CHAPTER 1

INTRODUCTION

1.1. INTRODUCTION

Drought is a climatic inconsistency characterised by deficient supply of moisture. Such a deficiency may be due to the inadequate and erratic distributions of rainfall. Drought has different connotations in different situations: absence of soil moisture to a farmer, absence of rains for a meteorologist, and decrease or absence of water in storage reservoirs and irrigation canals for an irrigation engineer (Maunder 1979 : 338).

The most common feature of drought is a continuously imbalanced distribution in the incoming water and water loss. The active working of precipitation, high evaporative transpiration, weathering away of soil moisture due to downward sinking of ground-water table, increased warming up of weather due to wind sweeping, and scorching heat, spell a drought situation. Irrespective of the definitional aspects (meteorological, hydrological or agronomical), drought in India affects almost 79% of the geographical area, causing different degrees of water stress and drought conditions. According to some estimates, it has been stated that out of about 260 million ha. of drought prone area, about 76 million ha. are subjected to mild, 117 million ha. to severe and 20 million ha. to disastrous drought conditions (Maunder 1979 : 338).

The concern of this study is more with agricultural drought than meteorological or hydrological drought. Agriculturally, drought is actually a period of scarcity of water which results in less production of crops. In socioeconomic sense, it is a period of intense economic problems, resulting from loss of agricultural production and shortage of water and pastures for animals, and decline in food cropped area. Drought is a serious problem for the government as well as rural people. It is a period of serious economic disaster resulting in acute shortage of water, lack of fodder for livestock, decline in area under different crops, and unemployment. In other words, it may also be defined as a period in which all the agricultural activities of farmers get disturbed though insufficient
and inconsistent rainfall is a primary cause, drought is also caused by disturbances in the ecosystem of a region. All the ingredients of nature like water, soil, vegetation and land along with the man play a very important role in maintaining the ecological balance of an area. Deforestation, over grazing, inappropriate landuse and abuse of water resources cause deterioration of the surrounding environment, resulting in depletion and degradation of fertility of soil and its erosion.

Drought essentially results from long-continuous dry weather and lack or insufficiency of rain which causes exhaustion of soil moisture, depletion of underground water supplies and reduction and eventual cessation of stream flow (Encyclopedia Britannica). Drought may be accurately described as a condition in which the amount of water available falls short of the quantity of normal requirement of water due primarily to failure or uneven dispersal of rainfall.

Because of the primary place given to rainfall in understanding drought, attempts at quantification of it are to a large extent based on quantity and variations in rainfall. The Meteorological Department has defined drought as a situation occurring in areas with less than 750 mm of rainfall when the annual rainfall is less than 75% of the normal. It has defined as moderate drought when the rainfall deficit is between 25 to 50 percent, and as severe drought when the deficiency is above 50 per cent. Areas where drought has occurred, as defined above in 20 per cent of the years examined, are considered drought prone areas and where it has occurred in more than 40 per cent of years, as chronic drought areas (Irrigation Commission 1972: 160). According to the Second Irrigation Commission, (Irrigation Commission 1972: 161), drought is the result of an imbalance between the soil moisture and evapo-transpiration needs of an area over a fairly long period, so as to cause damage to standing crops and a reduction in crop yield. The basic characteristic of drought is a steady rise in temperature in addition to the absence, or severe deficiency of rainfall over a fairly long period. Several factors such as precipitation, temperature, wind velocity, sunshine, soil texture, soil moisture and antecedent rainfall interact to produce this situation.
The problem of drought has several socioeconomic dimensions (Venkat Reddy 1978: 302). There have been glaring disparities in income and living standards between dry and drought areas on one hand and the irrigated and assured rainfall areas on the other. These differences are further widening since the Green Revolution, which is confined to the irrigated areas only. Such differences, if allowed to continue, would in the long run lead to marked inequalities in income between social groups and also regional imbalance as can be noticed in Andhra Pradesh. Therefore there is a need to take into account the socioeconomic factors to study the strategies for development. Droughts have been, more or less, a permanent feature of the Indian agrarian scene.

1.2 CONSEQUENCES OF DROUGHT: AN OVERVIEW

The difficulties of conceptualization notwithstanding, visitations of drought culminate in several socioeconomic aberrations. Some of such socioeconomic aberrations include distress sale of cattle, measures for storing food, collection of abnormal famine foods from forests, migration of able bodied persons, sale of valuables, and outstanding loans for food which result in the collapse of purchasing power. The drought in its wake also generates social disorders like dispersal of dependent (elderly and children) members of the family to better off relatives (Venkateshwarlu 1987: 287).

CONSEQUENCES OF DROUGHT

Recent research has accumulated comprehensive information on drought related impacts on economic, environmental and social sectors (Wilhite and Easterling 1987: 208). Thus reduction in employment due to production losses, increased cost of water management, damage to livestock, lack of feed and drinking water, increase in pollution such as water contamination and deterioration in landscape quality may become most serious and hazardous outcomes in drought affected environments. The debilitating social impacts, may include early retirement, interpersonal tensions caused by production uncertainty, decline in recreation, decline in health, personal hygiene and water recycling. Drought accentuates the incidences of stomach, eye and lung ailments and water borne diseases such as fluorosis. It is however, not necessary that there is a continuous or consecutive occurrence of all the socioeconomic ill effects.
The principal agro-economic indicators in an acute drought condition (Kalla 1988 : 3) may include deteriorating farm wage structure, increase in the number of child labour, continuous increase in the share of income from non-farm employment and a reduction in consumption. Continuous persistence of droughts may also result in social indicators including deserted villages, disruption of social institutions such as employment and labour markets, and relationships among societal groups, disorganization of social structures, disturbances in agrarian structure and changes in modes of subsistence, production and living.

Droughts are by no means confined to the Indian subcontinent but also are experienced in a wide ranging locations across Latin America, Belize, Brazil, the United States, the sub-Saharan Africa and several other countries. Droughts in the United States resulted a loss in crop production, and problems to industries (Hall 1983 : 155). Some of the educational institutions were closed due to shortage of water supplies. In the Northeast Brazil drought resulted in price rise due to hoarding, fall in crop production and problems to livestock and their production. In the Republic of Sudan (Trilbach 1989 : 129) drought resulted in indirect effects on social groups. Drought necessitated rural farmers and refugees to move to the urban areas and to work on Irrigation schemes. The government operated irrigation schemes, which had their roots in the earlier colonial policies, helped certain sections of the people thus creating problems to some others.

In Uganda, the British colonial policies and later those of the Ugandan government disrupted the delicate balance between the pastoralists (Karamajong) and their land. The policies needed imposition of taxes on pastoralists, which made them sell livestock for payment of such taxes. Such action resulted in over-grazing and famine. The land use problems emanated due to occupying of some of the lands by the Ugandan government which deprived the local pastoralists of their areas in which they were grazing their cattle. Conflicts with the neighboring farmers for water and land use also resulted. In Turkana (South Africa) drought caused difficulties to pastoralists. The construction of an international highway across their lands, and changes brought by the relief works and development projects resulted in uncertain future.
In Africa drought caused water shortages due to scanty rainfall, depletion of groundwater resources, reservoirs and artesian wells. Absence of tree vegetation accelerates run-off and reduces the proportion that eventually percolates to the underground water reserves. Given the increasing demand for water by men and animals, prolonged drought may reduce water supplies which may preclude them. In Sahelian countries (Niger, Chad, Mali) drought resulted in massive deaths of livestock. Food, fodder and water sources were affected. The other effects were; Inter-household inequality in Nigeria; peasant differentiation in Haiti; disruption of employment market in the Republic of Sudan (for example, on the Rahad Irrigation scheme where surplus labour from the International refugees was paid meager wages, and which also resulted in unemployment to some of the internal labour groups); migration of the affected families, dependence on friends, relatives apart from charities for material help and relief.

The malnourishment of children, women and men in Somalia drew the international attention to carry on relief operations on humanitarian grounds, not considering the problem of drought as the legacies of the Third World countries but as a problem of responsibility for the developing and developed countries as a whole.

The implication of policies in drought affected countries which tried to induce development in the name of relief; the existing competition between human and livestock for the fast depleting land, water, fodder and grazing forests the drought related casualties of men and livestock; the conditions of poverty, poor nutrition, disease and underdevelopment; disorganisation of social units, migration, unemployment; and landuse problems to pastoralists, and grazing problems to shepherds, provide a framework for an appraisal of the drought survival strategies.

1.3. IMPACT ON PRODUCTION

To understand the impact of drought on crop production we can make a brief review of the experiences in the countries of Latin America, the United States and sub-Saharan Africa.
During the past 100 years, four periods of severe droughts have affected the US Great Plains: in the 1890’s, 1910’s, 1930’s and 1950’s or roughly every 20 years. Each successive drought brought a marked decline in crop production. The US plains experienced an average of 20-25 percent reduction in wheat yields in relation to preceding wet years during the 1930’s (Warrick 1983: 68).

The drought of 1975 in Belize (Central America) (Hall 1983 : 156) affected virtually all facets of peasant and commercial agricultural production. Grain production is estimated to have declined by 50 percent; that is from a forecast production of 25 million kg to a production of around 1.25 million kg. Rice production was reduced directly by the drought but was also affected indirectly by a build-up of armyworm populations which damaged the rice crop. Paddy production was as low as 1.25 million kg, compared with 3.0 million kg in 1974. There was a shortfall of around 2.5 to 2.7 million kg of finished rice. Commercial crops were also affected. Sugarcane losses equalled half of the normal production and the more recently planted sugarcane fields were stunted because of water stress. The 1976 crop production was also down because of the water stress problems of 1975. In the citrus industry the orange crop, which experienced a 25 percent decrease bore the brunt of the effects of drought.

The production of selected crops (Coppans 1983 : 87) for Sahelian countries during the 1971-74 drought show declining trends as major crops such as millet sorghum, groundnuts and cotton showed low production. In Chad the millet production was 639 million tones in 71-72 and it was 430 million tones in 1973-74. In Mali, production for millet sorghum was 715 million tones in 1971-72 and it declined to 530 million tones in 1973-74. Cotton production was 74 million tones in 1971-72 and it declined to 58 million tones during 1973-74. In the famine affected area in Ethiopia, 85 percent of the cultivated land was devoted to food production including food crops and pulses. Sixty eight percent of the peasants faced food deficits and many areas were deficient in wheat, barley, sorghum, maize, and pulses.
1.4. IMPACT ON LIVESTOCK

Pastoral nomads across Africa and other regions are facing challenges to their way of life which has rested on a non-monetized, precapitalist mode of subsistence production (Mc Cann 1987 : 258). For example, people of Turkana, confronted by the construction of an international highway across their lands and by the changes which famine relief and development projects are bringing, face an uncertain future. Relationship between farmers and herders were strained (Horowitz 1972-1973, 1975 : 58) as the desiccation of the northern pastures forced a southward retreat of herds before the harvest was complete, with resultant conflicts between the two groups. For maintaining healthy, well nourished oxen, households must have access to pastures and supplementary feed (usually stubble from the past season’s harvest). In much of drought prone northeast Ethiopia the first effect of drought is the reduction of available forage. For Lasta and many other areas with high population pressure, pasturage is apportioned by households in the same manner as in arable land. Drought conditions result in several restrictions on production. First, oxen are weakened and tire easily; second, weak animals succumb to parasites and diseases; and finally household labour is required to handfeed animals by lopping browse with leaves. Households with cash resources can usually purchase straw or hay from less affected areas or support a herder to feed their animals, but others face pressure to sell or go into debt to obtain food. Many households are unable to support their animals and fall into capital dependency, which means that they have to borrow or rent oxen.

It is during drought years that herders most severely feel the loss of strategic water points and reserve dry-season grazing areas. Pastoral groups like Maasi of Kenya and Tanzania have to concentrate on already depleted low land-range areas. Under these conditions livestock losses are numerous, with upto 50 percent of cattle dying during recent droughts in certain districts in Kenya.

Perhaps the most long term serious effect of drought on the economy of communal lands was the decimation of livestock herds. While it is safe to say that no person in Zimbabwe died as a direct result of starvation, cattle deaths between 1978 and
1983 were estimated at 36 percent of the communal land herd. Cattle died at dried up dams and water holes when they got stuck in the mud and were too weak to struggle out. In many areas farmers refused to dip their cattle for fear that, in their weakened conditions, they may get drowned in the dip (Brotton 1987: 225).

The 1974-76 drought caused millions of Dollars (Belize) in livestock losses during the dry period. Of the commercial livestock, cattle were the hardest hit by the drought as it was estimated that 200 head of cattle died due to lack of adequate feed and water supplies. Further an estimated total of 525 head of cattle were lost, mainly in the Western (Cayo) district. The greatest loss in cattle was that of body weight-gain. A survey of cattle population of 45,000 showed an average weight loss and caused a loss of around $3 million to the industry (Hall 1983: 156).

During the 1983 drought in northeast Brazil, there was a decline in the number of cattle from 22.1 million in 1982 to 20.6 million in 1983. Aggregate data for the northeast have hidden the greater impact on cattle raising in the semi-arid part. Personal interviews with farmers in the state of Ceara indicate a decrease, as much as 80 percent in livestock between 1982 and 1983 (Parry et al. 1988: 288).

Mass deaths of livestock are recorded in Sahelian countries (Niger, Chad, and Mali) in recent as well as previous droughts. Estimates of livestock losses in 1972-73 ranged from 20 percent to 50 percent, the vast majority containing cattle. Total loss of livestock occurred to cattle, sheep and goats. In the hardest hit areas, the loss was put between 1.5 million and 1.8 million representing about 20 percent of the total livestock.

Drought can wipe out the capital and hit the basis of the social organization of the herders. The 1968-73 drought forced many pastoralists to poverty, to give up herding permanently, and to settle in towns. During 1968-73, Sahelian drought killed hundreds of thousands of grazing animals. Most of the Sub-Saharan areas were affected by drought and grain production fell from over 150 kg per person in 1970 to below 100 kg in 1984.
Livestock, the traditional source of cash in drier zones, suffers drastically in a drought area. In Kenya, in 1984 livestock losses were estimated to be between 50 percent and 60 percent. During a drought year, in the absence of food crops, farmers are inclined to sell livestock or exchange their livestock with foodgrains or cash. It is for this reason why the prices of livestock were often lower in the local markets. Herd owners who dispose of their livestock during a drought, may not be left with cash reserves for purchasing livestock as successive droughts cripple the livestock owner who is often unable to rebuild his herds. Drought impact of abnormal mortality was higher during 1973-74, as rangeland and crop residues became scarce. Cattle mortality, sales and unrecorded emergency slaughter were the available indicators of the drought effects. Sheep and goats were lost in large numbers (Parry et al 1988: 243).

Dry (seasonal) grass and fodder which is free for collection become commercialised as the paucity of pasture and grazing area decreased over a period of time. An overall shortage of feed, migration of people as well as cattle, and the farmers own needs for income following poor harvests create volatile market in fodder. If there is insufficient fodder or off-farm grazing is unavailable, livestock will have to be sold. Livestock mortality will be high unless extensive off-farm resources are available.

Economic impact of drought on cattle owners, as for example in Sahel, has been visualised where cattle herds movement reduced current income flow as milk yields fell and surviving ones were sold out at very low prices in exchange for millet. Loss of livestock involved considerable reduction in assets (capital stock) and income generating capacity. Drought induced other long term effects such as generalised feeding deficiency, increased fracture, reduction in fertility and low survival rates.

Marketing is another area where previous policies have been detrimental to herders and where donors and states can play a constructive role in the future. Most herder groups are in an especially vulnerable position in the market place. Their isolation from urban centres and market infrastructure often means that they pay premium prices for imports (e.g. grain) and receive low prices for cattle and livestock product exports (Horowitz 1987: 75).
1.5. IMPACT ON EMPLOYMENT, HEALTH AND LIVELIHOOD

Information collected from 229 households in the agroclimatic zones of a drought-prone area in Kenya indicate that few of the households have permanently employed members of the nuclear family. The permanent employment is the only cash income that is fairly insensitive to drought, at least in the short term. Long drought, over more than one season, may force problems to some of the agro industries to their closure as several firms making grain products (bakeries, millers etc.) were closed temporarily during the 1984 drought (Parry et al 1988 : 243).

There is a large number of rural households do not have permanently employed members and rely on casual labour for their major cash needs. These households are more vulnerable to drought, as the availability of casual work, particularly agricultural, may change during a drought. These are to be engaged in emergency work programmes for their food and maintenance which are difficult to organise.

Field research conducted in the northeast Brazil during the droughts of 1979-80 (Parry et al 1988 : 291) showed that 24.2 percent of workers affected by the droughts wanted to move for employment. Drought leaves severe impact on wage earners, lease farmers, dwellers and renters. The wage earner finds it difficult to be hired by the farmers for the execution of works, as these are scarce during drought period. Drought is a problem of subsistence to marginal farmers, agricultural labourers, and non agricultural labourers. In fact for wage earners, partners (non-owners), dwellers and renters, a drought can preclude the possibility of working on the owner’s land partly because subsistence agriculture becomes too risky and expensive and also because the owner wants his resources to be devoted to allied activities. In 1980, in Brazil the number of unemployed increased. Tenant farmers faced problems of accessibility, small landowners incurred loss of production and income. Income from cash crops and off-farm employment sources of income may be vulnerable to drought as well. It is the household to bear the consequences of drought.
During the 1972 Sahelian drought, the estimated number of drought-related human deaths was close to 1,00,000 persons. It also caused great damage in terms of more permanent social and economic disorganisation and migration to towns or other regions, an increased dependency on foreign aid and food relief. At the peak of the crisis, in April-June, 1974, there were some 2,00,000 people entirely dependent on food distribution in Niger (5 percent of total population). In Mauritania, 2,50,000 (20 percent of total population) moved temporarily and under dismal conditions into towns, completely destitutes. In Mali, another 2,50,000 (5 percent of total population) may have been forced into total dependency on towns (Coppons 1983 : 85).

In Niger, a case study in a Hausa village showed the farmers responded to famine by selling labour for cash, since a return to subsistence farming is not feasible, and that they resorted to increased seasonal migration (ICRISAT 1972 : 90).

Another consequence of drought is disruption of the employment market. Many of the large scale agricultural schemes both irrigated and rainfed have relied on seasonal labourers for agricultural operations. The severity of drought and subsequent famine forced many rural people to seek alternative paid employment. The labour stream on the market disrupted the traditional system by making work opportunities more difficult to obtain by depreciating prices. Similarly employment market was disrupted on the Rahad Irrigation Scheme in the east central Sudan. For at least four years before 1984, hired labour was paid a meager wage of 75 paistras for picking up a guffah of cotton. This was supplemented with a large supply of dura, the staple food, and reasonable accommodation. Labour surplus from internal refugees (mainly from Tendelti and Unm Ruwaba of west-central Sudan) made the employers to reduce wages. The consequence was that those labourers employed in internal labour groups either faced unemployment or found their incomes reduced below the normal expenditure (Trilsbach 1989 : 129). During drought periods there are many waves of migration toward towns in the interior of capital cities of the region and to other regions of Brazil. People start migrating during drought years when it becomes evident that there will be no rain and return when the drought is over, but the perception of the
end of drought is also determined by "normal" weather and farmers expectation of it (Parry et al 1988 : 271). Just as the effects of crisis are not distributed equally among households in Ethiopia, effects differ within the households based on such factors as age, social status and gender. Information on intra-household relations is essential to design rehabilitation projects as well as short term relief efforts to distribute aid at the household level.

Retroactive indebtedness and loss of productivity stimulate short-term as well as permanent migration as proved by the exodus of thousands of high-land population in Ethiopia annually to seek wage labour. More vital for the longterm stability of the rural economy of the drought-prone areas is the impact on those who stay behind. With sufficient rains the normative cycle of growth would allow dependent households gradually to reacquire livestock and retrieve the food supplies and seed programmes. Drought restricts supplies of capital which in turn lends increased manipulative powers to households which control the scarce remainder (Mc Cann 1987 : 245).

Another impact of drought on Sudanese society is the migration of the affected families to the areas where their relatives live. It is common that many families would resort to relatives or friends for financial and material support during the crisis which in turn may give rise to family onuses as shown by the Sudanese households. Inspite of assistances from the international charities, the vast majority of the migrants expect to receive a basic living at the expense of their relatives. This would result in onerous burdens on the host families though they are traditionally inclined to assist their guests. Livelihood would become difficult as food prices soar high.

In Sudan, female dominated refugees become a cheap labour source of urban labour. Most of them worked as house-maids in urban areas for which they were paid low wages, enough to buy some bread and onions, and often they have to feed as many as five children and one or two elderly people. Many find it difficult to improve incomes by extending their working hours, as many would undergo wage cut, since they work on semi-skilled works. This would naturally result in a dearth in money supply and a general slump in commerce and trade (Trilsbach 1989 : 129).
To withstand drought at farm level farmers adopt strategies such as (1) reduction in consumption, (2) postpone social arrangements such as marriages, (3) exodus to better areas with livestock or sell stock, (4) take consumption loans, (5) sell assets like gold, ornaments, as a last resort, and (6) some develop their indigenous systems of foodgrains and fodder storage to tide them over during scanty rainfall years. Farmers also to adopt risk through diversifications of crops and cropping systems (Venkateswarlu 1987 : 285).

The seasonal strategies to cope with drought in a village in Orissa are either adoption or diversification of primary, secondary and tertiary occupations of all working household members such as collection of common property resources, employment seeking, consumption modification, borrowing or lending, asset creation or sale, migration which are common strategies for coping with seasonality. Cultivators intensify plantation of winter crops and invest in new groundwater sources. Shepherds undertake relative feeding and grazing between dry versus lactating animals and migrate elsewhere. Weavers undertake alternative production of rope making. Service castes either participate in relief work or migrate. People in general modify or undergo retrenchment in their cropping patterns, participate in relief works, and borrow. The shepherds either migrate or mortgage their assets (Martha 1991 : 106). Most of the farmers prefer during drought to work under relief operations as they are indebted to banks and have an inclination to undertake dairy and poultry as a subsidiary occupation. Many families migrate to canal irrigated zones. Farmers migrate when there is a complete crop failure and lack of pasture and livestock.

It is a general notion that during drought, scarcity of food supplies causes prices to rise considerably. In the case of colonial West Indies, in the pre-emancipation period, periodic slumps in sugar prices and food production levels were reported in Barbados (Watts 1987 : 49). During the 1983 drought (Wellow Province) there was a slump in crop production and an upsurge in prices of foodgrains (Aduga 1984 : 114).
Another consequence of famine is variation in prices of foodgrains. As was seen during 1984, in most of the areas (eg. Republic of Sudan) grain prices at least trebled, and even further exceeded in some places. This was in spite of plenty of food stocks available in towns. It's price precluded often any opportunity for abject families to purchase and such people had to rely on famine assistance from charitable organisations. The dilemma for many rural people was that while basic food stuffs were increasing in value, salable assets, specifically livestock, were diminishing. These fluctuating prices had many implications for many rural traders in general, because the need for food and basic survival items cut short the amount of money in the trading system and the sale of non-essential items (Trilsbach 1987: 129).

The farmers were inclined to sell the produce and not to wait for the best moment due to level of capital and storage capacity. After a spate of post-harvest selling, prices begin to rise sharply especially in drought years. During the 1979 drought in (northeastern Brazil) prices of beans and rice, in the state of Ceara, rose to 100 percent above the rate of inflation. Prices of this scale are typical responses to local rural markets, but are often not reflected in consumer prices in the large cities, largely because of storage by middlemen.

The intensity and frequency of the crisis can best be understood by reviewing the price movements of rice, staple diet of most Kampucheans. Towards the end of June 1972, rice prices began to rise sharply, continuing upwards to such an extent that they quickly exceeded the capacity of all but the wealthy to purchase it. Fear, speculation, anarchy and corruption played their part in maintaining price level that placed the staple beyond the reach of those who needed it most (Ea McGregor 1984: 32).

The most immediate countywide effect of the 1982-84 drought in Zimbabwe was the desication of domestic water supplies. It was not uncommon for village women to walk up to 15 km each way (20 km in Filabusi) to seek alternative source. In Sebi, women and livestock had to stand all day waiting for over burdened wells to recharge with water. There were reports from Zabagwati of women exchanging blows and
scratches for filling too many containers. Even in the wetter areas, domestic water supplies ran dangerously low in places of population concentration. Water rationing was introduced in urban country and rural schools were forced to shut down during dry season (Brotton 1987 : 225).

Drought is normally characterised by water shortages. There is scanty rainfall and hence minimal recharge of the groundwater reservoirs and artesian wells. Absence of tree vegetation accelerates surface run off. Given the increasing demand for water by men and animals, prolonged droughts severely deplete water resources and may reduce supplies to dangerously low levels in many parts of Africa. Most major metropolitan areas of the United States depend upon surface water sources like lakes, reservoirs, and rivers for their water supply and persistent droughts have seriously threatened the adequacy and quality of these supplies. Persistent drought in 1980 continued through 1988. All outdoor use was disallowed and water use by industry was curtailed, yet no marked economic losses occurred. The impact of the 1988 drought on water resources depended upon several factors, most notably, pre-existing conditions. There is a general agreement that in the period 1845-48, approximately 1.00-1.25 million people died from starvation and from associated diseases such as pestilence, dysentery, relapsing fever and cholera in Ireland. In the 18th and 19th centuries, starvation, disease and death had become normal features of the Irish society. An estimated 2,50,000 died from pestilence, 99,000 from dysentery, 30,156 from cholera and 87,000 emigrated between 1845 and 1848 (Regan 1983 : 114).

A causal look at the health levels in the Sahel and incidence of the 1972 drought unravels that it aggravated what was already very precarious situation in the Sahelian countries. What the drought did in countries where the margins for survival were narrow was to push many people beyond the margin, make a quantitative difference in physical or economic conditions, bring a qualitative change in the possibilities of survival, leading to migration, a high incidence of infections and parasitic diseases at high rates of mortality, an extremely low and uneven density of health resources (Escudero 1982 : 87).
The manifestation of the underdevelopment in Ethiopia is the extremely low living conditions of the people. Owing to the great burden of ill health caused by communicable diseases (like malaria, parasites, eye and skin infections, measles, tuberculosis, and small pox) and nutritional deficiency which are the ills of underdevelopment, morbidity and mortality rates are high. Infant mortality was estimated about 200 per 1000 (for developed economies it is less than 20) and life expectancy is about 36 (for developed economies it is over 60 years). In 1973, 2,00,000 people died from famine (Aycllew 1982 : 93).

During the 1974 drought, the estimated number of drought related human deaths was close to 1,00,000 persons. At the peak of the crisis, in April-June 1974, there were some 2,00,000 people entirely dependent on food distribution in Niger (5 percent of the total population).

Historical records of famine in pre-industrial societies usually paint pictures of death on a massive scale, the low rates of population growth in pre-transitional and early demographic transition societies to testify to the high wastage of life associated with famine. Sorokin (1942) has demonstrated the horrific loss of life caused by historical famines suggesting that the death rate in affected areas sometimes reached 200 to 500 or 800 per every thousand population compared with normal rates of 10 to 30.

Coldwell (1975) has drawn on a wide variety of sources in his examination of mortality associated with the famine of early 1970’s. This estimate of excess mortality over the entire Sahel during 1970-74 was no more than a million. It would appear however that elsewhere, especially in South Asia, excess mortality may be more significant. Ainapur (1980) has estimated excess death during 1943 Bengal famine at 2 million and those in Bangladesh in 1974-75 at 1.5 million (Hugo 1984 : 7).

The drought of 1970’s in Ethiopia not only placed the rural peasants in poverty but also advanced their indebtedness. Peasants are under the burden of deadweight debt from year to year and they carried a debt amounting to almost 55 million. About 40 percent of the indebted peasants were land owning peasants, 32 percent were tenants, and
19 percent were partly owners and partly tenants. The most single purpose of these loans was purchasing food which accounted for 48 percent of the total number of loans. In Brazil, the drought forced the landless class to borrow at the time of distress and they have become bonded to money lenders owing to non-payment of loans (Nunes 1986 : 101).

1.6. DROUGHT AND SOCIO-ECONOMIC STRUCTURE

In West Africa, different methods are adopted by different economic strata to withstand a very poor harvest. The rich are able to withstand the shock of a very poor harvest through trade and off-farm income. Wealthy farmers have large holdings in extended patrilineal domestic units, produce more grain and groundnuts and are more likely to cultivate high value crops such as tobacco. They own ploughs and groundnut decarticators and keep cattle. They generally engage in intervillage trade in grain and other commodities. They store grain and lend money. The poor conversely have smaller households, heads of poor families usually engage in menial, often transient occupation that yield low returns. They engage in wage labour and borrow heavily to buy grain in rainy season. The worst-off are those with no credit worthiness; at best they may borrow a little land to farm, or use corn stalks to make bread for sale. It is common for poor men to sell both their farm manure and farms. They dispose of their few resources to meet their reproductive needs in a cycle of impoverishment (Watts 1987 : 197).

The stratification of Hausa communities translates directly into equally significant typological distinction for food availability and security during drought. The poorest farming households (5.1) were deficient subsistence producers often purchasing nearly 100 percent more grain than they sold. Lower income households tended to fall well below estimated minimal requirements; in these low income classes, the gross value of farm production could not cover the purchasing power required to obtain the food necessary for minimum caloric intake.

Simmons ( Watts 1987 : 199 ) made a crude economic distinction during drought between rich and poor; on the basis of cattle ownership. During the critical preharvest months, grain consumption per day was almost 30 percent higher among cattle owners when prices were 90 percent higher than the harvest level.
Available evidence suggests that the distribution of the effects of famine clearly create parallel process of stratification and economic vulnerability already present in rural Ethiopian society. The impact of regional drought and food shortage on individual households has a number of complex but definable factors. In the Hausa village (Kaita) the vast majority of households still owned their means of production, inspite of population densities, land shortage and the changes brought by colonialism. The absence of landless class, nevertheless should not obscure sharp socioeconomic differentiation within the community, the genesis of reproduction which is precisely related to the appearance of wage labour, the use of indebted ones, and the dominant role of merchant's capital under the aegis of the colonial state. In Nigeria there exists interhousehold inequality, specifically during seasonal stress. Labour is sold in urban markets and livestock and land are also sold often at non-reasonable prices. The poor households suffered a decline in household assets comprising of cattle, grain, land and farm related assets. While the well to do groups of households were able to muster the benefits of development and could adjust well with the famine situations utilizing the scarce labour (normal period) which was available plentifully. clearly then, in peasant communities where socio-economic differentiation is so prominent, poor farmers, shackled by their poverty, are largely powerless to effect the sort of changes that might mitigate the debilitating consequences of environmental hazards (Watts, 1963 : 255).

In Brazil, the drought effected the poor more severely which reinforced the already prejudiced differences between rural and urban population as well as the difference between the small producers of the subsistence crops who constitute the entire gamut of rural producers, and the largescale farmers who produce cash crops (cotton, hemp etc) as well as raising cattle (Nunes 1986:101).

The drought left severe consequences on economy and society of the North Eastern Brazil particularly wage earners, partners, dwellers, and renters. The wage earner is hired by farmers for the execution of a specific task and is paid in money, usually on a daily basis. The partner is a non-owner, he produces on the owner's land, taking all the risks and paying the owner with a percentage of production, upto 50
percent. The renter pays in cash for the rent of the land. The dweller is a permanent worker. He lives either on working a certain number of days for the owner or make a payment cash for goods. The squatters are non-owner producers who does not pay any rent for land used. Wage earners suffered a loss in employment. Tenant farmers loose access to land leading to migration. Small land owners incurred loss of production and income and sold land mainly to the large owners. The medium and large farmers utilised the water in reservoirs, adopted cattle raising, obtained subsidised credit and utilised the abundant man power for farm restoration. For them the problem is basically of production (Parry et al, 1988:129).

Large land owners became the main beneficiaries of drought works through political influence and inturn enriched their economic and social status vis-a-vis other social groups. By benefiting the large land owners and higher social strata of the arid hinter lands, the drought hampers the way of rural life and their conditions (Nunes, 1986:101).

Land is the basis of life and the general assumption is that the peasant community in drought areas is very clearly tied to the land, which is the only source of life and subsistence; particularly in the case of Ethiopia. The size of cultivable land that the peasants possess, the availability of grazing land near-by and the availability of drought animal to some extent determine farmer's level of life. Land was considered to be birthright of every human being. The land reform of 1975 in Ethiopia does not allow peasants to sell land or to exchange it for other property or assets. During the process of marginalization, private ownership of land took its roots and the consequent disruption of traditional system and values. Commercialization lead to the emergence of tenants and hence their gradual eviction, leading to their gradual transformation into agricultural proletarians (Spitz 1986 : 8).

1.7. DROUGHT AND POLITICAL PROBLEMS

Political problems emanating from political turmoil also seemed to have acquired greater vehemence in the face of drought and famine. The British policies and later,
those of Uganda's government not only disrupted the delicate balance between the Karamajong pastoralists in Uganda and their land but in fact deflected them from their gradual exodus towards sedentary farming. The constant acquisition of crucial Karamajong lands by the colonial government beginning in the 1920s without a reduction in the number of livestock lead to overgrazing of the remainder. The net implication of colonial and neo-colonial policies on the pre-capitalist Karamajong created the need for cash income to pay taxes which would only be earned by selling cattle to sole buyer governments at a fixed artificially low prices. Cattle were raised on decreasing areas of land which became overstocked and subsequently eroded. Food from hunting and sedentary farming became scare due to colonial and neo-colonial policies with the virtually inevitable consequences of desertification, diseased cattle, increased rampage by neighbouring tribes and finally a catastrophic famine.

The people of Turkana in Africa are confronted by the construction of an international highway across their lands and by the changes which famine relief and development projects are bringing them to face an uncertain future. The non-Turkanas, who are making most of the decisions which shape the new relationship between Turkana and outside world, contemplate that solution of the nomadic flocks primarily lies in the production and to certain much lesser extent fish and perhaps irrigated crops for sale on the national market. This may however undermine what is left of Turkana culture, and places stress on Turkana land which it cannot bear. Relief agencies and government enter into these potentially volatile situations, often with cogent methods without conceiving consequences. It was suggested that they shall look closely at the immediate and background causes of famine before leaping into formidable solutions which may simply complicate the matters in the long term. The development schemes posited on a closer involvement in a market and cash economy, and closer ties to national governments, may be planting future seeds of famine for pastoralists and ecologically sensitive lands which they occupy (Snow 19X7 : 155).
The political and military situation in Kampuchia during 1975 did little to ease the famine crisis. For the bulk of the population, one set of difficulties and problems was, one effect replaced by another. As the strategic situation of the Phnom-Penh authority worsened, food crisis in Kampuchia during the 1970's had their origins in the political and military events of the decade. While the fall of Pol-Pot regime, the Vietnamese occupation and decisions of the Heng Samrin administration have resulted in more abundant agricultural production, a substantial decline in international aid since 1981 continues to concern both the Phnom-Penh authorities and those responsible for the aid programmes. Armed hostilities continued to prevent cultivation and or disrupted the harvesting of the nation's rice crops, and risk of famine in Kampuchia remains. Short term military and political victories, for this or that ideology, will only be defeats, if those who survive them, do not have enough to eat. Forecasted subsistence crises and diminishing international aid make the outlook a bleak one for a nation and people already devastated by war and famine (Merg Try Ea 1984 : 48).

1.8. DROUGHT AND INTERVENTION

The Brazilian Government spent the equivalent of US $1777.9 million in emergency programs during the 1975-83 drought period. Some 25 million workers were assisted in 1983, and 88 percent of the total area of northeast Brazil was effected. The emergency programme precluded starvation and thousands of deaths, as well as massive migration. The emergency programmes have also contributed to the creation of infrastructure like dams, roads etc. Notwithstanding these positive effects, it was recognized that the programmes were not sufficient to prevent deterioration of nutrition levels and increasing mortality rates. As relief programmes, they did not help to solve the structural problems prerequisite for reducing poverty and increasing resilience in coping with droughts. It is interesting to note that, during the 1979-80 drought, 80.5 percent of the total family budget of workers enlisted in the emergency program was spent either on food (45.6 percent) or to repay personal debts (34.39 percent) (Parry et al 1988 : 294).
There are NGOs such as CARE and OXFAM which function primarily as funding agencies and others which are primarily operational at the local level. Some NGOs are specialised in providing food aid, while others provide medicine. Some NGOs largely focus on relief, while others provide priority for development activities. Some work closely with the state, some receive substantial revenues from the state, and some others work independently of the state (Scott 1987: 349).

1.9. SCOPE OF THE PRESENT STUDY

In the light of the foregoing review of drought and its effects in the countries of Africa and Latin America, the present study aims at an analysis of the drought, its effects and survival strategies in the semi-arid Rayalaseema and Telangana of Andhra Pradesh. Two mandals in each of these two regions have been chosen for their common geographical features of being located in a semi-arid area with similarities in landforms, topography, soils, community pattern, economic organization, and with a hierarchy of caste and class groups, with mutual dependence and exchange of goods and services providing favourable conditions (advantages) to a certain category of sections, while at the same time creating problems (disadvantages) of survival and livelihood to the lower sections, particularly in the wake of drought.

1.10. OBJECTIVES OF THE STUDY

The main objectives of the present study are:

i) To study the impact of drought induced changes on agriculture, allied activities and the resource use in a drought prone area,

ii) To study the impact of drought on different groups of people,

iii) To analyse the survival strategies adopted by different groups, particularly the ‘poor’ and

iv) To identify appropriate policy intervention as well as institutional arrangements to mitigate the impact of drought.
1.11. METHODOLOGY

Drought, being a natural geographical phenomenon, it has to be studied in various situations under varied socio-economic conditions. The basic survival strategies relating to specific geographic locations and, specific agricultural caste groups involved in farming have to be paid closer attention. Attention should be paid to special groups such as shepherds and cattle keepers who bear the drudgeries of ecological crisis such as drought while responding to the natural variation to a certain extent and constant self-devastating man-made ecological imbalances which take their shape into ‘drought’ at the regional resource level.

The farmers, agricultural laburers, rural artisans and the landless labourers suffer differential impact of drought as it's destructive forces are focussed on the basic survival system consisting of (a) man and society, (b) man and environment, and (c) man and nature.

First, the spell of drought on man and society results in changes in societal conditions. Second, the spell of drought which works on man and environment creates problems to traditional practices such as farming and sheep rearing/cattle keeping. Drought necessitates the communities which depend upon such activities to go for unconventional methods of cultivation, irrigation practices, and landuse procedures. The well to do sections of the farming community must available resources and developmental benefits using social status and economic conditions. In such an environment man himself poses problem to the well being of man and his environs, ponds, water resources, forests, trees, livestock, crops, pastures and the land resources. Man during drought, with a shortsightedness ignores the future needs involving longrun ecological perspective. Some of these are indiscriminate water use, over utilisation of water, land, forest resources, accumulation of technologies providing preconditions for degradation and desertification of land and forest, and encroachment of the existing resources. Such a problem is to be interrelated with appropriate technology and rational utilisation of the resources.
Third, the spell of drought works on man-nature relationship. Man is an ingredient of nature maintaining symbiotic relation. The phasing and sowing of the crops, watering and harvesting of the crops, growing of trees, rearing of cattle and sheep, feeding of animals, collecting of water, fodder, food and fuel wood are all seasonal activities of man for livelihood. Every action of man is in tune with the changes in nature. Drought causes its impact on man and his crops, livestock and on his surroundings. The action of nature here is rainfall which forms a subsystem of nature. But man instead of identifying the causes which had disturbed the once well balanced man-nature system of relationship which have often been disturbed by man himself by way of encroachment of water, land and forest resources, overcultivation and utilisation of resources, unconventional methods of cultivation, lead to creation and aggravation of droughts. The deviation of man from nature occurs over a period of time at a point of space when man’s actions result in changes which are not adjustable with nature. Nature, in the form of second level alternatives of survival, provides certain subsistence systems as contingents to man. However these alternative strategies do not occur on an immediate basis but are achieved after certain risks such as time testing, distance covering migratory strategies for resource collection, specifically in case of different sections of farming and non-farming communities at village level in general and certain shepherd groups in particular.

The design of the study should be capable of accommodating the collection of adequate information not only the households, but also the nature of resources and institutions. The study focuses two drought prone districts viz Ananthapur and Mahboobnagar of Andhra Pradesh. Four villages from Anantapur district and three from Mahabubnagar are selected for more detailed study. From each village 50 households are selected on the basis of stratified random sampling. The households are stratified into three groups of cultivators, agricultural labourers and others. Besides, care is taken that different caste groups are represented in each stratum.

For the purpose of an indepth study of predominantly non-agricultural groups, two shepherd communities, Gollas and Kuruvas are selected form Mahboobnagar district.
For the study of these groups a combination of household survey and field observation methods were used. The other main sources include secondary sources like literature on drought studies as well as Census, the A.P. Directorate of Economics and Statistics and the Mandal Offices.

The study is divided into six chapters. The second chapter is a survey of drought conditions in India and Andhra Pradesh with a view to provide a wider background to the present study. The third chapter analysis the drought conditions with specific reference to Anantapur and Mahabubnagar districts. The fourth chapter deals with the impact of drought particularly on agriculture and employment in the selected villages. The fifth chapter attempts a study of certain specific groups like shepherd communities in terms of the adjustment strategies adopted by them in the face of drought. The last chapter contains the summary and conclusions of the thesis.