DROUGHT—

it can be beaten

Seven major droughts spread over a period of the last 100 years have simultaneously devastated the greater part of Australia.

In addition there have been a number of severe droughts affecting limited areas—the droughts of 1965 and the present limited but serious drought affecting the west and north-west of New South Wales.

What is drought?

The answer depends upon the type of country in which drought occurs.

In a brilliant and informative study entitled "Drought in Australia" issued by the Director of Meteorology, Melbourne (Sept. 1957), J. C. Foley, B.Sc., lays down a number of criteria:

"The term 'drought' is one which has a very wide range of usage. A commonly accepted broad definition is 'dryness due to lack of rain' Various writers use this term in the broad sense. Thus Thonthwaite (1941) represents drought frequencies by the number of consecutive days without rain experienced in various periods of years. Tannehill (1947) states that drought belongs to that class of phenomena which are popularly known as 'spells of weather' a drought is a spell of dry weather. It is unique among 'spells of weather' in that it creeps upon us gradually, almost mysteriously, but its consequences are a terrible reality." (My emphasis, W.M.)

Foley also indicates that more recent writers have attempted to define drought in its ecological effects.
Blair (1943) indicated that drought is a relative term. Crops in different parts of the world are more or less adjusted to the normal moisture conditions and to the normal rainfall distribution of the region. Hence what would be a drought in one region would not be injurious for another.

As we will see later there are important conclusions to be drawn from Blair's point of view.

A pioneer meteorologist, Government Astronomer Russell, in analysing N.S.W. droughts of 1888-1895 said in 1896 that "drought is not wholly made up by a shortage of rainfall. Its most important factors are great heat and drying winds. In 1895 for example there were many falls of rain in winter and spring which would have made grass in ordinary seasons but no sooner had it fallen than a dry north-west wind and a burning sun dried it all up."

Major droughts have occurred in Australia in the years 1864-68; 1880-86; 1888; 1895-1903; 1911-16; 1918-20; 1939-45 and 1963-65. Of these droughts the most disastrous is considered to be that of 1895-1903.

West Australia in 1910-14 had a drought extending four years and three months in the coastal districts between Northampton and Walebing. This area is normally one of the most reliable wheat growing areas in Australia, but the average was two bushels per acre—the lowest ever.

The same drought in South Australia resulted in a wheat yield of 1.41 bushels per acre in 1914. Victoria in 1913-16 had a wheat yield of 1.41 bushels per acre.

New South Wales in 1892 had a sheep population of 62,000,000, but 12 years later it had fallen to 26,500,000 due largely to drought.

Drought causes enormous economic losses and human suffering. Unfortunately there has never been any real attempt in the seven good years to prepare for the seven lean ones.

Summing up the position Foley states: "Droughts such as experienced in the past are considered to be characteristic of the climate, a feature which must be borne in mind in relation to its effect on the national economy. There is no evidence from the picture presented by the
residual mass diagrams (a method employed by meteorologists to estimate drought effects) that the climate in this respect is changing."

(Droughts in Australia, P. 1, J. C. Foley, B.Sc.)

This brings us to a consideration of the Australian weather pattern and what causes rainfall or the lack of it.

Roughly speaking almost all of Australia extends between the latitudes 12 degrees S and 38 degrees S, i.e. 26 degrees which is less than the latitude range of other continents. It has so little land above 2,000 feet elevation and so simple a coastline that latitude is the controlling factor in climate.

"Various portions of the continent", states Griffith Taylor, "are affected by a belt of tropical cyclones, the trade wind belt, the anti-cyclone belt and the belt of antarctic cyclones."

("Australia" by Griffith Taylor, D.Sc., P. 51.)

In winter the antarctic lows bring rain to the south-west of West Australia, to South Australia, the Riverina and Tasmania. These rain systems penetrate as far north on some occasions as Carnarvon in West Australia to the Darling Downs in Queensland.

Summer rain is caused by monsoonal effects of high temperatures in north Australia and by the trade wind belt which causes moist on-shore winds on Australia's north-east coast.

Heavy late summer and autumn rains are caused by what are known as east-coast cyclones originating outside Australia and which travel west, south-west and then south-east (according to the ferrel effect).

Droughts and their converse of heavy and persistent rains occur when the normal weather pattern is disturbed. The Meteorological Department believes that last year's drought continuing into this year in New South Wales began on August 22, 1965, when the normal winter weather pattern suddenly changed to a spring pattern.

The late Griffith Taylor, an Australian scientist with a world-wide reputation, believed that sun-spot activity has a bearing upon drought conditions. He wrote: "In 1922 the writer found that drought years in the Bourke district occurred fairly regularly during years of low solar activity; i.e. when sunspots were few as in 1890, 1902 and 1923. Later, Kidson in 1925, showed that this
was usually the case in the wetter parts of Australia, while the contrary conditions occurred in the great arid regions of the west and the centre."

In general then northern Australia receives its rainfall during the summer while southern Australian rainfall is predominantly received during the winter. The influence causing precipitation may vary in a northern or southern direction, or in intensity causing wide fluctuation in actual amount of rainfall.

Drought has an irregular history in space and time. There is no indication that climatic conditions will change in our favor or that worse will befall. (This is not to rule out the possibility that man will one day so understand all the factors underlying our weather that rainfall may be made subject to a considerable degree of control.)

Since we have to live with drought we should be prepared to meet its challenge both now and in the future.

Starting from the premise that Australia is the hot, arid continent with limited water and soil resources, we should plan maximum utilisation of both and improvement of the latter.

First place must go to water conservation. This requires the construction of dams where suitable sites exist, construction of weirs on such rivers as the Darling, construction of barrages such as exist on the Murray outlet and that planned for the Fitzroy in Queensland.

Further, we need the fullest knowledge of the extent of underground water supplies and their qualities.

Where possible, water conserved in various ways should be integrated in a connected supply system so that a deficiency in one area could be met by a surplus from another.

Water conservation is not only a question of huge storages such as the Snowy, Hume, Eildon, etc., but also of small local schemes and farm dam storage.

To the Water Research Foundation of Australia goes the credit that for the first time in the world a manual on farm dam construction has been produced. The value of the manual, prepared by Professor J. R. Burton (Bulletin No. 9, Vol. 1, Water Research Foundation of Australia) can be estimated by the fact that in N.S.W. alone annual cost of farm dam construction is $8,000,000.
When water is conserved to what use should it be put?

As water is a national asset, some re-thinking is necessary on the question of riparian rights. Water supplies should be first available for town water supplies and for farm stock purposes.

As many cattle and sheep have died in the current N.S.W. drought from bad water as from lack of nutrition. Next, water should be available for limited irrigation schemes producing annual crops and an amount provided for crops of a perennial nature, such as horticulture (fruit, trees and vines). A system of priorities should be established.

For example, the wisdom of extending rice acreages is being questioned, as rice is most wasteful of water.

It is being urged that irrigation water might be more profitably employed for more lucrative or less water-demanding crops, including even wheat.

Maximum utilisation of Australia's water resources is not the only answer to drought. It is doubtful if more than 5,000,000 acres of Australian land can be irrigated with available suitable soil in sufficient acreages.

For Australia, dry land agriculture is and will probably always be our mainstay. The great need is for the development of grasses, grains, clovers and crops which will be more drought resistant or economical in water consumption.

What sub-clover mainly has done for temperate Australia must be achieved in both dry and moister areas if drought is to be combated.

A break-through has been achieved with two new legumes—Townsville Lucerne and Siratro. Townsville Lucerne (Stylosanthes humilis) should not be confused with ordinary lucerne or alfalfa (Medicago sativa). Both are legumes but the old established plant and king of the fodders will not grow in northern Australia. The use of Townsville lucerne in conjunction with flinders, mitchell and spear grass country in Queensland promises a dramatic improvement in beef yield up to 10 times the present yield.

Siratro has been the personal achievement of Dr. E. M. Hutton, who is assistant chief of the Division of Tropical
Pastures within the C.S.I.R.O. The new plant is already performing well under a wide range of conditions in the summer rainfall areas of northern Australia. This and other summer legumes are extending into the northern half of N.S.W.

Anti-drought measures should also include reafforestation with native trees such as the kurrajong, quandong (native peach) and some of the mulgas (acc. sp.).

In good years greater reserves of fodder could be established by putting down more ensilage in pits storage. Made from mixtures of grasses and clovers or even one grass such as sudax (a new hybrid fodder sorghum) ensilage stored in the earth preserves its fodder qualities for many years.

Reserves of grain such as wheat and oats should also be held under a fodder conservation plan.

The organisation of anti-drought measures in Australia also demands the reorganisation of our transport system, particularly the railways. This would permit rapid passage of stock to agistment areas and the carrying of grain and fodder in massive block lots where necessary.

Long-range plans against drought require more investigation of desalination of water. The English, working quietly, have made the most spectacular advances with the multi-flash process. Soviet scientists have also made considerable headway in desalination processes.

A problem to be faced with water storage is that of evaporation. The use of cetyl alcohol as an anti-evaporation substance is effective but very expensive.

A new process involves the use of a wax base such as found in lipsticks. The base is spread by molasses carrier which readily dissolves, leaving the protective wax in place. As to the economics of the process, nothing has yet been revealed.

The immediate need is for a crash program involving intensified research and practical application of rain-making as well as the utilisation of the considerable underground reserves of water in drought-affected areas.

The Water Conservation and Irrigation Department, with limited resources, is boring for water and carrying out analyses of its quality. More needs to be done and small turbo drills such as are used for seismic work in
oil search should be acquired and put to use to locate and prove underground water reserves in the Lachlan, Namoi, Macquarie and other river basins.

At the same time more water could be transported by rail and rolling stock could be acquired from Victoria and South Australia via the bogie exchange point at Dynon, in Victoria.

Both immediate and long-range measures against drought must include the establishment of a pool, primarily of breeding stock, to replenish cattle and sheep lost in the drought.

Various State instrumentalities are responsible for conservation of water and its use. These bodies have an annual allocation for their general work and special legislative provision is made for the construction of major works. But all expenditure has to be encompassed within the general allocation of funds made by the Loan Council.

To carry out necessary investigations into water resources there exists an organisation known as the Water Research Foundation of Australia. This is financed by grants from State Governments and universities and donations from local government bodies, various business organisations and private donations.

Valuable work has been carried out by the Water Research Foundation, but its activities are severely limited by shortage of funds.

Australia, the nation which needs even more than others, full information on water resources, spends less than others on research.

Commenting on this position, the chairman of the Water Research Foundation, Mr. J. G. Beale, M.L.A.—N.S.W. Minister for Conservation—said in presenting the annual report for the year ending June 30, 1965:

"The control of water is vital in so many parts of our country. For example, recently and simultaneously floods caused damage in one area while water flowed to waste in another area and drought caused losses in yet another area... It is astounding how little is being put into research, particularly water research, in comparison with the huge cost of the present $200 million drought loss."
"Australia spends little of its national income on research—only 0.7 per cent. This compares with 2 per cent in Great Britain and 3 per cent in the U.S.A. and the U.S.S.R." (my emphasis, W.M.).

[Since this article was written, Professor J. W. Green has resigned his post as head of the Department of Nuclear and Radiation Chemistry, University of N.S.W., to take up an appointment in the U.S.]

His reason: He could not get $100,000 for equipment to carry on his vital work of charting Australia’s major underground water resources by the use of radio-active isotopes.]

The chief immediate sufferers of a prolonged drought are the farmers on small holdings, the shearsers, shed and station workers, as well as some in the service of industries.

Any crash program should be slanted to provide work for all these people to avoid more serious hardship.

The labor movement has not yet, except in very few cases, given consideration to the drought question. Country people are becoming more aware that city workers organised in the trade unions are their natural allies whose aid is essential if a worth-while anti-drought plan is to be worked out and implemented. Such implementation means that much money must be spent.

The provision of finance is a Federal Government responsibility.

Money for immediate relief for country workers and farmers for the carrying out of a crash program of dam building, bore sinking and rain making, for financing the erection of fodder reserves and necessary transport, for the construction of major water storages and for extensive plant research must be provided by the Federal Treasury.

But there are ample signs that the Federal Treasury is not thinking along these lines.

The national newspaper “The Australian” reported (13/5/66) that the Federal Government “is certain to reject a New South Wales bid for $500 million in Commonwealth aid for water conservation.”

According to “The Australian”, senior Treasury officials said the project was “a political pipedream which paid scant attention to hard economic facts.”
Thirty years ago, in July 1936, the fascist rebellion against the democratically-elected Spanish Government began. The decisive victory of the Popular Front in the February elections of that year expressed the Spanish people's demand for long-overdue social reforms. But the Spanish landlords and aristocrats, with the full support of Hitler and Mussolini, set out by force to flout this decision. After two-and-a-half years of heroic resistance, the Spanish people succumbed before overwhelming military forces, Spain was plunged into darkness, and the door unlocked to the even bigger tragedy of World War II.
There are parallels between what happened in Spain in the thirties with what is happening in Vietnam today. A victory for the Spanish people, a setback for the fascist powers and their accomplices, could have had a profound effect on world events since then. The struggle of the Vietnamese people today against the aggression of American imperialism and its allies, the outcome of that struggle, could also have a decisive effect on war and peace, on the shape of the world to come. As in Spain, the whole world again is involved.