or energising game.

   (allow approximately 5-10 minutes)

Participant Action 3

1. Affirm how you have just conducted a basic gender analysis.

2. Ask participants to suggest how, in the light of the activities and ensuing discussion, they would define 'gender'.
   - Write up the key terms suggested.

3. Hand each participant a copy of 'gender definitions' and ask them to read and review the definitions, individually.

   Allow approximately 10 minutes for this activity.

Review and Discussion

1. In plenary, encourage questions of clarification. Manage the process, but suggest that rather than you, participants respond to each others' questions. This will allow them to practise using key terms. Intervene when there is a need for information or a fresh perspective.

2. Ask participants to describe how they would use a gender analysis in order to conduct a vulnerability assessment.

3. Ask participants to suggest ways in which gender analysis is a critical part of risk reduction.

1. Much of this session is based on activities facilitated by Paulina Chiziane from the CVM (Mozambique Red Cross) and a participant in the SADMTP course. Her sensitive communication and insightful facilitation resulted in an enjoyable and rewarding session that was highly commended by other participants.

Definitions of concepts used in gender analysis[1]

Gender and Sex

Sex identifies the physical, biological difference between men and women. It refers to whether people are born male or female. Gender identifies the social relations between men and women. It refers to the relationship between them, and how it is constructed. It refers to the expectations people have of someone, simply because they are male or female.

Gender Roles

Men and women undertake different roles, depending on the task they are involved in. Gender planning recognises that in most at-risk communities women have a triple role, undertaking reproductive, productive and community managing activities. Men are primarily engaged in productive and community politics roles.

reproductive role - refers to child-bearing/child rearing responsibilities, and to domestic tasks required to guarantee the well-being and health of present and future workforce (other members of the household, including children). Time-consuming activities such as water and fuel collection are examples, as is the gathering of wild fruits during time of drought.

productive role - refers to the work done for pay in cash or kind; these roles include both subsistence/home production with actual use value, and market production with an exchange value. Examples include small income-generating work such as weaving or basket-making, undertaken both for household usage and to decrease economic vulnerability of the household.

community managing role - refers to activities done at the community level, mainly by women, as an extension of their reproductive role. This is voluntary unpaid work aimed at maintaining the well-being of the whole community. For example: work involved in the maintenance of communal water sources, or work in a primary health care programme, or school committee.

community politics role - refers to activities undertaken mainly by men at the community level, often within the framework of policy-making or politics. An example would be the constitution of community representative structures. This work is usually paid, either directly or through status and power.

Gender Needs

Based on their roles women and men have different needs. This is enhanced by the subordinate position of women in Southern Africa.

practical gender needs - are linked to the social roles assigned to women by particular social conventions and culture. Practical gender needs do not challenge gender divisions of labour, but they are a response to immediate perceived necessity. For example, the arduous task of collecting water from remote places in drought-prone areas forces women to walk long distances with a heavy load.

strategic gender needs - strategic needs arise out of the subordinate position of women in society. Meeting such needs would assist women to achieve greater equality and change the existing gendered division of labour. Empowering women through greater self-reliance would be one way of reducing risk.

1. These definitions are adapted from C. Moser and C. Levy (1984-90) *Training Materials for Training in Gender Planning for Development*.

9

How do economic adjustment policies affect risk?[1]

Purpose

Participants develop their understanding of how economic policies at the national level affect household vulnerability and decrease the capacity of individuals to cope with risk.

> **Note**
>
> Participants enhance their knowledge, test their understanding and use the information gathered to assess economic risk.

Procedure

The session is a series of inputs, discussions and participant actions.

Time

- 3 - 4 hours

Materials

- copies of the SAP play for each participant (see resources)
- a poster / sign saying: *TOBACCO MARKET COLLAPSES*

Process

Section 1: What is SAP?

Introduction

1. Introduce the session by outlining purpose of the session and procedure of section 1.

2. Begin by giving an interactive input: ask questions, allow participants to respond, and add information and/or explanations, if necessary.

   ? Most Southern African countries are in an economic adjustment process. Why?

   There has been a process of long-term decline or stagnation, due to:

   — economic decline / lack of economic growth
   — drought and other shocks / disasters
   — civil conflcit and population movements (refugees)
   — mismanagement
   — an unfair trading environment (decline in prices for exports)
   — lack of control over decision-making

   ? What are the effects of long-term decline?

   — lower export revenue, and higher import costs
   — a balance of payment crisis (what does that mean? There is less earning than spending; hence there is an increase in borrowing which leads to increased debt; this, in turn, leads to a devaluing of the currency)
   — lower government revenue
   — increasing budget deficits
   — increased interest rates
   — increased inflation

   ? The response to this decline has often been a stabilisation or adjustment policy. How do you define stabilisation and adjustment?

   —Stabilisation:
   refers to economic reforms required by the International Monetary Fund (IMF). It aims at stabilising the economy so that there is a balance between income and expenditure. Stabilisation policies are short-term solutions managed by the IMF.

   —Structural Adjustment:
   is concerned with changing the structure of the economy in order to redress the underlying problems that lead to economic decline. It is controlled by the World Bank (WB) and aims at long-term solutions. It has a sectoral focus, that is, it generally pushes for an increase in the production of goods (industrial or agricultural) that can be traded. It also aims at reducing the size and influence of the public sector.

3. Explain to participants that in order to illustrate structural adjustment you will tell an everyday story.

Sample story (you may want to make up your own):

"When John Kumwembe returned home from years of working in a South African mine he took what money he had and set up a store. It was the only one in the region and although the villagers in surrounding communities were poor his business did well.

One day his friend Kileo came to see him; they used to play in the same soccer team but hadn't met for a while. After the exchange of greetings Kileo explained the reason for his visit: he had bad problems. His wife was ill and needed to go to town to have an operation. His son's schoolfees were due - in short, he needed to borrow some money and would John lend him 1000 kwacha. If the rain came soon his crops would be good, so he could pay the money back.

John agreed: after all, they had grown up together, and Kileo's wife was a good customer at his shop. At the bank the manager warned him; you must charge interest, at least 15%! John gave Kileo the money and said: you must pay me back with interest, so you owe me 1000 plus 15 %, that is 1150. Kileo agreed; he needed the money and besides he knew prices always seemed to go up, why should this be different?"

4. **Interrupt the story and ask participants to continue where you left off: what do they think happened next?**
   - **Allow 5 minutes for participants to spin out the story; collect alternative suggestions without commenting.**

5. **Continue the story:**

"At the end of the harvest season Kileo came to see John. They exchanged greetings and news: the wife was well, the operation had been a success. His son was doing well at school. For John, business was not too good - people were poor and were doing without some of the things they used to buy. Yes, said Kileo, these were bad times. The rains didn't come and his crops had died. So he had nothing to sell - in fact, they wouldn't even have enough to live on. And now, there had been cut-backs at his work, and he had been laid off. But the school fees were due again. Please could John lend him some more money - 500 kwacha; he would owe him 1650.

John wanted to help him; after all, he was a good man and he worked hard to support his family. And their children went to the same school. But how would Kileo ever be able to pay him back? He spoke to the bank manager and when he came back to Kileo he said: "I will lend you some more money, but this time there have to be some conditions."

6. Interrupt the story again; ask participants: what conditions would you suggest should be imposed on Kileo?

   — Allow 5 minutes for participants to make suggestions for conditions attached to the loan.

7. Continue the story:

> *"John told Kileo that he would have to change his way of life: if he could not afford to pay school fees he would have to take his child out of the school; he should grow different crops; use his fields to grow something he could sell, like tobacco. How could he afford to buy the seeds? Well, he might have to sell some of his cattle. And he would have to begin making payments every months. He, John, could no longer wait until the end of the season. And he was sorry, but the interst had gone up. 16% now. Maybe his wife could go out and work and help with the repayments?*
>
> *Kileo went home that day, and his life and that of his family changed forever."*

A year passes: Hold up the sign that reads: *Tobacco Market Collapses...*

8. Ask participants to describe briefly, how this story illustrates 'structural adjustment':

   — at the household, community, national level

   — in terms of the relationship between the IMF/World Bank and a country

   — in terms of the impact of hazards such as drought on 'normal' development processes

9. Suggest a break / energising game.

Section 2: The aims of SAP

Introduction

1. Introduce the procedure of this section.

2. Ask participants to focus on the characteristics of structural adjustment policies. Ask: How do they work? What are the goals of SAP?

3. Record responses on newsprint; ask participants to explain to each other what each one means and assist where necessary.

The following main points should be mentioned:

> —*increase exports and reduce imports, to assist balance of payments difficulties and enable Southern African countries to*
>
> — *repay western debts*
>
> — *increase the production of food and cash crops*
>
> — *encourage private-sector involvement and competition*
>
> — *reduce government expenditure and the role of government intervention: liberalisation of trade and industry*
>
> — *economic growth, efficiency, free markets*

Participant Action

1. Introduce 'The Structural Adjustment Play' (see resources) by outlining its purpose to present arguments for and against the introduction of an economic adjustment policy, as a way of exploring whether / how economic policies can reduce or enhance risks

2. *The Structural Adjustment Play*

   — Ask two participants to act as 'supporting voice' and 'opposition voice'

   — Give each acting participant a role sheet

— Point out that you will act as the 'presenter'

Hint

Alternatively, you can ask participants to improvise a dialogue on the pros and cons of SAP. This could either be in the form of a panel discussion, with approximately 3 participants on either 'side'; or in small 3-member groups

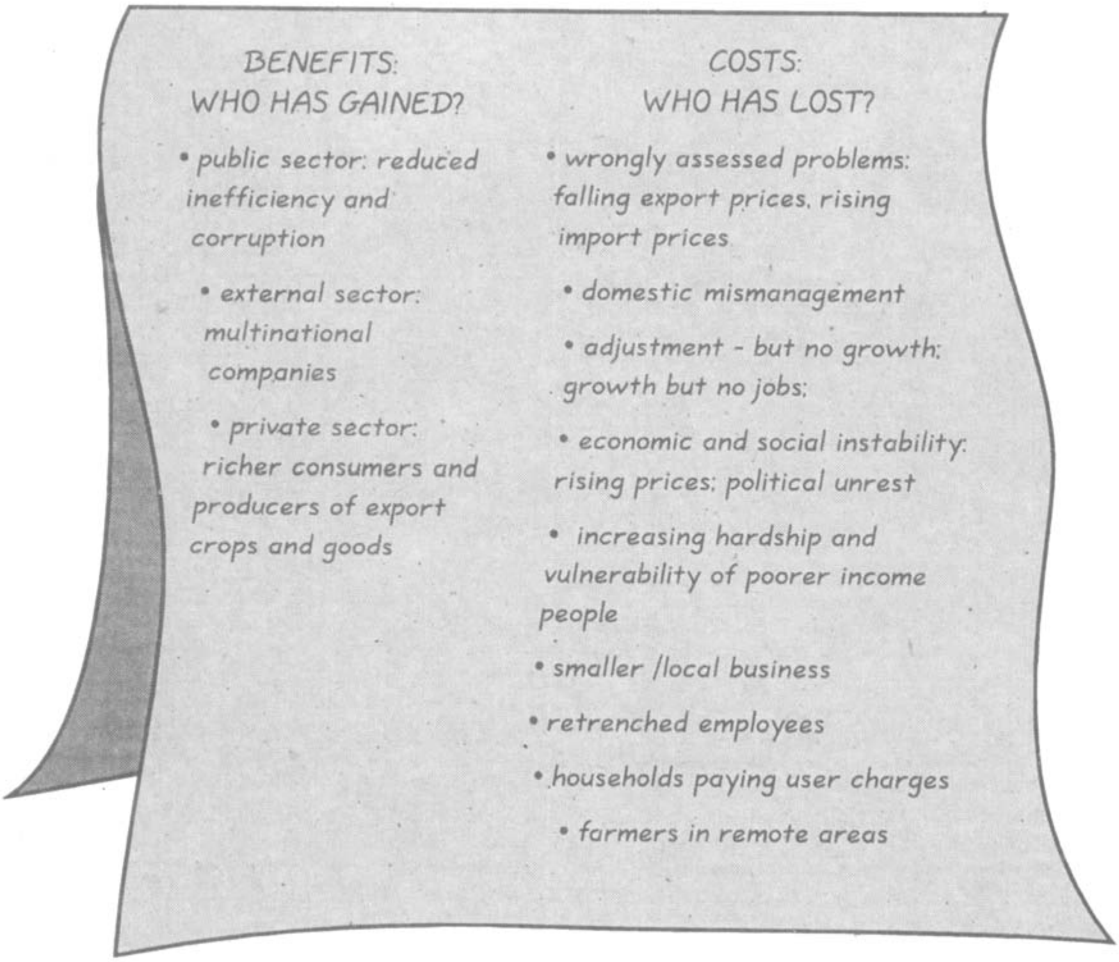
3. Manage the process and participate in the reading / enactment of the play

4. Encourage any questions of clarification; explain terms and concepts, where necessary.

5. Ask participants to summarise the main arguments made by the opposing voices; suggest that you will record them as a cost-benefit analysis:

   — Prepare a sheet of newsprint in two columns, entitled: 'benefit: who has gained?' and 'cost: who has lost?';

   — Record points raised in the appropriate column.



6. Ask participants to respond to the following question:

   ? From your experience, which voice (SV or OV) or which column (benefit or cost) reflects the impact that an economic adjustment policy has had in your country? Explain.

7. Suggest a break and/or energising game.

Section 3: How have structural adjustment policies increased risk?

Introduction

1. Outline the procedure of this section.

2. Divide participants into five small groups with the following labels:
   - social impact
   - health impact
   - environmental impact
   - political impact
   - women

3. Give the following instruction:

   List ways in which SAP have increased risk with regard to:
   — social impact
   — health impact
   — environmental impact
   — political impact
   — gender isolation
   You are expected to report back to the rest of the group.
   You have 20 minutes to complete the task.

Review and Discussion

1. Manage report backs, and facilitate discussion.

2. Sum up increased vulnerabilities; ask participants to name some of the capacities which communities have relied on in order to cope with increased threats.

1. Much of the information is based on training sessions prepared and run by Carol Thompson, University of Arizona, and Graham Eele, from the Southern African Development Community Food Security Training Programme, Harare.

Notes

Discussing structural adjustment

This is the skeleton of a possible dialogue on structural adjustment policies (SAP) between a supporting voice (SV) and an opposition voice (OV). Arguments can be elaborated at will; 'actors' should feel free to enact the moods underlying the arguments. Each characteristic of SAP will be introduced briefly by the presenter (P), after which SV and OV will engage in a dialogue.

P: Ladies and gentlemen, welcome to our dialogue on SAP. May I introduce to you the two contestants: one my right: SV, and on my left: OV They will present to you arguments in support of and in opposition to SAP - after which you will be invited to make up your own mind! (applause)

P: The first (but not foremost) characteristic of SAP is the liberalisation of trade and exchange. The government no longer controls the price of goods sold in a country.

OV: Yes, we have noticed that! Look at how the prices have rocketed! The average household can no longer afford to buy basics like sugar and chicken.

SV: We no longer have to endure the tyranny of Government control! We, the business owners, will at last have a say over what to produce, and what to charge for our products. Our profits are your benefit: we can expand our business, and that means you have a much greater choice of goods! More variety! And: more jobs - the more business, the more employment. If we can show the world that we have a thriving economy, foreign investors will be confident to invest in our country - and their companies and factories will mean more jobs.

OV: Foreign countries already own too much of our industry. They only have their profits at heart - not the benefit of our country. We will lose control of our economy and resources.

P: Trade liberalisation also means, wages are no longer controlled by the government. Collective bargaining is the order of the day: workers negotiate directly with their employers and agree on the rates of pay.

SV: We want to ensure high productivity - so we will pay good wages. Of course, we can only pay what we can afford in terms of ensuring growth. Remember: increased productivity - increased goods, and increased jobs!

OV: Wages are already so low that most of the workers cannot afford to purchase a basic food basket for their households. With this rate of unemployment we are not in a position to bargain with employers. They will just dismiss us! If the government doesn't control our wages and rights through labour laws, we will have to accept even less from employers. 'Freeing wages' is a euphemism for 'banning trade unions'.

OV: You want us to grow crops that can be sold. But who will travel into the remote parts of the country and pick up our products? Who will pay the additional cost of transport? And what if the market crashes: if our maize does no longer fetch a good price, internationally?

We have to ensure that we have basic food-stuffs at home, before growing for export. We should grow more drought resistant crops like sorghum and cow-peas, but who will be prepared to grow food if high incentive prices are offered to grow maize?

P: Under the old laws foreign investors could only send a small proportion of their profits out of the country. With SAP they are free to remit all their profits.

SV: At last, a truly free market. This makes it so much more attractive to invest in our country! Why would they want to bring their money here, and provide jobs for you and then not be able to take their profits out? We need foreign currency - how else will we compete in the market?

OV: Can you not see that already too much money is leaving our country? Foreign companies use our resources to get rich - and they leave us all the poorer. Yes, we need foreign currency - but if they are allowed to take out more money we will have an even greater shortage of foreign currency.

Reduced public spending is one of the cornerstones of SAP. This includes cutbacks in money spent on services such as health and education; dismissal of public servants; reorganisation of inefficient systems of management.

SV: For too long too many public servants have been unproductive. To employ three people doing the work of one person is not cost-effective.

OV: So: more unemployed join the queue outside the labour bureau.

SV: The money saved on redundant civil servant's wages can be used much more productively. It means we have a bigger budget for roads, bridges, sports stadiums and the like.

OV: You want to cut on basic services! We fought our liberation for the right to have primary health care, and primary education for all. If people have to pay in order to attend the clinic they will not be able to afford to come. Disease will increase.

SV: We will ensure continued PHC and education - with the support of the World Bank. And we will subsidise basic food stuffs.

OV: What will you do about the spiralling interest rates? Small business sector cannot afford them - but the international companies can go elsewhere for credit.

P: Can we ask both voices to present closing arguments, please.

SV: There has to be growth: no jobs, no income, no stability. There is a lot of evidence of improved economic performance in African countries due to sap's. The annual growth of goods and services in countries like Burundi, Gambia, Kenya and Senegal rose from less than 2% before SAP to 3%. If it wasn't for the disruption by political changes in some countries it could have gone even higher. Besides, the SAP provide an effective instrument to deal with the debt problem. And now, the IMF supports new and more concessional approaches by creditors.

OV: SAP makes too many assumptions: for example, that an improvement in the national economy will ensure an improvement at the household level (not just of the well-off minority); or: that we have a stable political situation, rather than constant upheaval where the changes in one country potentially affect the whole region. And what about the droughts? Women already supply so much free labour to collect water and fuel, and many men and women lose time to productive activities, because of relief work. Times of large-scale food insecurity are not the right time for introducing structural adjustment policies!

10 What are the causes of droughts and how do they impact on the environment?

Purpose

Participants enhance their understanding of the causes and effects of droughts.

> **Note**
>
> Participants gather technical information on and improve their understanding of
>
> - different types of drought,
> - factors effecting the severity of drought, and
> - the impact of drought on various elements at risk

Procedure

This is a reading and discussion activity.

Time

- 1½ -2 hours

Materials

- reading: Drought Disaster hits Zimbabwe (see resources)
- copies of 'The Climate Factor' from: *State of the Environment in Southern Africa*, for each participant; (see resources)
- questions written up on flipchart paper
- four sheets of flipchart paper entitled:
  - Identify the elements at risk from a drought
  - Identify human activity that exacerbates the effects of a drought
  - Identify various pressures on the environment as a result of a drought
  - Identify the impact on industry

Process

Introduction

1. Outline the purpose and procedure of the activity.

2. Tell a brief story that illustrates different perceptions of causes and effects and definitions of what might constitute a drought.

Sample Story

A simple story may begin with a letter from an African person writing from northern England. 'We have water restrictions', she reports, 'because it hasn't rained for three weeks. There is a drought'. The response at home is a mixture of hilarity and disbelief: 'Three weeks no rain and they call it a drought! Ha ha, it always pours in England, it's as green and luscious as can be - they don't know what it means to have a drought!'

And yet northern England is experiencing a drought, because 'drought is a relative, rather than an absolute, condition'.

3. Inform participants that in order to better understand drought as 'a relative rather than absolute condition' you will hand out some technical information, written about the Southern African region.

Participant Action

1. Distribute copies of 'The Climate Factor' and ask participants to read through the information, underlining or writing down key words and issues.

   Allow approximately 30 minutes for this.

Hint

Alternatively, you may invite a technical resource person who has expert knowledge of droughts to give a presentation on the topics outlined. In this case ensure that participants end up with written records of key issues.

Review and Discussion

1. Ask participants to work in pairs and to refer to the reading when following the instructions written on newsprint:

   Face each other and take turns in explaining the following ideas and concepts:

   > - explain what is meant by drought is a relative, rather than an absolute, condition'
   > - explain ENSO
   > - explain the ITCZ
   >
   > You have approximately 15 minutes to complete this task.

2. Monitor the process and assist where necessary.

3. In plenary, check how participants found the task and encourage questions of clarification and further explanation.

4. Ask participants to consider the sources of information that technical advisers draw on: list the sources for meteorologists, hydrologists and agriculturalists on flipchart.

Participant Action

1. Stick the four sheets of prepared flipchart paper on the wall:

   > Identify the elements at risk from a drought

   > Identify human activity that exacerbates the effects of a drought

   > Identify various pressures on the environment as a result of a drought

   > Identify the impact on industry

2. Ask participants to get into four groups and ask each to choose one flipchart. Request groups to respond to the instruction on their flipchart. Allow approximately 5-10 minutes.

3. Instruct participants to go on a 'gallery walk' and read the lists of other groups.

Review and Discussion

1. Review the lists: highlight important aspects and add other factors that may have been omitted.

2. Ask participants to refer to their experience of a recent drought, such as the Southern African drought of 1991-2.

   Discuss the following questions:

   ? What impact did the drought have on you, personally?

   ? What impact did it have on other people and communities in your area / region / country?

   ? List social, organisational, economic and environmental factors that contributed to your being able to cope with the drought.

   ? Identify factors that made others more vulnerable.

3. Summarise the activity by asking participants to name ways in which they could apply the information gathered to their work in the field.

4. Distribute copies of 'Drought disaster hits Zimbabwe' and ask participants to read this text as follow-up homework.

DROUGHT DISASTER HITS ZIMBABWE

By Joshua Chigodora and Munyaradzi Chenje

(Environment Resource Centre for Southern Africa; SARDC)

Maria Kudzingwa vividly remembers the years of plenty in Nhekairo village, in Wedza. The rains were more reliable and rivers in her area flowed swiftly. All those memories seem, however, to be drying up like the thirsty, cracked earth on which she is sitting, patiently waiting at the borehole for her turn to fill her water pail.

With only six people at the borehole, including Kudzingwa — who is in her sixties — the atmosphere appears laid-back, belying the jostling and elbowing for position which usually takes place on a busy day. Kudzingwa sits close by to rest her legs tired from the 10-kilometre walk from her home to the borehole. She turns her wizened face to watch those ahead of her fill up their containers. Up and down! Up and down, the handle of the hand pump goes, pumping water from the bosom of the earth. With each upward motion, the water flows into the pipe and is spat out, gushing into containers with each downward motion. Some of the water misses a container, splashing by its sides and trickles down the sloppy ground. Kudzingwa's eyes seem to follow the trickle of water as it meanders its way on the ground. The flow gets slower and slower as the thirsty earth sucks up every drop of the water.

Nhekairo village, in Wedza, about 150 kilometres east of Harare, used to have abundant supplies of water, says Kudzingwa, finally turning up her face to her visitors. The village used to have plenty of water trees, such as the mukute trees but these have since been cut down, leaving the terrain bare and degraded. For Kudzingwa, the past holds the best of her life experiences. The present, with its severe droughts and failed crops almost every season, is a stark reminder of paradise lost.

Many of the villagers hardly harvested anything this past season as most of the crops wilted under the merciless heat from the sun and lack of rain. While the villagers were self-sufficient in food in the past, most of them have been forced to depend on handouts - government drought relief and welfare. "I should be busy preparing my maize harvest at this time of the year, but here I am busy looking for water," said Kudzingwa with disappointment in her voice.

She points to a place where the village used to draw water from a spring which had water all-year round. Today, the same spring is only remembered in the past tense. Villagers also depended on hand-dug, shallow wells. But those have since given way to drilling rigs which are now used to tap an eve-receding water table deep down in the ground. Kudzingwa blames modern technology for such misfortunes, saying people no longer respect their ancestors and culture. She said the practice of praying for and receiving abundant rains has died and will never return as the spirits are upset with what is happening in this country.

As generations come and go, memories of springs with abundant water supplies, many hand-dug wells, and rain-praying ceremonies would probably only be remembered in folklore. But that too may be difficult to sustain for long, as the present generation seems to have been caught in vicious circle recurrent drought, large-scale crop failures, and the scorching sun. Simba Nherera (28) laments about sharing water supplies with livestock. Water scarcity in the village is evidenced by Manyimo dam which is drying up. Due to lack of many water sources, the villagers now use water from the dam for washing, drinking, cooking and livestock. The water is polluted and looks unfit for human consumption.

The plight of Nhekairo village is not an isolated freak of nature, but is replicated hundreds of times throughout Zimbabwe, with millions of villagers now facing not only starvation but also water shortages. In Tsholotsho, Matabeleland North Province, a total of 35 children died between January-June this year due to malnutrition. In the same period, the district hospital attended to 119 children who were suffering from malnutrition. In Mt Darwin, some villagers are being forced to walk 20 kilometres in search of water. It has been reported that the water table has gone down and boreholes are drying up. In Chivi South in Masvingo province, villagers continue to live on the threshold of starvation.

The water crisis extends beyond rural areas and have forced many urban areas, including Harare and Bulawayo, to start water rationing. Government officials say the present water situation is critical in most towns. In Chegutu, a critical water shortage is threatening industry and some business people fear they could be forced to stop production.

A few months ago the government declared the town, which is more than 80 km west of Harare, a water shortage area and the local town council was forced to introduce water rationing to conserve water. The town's water supply will only last until October this year despite the water rationing. Apart from the fears of economic ruin if water runs out, residents are also concerned about the health risks. Because water is available at specific periods, sanitation and personal hygiene is suffering, according to some residents.

The District Environmental Health Inspector at Chegutu District Hospital believes the possibility of an outbreak of an epidemic should not be ruled out. "The restrictions in water use, though necessary, will result in a decline in levels of personal hygiene. Sewerage blockages are inevitable," said the inspector. "The frequent water cuts will affect the effectiveness of chlorine and therefore the water quality. What do you expect from such a situation?" "The truth is we have had more dysentery cases over recent weeks than at any time before water rationing ...," says Chegutu District Nursing Officer, Sister Patricia Zari. "Nutritional levels have gone down considerably in some areas since we had to close our nutritional gardens because of lack of water"

The water crisis has also affected industries in the town and the surrounding farms. Production in most firms has gone down by 30 percent and the business community fears this could have repercussions to employment and income levels, and the future development of the town. Agricultural activities have already suffered from the water cuts as farmers have been ordered to limit water use to the barest minimum.

The Zimbabwe government has since described the crisis as a disaster, which, if not dealt with promptly, could see many people dying of hunger. The 1995/96 drought is already described as worse than the drought of 1991/92, then called the worst this century. (SARDC)

5

The Climate Factor

Rainfall is the lifeblood of southern Africa. Much of the region is arid or semi-arid and rainfall is extremely variable, often unreliable. A poor year can result in large-scale crop failure, food shortages and, in extreme cases, famine. Trees and grasses wilt and die, and animals perish from hunger and thirst. Subsistence farming, which provides most people of the region with their food, depends on sufficient rainfall. Any signs of drought are received with dread. Drought is associated with suffering, and loss of valued crops, livestock and wildlife. Praying for rain is not uncommon in many parts of the region, and the onset of the rains is often viewed as the single most important event of the year.

Droughts are not easily predicted and most of the region has long, dry spells every year. If the rains do not come by a particular time, this may be a sign of drought; early rains may hide an impending drought.

The 1980s saw an increase in the severity of the impacts of droughts. The 1982-83 drought in Mozambique was considered the worst in 50 years and led to many thousands of deaths. But the worst drought in the region was experienced a decade later, in the 1991-92 season. The areas surrounding the Kgalagadi — the savannas of Angola and Botswana, and the pastoral areas of southern Africa — were the most affected. Drought left most of those areas parched and gasping for elusive rains. [2]

DROUGHT DEFINED

The word "drought" is derived from an Anglo-Saxon word *drugoth*, which means dry ground. However, meteorologists, hydrologists, agriculturalists and economists define drought differently.[3] Meteorologists define drought solely on the basis of the degree of dryness and the duration of the dry period. Hydrologists link periods of shortfall to the effect on surface or sub-surface water supply (stream flow, reservoir and lake levels, groundwater). Agriculturalists link drought to agricultural impacts, focusing on precipitation shortages, the differences between actual and potential evaporation, and factors such as soil water deficit. Economists associate the supply and demand of goods and services with elements of meteorological, hydrological and agricultural drought.[4]

Central to all definitions is the shortage of water. Drought denotes dryness and should not be confused with aridity even though both are characterised by a lack of water. Aridity is a permanent climatic condition. Drought is temporary. Drought occurs when there is a protracted shortage of water. A dry spell has to last long enough to cause damage, otherwise it is not a drought.

Drought is a relative, rather than an absolute, condition. An area normally receiving 1,000 millimetres (mm) of rain annually would experience drought if it received 700 mm per year, but would not have serious problems from an agricultural perspective. An area normally receiving 700 mm would experience crop losses if it received 400 mm. Yet each area would have lost 300 mm. In drier areas, even small reductions of rainfall can have significant economic effects. Although we tend to associate droughts with areas of low rainfall, they can also occur in areas that normally enjoy abundant rainfall.

Shortage of rainfall is always the "trigger", but it is the lack of water in the soil, rivers or reservoirs which causes the hazard.[5] Plants do not use rain as it falls, but rely on the moisture available after the rain seeps into the ground. Similarly, rainfall does not supply water directly for irrigation or domestic use. It is harnessed from rivers and reservoirs, and from underground.

When the duration of a drought is short, the impact is minimal as long as the previous season was wet enough to provide adequate food and water reserves. If a dry spell lasts for a longer period of two or three years, then the impact can be severe on the environment, people and their crops, and livestock. Meteorologists refer to the frequent but short dry-periods, often lasting for less than a year, as "normal drought". It is not uncommon for a "normal drought" to occur in the middle of a wet spell.

CLIMATIC CAUSES OF DROUGHT

Although climatologists have produced a number of plausible explanations as to why droughts occur, a single conclusive answer is yet to be found. Past occurrences of drought have been linked to certain events such as *El Nino* and volcanic eruptions.

El Nino and the Southern Oscillation (ENSO)

El Nino is a weather condition which begins with the warming of waters in the western Pacific ocean, eventually affecting global climate.[6] This condition has an effect on weather over a quarter of the world's surface. *El Ninos* develop as the warm waters of the tropical Pacific spread eastward in concert with shifting patterns of atmospheric pressure. These natural warming events alter weather patterns worldwide, probably causing droughts in southern Africa or contributing to their severity.

During the 1982-83 season, the severe drought in southern Africa and the Sahel, and the famine in Ethiopia, were linked to an *El Nino* occurrence.[7] Again, when the devastating 1991-92 drought occurred, *El Nino* lasted until the end of February 1992.[8] Some experts say that about one-third of the droughts in the region could be attributed to *El Nino*.[9]

El Nino is a component of another global weather phenomenon, the Southern Oscillation, and together these are known as ENSO. During an ENSO phase, equatorial waters across the Pacific ocean get warmer. Normal airflow moves westward from the Pacific to the Indian ocean, but during *El Nino* this movement is weakened or altered. This results in high rainfall in some parts of Latin America but low rainfall and even drought in southern Africa.

The opposite extreme of the ENSO cycle occurs when a cold phase known as *La Nina* or (anti-*El Nino)* is experienced The occurrence of *La Nina* results in unusually heavy rain in southern Africa. At this time the Pacific is cooler than the Indian ocean and wind moves from the Pacific toward the latter. *El Nino* means "the boy-child" in Spanish, so-named because it occurs around late December, when Christians are celebrating the birth of Christ. La Nina means "the little girl"

Volcanic eruptions

Volcanic eruptions elsewhere in the world have been linked to drought in southern Africa. Climatologists believe that the eruption of Mount Pinatubo in the Philippines in June 1991 could also be linked to the drought that devastated southern Africa in 1991-92.

Dust spewed by the volcano could have interfered with southern Africa's Intertropical Convergence Zone (ITCZ), which brings rain to much of the region, and other weather systems. Mount Pinatubo's volcanic dust reached the stratosphere (a layer of the atmosphere 10-60 km above the earth's surface) over the Indian ocean and partially blocked the sun's radiation. As a result, the ocean and the air above it did not warm as much as is usual. Thus, the rain-bearing wind, which drives moist air toward the region from the north-east, was not strong enough to reach southern Africa and was pushed up north of Zimbabwe.[10] Rain associated with the ITCZ fell further north than usual — over Zambia.

Global climate change

Scientists predict that global atmospheric changes could disrupt established weather patterns, so that existing weather conditions such as drought occur more frequently. It has been suggested that global warming may have caused or contributed to recent droughts, but there is no scientific evidence yet to support this. The fact that droughts have been an ongoing occurrence since pre-historic times makes it difficult to assess the role of global atmospheric change.

SOUTHERN AFRICA AS A DROUGHT-PRONE REGION

Southern Africa's climate and rainfall patterns have been highly variable for at least the last three centuries,[11] leading to recurrent droughts of varying severity.

Droughts lasting between one and five years may occur in isolated areas or on a regional scale.[12] The region experiences regular wet and dry spells, that is, several years of abundant rain followed by periods of little rain. Theories about the cyclic nature of rainfall in the region were first put forward by scientists in 1888. By 1908, a South African scientist based in

Natal had found evidence of an 18-year cycle of wet and dry years. Continuing research seems to support this theory.[13]

A 77-year study done in the upper Vaal catchment, South Africa, reveals two distinct patterns of rainfall cycles. First, the cycles of drought followed by high rainfall are a common feature in the Vaal catchment. Second, the length of droughts in the area varies considerably, while there is also variance in the quantity of rainfall received in each wet period. South African experts believe that this has some significance for the region. If the trend continues, the rest of the 1990s could be relatively wet.[14]

Generally, arid and semi-arid areas are most prone to drought, especially toward the southwest, in Botswana and Namibia. The erratic and unpredictable rains in Botswana make that country more susceptible to water shortages than some of its neighbours. The poor sandy soils, which retain little water, coupled with high evaporation rates, exacerbate the problem. However, a plant that can root deep into the ground has access to moisture for a longer period. The camel thorn and Zambezi teak are good examples. In Botswana, only three years between 1959-1972 had abundant rains; six received inadequate rain and the other five received very little rainfall.[15] While Botswana has recently received above-average rainfall on a national scale, the distribution remains erratic and there are large variations, which cause severe localised crop failure.

Like Botswana, Namibia is an arid country. The northern parts and coastal areas, in particular, are the most severely affected by drought. Parts of the Namib desert record virtually no rain in some years. Evidence of drought and degraded land is particularly strong across northern Namibia. Years of abnormally low rainfall and overuse have turned savanna grass to straw, and dried up creeks and water holes, leaving cattle thin. Dust devils dance over the plains, and sudden bursts of wind can bring a blizzard of white dust, dense as mist.

Photo 5.1 SOUTHLIGHT-G Tillim

Drought often means a daily trek for water, several kilometres longer than usual, as local supplies dry up, shown here in Lesotho.

David Livingstone's journal Box 5.1

British missionary David Livingstone recorded a drought in Botswana between 1845-1851.

Livingstone was living among the Bakwena at Kolobeng, not far from Gaborone. His letters and diaries described a number of events related to the drought, including the summoning of rain-makers. So bad was the drought that some people had to emigrate. In January 1849, Livingstone wrote that the famine was so acute that the people had survived the previous six months entirely on locusts.

Ultimately, the local people began to blame Livingstone's mission for the drought. The criticism became more vocal when the Kwena chief, a renowned rainmaker, converted to Christianity and gave up rainmaking.

"We know a great difference in him since we came to him. He was a rain maker and had the reputation of being a wizard .... He has nothing now to do with the rain making incantations and it was by his own desire that we began prayer meetings in his house."
(Letter from David Livingstone in Kolobeng to Dr. J.R. Bennett, 23 June, 1848)

Soon after Livingstone's departure from the area, the drought broke.

SOURCES: Hitchcock, R.K., "The Traditional Response to Drought in Botswana", in *Symposium on Drought in Botswana*, Botswana Society, Gaborone, 1978, p. 92
Holmes, Timothy (ed.), *David Livingstone Letters and Documents 1841-1872 - The Zambian Collection at the Livingstone Museum*, The Livingstone Museum in Association with Multimedia Zambia, Lusaka, and James Currey, London, 1990, p. 31

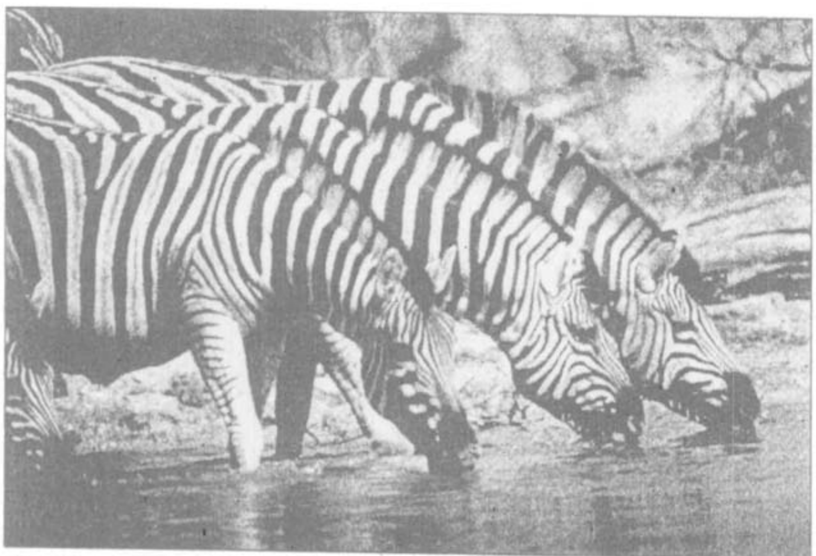


Photo 5.2 NAMIBIA REVIEW-National Parks & Wildlife
Namibia's Etosha pan, now a dried-up lake, supports a large population of wild animals, with ample waterholes in the wet season.

One of the areas that has been severely impacted by drought is Namibia's Etosha Pan, which has attracted the attention of US scientists from the University of Virginia. They are probing air and soil around the pan, now a dried-up lake. In wetter years, it was one of Africa's major breeding grounds for flamingos. When the lake last held ample water, in 1979, more than 200,000 flamingos nested on its islands.

Even in Tanzania, which gets more reliable rains than elsewhere in the region, rainfall can be low and uncertain in parts of the country. For example, in the capital city of Dodoma, in the central part of the country, the rainfall is extremely variable.[16] Tanzania experienced droughts from 1943 to 1993. Recent research in central Tanzania indicates a serious drought and famine in every 10 years, characterised by years ending with the number 3 or 4 in every decade.[17]

Trends and patterns in regional rainfall

Southern Africa's rainfall is variable, but there has been no evidence of long-term change in rainfall patterns. Nor is there any indication that the region's climate is becoming drier overall.[18] A 100-year study (1880-1980) of weather patterns in East Africa — based on air temperature, rainfall, mountain glaciers and lake levels — detected no long-term climatic change.[19] Only short-term climatic fluctuations were noted. Similar studies of long-term records have been car-

Climatic change 1800-1992

Table 5.1

A historical overview of drought and rainfall patterns in southern Africa since 1800.

❖1800-30	— Southern African rivers, swamps and other water sources dried up. Some well-watered plains turned to semi-arid karoo.
❖1820-30	— This was a decade of severe drought throughout Africa.
❖1844-49	— Southern Africa experienced five consecutive drought years.
❖1870-90	— This period was humid in some areas and former Lake Ngami filled in the northwest of Botswana.
❖1875-1910	— There was a marked decrease in rainfall in southern Africa, and 1910 experienced a severe drought.
❖1921-30	— Severe droughts in the region.
❖1930-50	— Southern Africa experienced dry periods alternating with wet ones, and in some years the rains were very good. The 1946-47 season experienced a severe drought.
❖1950s	— There was abnormally high rainfall in some parts of the region. East Africa experienced flooding, and Lake Victoria rose by several metres. Elsewhere, the equatorial region experienced below normal rainfall.
❖1967-73	— This six-year period was dry across the southern African region. The equatorial region experienced above average rainfall.
❖1974-80	— This period of six years was relatively moist over much of southern Africa. In 1974, the average annual rainfall was 100 percent above normal throughout the region.
❖1981-82	— Most of southern Africa experienced drought.
❖1982	— Most of sub-tropical Africa experienced drought.
❖1983	— This was a particularly bad drought year for the entire African continent.
❖1985	— Conditions improved.
❖1986-87	— Drought conditions returned.
❖1991-92	— Southern Africa, excluding Namibia, experienced the worst drought in living memory.

SOURCE: Tyson, P.D., *Climate Change and Variability in Southern Africa*, Oxford University Press, Cape Town, 1987 ried out in other countries in the region, with the same conclusions being drawn.

Regional weather systems

The Intertropical Convergence Zone (ITCZ) brings most of the rain that falls in the region. The ITCZ is a zone of intense rain-cloud development created when the Southeast Trade Winds (from the southern part of the region) collide with the Northeast Monsoons (winds from the north). The movement of the ITCZ southward away from the equator marks the start of the main rainy season in the Southern Hemisphere. This movement is linked to the position of the sun in relation to the region, which marks the seasons. During summer, when the sun is directly overhead between the equator and the Tropic of Capricorn, it heats the ocean and other water bodies. This causes warm, moist air to rise into the atmosphere, often resulting in substantial and rain-bearing clouds. During the summer months, the ITCZ is the main rain-bearing system over most of southern Africa.

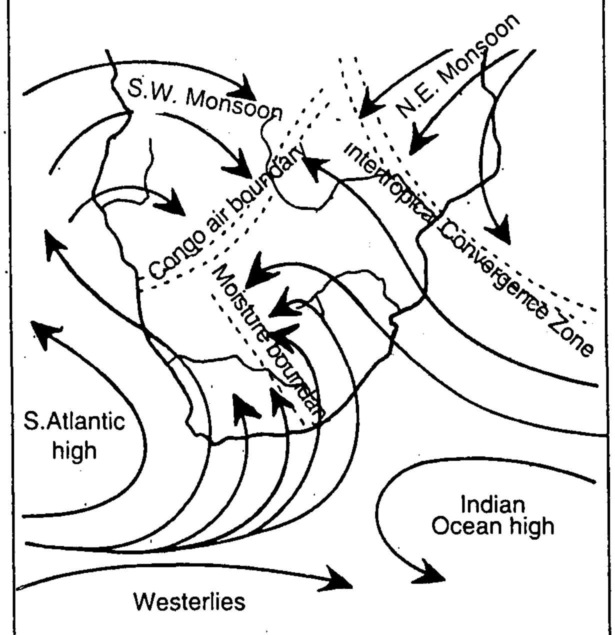
One indicator of how well a season is performing is to monitor the position of the ITCZ, and compare this to its "normal" position at different phases during the rainy season. In a normal year, the ITCZ can fluctuate between mid-Tanzania and southern Zimbabwe, bringing good rains to most of southern Africa.

The ITCZ and other main rain-bearing systems have often been inactive in recent years and less effective in promoting rainfall. An atmospheric condition known as the Botswana Upper High also creates unfavourable conditions for heavy rainfall.[20] Its frequent occurrence almost always results in drought in some countries in the region. In some instances, like an expanding balloon, it tends to push the rain-bearing ITCZ and active westerly cloud-bands out of the region and over the Indian Ocean.

Rainfall variations across southern Africa

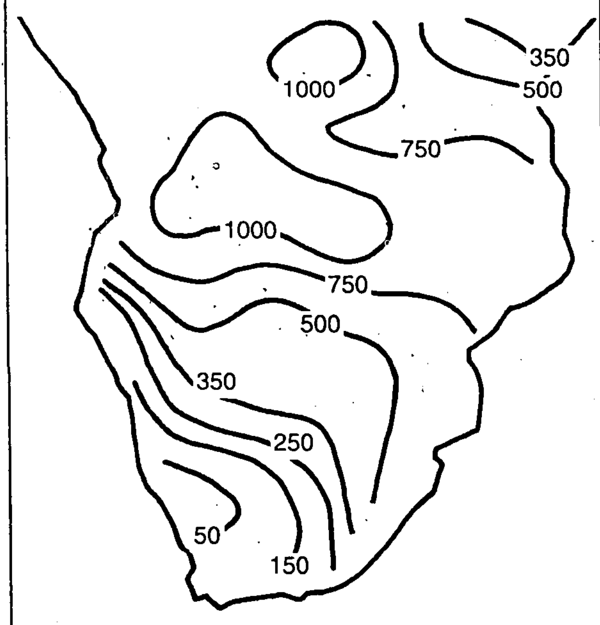
Rainfall in southern Africa comes almost entirely from evaporation over the Indian ocean. During winter and drought periods, the Botswana Upper High, along with the eastern mountain belt stretching from the Drakensberg in South Africa right up to Tanzania, blocks moist air from entering the region. The Botswana Upper High is a high pressure cell centred over Botswana (hence the name) between three and six kilometres above sea level. Its establishment is unfavourable to widespread rains across southern Africa.

Basic movements of air masses over southern Africa in summer Map 5.1



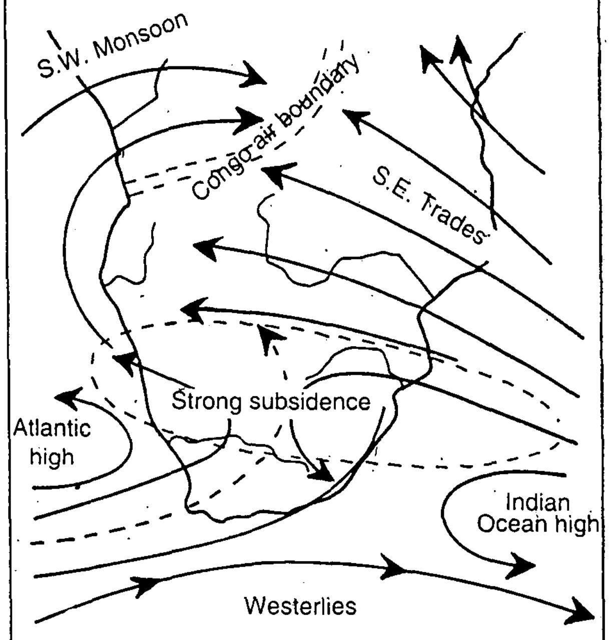
SOURCE: Van Heerden, J. and L. Hurry, *Southern Africa's Weather Patterns: An Introductory Guide*, Acacia Books, South Africa, 1992

Mean summer rainfall (mm) over southern Africa Map 5.2



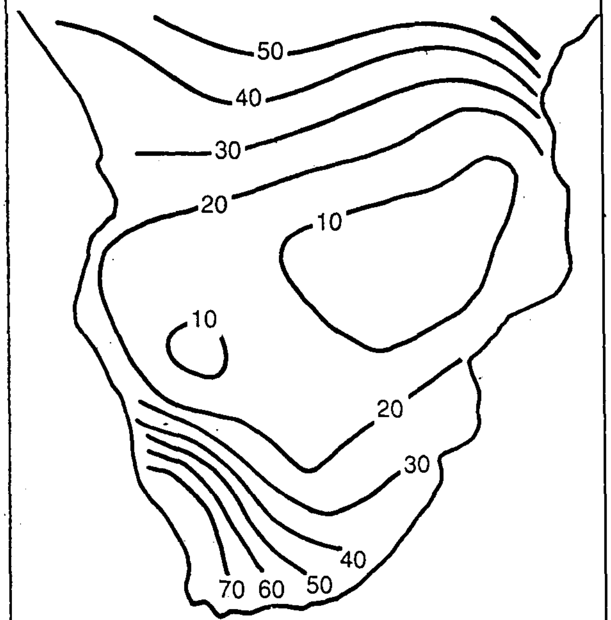
SOURCE: Rocha, A.M.C., "The Influence of Global Sea Surface Temperatures on Southern Africa Summer Climate", Phd Thesis, Meteorological Department, University of Melbourne, 1992

Basic movements of air masses over southern Africa in winter Map 5.3



SOURCE: Van Heerden, J. and L. Hurry, *Southern Africa's Weather Patterns: An Introductory Guide*, Acacia Books, South Africa, 1992

Mean winter rainfall as a percentage of the annual total Map 5.4



SOURCE: Rocha, A.M.C., "The Influence of Global Sea Surface Temperatures on Southern Africa Summer Climate", Phd Thesis, Meteorological Department, University of Melbourne, 1992

Moisture in the air generally increases from southwest to northeast in the region. Rainfall increases toward the equator, with the south and west of the region being arid or semi-arid.[21] The clouds gradually lose moisture as they move westward over the region, and less rain falls. This decrease in rainfall has an influence on rainfall variation, and areas with the least rainfall are most prone to high rainfall variability.[22] Examples are the nama-karoo, succulent karoo and desert. The dry savanna and fynbos zones have slightly more rain and less variation.

Malawi, located within the moist savanna zone, experiences fewer droughts because of the mountains which stimulate rainfall. The country's relatively good rains have made it a natural refuge for migrants from drought-prone areas.[23]

RAINFALL AND ECOZONES

Rainfall patterns, and the frequency and intensity of drought cycles, negatively affect the region's ecozones on a regular basis. The drier ecozones (the nama-karoo, succulent karoo, desert and large parts of the dry savanna) are particularly affected. Scientists studying these ecozones think that areas receiving less than 300-400 mm rainfall annually are controlled more by the short-term changes in rainfall than the long-term average. It is particularly so in areas where the amount of rainfall differs on a yearly basis from the average by more than one-third.[24] As the variation increases, so does the amount of change. The length of the drought seems to have a much stronger effect than its intensity. Plants and animals can survive a short, very dry spell more easily than a longer spell which is not as dry.[25]

Plants need water to survive and grow. Research has shown that in dry grasslands, the amount of grass cover can increase by up to seven times during a wet period.[26] In the desert ecozone, rainfall can vary by 100 percent from year to year, with the vegetation produced varying by up to 50 percent. During dry periods, some plants become extinct in their local areas while the same species thrive in areas of abundant rainfall. This may prevent the species from becoming extinct. The dry and wet periods also lead to changes in composition of plant species. Studies on dry grassland have shown variations of species composition directly related to dry and wet changes.

In areas which fall between the summer and winter rainfall areas, there seem to be opposing wet and dry cycles. When the winter rainfall area is in a dry cycle, the summer rainfall

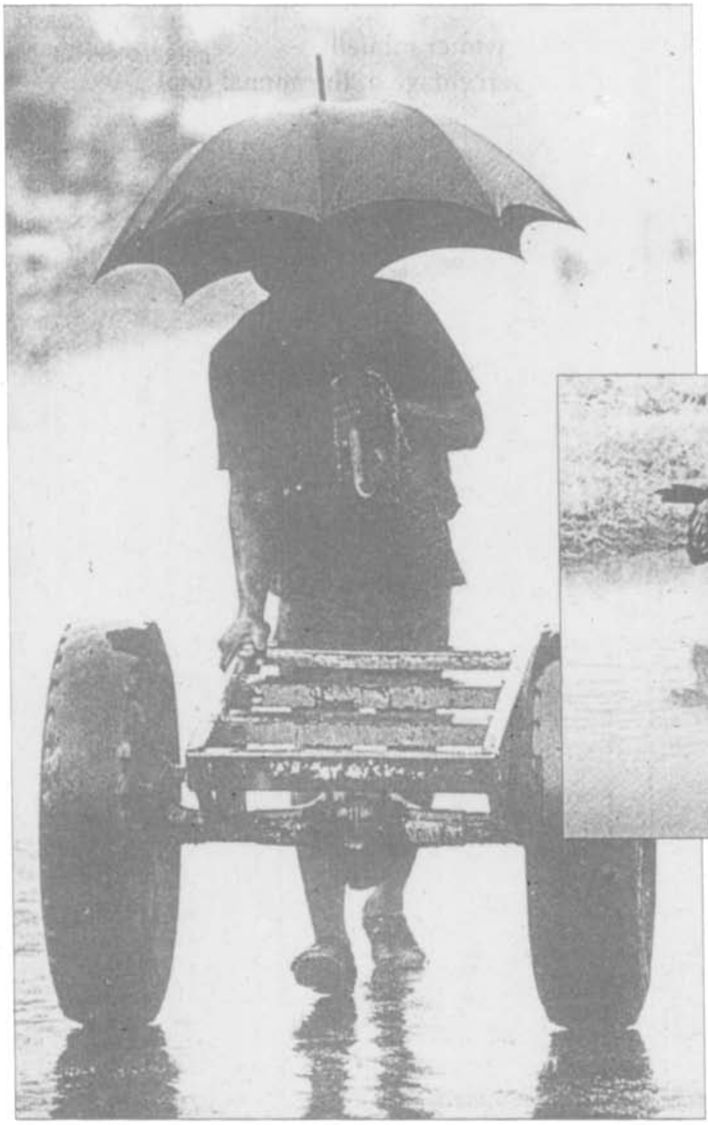


Photo 5.3 PHOTOGRAPHIC TRAINING CENTRE, MAPUTO-R Rangel

People and wildlife adapt to rainfall patterns, changing their habits to suit the weather conditions.

area is in a wet cycle. Parts of the nama-karoo area which fall between these two zones are affected by these cycles. Summer rainfall tends to favour grass, so during periods of high summer rainfall grasses dominate. But grasses go dormant in winter, so when winter rainfall is higher the shrubs are the winners.[27]

Animals which feed on plants are affected by these cycles. Their numbers increase and decrease dramatically in response to rainfall, which determines the amount of food available. Animals such as the wildebeest experience a population explosion during wet periods, followed by near-extinction during drought years — particularly where normal movements are restricted by fences and people.[28] This is also true for cattle, although artificial water-holes have helped many through a short drought.

The type of animals found in an ecozone also changes with the plant species composition. More grazers (grass-eaters) move into an area during a period of abundant grasses. Browsers (leaf-eaters) take over during times when leafy shrubs are dominant.[29] Large mammals tend to roam over large areas in search of food and water during drought. Elephants, which require large amounts of food, migrate in search of food and dig for water in dry river beds.

Photo 5.4 SARDC-P Johnson

The vegetation in such regions has adapted to dry and variable environments. Some plants have specialised roots which store large amounts of water. Deep-rooting plants can obtain moisture at great depth and for longer periods. Examples of such plants are found in the Kgalagadi sands of Botswana, southern Zambia and western Zimbabwe where species such as the Zambezi teak remain in leaf throughout the year. Succulent plants, which have thick fleshy leaves or stems which store water, are also common in the region. Other plants are deciduous, shedding their leaves during the dry season to cut water loss through leaves. Still others can lie dormant for a long time until the next rains come, even a couple of years later.

FACTORS THAT WORSEN DROUGHT

Though droughts in southern Africa are regular climatic events, there is some question as to whether human activities may adversely affect weather patterns. Some scientists argue that severe deforestation or overgrazing over large areas may result in dry rather than fairly moist, warm air rising, enhancing the chances of drought. This view is contentious, as explained by a Canadian climatologist, who wrote in 1984 that while Africa's droughts are considered by most researchers to be aspects of natural fluctuation:

Weather monitoring and reporting in southern Africa Box 5.2

The World Meteorological Organisation (WMO) and the United Nations Food and Agricultural Organisation (FAO) assist southern Africa with weather monitoring.

The WMO project "Drought monitoring for eastern and southern Africa" consists of the drought-monitoring centres in Nairobi and Harare. FAO's involvement is mostly through the National Early Warning Units (NEWU) of SADC as well as through the Regional Early Warning Unit (REWU) based in Harare. Member countries send raw weather data to the centres. The centres in turn prepare bulletins such as the *Ten-Day Drought Watch for Southern Africa* and the monthly *Drought Monitoring Bulletin*.

Meteorological data is exchanged among member countries and the drought monitoring centres through WMO's Global Telecommunications system, by fax and telephone, but the performance of some modes of communication has not been satisfactory. Poor communication remains one of the major constraints to effective exchange of meteorological data in southern Africa.

Publications such as *Impact*, a magazine published by Climate Network Africa, inform on rainfall and distribution in southern Africa. Their information is supplied by the drought monitoring centres. REWU regularly publishes weather information of interest to farmers, policymakers, donor agencies and others concerned with food security.

While information and weather forecasting is available in the region, there has often been a lack of appreciation by government officials of the value of such information for planning purposes. Prior to the widespread drought of 1991-92, the drought monitoring centres advised all national weather services about the possibility of drought due to persistent anomalous atmospheric and oceanic behaviour, nine months before the eventual calamity. But some governments in the region did not act quickly, and were found wanting when the drought eventually came.

The challenge ahead is to ensure that weather information is translated into management decisions if crises are to be avoided.

SOURCE: Maurice Muchinda, "Global Weather Patterns in Relation to Southern Africa", Drought Monitoring Centre, Nairobi, Sept 1993

"... it is conceivable — though still unlikely in the view of some professionals — that human interference may be prolonging and intensifying the dry spells natural to the climate."[30]

There is no conclusive evidence linking poor land-use with decreased rainfall in southern Africa. Human activities do, however, increase the impacts of drought. There is agreement that the impacts are becoming more severe in southern Africa, and the environment more susceptible to irreversible damage as a result. Rapidly increasing numbers of people in southern Africa put more pressure on resources and lead to clearing of vegetation, use of marginal land, inappropriate land-uses and soil degradation, altering the landscape in the process. This has led to adverse environmental developments such as no groundwater recharge and flash floods.

Natural resource degradation

Droughts intensify land degradation and weaken the land's resilience — its ability to bounce back to full production after a drought episode. Overgrazing and poor cultivation practices in combination with drought can lead to the deterioration of pastures and arable land to the point where they must be abandoned.

There is little documented evidence yet to support the theory that overgrazing and expanding cultivation reduce the amount of rain that falls in the region. The more obvious result of overgrazing and overcultivation is soil erosion, floods, reduction of productivity and species shifts when the rains eventually return.[31]

Drought also directly results in the loss of trees and a lack of regeneration. Vegetation cover loss enhances the impact of drought in two major ways: the increase of rainfall runoff, and evaporation. Increased rainfall runoff affects many soil types, reducing nutrients, organic matter and moisture availability for the remaining plants. The increased daytime temperature range, because of the loss of vegetation cover, may also inhibit the regeneration or establishment of woody plants. In the end, woody plants using moisture from much deeper in the soil dominate at the expense of the more shallow-rooted grasses and trees which utilise moisture in the surface layers of the soil. All of this results in a significant change in species composition.

IMPACTS OF DROUGHT

Drought has its greatest impact on water supplies. Lack of water affects every aspect of environmental health and human activities, including agriculture, natural areas, industry and development projects.

Agriculture

Agriculture is the sector most directly affected by drought, and the impact can be extreme in dryland farming areas which rely on rain to provide water for crops. In Botswana, for example, where most cultivation is rain-fed, between 1979-1981 production fell from 60,000 tonnes to below 20,000 tonnes due to lack of rainfall. In 1984, production was as low as 7,000 tonnes. This represented a food decline from 715 to 100 kg per family as a result of drought.[32] In arable areas, problems of soil erosion are intensified and worsened during a drought. This is basically due to severe loss of vegetation during the dry spell.

Drought is the most important factor limiting livestock production in Africa. A single-season drought does not have a major impact on livestock numbers as the animals can survive, though they may not put on weight or breed. However, a drought lasting two or three seasons exhausts the available food sources, decimating herds. In Botswana, for example, drought reduced cattle numbers from 1.35 million to 900,000 in the dry years of 1964-67.[33] The 1991-92 drought, which ravaged most of southern Africa, killed more than one million cattle in Zimbabwe and many more in other coun-

Livestock and drought Box 5.3

Livestock can be severely affected during times of drought, and can die in large numbers under persistent dry conditions.

❖ During the 1980s drought, cattle in the Mopane area around Palapye and Francistown, Botswana, were in much better physical condition than those further south because *mopane* trees — which can be browsed — still had leaves.

❖ During the 1991-92 drought, Zimbabwe's commercial and communal farmers lost more than 1.5 million head of cattle, and agricultural experts believe it will be several years before the national herd fully recovers.

❖ In Lesotho, all livestock importation from South Africa is halted during a drought to give way to local sales of beasts. This is aimed at reducing grazing pressure on the rangelands.

❖ In Botswana, where cattle production constitutes a major economic base, a decrease in cattle population is a great loss. Rural people depend on their cattle for food and draught power. Loss of cattle forces them to hire tractors, which most cannot afford. In 1988-89, when the rains came, most communal farmers in Botswana had no draught power because their herds had been destroyed by the drought.

❖ Livestock numbers in the Kgalagadi have been flexible, adjusting to rainfall conditions. In the 1950s and 1960s, livestock increased rapidly. When drought set in, more than half of the livestock died. The 1970s brought another improvement in rainfall and an increase in livestock.

SOURCE: Zumer-Linder, M., "Botswana: Can Desert Encroachment be Stopped?", *Ecology Bulletin*, Vol 24, 1976, p. 179

Photo 5.5 SOUTHLIGHT-P Grendon

Intensive livestock farming can threaten fragile soils, especially in times of drought. Near Rietfontein in Northern Cape, 1990.

tries of the region. During a drought, overgrazing leads to further degradation of pastures and arable areas in cattle farming-areas. The deterioration of grazing capacity further reduces livestock numbers.

In drier areas, scanty rainfall for a few years can kill vegetation permanently and poor land-practices only make it worse.[34] In Namibia, for example, degradation of pasture is caused by interaction of overstocking and drought cycles.[35] Drought can also exacerbate deforestation, as some of those whose crops are lost attempt to make money by selling firewood.

Urban areas and industry

Drought also affects urban areas and industry. During the mid-1980s drought, the construction industry in Botswana was forced to reduce its activities after water reservoirs fell to critical levels. Beverage companies, which use a lot of water to wash bottles, had to change to non-returnable aluminium cans which require less water. The 1991-92 drought was no different. Botswana's construction and textile industries had to retrench workers after operations were scaled down because of a severe shortage of water. According to the Botswana Textile Manufacturers Association, 50 percent of the workforce in the sector was laid off during the drought.

Similar problems hit Bulawayo, the heart of Zimbabwe's industrial sector. Companies were almost forced to pull out and relocate elsewhere because of a lack of water, and half of the small businesses crumbled. In South Africa, Swaziland and Zimbabwe, sugar cane industries almost ground to a halt because there was no water for irrigation.

Rivers, lakes and groundwater

The drop in water supplies in dams and rivers also affects the quality of the water. Because of the reduced water volume, the concentration of sewage and other effluent in rivers increases, resulting in outbreaks of diseases such as diarrhoea, dysentery and cholera. The cholera outbreak that affected almost every country in the region during 1992 and 1993, claiming hundreds of lives, may have been compounded by the drought.

In many drought-affected areas in Zambia, streams and rivers dried up. Villagers, mainly women, had to walk long dis-

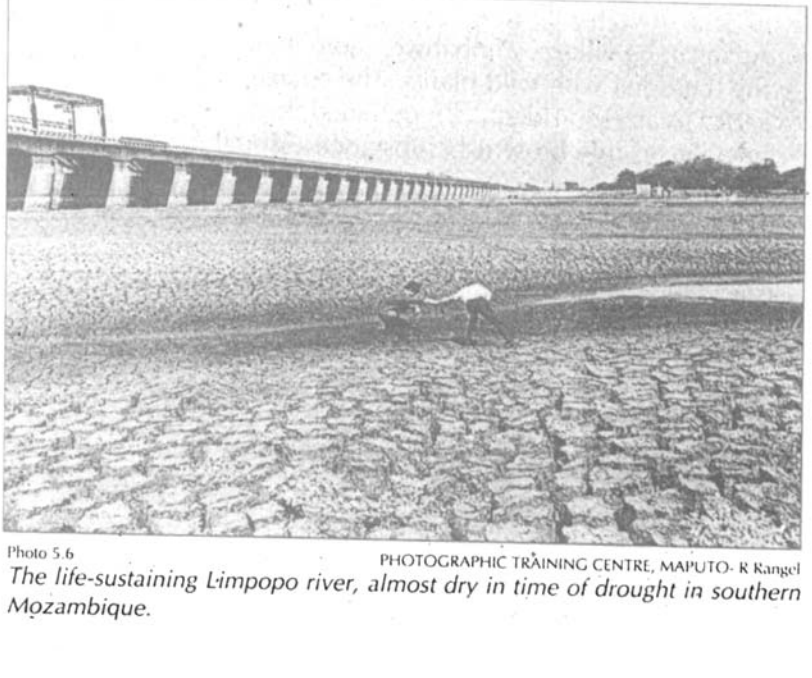


Photo 5.6 PHOTOGRAPHIC TRAINING CENTRE, MAPUTO- R Rangel

The life-sustaining Limpopo river, almost dry in time of drought in southern Mozambique.

Indigenous responses to drought: food reserves Box 5.4

Over hundreds of years, people in southern Africa have developed effective responses to alleviate the ravages of drought on their communities.

The Basarwa (or San people) of northern Botswana share food as a form of "risk insurance" in times of drought. The relatively well-to-do share with the less fortunate, thus ensuring that everyone in the community survives. The Basarwa also increase their hunting and foraging activities to obtain extra food reserves. They have adapted to their harsh environment, surviving on very limited resources. They can live in areas receiving an annual rainfall below 350 mm, a minimum amount considered essential for dryland agriculture. The Basarwa can go for long periods without surface water, relying mostly on food and dew that collects on wild plants.

Rural people in Botswana utilise over 250 species of wild plants and animals for food in times of drought. Most of these plants are not used during years of good rainfall, and this is vital because it gives the plants time to recover and regenerate before the next drought. The Batswana have also developed food preservation and storage methods to establish and maintain a reliable, nutritious food-base during long-running droughts. The methods include sun-drying, salting, parching and fermenting foodstuffs.

Elsewhere in the region, subsistence farmers are also turning to drought-resistant crops. Tanzanian and Zambian farmers have adopted cassava, sorghum and millet as drought reserves. During the 1991-92 drought, the Government of Zimbabwe called upon farmers to grow drought-resistant crops, most of which had been abandoned for the more commercially viable maize.

Many rural people throughout the region ate wild roots and fruits to survive. These were plants that indigenous people had known for many generations as an alternative source of food during times of hardship.

At Sagambe village, Zimbabwe, more than 1,000 families survived the drought by supplementing their diet with wild plants. The villagers, who on occasion, supplement their staple diet of *sadza* (maize porridge) with pounded flour from a bush palm known as *nyamutata*, had to rely heavily on this brownish substance throughout the drought period. Many of the villagers crossed into neighbouring Mozambique to collect this bush palm from the Tangwena mountains.

Desperate villagers in the Southern Province of Zambia also resorted to similar actions to survive the drought. The villagers collected roots, some of which were poisonous, and either boiled or soaked them in water to get rid of the poison before eating them.

During an earlier drought in 1982-84, many rural households in southern Zimbabwe generated income by harvesting, shelling and selling wild *marula* nuts, a species found in several countries in the region. The villagers used the income to buy basic foodstuffs.

SOURCES: Fluret, Anne, "Indigenous Responses to Drought in Sub-Saharan Africa", *Disasters*, Vol 10, no 3, 1986
Muir-Leresche, Kay, "Drought Relief Strategies: Some Ideas", University of Zimbabwe, Harare, n.d., p. 4

tances, only to settle for polluted water. In many cases, the villagers were forced to share the water with wild animals and their livestock, making it even more unsuitable for human consumption. This is thought to have led to widespread outbreaks of dysentery and cholera that killed hundreds of people in Zambia in 1992. It is worth noting that when a previous cholera outbreak occurred in several countries in southern Africa in the mid-1980s, the region had just come out of another drought.

Drought problems go deeper than just the availability of surface water. The water-table is usually lowered if an area is hit by recurrent droughts. The lowering of the Kuiseb water-table, in the Namib desert, resulted in the wilting and

Rural water management conquers drought Story

Gaborone (SARDC) — Peter Mosweu has no formal training but the skill he has acquired over eight decades qualifies him as a rural water-management expert and drought survivor.

The 84-year-old farmer from Botswana, who never went to college or university, today hosts groups of students from a Gaborone agricultural college at his 51-hectare farm in Dinkgwana communal lands, to show them his water-harvesting skills.

"I did not go to school to train as a water engineer," says the grey-haired, five-foot Mosweu, "but I have equally good knowledge on how to harness water and I have used those skills to build two dams."

Fed up with the 10km trek his family had to make almost every other day to and from a district borehole in Mochudi village about 40 km north of the capital, Gaborone, the farmer built his first dam using a spade. The dam, on a fast-flowing underground stream, took three years to complete. It now holds about 400 cubic metres of water, according to local estimates.

Since the dam was built more than 15 years ago, Mosweu, his family and livestock have escaped largely unscathed by the cycles of drought that grip Botswana almost on a regular basis. During the 1991-92 drought, described as the most severe in living memory, Mosweu's family and about 100 neighbours survived with their animals intact.

While many people in Botswana lost some of their animals or could not use them as draught power because they were too weak, Mosweu's livestock — cattle, donkey, pigs, goats and sheep — was in good shape.

He supplies his neighbours with water "because it's good neighbourliness to do so." His philosophy is simple: Love thy neighbour. He explains that while he may have abundant water supplies today, he may suffer shortages in other necessities tomorrow and believes his neighbours will come to his aid.

Mosweu's fame as a rural water expert has attracted the attention of the Forum on Sustainable Agriculture, a Gaborone-based non-governmental organisation. It has since invited him to participate in its farmer-to-farmer programme whose aim is to get Batswana farmers to learn from each other's experiences and share skills.

Richard Kashweeka, the Forum's co-ordinator, said Mosweu's water-harvesting skills are of great benefit to other rural farmers. "Even in dry, dry seasons he has managed to feed his family, livestock and neighbours," said Kashweeka.

— **Munyaradzi Chenje**, Southern African Research and Documentation Centre (SARDC), Jan 1994

Photo 5.7 SOUTHLIGHT:P Weinberg

Traditional crops such as sorghum and millet are more drought-resistant than maize, which requires predictable rains or irrigation.

dying of acacia trees — a valuable and vital component of the lower Kuiseb ecosystem.

Human population movements

Historically, droughts have provided an impetus for mass migrations of people in southern Africa. People tend to move from an adversely affected area to a relatively better one. In Botswana, where boreholes dried up during the 1991-92 season, people moved first from rangelands to arable areas — and eventually to urban areas. Drought has also been a factor in the movement of commercial farmers off the land. South African commercial farmers numbered 120,000 in 1982 but only 66,000 remain on the land today. The rest have abandoned their farms due to drought — moving to urban areas and creating pressure on services and employment.

Wildlife and fish populations

The migration patterns of wild animals, including birds and mammals, are determined by seasonal rainfall. In the event of a drought, migrations are disrupted and wildlife numbers decrease, particularly herbivores. Severe loss of wildlife leads to ecological imbalances and economic losses.

Fluctuations in wildlife populations are fairly common in drought-prone areas. During a wet period, numbers increase rapidly, peak and then decline when drought sets in. The 1962 drought, for example, killed nearly all the zebra in Botswana. Hundreds of thousands of wildebeest also died.[36] The 1991-92 drought, which ravaged most of southern Africa, killed a significant number of wild animals in most countries of the region.

Fish populations also tend to decline during drought. Rivers and lakes shrink, and food sources for fish decrease, resulting in low breeding and smaller catches for fishermen. The characid (a fish found in the Zambezi), for example, breeds well in a three-to-four-month period when the river flows fast. During drought, the river flows slowly and there is little breeding.[37] Inland rivers and deltas such as the Okavango Delta in Botswana are a source of food and income for villagers in surrounding areas so the loss of fish increases the hardship of the drought.

PLANNING FOR DROUGHT

Climatic change and drought are recurring cycles in most parts of southern Africa. Drought has been studied here for over 100 years, and is recorded in text and oral history dating back many generations. It is reasonable, therefore, to expect and plan for droughts in this region — with or without global warming. Mismanagement of one drought leads to reduced productivity and greater susceptibility to the next drought.

Awareness, education and training can help to reduce drought susceptibility in the region. Today droughts are viewed as abnormal or unusual, particularly by urban populations, and not something for which people can plan or prepare. Droughts are also viewed entirely as environmental problems rather than problems exacerbated by people and their interaction with the environment. An improved knowledge base and increased understanding of all the factors surrounding drought is needed to improve awareness, education and training.

Early warning capabilities have been upgraded in the region, and information systems improved. Collection and dissemination of information can play an increasingly important role in drought anticipation and preparation. The challenge now is to encourage wider usage of this information for planning purposes.

Normal rainfall expected this year [1993] Story

Johannesburg (ZIANA-Reuter) — Normal rainfall levels are expected over southern Africa this year after two seasons of severe drought that hit agriculture in the region very hard, weather experts said yesterday.

"Just about all the signs we look at are close to normal at the moment," weather researcher Simon Mason said in an interview. "The implications for the next two-to-three months are that the prospects for close to normal rains are very good and the chance of a bad start to the season or a particularly wet start are rather low."

The rainy season runs from October to April, covering an area running from around 10 degrees of latitude — from northern Angola, Zaire, Malawi and southern Tanzania through Zambia, Zimbabwe and Mozambique to the southern tip of the continent.

The region's weather is primarily governed by a massive area of equatorial ocean stretching from the Peruvian coast 10,000 km westwards to the international dateline in the central Pacific.

Surface warmth in the area, a phenomenon known as *El Nino*, spells drought for southern Africa. Conversely, an unusually cold surface current, *La Nina,* heralds unusually heavy rain.

Mason said a particularly strong *El Nino* developed at the start of the 1991-92 rainy season, bringing the worst drought of the century to much of southern Africa. Crops withered and hard-pressed governments were forced to spend scarce foreign currency to import food for their people.

South Africa, the main import point for drought relief for much of the region, has just received a soft loan of $850 million from the International Monetary Fund to help pay for emergency grain purchases.

El Nino conditions weakened in the first part of 1992, but suddenly and unexpectedly strengthened again last December, bringing a second successive year of drought, although less severe, in the 1992-93 rainy season to last April.

"This persisted through the first half of 1993, but there are indications that it weakened in July this year," said Michael Edwards, deputy director of the South African Weather Bureau. "Statistically over the past 70 years there has never been a period of three consecutive drought years — less than 75 percent of average rainfall over the main rainfall regions of South Africa."

He said there had been only two instances of two consecutive drought years during this period — between 1925-1927 and 1991-1993.

Unusually cold water in the western equatorial Indian Ocean means good rains, while warm water indicates drought conditions. Mason said the ocean temperature was now about normal after two years of fairly warm water.

—The Herald, Zimbabwe Newspapers, Harare, 29 Sep 1993

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CHAPTER 5

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