

**PASTORALISM, DROUGHT
EARLY WARNING AND RESPONSE**

by
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SUMMARY

The majority of current Early Warning Systems (EWS) are not capable of detecting drought stress on pastoralists nor capable of providing adequate information for intervention to support pastoralists during a drought.

This paper will identify the reasons for this failure and outline implications to make the early warning and response process more appropriate for the pastoral sector. A theoretical framework on 'entitlements' will be used for this purpose.

EWS need to put more emphasis on monitoring 'determinants of entitlements', such as markets, assets, rights and opportunities to change livelihoods, instead of monitoring only rainfall, vegetation and crop production. Decentralised early warning and response capacities have many more advantages for this purpose than centralised ones.

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1 INTRODUCTION

Nomadic and transhumant pastoralism is the most efficient form of land use for parts of arid and semi-arid lands, where crop production is very risky due to high climatic variability (Kilby, 1993; Scoones, 1995). Pastoralism provides a major contribution to many economies in arid and semi-arid lands. For Africa it is estimated that there were 147 million cattle, and 230 million sheep and goats in the early 1980s. The annual output as a whole for livestock in Africa was estimated in 1984 to be worth US\$10 billion, compared with total cereal production, valued at US\$8.4 billion (see Kilby, 1993:92). Despite the important contribution that pastoralism makes to African economies, it must be said that it has survived more in spite of, than as a result of, various development policies implemented over the last fifty years, which have often undermined the traditional management of pastoralists. Kilby (1993:92) points out that they have focused on the extension of crop production into marginal areas, on sedentary ranching, and on an expansion of national parks and game reserves. Such policies have effectively denied pastoralists resources and mobility which they require to feed their herds, especially during drought years.

Climatic variability is very high in arid and semi arid lands and people often have to cope with long periods without rainfall (Evers, 1994). The experience of major droughts during the last decades shows that pastoralists have been the major victims of such natural events. This paper argues that meteorological drought can not be avoided but its impact, such as famines, disease outbreaks, and destitution, can be greatly influenced by timely and effective intervention of institutions such as local, national governments and aid agencies (TDCPU, 1992; Blench and Marriage, 1998). Early Warning Systems (EWS) are the primary means of detecting timely drought related stress on livelihoods and of eliciting response (intervention). The experience of the last two decades shows that the great majority of EWS failed to fulfil this purpose. The warning signal frequently came too late and the response was often inappropriate and usually too late (Buchanan-Smith and Davies, 1995). Most responses came (and are still coming) in the form of food aid when famine had already taken place. But an outbreak of famine is a clear signal that the early warning and response process has failed to prevent it (Borton et al, 1991).

Current EWS focus mainly on agriculture. Pastoralists' needs have been largely ignored in the early warning and response process. This paper¹ will analyse what kind of EWS can best be used in the context of pastoralism and drought. The starting point is how pastoralists pursue their livelihood during a drought. Secondly, this paper will analyse how institutions can intervene effectively to mitigate the impact of drought. Effective intervention is here seen as policies and measures of external institutions which support pastoralists to pursue their livelihoods during a drought. An EWS is the linkage, which identifies the needs of pastoralists and provides information for decision makers for effective intervention. Thirdly, this paper will analyse what kind of information can be best used for the early warning and response process. This paper will use a theoretical framework for this purpose. It will be argued that EWS need to put emphasis on the monitoring of markets, rights, assets and opportunities to change livelihoods rather than only on rainfall, forage and crop production. The majority of current EWS fail to do so. The EWS of Turkana (Kenya) is one of the few EWS which includes information on markets, assets and changes in livelihood strategies, and so far the only one which has a true focus on pastoralism. It will be used as an empirical example to demonstrate the early warning and response process. It will be shown that a well designed EWS is not enough, and that ultimately political constraints determine if response is forthcoming or not. This point will be assessed in the last part of this paper.

2 PASTORALISM AND DROUGHT

Meteorological drought occurs when rainfall is well below expectation in any area for an extended period (see TDCPU 1992:8). How are pastoralists livelihoods affected by drought ?

The most direct impact of a shortage in rainfall on pastoralists' livelihoods is the drying up of water sources and declining forage resources for livestock (OFSG, 1990). Water and Forage are the most important resources for pastoralism and changes in their availability greatly influences pastoralists' livelihood security. Livestock is the most important asset for pastoralists and livestock productivity is directly dependent

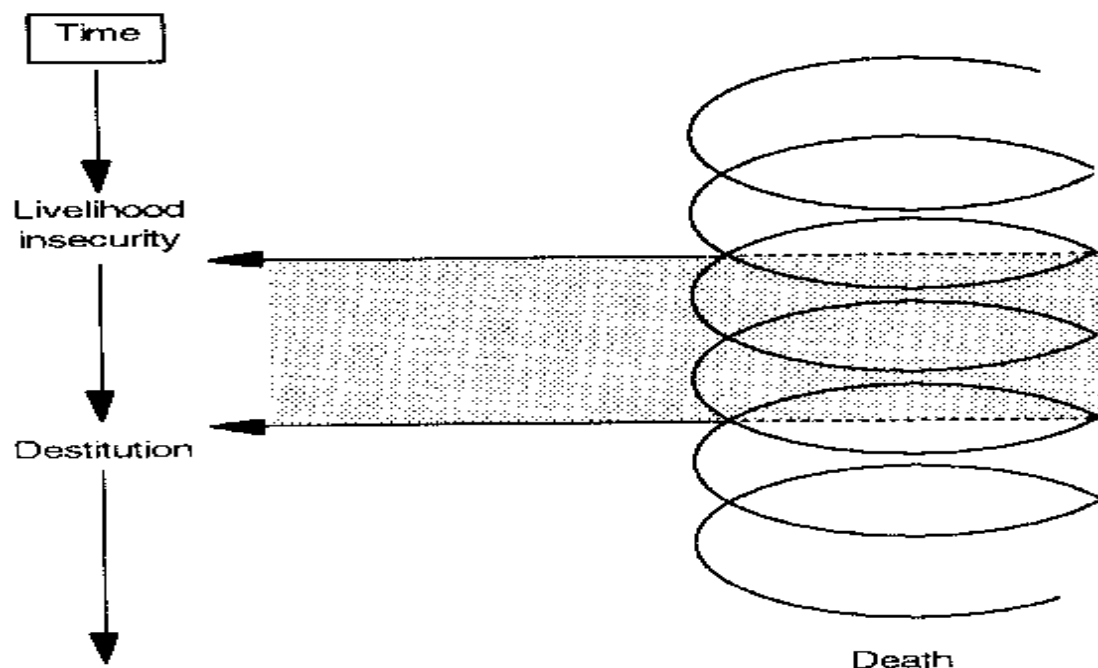
¹ I would like to thank Richard Black (University of Sussex), John Morton and Cary Hendy (Natural Resources Institute) for valuable comments on a previous draft.

on access to forage and water resources. Access to forage and water resources tends to decrease during a large scale drought with the result that pastoralists lose assets.

The value of pastoralists disposable assets determines pastoralists' power to purchase goods. If the value drops to the extent that they can no longer purchase the food they need to sustain themselves, then pastoralists lose their food entitlement and drought turns into famine (see TDCPU, 1992:7; Hussein et al , 1993). 'Entitlement' refers to goods, services and resources over which people have effective command in using them to benefit their livelihood.

Famine can be defined as prolonged decrease in the food intake of large numbers of people to levels below what they need to maintain reasonable nutritional condition (TDCPU, 1992). Sen (1981) has shown that lack of purchasing power is the cause of famine rather than declining food supply. Sen said (1981:1) that starvation is the characteristic of some people not having enough food to eat. It is not the characteristic of there not being enough food to eat. This understanding underlines the fact that poor people are most vulnerable to the impact of drought, because they have less purchasing power, which means less food entitlements (Oba, 1997; Maxwell et al , 1990).

Figure 1: Downward spiral of famine

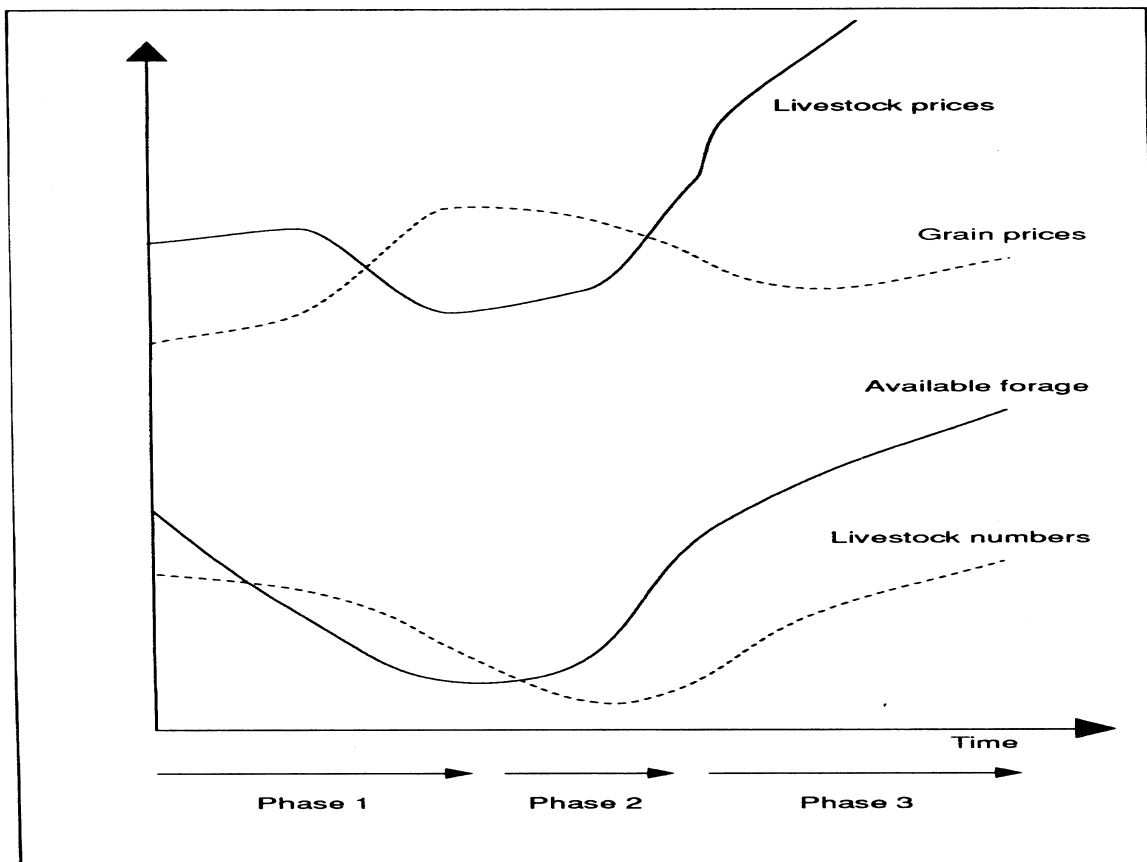


Source Buchanan-Smith and Davies, 1995

Famine is not the only danger of drought; another major danger in the long term is destitution (see Figure 1). Bush (1995:248) argues that famine is a first and immediate risk, but the long term risk is destitution of pastoralists. Once pastoralists become destitute, food insecurity becomes a chronic - rather than temporary - problem, because economic opportunities in pastoralist areas outside the pastoralist sector are generally poor.

How is the pastoralist economy affected by drought? The impact of meteorological drought causes several changes in the pastoralist economy. Several case studies indicate that pattern of changes are similar in different sequences of drought (Kahn, 1994; Bush, 1995; Riely, 1992). Toulmin's model of the 'drought cycle' is based on these similarities in different sequences. She (1995:97) divides the drought period into three phases derived from pasture production, livestock numbers, grain and livestock prices (see Figure 2).

Figure 2: The drought cycle



Source: Toulmin, 1995

In the first phase, the failure of rainfall causes a great decline in forage production. It is assumed that drought conditions are sufficiently harsh and widespread for extensive movement to be unable to compensate for falling fodder availability.

The result is an imbalance between livestock numbers and available forage. Livestock numbers start to fall, through sales and deaths among the most vulnerable. As drought hits harder, the condition of animals becomes worse and cereal harvests fail. As a consequence, grain prices rise and livestock prices decline (see Figure 2) (Toulmin, 1995:99). Toulmin points out (1995:99) that these relative price movements provide an increasingly tight squeeze on herders' ability to raise cash to buy the food needed by their families. Thus, herders may be forced to sell animals far in excess of those required to bring animal numbers into balance with fodder availability. This may compromise their ability to reconstitute a viable pastoral existence in the post-drought period.

In the second phase the bottom of the drought cycle is reached. Herd numbers continue to fall, as sales and deaths continue, despite the levelling off and gradual improvement in fodder availability due to the onset of rainfall. Shortages of grain continue to keep food prices high (see Figure 2). If food aid is delivered, these levels will be somewhat moderated. There is still a pressure on herders to sell further stock in order to purchase food. In the end of the second phase forage starts to recover due to the start of rainfall (Toulmin 1995).

In the third phase, rainfall, grain harvests and pasture conditions have recovered from the previous drought conditions. By contrast, livestock numbers remain well below the level which could make effective use of the available grazing as in the pre-drought period. Poorer households still may be under pressure to sell stock, due to food shortages. Richer ones may be able to reconstitute herds. Some pastoral households become totally destitute and must receive food relief. Toulmin states (1995:99) that as pasture conditions improve and post-drought harvests start coming in, a rapid inversion of relative grain prices to livestock prices takes place (see Figure 2). Cereal prices fall, while the price of animals starts to rise rapidly, due to the shortage of animals and the intention of herders to reconstitute their herd. Most notably the demand for young breeding stock is very high (Toulmin, 1987; Grandin and Lembuya, 1987).

What are the limitations of such a model ? A major criticism can be based on the fact that every meteorological drought and its context was, is, and will be different. As Toulmin herself admits, the model only applies if drought conditions are 'sufficiently harsh and widespread'. But droughts do differ in terms of 'spatial dimension' and 'timespan of lacking rainfall'. Referring to Zimbabwe, Scoones (1996:217) differentiates between three drought scenarios: a single-year rainfall deficit resulting in temporary dry season feed shortages (as in 1987); a two-or more year rainfall deficit resulting in local or feed shortages (e.g. over a district) over several seasons (as in 1982-84); and a two-or more year rainfall resulting in widespread feed shortages deficit (e.g. over the whole country) (as in 1991-92).

Applying this distinction to Toulmin's model it means that forage availability will be different in each case. Accordingly, the changes in livestock numbers and prices will be different and the model will be distorted. However, it is likely that the general trends will remain because forage availability has declined in each case.

Another point, which can be questioned in this model is the assumption that the market will react in this way. Other influences than livestock numbers may influence the prices, and the scenario showed in Figure 1 will be distorted. This point will be discussed later in chapter four under 'market indicators'.

However, Toulmin's model shows general trends in the pastoralists' economy which are likely to occur during a drought period. Furthermore, it points out that pastoralists respond to declining forage availability with the adjustment or, if possible, movement of their herds. This is a part of pastoralists coping activities during a drought.

Pastoralists change² their livelihoods to cope with declining resources (e.g. water, forage) during a drought (Davies, 1993b). Coping activities evolve from opportunities to change livelihood strategies in order to improve livelihood security. Through such behaviour pastoralists protect and promote their entitlements during a drought.

In Box 1 several coping activities are presented. Clearly, these are examples, and not patterns of behaviour which occur always and everywhere (Webb and Reardon, 1992; Kinsey et al , 1998).

²Change means both modifying and diversifying.

Box 1: Selection of pastoralists' coping behaviour

Herd management: transport of animals to areas where forage is available; sales and slaughter of animals; diversification or switching of species composition within the family herd;

Generation of food stores: cereal stores to prevent needless distress, sales of livestock; stores of milk, meat, fat, wild fruits, and others;

Forage supplementation: preparation of hay, lopping of trees (leaves, fruits, branches), supply of commercial forage supplements, others;

Supplementing and diversifying of income: hunting, food gathering, fishing, trade, working in urban areas

Dispersement of resources and demand: herd and family splitting, temporary migration, transfer of animals within social networks (whether with kinship basis, or with stock associates) on which individuals have legitimate claims, resource sharing (e.g. circulation of milking animals);

Migration to urban areas

(Source: Mc Cabe, 1990; Oba and Lusigi, 1987; Scoones, 1992, 1995 and TDCPU, 1992)

3 INSTITUTIONS, PASTORALISM AND DROUGHT

3.1 Pastoralism and External Intervention

So far it has been shown how drought conditions affect pastoralists' livelihoods, and in turn, how pastoralists respond to these conditions. The role of external institutions has not been mentioned yet. How can institutions intervene to support pastoralists during drought? Generally speaking, external intervention can promote, help to protect, and provide entitlements. The impact on pastoralists economy and pastoralists coping behaviour offer several options for this purpose. Box 2 shows a selection of possible interventions.

Box 2: Options for external intervention during a drought
<u>Support in movement of livestock:</u> provision of information where forage is available; management of conflict concerning access to key resources (waterpoints, forage); provision of transport infrastructure;
<u>Support in marketing of livestock:</u> to ensure purchasing power and avoid waste of assets;
<u>Provision of food aid:</u> to relieve pressure on food prices and supply grain directly to pastoral populations;
<u>Subsidies and price control:</u> to ensure pastoralists a minimum of purchasing power in the context of selling animals, buying food;
<u>Health and Nutrition support:</u> to control disease outbreaks and to protect nutrient status of vulnerable groups;
<u>Provision of credit:</u> to fund purchases of cereals, and avoid unnecessary sales of livestock in order to allow herders to buy their own fodder;
<u>Veterinary campaigns:</u> to avoid large-scale livestock deaths as a result of outbreaks of contagious animal diseases during drought;
<u>Providing opportunities to change livelihood</u>
(Source:DPIRP, 1997; TDCPU, 1992; Thompson, 1993; Toulmin, 1995)

Timely intervention is crucial during a drought. The model of the drought cycle gives an idea at which point what kind of intervention is needed. Toulmin (1995:100) points out that in the first phase the main imbalance, between the number of animals and fodder availability, needs to be addressed. Either animals can be taken out of the drought affected region through slaughter or be moved elsewhere, or fodder can be brought in to permit their survival. Options for intervention at this point include: support in the marketing of livestock; support in movement of livestock to areas where forage is available; provision of credit to allow herders to buy their own fodder; subsidised transport and distribution of fodder.

In the second phase, animal numbers have already fallen below fodder availability and yet herd numbers continue to fall, due to a continued squeeze on herders' incomes and their need for cash. Possibilities for intervention in this period include (Toulmin 1995:104): provision of food aid to relieve pressure on food prices and supply grain directly to pastoral populations; credit to fund purchases of cereals and avoid unnecessary sales of livestock; and subsidising livestock prices.

Options for intervention in the post-drought rehabilitation phase can range from activities which are aimed at rehabilitating the livestock sector, by enabling the destitute to re-enter pastoral production, and reducing pressures on herders' incomes, to those encouraging a shift to other forms of securing livelihoods. A key for regaining livelihood security is to enable pastoralists to reconstitute herds (Toulmin, 1995:106; Heffermann, 1998).

The most frequent form of intervention during a drought is food-aid as a famine relief. Clearly, food aid is necessary when people are starving. But food aid alone does not save pastoralists from destitution. Effective intervention must be aimed at promoting and protecting entitlements rather than solely providing food entitlements. Providing food entitlements has little impact on the effects of drought, which drive households into destitution.

It has been shown that each drought phase requires certain interventions to support pastoralists in coping with drought. The examples of intervention given in Box 2 are not a blueprint, but options which need to be related and assessed to the context. Clearly, the context of each drought was, is and will be different and therefore requires its own design in regard to interventions. A precondition for effective intervention is that decision makers be well informed about drought and its impact on pastoralism. They require information in the following areas: a) timely notice about a developing crisis, b) location of drought stress, c) population groups which are affected, d) assessment of the severity of drought stress, e) assessment of needs for intervention, f) targeting of intervention, g) monitoring and evaluation of the effectiveness of intervention (Riely, 1992).

3.2 The Role of Early Warning Systems

Early warning systems (EWS) are a means of covering parts of these information requirements. The first major impetus to establish EWS in Africa came after the famines of the early 1970s in the Sahel, which the international community failed to recognise in time. Buchanan-Smith and Davies (1995:4) note that EWS were set up mainly to service donor and UN food aid institutions. This is still the primary purpose

of many EWS. Even one of the most modern and influential EWS, the FAO's Global Information and Early Warning System (GIEWS), is clearly food-supply orientated. The pastoral sector has been largely ignored in EWS. Most of the EWS are focused on monitoring rainfall and crop production and only a small degree of attention is paid to production determinants of the pastoral economy. Hesse (1987:1) claims that this is because governments are more interested in estimating food production deficits, in order to determine food imports and aid requests, than in providing detailed information on specific vulnerable groups, such as pastoralists.

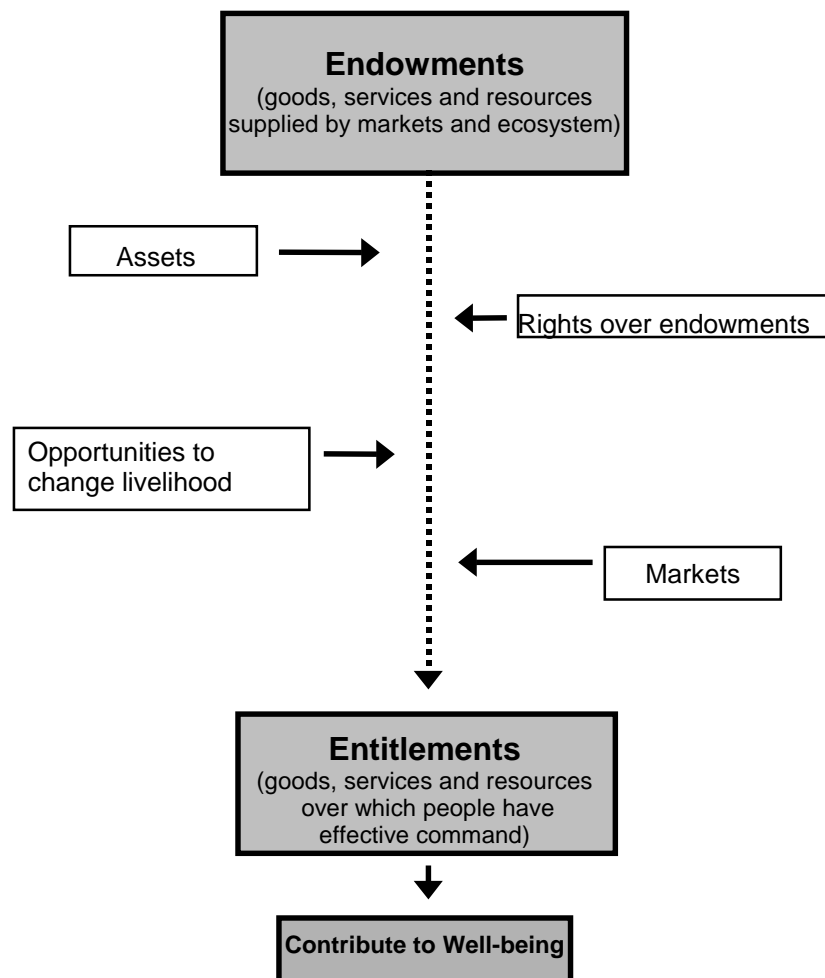
With the influence of the entitlement theory of famine in the 1980s (Sen, 1981), some EWS began to incorporate indicators of effective demand for food, including price data and other socio-economic indicators, and a number responded to the work on coping behaviour by trying to incorporate behavioural indicators of famine vulnerability (FEWS, 1998). But still, the great majority of EWS are mainly focused on endowments³, such as rainfall and crop production data.(Buchanan-Smith and Davies, 1995).

The livelihood security status of pastoralists during a drought depends ultimately on entitlements and not on endowments. This paper defines 'entitlement' as goods, services and resources over which people have effective command in using them for their livelihood (Leach et al., 1997). Accordingly, it is necessary to monitor - besides endowments - other factors which determine pastoralists entitlements. Endowments become entitlements when people gain effective command over them. This is constrained by assets⁴, markets, rights and opportunities to change livelihoods (see Figure 3).

³Endowments are defined as resources provided by the ecosystem and as goods, services supplied by markets.

⁴Asset refers to possession; disposable assets is equivalent to purchasing power.

Figure 3: Determinants of Entitlements



Source: own creation based on Sen, 1981 and Leach et al, 1997

To date not much literature has emphasised these determinants in the context of EWS. Figure 4 illustrates two types of EWS. The first type represents the conventional EWS which are in use. The focus of monitoring rests primarily on endowments (though meanwhile most EWS also make use of market data). They respond primarily by providing food entitlements in the form of food aid. This type is very limited in effective early warning and response for pastoralism (even for farming-sector). Again, pastoralists' (and also farmers') ability to cope with drought depends not on supplied goods, services and resources but on goods, services, and resources which they effectively have for their livelihoods. Therefore EWS must also monitor determinants of entitlements.

Figure 4: Different types of EWS

	<i>conventional EWS</i>	<i>suggested EWS</i>
Focus of EW Monitoring	endowments (crop and forage production, water sources)	determinants of entitlements (endowments, rights, markets, assets, opportunities to change livelihoods)
Response	providing food entitlement (food aid)	providing, protecting and promoting entitlements (diverse, flexible intervention)

Effective external interventions (response) means not only providing food entitlements but also providing, protecting and promoting livelihood entitlements during a drought. It has been shown that in so doing, external institutions have a range of options (see Box 2).

So, the starting point in designing an Early-Warning System is to focus on how pastoralists pursue their livelihoods rather than on how they fail to do so. It must not only be capable of warning of large-scale famine, but also be sensitive to changes in livelihood security status long before famine threatens (see Buchanan-Smith and Davies, 1995:11).

An Early Warning System is a system of data collection to monitor pastoralists determinants of entitlements in order to provide timely notice when drought stress occurs and thus to elicit an appropriate response (Buchanan-Smith et al., 1991a).

What kind of early warning indicators can be used for this purpose ?

4 PASTORALISM AND EARLY WARNING INDICATORS

4.1 Monitoring of Endowments

Rainfall

Rainfall Monitoring has been a major part of almost all EWS throughout Africa.

Usually monitoring is carried out on the ground using gauges, a standard component of EWS. Another way to monitor rainfall, is the use of remote sensing techniques, which is a standard method of global EWS, such as FAO's (GIEWS) or USAID's (FEWS) (Buchanan-Smith et al 1991a; Club de Sahel, 1997; IUCN, 1989).

Is rainfall a useful indicator for early warning of drought stress on pastoralists ?

Referring to timelines it can be argued that rainfall is by far the most important indicator in detecting drought in its earliest stage. Lack of rainfall initiates a decline in crop and forage production, which may result in drought stress or even famine. But the amount of rainfall says nothing about peoples' livelihoods, especially not those of pastoralists. Pastoralists are more resistant to the lack of rainfall than farmers. Farmers are affected earlier, because crops, their main asset, are usually lost in the first year of drought. Pastoralists are more flexible. They can move their assets (livestock) to areas where forage and water is still available. They are not necessarily seriously affected by one bad year of rainfall (Bush, 1995). The livelihoods of farmers usually become more vulnerable in an earlier stage than those of pastoralists. Another point is that the impact on forage and crops is not only dependent on rainfall but also on location specific factors such as relief, soil quality, temperature, and importantly, the management of resources (Blench and Marriage, 1998; TDCPU, 1992; NORAD, 1987). To conclude, the use of rainfall data is an important part of an EWS, but alone it is nearly useless.

Rainfall can also be forecasted. This is an area where progress has recently been made in the context of El Nino. The forecasting of amount and distribution of rainfall due to the El Nino phenomena has been much better than in the past. Advances in climatic research and weather forecasting systems are likely to make earlier and more reliable

forecasting of droughts in future. However, in every forecasting there always remains an element of uncertainty (Rothauge, 1998; Benson and Clay, 1998).

Crop production

Crop production is one of the most widely used indicators in current EWS. This reflects the conventional emphasis on supply factors. Agricultural crop forecasting and crop production surveys are widely carried out throughout Africa. Most countries have set up permanent agricultural surveys for their major crops. Remote sensing technologies are a widely used means of monitoring crop production on a large scale (e.g. the Global Information and Early Warning System (GIEWS) of the FAO, or the FEWS of USAID)

Agricultural production data can be used in different ways. A Food Balance Sheet Accounting is a common method of using agricultural production data for EW purposes. It was developed by FAO for the GIEWS and is now widely recognised and used by national governments in Africa. A twelve month food balance sheet is constructed assembling data on food supplies (opening stocks, imports and production) and disposals (domestic utilisation, exports and closing stocks). It is used for EW to quantify the size of an expected food deficit or surplus, necessary food import requirements and, in particular, food aid requirements (Buchanan-Smith et al. 1991a : 19). Food Balance Sheet Accounting is a macro tool to determine national food security status and appraise food requirements, but for determining food security of pastoralists it is nearly useless. The data is highly aggregated and nothing can be said about what kind of population groups are affected by food crises, nor where they are and when they will require relief (Cutler 1984).

Pastoralists' livelihoods do not rely on the production of crops, but much more on the availability of grain during drought years. The observation that crop harvests fail does not mean that pastoralists lost their food entitlements. They may have access to grain through the market from stores or other surplus regions. On the other hand, good performance of crop production does not ensure that pastoralists have access to it. Monitoring crop performance does not say much about pastoralists livelihoods. However, declining crop production can indicate that a problem may emerge (Buchanan-Smith et al. 1991a; Newhouse 1987).

Forage production

The monitoring of forage resources is a more relevant indicator for pastoralism than crop production. Most EWS do not cover forage performance. This reflects the neglect of pastoralism in the context of EW. Forage performance can be monitored in similar ways to crop production: use of remote sensing technology, aerial photography and ground surveys. The EWS of the Turkana district in Kenya is an example which uses all three methods (see TDCPU, 1992:39).

Again there are global information systems, such as UNEP's Global Environmental Monitoring System (GEMS), which operate at a macro scale and use mainly remote sensing techniques, for instance Normalised Difference Vegetation Index (NDVI), and make suggestions referring to range conditions world wide. The ESON (Environmental Support of Nomads) project in Saudi Arabia is an example of a national information system especially designed to monitor range resources and to provide information for the pastoral sector. It combines meteorological with vegetation data and provides seasonal forecasting regarding range quality (Al-Gain, 1998). However, in every meteorological forecast there always remains always an element of uncertainty.

Like crop production, forage production is a supply indicator. The livelihood security of pastoralists relies primarily not on forage production but on access to forage. Sufficient forage production does not guarantee that all pastoralists have forage entitlements. Pastoralists' forage entitlements are determined by other factors, such as land tenure, infrastructure, borders and conflicts. Nevertheless, if forage production is very poor, clearly pastoralists have a problem and need to change their livelihoods.

Water sources

Water is the second important input for pastoralists' livelihood. The monitoring of water sources and quality can be relatively easily carried out through aerial or remote sensing surveys combined with ground surveys. In the Turkana district, water sources are monitored monthly or every quarter for early warning purposes.

The case of water is very similar to that of forage. Again, the existence of water endowments does not mean that pastoralists have water entitlements. However, water

is a key resource for pastoralists. If water sources are drying out over large areas, pastoralists have a problem and their livelihood will become more vulnerable.

4.2 Monitoring Determinants of Entitlements

Market indicators

The monitoring of markets is highly relevant because they represent a determinant of entitlements. They influence pastoralists' ability to cope with drought through prices which are determined by supply and demand. Market indicators represent the most widely monitored socio-economic information in the context of early warning. Their relevance and validity is now widely accepted. Grain prices, and livestock prices and supply are the most widely monitored market indicators. Their monitoring is relatively simple and cheap (Khan, 1994).

Market prices change because of pastoralists' responses to declining entitlements during a drought (see also Figure 2). Pastoralists increase the marketing of animals to reduce the possibility of future capital loss, at an early stage of a drought, when forage becomes scarce, (Khan 1994). If the demand for livestock remains the same, the increased supply of livestock implies that the market price for livestock declines. The extent to which the general price of livestock declines depends upon the nature of market demand and supply functions. Referring to the impact of drought in Ethiopia, Cutler reports (1985a:59): unseasonal grain retail price increases, unseasonal increases in the sales of livestock, and an increase in the volume of people seeking work of various kinds, all giving clear and measurable signs of abnormal degrees of drought stress. Other case studies confirm Cutler's observations (Khan, 1994; Toulmin, 1995). Regarding timeliness of market indicators it must be said that they do not really warn of drought related stress; they rather confirm established stress which becomes apparent in the market place (Hesse, 1987). Forage production data might indicate earlier an emerging problem, but the advantage of monitoring livestock prices is that it is all-encompassing and reflects many other stresses besides poor forage (Walker, 1989).

But market prices are not always straightforward. In certain circumstances market prices are misleading. This can be demonstrated through the relationship between supply and demand function:

- A) Sales of poorer households may not be indicated by market prices: after longer periods of drought poorer households may own few livestock. The cumulative distress sales of smallholders in order to buy food may be marginal to overall market quantities and may not be reflected in price changes (see Riely, 1992:6.2). In this case the increased supply of animals on the market is so marginal that prices do not go up.
- B) Food prices may show little change in spite of large shifts in consumption: when incomes are highly correlated to crop production, less crop production means less demand for grain because people have less income. Reduction in demand for food tends to drive the price down. But at the same time the supply of grain falls because crop harvest fails. Reduced supply tends to drive the price up. The result of this example can be the price of grain remains stable, even though less grain is available on the market.
- C) The market can be influenced by political decisions or conflicts during drought: for instance, Niger prohibited movements of grain into parts of Eastern Mali and closed its borders in 1984; armed conflicts like the war between Burkina Faso and Mali or recently in Sudan may also influence the market (Hesse, 1987). These events may distort market prices.

However, market indicators are useful means in the context of EWS. Again, they are a determinant of pastoralist entitlements, which means that they influence pastoral ability to cope with drought. Of course, EWS can not rely on them alone, they need to be combined with other EW information. Decision makers need to be aware that in certain circumstances market signals can be misleading.

Assets

The assets of households is a very important determinant of entitlements. It determines for instance whether households are able to buy food or not. Purchasing power is determined by income and disposable assets. As has been said, population groups with higher purchasing power can cope more easily with drought stress than

poorer ones, because they can buy goods and services which they need to pursue their livelihood.

For pastoralists the most important asset is their livestock. Therefore livestock needs to be included as an EW indicator. It can help to identify vulnerable groups during a drought and to target effective interventions. Average livestock holdings per person (when combined with prices) give an idea of to what extent pastoralists are able to purchase goods and services. A declining nutritional status of livestock is one of the first signs that livestock cannot feed itself from the available fodder and browse reserves. Information about livestock mortality and breeding helps to predict purchasing power (when combined with market prices).

The Turkana EWS is so far the only EWS which monitors livestock. Livestock is monitored as follows: quantity and distribution, production, pathology (diseases), nutritional condition, sales and mortality. With the exception of livestock quantity and distribution, which are monitored through aerial surveys, all data is collected through household and community surveys (TDCPU, 1992).

Rights over endowments

One of the first responses to declining forage and water sources is to move the herds to other surplus areas. The greatest constraint to movement are borders, conflict and limited access to key resources such as waterpoints or grazing resources (Scoones, 1995). Such key resources can not be used for pastoralists livelihoods (well-being) when pastoralists have no access to use them.

This depends on land tenure and other formal and informal institutions which decide over access to resources. This issue needs to be addressed in the context of early warning and response. Governments for instance could intervene to guarantee access to pastoral groups for key resources during drought years. Therefore decision makers need be aware of key resources for pastoral groups and access rights to use them. No EWS has been found in the literature which pays attention to these issues.

Changing livelihoods

In the second chapter it has been shown that pastoralists respond to drought related decline of entitlements with the changing of their livelihood strategies, such as herd management and diversification of income, in order to improve livelihood security.

Having opportunities to change livelihoods is an important determinant of livelihood security. For instance, when a pastoralist loses his livestock (main entitlement source) but has instead the opportunity to gain food entitlements through hunting and food gathering he/she probably can survive. On the other hand if he/she has not the opportunity to do something else to gain food entitlements, and no family member or external intervention helps him/her, he/she might die.

The sequential ordering of pastoralists' changes in livelihood strategies to intensifying levels of drought stress suggest that the behaviour itself can be an important indicator for EW purposes (Riely, 1992). The relevance of such an approach has been shown through changes in market prices which are initiated through pastoralists' response to drought stress. Clearly, other changes of pastoralists livelihood can also be used for EW purposes. Box 3 shows some examples of 'behavioural' indicators which indicate changes in pastoralists livelihoods in order to cope with drought stress (Webb, 1993; Maxwell, 1996).

Box 3:	Examples of behavioural indicators
	Herd management: movement of herds, herd splitting, herd composition, sales and slaughters,
	Employment and migration patterns: changes in number or demographic, composition of migrants, changes in timing and destination, changes in wages and unemployment levels.
	Marketing patterns: livestock and grain prices, changes in supply and demand; marketing of other household assets, such as jewellery or cookware;
	Income generating activities: collection of firewood, production of charcoal, gathering of grass and crop residues, fishing, hunting, work in urban areas
	Others : generation of food stores, preparation of hay, etc.
Source: adopted from Riely, 1992; TDCPU, 1992	

The advantage of using 'behavioural' indicators is that they can be simultaneously used to signal declining entitlements and also indicate how to intervene, in order to support pastoralists timely to conserve, promote or provide entitlements. Furthermore it is likely that the monitoring of coping behaviour provides a more locationally and culturally specific picture of changing conditions than other indicators used in EWS. (Davies, 1993a,1996 ; Ellis, 1987; TDCPU, 1992; Riely, 1992).

How can behavioural information be gathered ? The collection of data on behavioural indicators needs to encompass a wide sample of households in order to differentiate responses across pastoral groups. The data can be quantitative or qualitative. The methods of obtaining behavioural data can range from continuous surveys of a large number of households, to frequent informal interviews with local informants, to community-based reporting systems which rely on indigenous sources of information (Riely, 1992; Davies, 1993). Recent experiences of Action Aid in Dalocha (Ethiopia) show that participatory methods can be used in the context of emergency response to local food stress. Howell (1998:71) points out that a participatory approach promotes clear communication with beneficiaries and gives a clearer and more accurate picture for targeting and intervention.

What are the constraints and limitations of using behavioural indicators? The use of behavioural information is not entirely straightforward. It requires a detailed understanding of the local conditions affecting pastoralists' livelihoods. Riely points out (1992:1.5) that changes in livelihoods must be properly understood in the context of household goals, the productive strategies used to achieve these goals and the constraints that limit the scope of their activities. Local behaviour must be analysed over time to understand it. Therefore its usage can be very time and resource intensive. Approaches to the monitoring of coping behaviour can easily disguise intra-community variation, by failing to take into account that one person's coping behaviour is another's normal livelihood. Differences in options and choices in the context of drought occur at individual, household and community level among pastoralists. If a particular activity, for instance gathering of crop residues or producing charcoal, is identified as being a coping activity of drought stress, it can not be assumed that all pastoralists who take up that activity do so in order to cope with drought stress (Davies, 1993b).

Coping activities are not necessarily economically or environmentally sustainable. Davies (1993b:393) warns of locking pastoralists into a vicious circle of subsistence and coping, if interventions are designed to support coping activities which are neither economically nor environmentally sustainable. Such an intervention promotes pastoralists standing still rather than moving forward.

Another point is that it can not be assumed that a change in behaviour which has indicated drought stress can be used as an indicator in the next drought. Pastoralists

constantly adapt their livelihoods to changing political, economic and ecological conditions. What may signal drought stress in one year will be not necessarily indicate the same thing next year. It is therefore important to differentiate between adapting and coping behaviour (Davies, 1996).

To conclude, information about how pastoralists respond to declining livelihood entitlements can be of great use in the context of early warning and response. They signal that pastoralists have a problem and illustrate at the same time options for external intervention aimed at providing, protecting and promoting livelihood entitlements. But the usage of behavioural information is not straightforward and has certain limitations and dangers as has been shown. Rather than replacing conventional indicators, behaviour indicators act as complements, enabling a clearer interpretation of the information gained through other indicators. For instance, in addition to data on market prices, observations concerning household consumption, storage and marketing patterns lead to a greater understanding of why food prices do or do not change at a given time (see Riely, 1992:1.4)

4.3 Monitoring of Well-being

Measuring nutritional status using anthropometry is one of the most popular indicator used to monitor well-being. But can it be used for early warning purposes ? It can be argued that once malnutrition occurs in pastoral communities it is too late for early warning of drought stress. It is difficult to deny this. Yet, Young and Jaspers (1995:26) point out that people often reduce their food intake as an early response to drought related stress. Accordingly, nutritional data can serve as EW information. But it cannot be assumed that pastoralists do always reduce their food intake as an early response to drought stress (Haddad et al , 1994).

Buchanan Smith note (1991a:24) that the methods used to collect anthropometric data are problematic. Standard sampling methods (30 clusters) are time consuming and usually result from cluster surveys cannot be disaggregated, which reduces their sensitivity (Peterson, 1997). Secondly, the levels of malnutrition which are considered 'to represent a serious problem' pose difficulties. It is hard to generalise about particular rates of malnutrition in the context of drought. Thirdly, changes in

anthropometric measurements of malnutrition can result from other changes in the incidence of disease and do not necessarily represent changes in levels of food consumption (see Riely, 1992:6.2).

In terms of eliciting response, Borton and York (1987:25) note that nutritional status appears to be the most credible type of information from the donor point of view. They put great emphasis on anthropometric data for programming and targeting relief operations.

Generally it can be said that the appearance of malnutrition confirms that pastoralists do not have sufficient food entitlements (apart from disease induced anthropometric change). In spite of the fact that nutritional data is probably the latest early warning indicator, it is the best indicator to confirm *not-well-being* and therefore important for targeting emergency interventions.

5 ANALYSIS OF EARLY WARNING AND RESPONSE

5.1 Early Warning Information and Institutional Constraints

An EWS has been defined as a system of data collection to monitor pastoralists' determinants of entitlements in order to provide timely notice when drought stress occurs and thus to elicit appropriate response. At which level should an EWS operate and how should it be structured to fulfil this purpose?

One point to consider is that the range of indicators which can be used in EWS are constrained by the characteristics of the institutions which undertake early warning and analysis. International organisations with multi-country early warning systems and analysis based in foreign donor capitals have to rely primarily on data from satellite images and other secondary information such as market prices. The collection and use of behavioural information in EW analysis requires gaining access to local sources of information and, importantly, a locally based analytical capacity for its interpretation. Given the complexity of local conditions, centrally-based EWS cannot obtain the necessary level of detail to adequately assess reported changes in pastoralists' livelihoods. Their limited access to local level information sources and limited understanding of local conditions precludes the effective use of data sources such as

household behaviour. This highlights the necessity for decentralisation of EWS and capacity building at the local level (see Riely, 1992:6.9).

Clearly, the interests in and purpose of an EWS will determine its characteristics. If it is to save lives, it will focus on triggering (emergency) famine relief, mainly food aid (food entitlements). The sole provision of food entitlement is not an adequate means of saving pastoralists from destitution. If an EWS wants to contribute to saving livelihoods, it needs to detect stresses on people's livelihood security, in other words, changes in the determinants of entitlements.

Figure 5 shows four selected EWS and the indicators which they use. For further examples of EWS in Africa see appendices 1. The four EWS in Figure 5 represent examples of centralised famine EWS. Their purpose is to prevent famine, and they are not designed to and are not capable of detecting localised livelihood insecurity. It can be seen that assets and rights are not monitored. The only indicator included to signal changes in livelihoods strategies is migration⁵. None of the EWS particularly address the needs of the pastoral sector.

Figure 5: Indicators used in selected EWS

	National EWS Burkina Faso	National EWS Ethiopia	National EWS Sudan	Global EWS GIEWS-FAO
Monitoring of endowments	Rainfall Crop production Food stocks	Rainfall Crop production	Rainfall Crop production Food Stocks	Rainfall Vegetation cover Crop production Food Stocks
Monitoring of determinants of livelihood entitlements				
• Markets	arket prices	arket prices	arket prices	arket prices about wages
• Assets				
• Opportunities to change livelihood	-	Migration data	Migration data	Migration data
• Rights	-	-	-	-
Monitoring of well-being	Nutritional status	Nutritional status	Nutritional status	Nutritional status

Source: own creation based on data from Buchanan-Smith and Davies, 1991

The next chapter outlines the EWS in the Turkana district of Kenya. It is so far the only example which could be found in the literature that is designed in a manner that comes close to the EWS recommended in this paper (monitoring determinants of entitlements) and the only EWS which has a true focus on pastoralism.

5.2 Early Warning and Response in Turkana District (Kenya)

Indicators and institutional structure

The EWS of Turkana was set up in 1987. It operates at the sub-national level, for the district of Turkana in the northern part of Kenya. It is run by local government, by the Turkana Drought Contingency Planning Unit (TDCPU). In 1990 it was partly funded by the Kenyan government, the EU and the government of the Netherlands (see Buchanan-Smith et al 1991b : 64). Figure 6 shows the indicators which are monitored by the EWS Turkana.

Figure 6: Indicators used in the EWS of Turkana, Kenya

	<i>Indicators monitored</i>	<i>Method of monitoring</i>	
Monitoring of endowments	– Rainfall	* Rain gauges/ satellite images	
	– Water Sources	* Aerial surveys/ community surveys	
	– Vegetation cover and quality	* Community surveys/ aerial surveys/ satellite images	
	– Crop harvest	* Household surveys/ community surveys	
	– Crop conditions	* Household surveys/ community surveys	
Monitoring of determinants of entitlements			
	• Markets	– Livestock sales and prices	* Household surveys/ community surveys
	• Assets	– Livestock pathology and mortality	* Household surveys/ community surveys
		– Livestock nutritional conditions	* Household surveys/ community surveys
		– Livestock production (milk yields, bleeding rates, slaughter rates, birth rates)	* Household surveys/ community surveys
		– Livestock numbers and distribution	* Aerial survey
	• Opportunities to change livelihoods	– Income-generating activities	* Household surveys/ community surveys
		– Number of displaced people	* Household surveys/ community surveys
		– Breaking up of households	* Household surveys/ community surveys
	Rights	<i>not monitored</i>	-

⁵Migration is seen as an act of changing one livelihood. Migration data confirms that people do or have changed their livelihoods. People do not migrate because of declining entitlements, but because they have an opportunity to change their livelihoods (to migrate).

Monitoring of well-being	- Nutrient condition of children<5	* Household surveys/ community surveys
	- Diet	* Household surveys/ community surveys

Source: own creation based on data from TDCPU, 1992

As it can be seen from Figure 6, the EWS in Turkana monitors information which illustrates changes in the determinants of pastoralists' livelihood entitlements. Only 'rights over endowments' is not covered in any form.

The EWS of Turkana is a decentralised system, with information mostly flowing from the local level up to the district headquarters. The EWS uses both primary data and secondary data. Primary data is collected through community and household surveys, which are carried out by local field workers (see Figure 6). Secondary data is regularly provided from other government departments, such as the Meteorological Department, the Regional Centre for Services in Surveying, Mapping and Remote Sensing, and the Ministry of Health (see Buchanan-Smith et al 1991b:66).

The TDCPU collates and analyses all the information, which is published in quarterly EW bulletins. An innovative feature is that the food security situation is described quarterly according to one of four predetermined warning stages (normal, alert, alarm and emergency), to facilitate the interpretation of the information (see Box 4).

Box 4: Warning Stages of EWS Turkana

Normal: environmental, livestock and pastoralists welfare indicators show no unusual fluctuations but remain within the expected seasonal ranges.

Alert: environmental and livestock stress indicators start to fluctuate outside the expected seasonal ranges within certain localised areas. An alert stage can also be signalled when unusually low asset status is reached within the district.

Alarm: environmental and livestock stress indicators continue to fluctuate outside the expected seasonal ranges and this situation extends to most parts of the district. Pastoral welfare indicators begin to fluctuate outside expected ranges. Reports of displaced population groups due to collapse of the pastoral system become more frequent.

Emergency: the environment and the pastoralist population are in a state of emergency. Displacement of herders and their families continues due to large-scale mortality of livestock and the further collapse of the pastoralist system. All indicator values including those of pastoralist welfare fall to very low or minimum levels.

Source: (TDCPU 1992; Buchanan-Smith and Davies 1995:175)

Who uses EW information and for what? In 1989, a drought management committee (DMC) was set up to receive formally the EWS information and to recommend and monitor any necessary action in response. Its members have comprised representatives

from all the main district departments concerned with the impact of drought, plus representatives from NGO's and donor agencies. The TDCPU has acted as the secretariat, and the DMC meets quarterly to consider the unit's bulletins, and more frequently in time of crisis (see Buchanan-Smith and Davies 1995:177). The key to linking information to response is supposed to be the District Drought Contingency Plan. The TDCPU states (1992:77) that its aim is to plan interventions in advance, and to implement them as soon as a particular warning level is declared, without need for major new decisions. In other words, so that natural bureaucratic inertia operates in favour of preplanned actions rather than against it.

Review of Response

From April 1990 to the end of 1991, the EWS signalled an 'alert' stage of warning for the first time. There were two specific response interventions: an Emergency Livestock Purchase scheme (ELP) in selected parts of the district in 1990 and intensified food-for-work activities in Kakuma division in 1991. The time lag between warning and action for both these interventions was very short when compared with the relief operations launched in other countries. Buchanan-Smith and Davies (1995:202) point out that the response of Turkana EWS through small scale Emergency Livestock Purchase scheme is so far the only example of response which did not come in the form of food aid and was aimed to protect livelihoods before lives were threatened.

The early warning and response process performed much less successfully in 1992, by which time the drought had persisted and intensified, accompanied by a marked increase in livestock raiding. By the middle of 1992, the first signs of a famine were evident, and the final warning stage of 'emergency' was signalled by the EWS, but no relief response was under way. Eventually, a large-scale relief operation was launched, but too late to prevent a food crisis. It was the first time that the DMC had to respond to a district-wide drought when widespread food insecurity was signalled. Also, drought alone was rarely the problem in Turkana. In the 1990s, livestock raiding has occurred on an unprecedented scale. The EWS was not specifically designed to deal with this, but it has been a major cause of food insecurity in parts of the district (see Buchanan-Smith and Davies 1995:167).

5.3 ANALYSIS OF RESPONSE

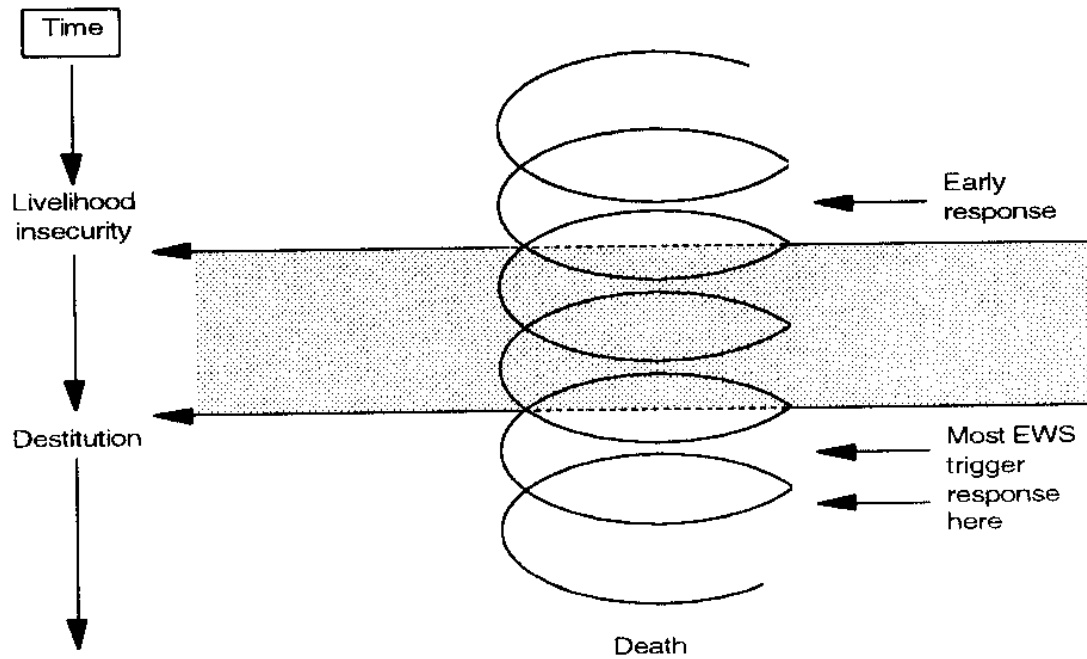
What can be concluded from the Turkana case? The performance of Turkana's EW/response system in 1990 and 1991 contrasts sharply with 1992. The rapid and effective response to localised pockets of food insecurity shows the advantage of a decentralised district level system, where the decision makers are close to, and more familiar with, the situation to which they are responding, compared to distant decision making in centralised EWS.

Buchanan-Smith and Davies (1995:202) point out that the response in Turkana 1990 was successful because of a well developed and sensitive EWS, some preplanning of relief interventions, aid resources allocated in advance for destocking, responsibility delegated to the district level where EW practitioners and decision makers were in close and regular contact, and a local political environment conducive to timely response. The fact that the same pattern was not repeated two years later during the more severe drought of 1992 shows that a well designed EWS is not enough. The political context (e.g. conflicting interests, donor government relations) is the definitive influence over whether or not a timely response is launched (Buchanan-Smith and Davies, 1995).

The failure of response in 1992 also shows that an EWS which operates at the district or local level should be integrated into a national strategy for responding to major emergencies like in 1992, when needs exceeded district level resources.

Late response can be the result of late Early Warning and the timespan between the EW signal and action. Buchanan Smith and Davies (1995) have entitled this time lag 'the missing link'. Figure 7 shows the timing of response in the downward spiral of famine. It shows that EWS generally trigger response too late (and often also too little) in order prevent destitution (Buchanan-Smith and Davies, 1995).

Figure 7: The timing of response in the downward spiral



(Buchanan-Smith and Davies, 1995:6)

Response must come earlier and should be aimed at saving livelihoods rather than only saving lives. This requires flexible and different kinds of local interventions, rather than that of food aid alone. Such an intervention might be more expensive, but in turn, it can be expected that parts of the social and economic costs of destitution can be avoided (Kilby, 1993).

Locally based interventions are often more cost effective than donor-based efforts or even those based within the central governments. Riely (1992:6.6) argues that information costs are lower because much information is readily available. For instance, by making use of informal information sources: pastoralists themselves know best when their livelihood are in danger. Riely reports (1992:6.5) from Kordofan (Sudan) that local leaders of pastoral groups in the early 80s requested assistance nearly a year before the actual outbreak of famine. The same happened again in 1989. Again, local level information can be cheaper and more easily generated through a decentralised EWS.

Figure X shows the differing response times for several countries. None of the EWS (even though late) failed to sound the alarm. It was the response system which failed to provide timely assistance.

Figure 8: Time lags between EW and Response

Ethiopia	Sudan	Chad relief	Mali relief	Turkana	Turkana
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	relief food distribution	(Darfur) relief food distribution	food distribution	food distribution	ELP 1990	relief operation 1992
Time-lag:						
from early warning to decision being taken	approx. 3 months	approx. 4 months	1.5-5 months ⁶	approx. 0,5 months	1 month	approx. 6 months ⁷
from decision to delivery of relief	2 month for first delivery, 8-9 months for most of the deliveries ⁸	5 months for the first delivery, >9 months for most of the deliveries ⁹	3.5-7 months	1 month for the first delivery, 4 month to complete deliveries	2 months	2 months ¹⁰

Source: adopted from Buchanan-Smith and Davies, 1995:203

What are the constraints to timely response?

A centralised structure of most of the national EWS is a constraint to timely localised response. Decisions about relief and mobilising of resources are mostly made in the capital, by people who are far away from where assistance is needed. EW information has to be aggregated to fit with centralised decision-making, thereby also losing understanding of local economies and pastoralists' coping behaviour (see Buchanan-Smith and Davies, 1995:207, Riely, 1992).

It would be naive to believe that EW information is entirely objective and has no political value. The political context in which early warning operates consists of the divergent interests of competing groups. The context determines greatly how information is used and interpreted.

Relations between donor governments and recipient African governments are an important determinant of whether an adequate relief response is launched in time (see Buchanan-Smith and Davies, 1995:208)

Buchanan-Smith and Davies (1995:204) argue that those countries dependent upon relief being mobilised in Europe or the US encountered the most severe delays. A EWS is more likely to put a decision of response into action if it is not dependent

⁶ Time lag varies from one donor to another.

⁷ From the first general recommendation made by the EWS that interventions would be unavoidable if the rainy season failed in 1992 until the DFRC was formed in September.

⁸ Some of the relief delivered early in 1991 was food-aid pledges carried over from the previous year.

⁹ It should be noted that in the Dafur case, 11 months after recommendations had been translated into decisions to provide relief, only one-third of total requirements had been delivered.

upon the international relief system mobilising resources outside Africa. The international relief system is more crisis orientated and responds slowly, especially if there are larger-scale and higher-profile emergencies elsewhere (Borton, J et al, 1991). This refers to credibility and accountability. Donors like to rely on their own information. They are less likely to trust national EWS and rely more on assessments carried out by UN agencies. In other words, only when institutions such as the FAO's 'harvest assessment' and the World Food Programme's 'need assessment' or FEWS confirm a crisis will donors respond (Petty and Buchanan-Smith, 1992a). Buchanan-Smith and Davies (1995:205) claim that there is institutional pressure to delay response until hard evidence of a crisis exists and relief need can be quantified with some certainty. This invariably leads to late response, rather than heeding the first warnings of an imminent crisis. Evidence of a crisis already under way is usually necessary for the response process to be treated with urgency. Donor decision making is driven by downstream rather than by upstream events. Evidence of famine is usually most influential, which is ironically a sign of a failed process to respond in time (Kilby, 1993; Buchanan-Smith and Davies, 1995).

6 CONCLUSION

Meteorological droughts can not be avoided but their impact on pastoralists' livelihoods can be greatly influenced by external intervention. Effective intervention means supporting pastoralists in coping with the impact of drought. Therefore intervention must be aimed at promoting, protecting and providing pastoralists' entitlements. Timely intervention is crucial for this purpose. The experience of two decades shows that intervention in a drought was constantly too late and only in the form of food aid (provision of food entitlements).

¹⁰Between the forming of the DFRC in recognition of the need for a large-scale relief operation, and the first major distribution by NGOs

EWS are the means of detecting stress on livelihoods and providing timely information for decision makers before lives are threatened. Early warning which seeks to detect stress on pastoralists' livelihood requires its own design. The majority of current EWS are neither capable of detecting stress on livelihoods in general, nor do they pay attention to early warning and response requirements of the pastoral sector.

The former incapability results from putting emphasis on monitoring of endowments such as rainfall, crop and vegetation. But information about endowments says very little about livelihoods. Livelihood security and ability to cope with drought depend not on endowments, but on entitlements. For that reason EWS need to monitor the determinants of entitlements, which are, besides endowments, markets, assets, rights over endowments, and opportunities to change livelihoods.

Rainfall, forage performance, and water sources are relevant endowments which should be monitored as early warning indicators for the pastoral sector. Relevant early warning indicators which comprise determinants of pastoralists' entitlements are markets of grain and livestock, access rights to water and forage resources, livestock as the most important asset for pastoralists, and livelihood strategies such as herd management, employment and migration patterns, marketing patterns and income generation activities.

Early warning and response activities are constrained by the characteristics of institutions which undertake them. A major part of early warning information can only be accessed at the local level. Centralised EWS which operate at national or international level are, for instance, barely capable (or only with high costs) of generating data on changes in livelihood strategies or assets of pastoralism. Many interventions, such as support in marketing, veterinary campaigns or provision of credit also need to be implemented at the local level.

As a rule, early warning and response activities should be carried out as near to the level of beneficiaries as compatible with efficiency and accountability (Swift, 1995). This principle means in many cases decentralisation of early warning and response capacity. But the case for decentralisation needs to be assessed in each case. It is, for example, unlikely that a decentralised early warning and response process would work

more efficiently in state structures which are otherwise highly centralised (Davies, 1993a).

Efficiency and cost effectiveness are very important in the context of scarce financial resources and other major problems of developing countries in arid and semi-arid regions. Meteorological drought might not occur for many years, and it cannot be assumed that governments or donors are willing to fund an EWS which monitors all the indicators suggested above over the whole time. Options to make early warning more efficient need to be considered. One point is that no one institution should be solely responsible for collecting and analysing all early warning information. Different institutions tend to have comparative advantages for different tasks. Another point is that EWS should make use of the range and capabilities of early warning indicators to detect different impacts of meteorological drought. For instance, rainfall and vegetation monitoring is very useful in detecting early an emerging problem for pastoralists. It can be carried out, relatively cheaply, for large areas through remote sensing techniques. This is an advancing technology and probably already (certainly in the future) more cost effective than time intensive ground surveys. This is, for instance, an early warning activity which can be done by national government departments or international agencies, given that they also provide the information for district and local governments.

The awareness of a meteorological drought should trigger an alert to intensify monitoring drought stress on livelihoods. At this point local level information and decentralised early warning and response capacity is important. Vulnerable groups need to be identified and monitored. This can only be done by monitoring determinants of entitlements: all four, assets, markets, access rights and opportunities to change livelihoods are important:

Market data is probably the cheapest information and systematic monitoring of changing livelihood strategies probably the most expensive. Information on markets and assets are more quantitative in nature and can therefore also be used to compare affected groups or areas. Informal information, such as from the pastoralists themselves, is very useful. Data on nutritional status of pastoralists becomes more important during emergencies such as famine.

The failed response process of 1992 in Turkana shows that decentral EWS must be integrated into a national capacities and strategies. These are particularly important during major droughts when needs exceed decentralised early warning and response capacities and large scale relief operations are needed.

The response process of Turkana also shows that the political context, such as conflicting interests between donors and governments, or district and national governments, is the ultimate influence over whether intervention is taken or not. Efforts should be made to minimise potential conflict between different stakeholders of early warning and Response capacities when designing early warning and response capacities. The result might be an early warning and response structure opposed to suggestions made in this paper. But it is probably more important to minimise conflict than to design a potentially effective decentralised EWS.

As a final point the author suggests four areas which need to be addressed in future research concerning early warning and response for the pastoral sector: firstly, monitoring and effective intervention in regard to access to key resources for pastoralists during drought; secondly, cost effectiveness of different indicators and forms of interventions; thirdly, institutional requirements for efficient generation of local level information and effective local level interventions; fourthly, minimising of conflict in early warning and response capacities.

APPENDICES

Appendices 1: Early Warning Systems in Africa in 1991

Early Warning System	SCOPE	FUNDING	
		Within Government	Within Country
GIEWS	global	FAO	-
FEWS	regional	USAID	-
SADCC ¹¹	regional	FAO	members of national governments
CILLS ¹²	regional	Consortium of donors	members of national governments
IGADD ¹³	regional	European Development Fund	members of national governments
CISFAM ¹⁴	regional	WHO ¹⁵	-
Ethiopia	national	Unicef	national government
Sudan	national	UNDP, FAO	national government
Chad	national	EDF ¹⁶	national government
Mali	national	Consortium of donors	national government
Burkina Faso	national	Save the Children Fund, Oxfam	national government
Botswana	national	FAO, Unicef	national government
Darfur (Sudan)	sub-national	ODA, Oxfam	regional government
SADS (Mali)	sub-national	Save the Children Fund	-
Tigray (Ethiopia)	sub-national	-	REST ¹⁷
Turkana (Kenya)	sub-national	EU, Dutch Government	regional government

(Source: Buchanan-Smith and Davies, 1991a)

¹¹Southern African Development Co-ordination

¹²Permanent inter-state committee for drought control in the Sahel

¹³Inter-Governmental Authority on Drought and Development

¹⁴Consolidated Information System for Famine Management in Africa

¹⁵World Health Organisation

¹⁶European Development Fund

¹⁷Relief Society of Tigray

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