

**Colin Malcolm Donald: 1910-1985**

Written by Walter R. Stern

Colin Donald was Waite Professor of Agronomy at the University of Adelaide from 1954 to 1973, succeeding Professor H.C. Trumble, the first Professor of Agronomy in Australia. Previously he had been with CSIRO. Between 1934 and 1940 he was stationed at the Waite Agricultural Research Institute in Adelaide working on mineral deficiencies in pastures and strain evaluation in subterranean clover. Between 1942 and 1954 he worked on a wide range of problems at the Division of Plant Industry in Canberra. He became Assistant Chief of the Division and left his mark on the field work CSIRO was conducting at the time, and on the research scientists in the Division.

During 1941 and 1942, he held a Pawlett Scholarship of the University of Sydney and studied in the United States of America, Britain and New Zealand. His sojourn in Professor J.E. Weaver’s laboratory at Nebraska stimulated his thinking on competition and had a lasting influence. His meeting in Britain with George Stapleton and William Davies stimulated his thinking about the role of forage legumes and the use of nitrogen fertilizer on pastures; in New Zealand his contact with Bruce Levy furthered his interest in management and ecology.

Prof. Donald wrote extensively on various aspects of crop and pasture growth. He wrote well, with enjoyment and always presented a positive side of his topic. Perhaps one of his most widely read publications was “Pastures and Pasture Research” first published in 1941 by the University of Sydney. Originally delivered as a series of lectures at the university, they were revised and reprinted several times and for many years served as a reference for pasture agronomists around Australia.

Of the most widely cited contributions, the following deserve mention. The article in the Advances in Agronomy in 1963 “Competition among Crops and Pasture Plants,” was based on a series of lectures given at Cornell University during study leave. It has been compulsory reading for many students and is still widely quoted. The 1964 Farrer Memorial Oration “The progress of Australian agriculture and the role of pastures in environmental change,” which appeared in the Aust. J. Sci (1965) 27: 187-198, and the chapter on “Innovations in Australian agriculture,” which appeared in D.B. Williams (1981) “Agriculture in the Australian Economy” (pp 57-86), develop the same line of thinking. They give a wide ranging account of the role of pastures in Australian agriculture and put in perspective the development of farming in southern Australia.

Prof. Donald will probably be remembered, most of all, for his introduction of the concept of the ideotype. First proposed at the 3rdInternational Wheat Genetics Symposium in Canberra in 1968, it was received coolly by cereal breeders at the time. The arguments that ensued lead Donald to embark on a breeding programme which he carried on into his retirement and culminated in the publication in 1979 of the paper “A barley breeding programme based on ideotype” (J. Agric. Sci. Camb. 93: 261-69). Nowadays, the word ideotype is accepted in the vocabulary of breeders/agronomists, alongside genotype and phenotpype and appears regularly in the literature.

As well as his contributions in scientific journals, Donald wrote many review articles. These were like a breath of fresh air in the literature. They not only put work in perspective but they contained a significant element of original thought; they were invariably well written and therefore were widely read. In this respect his writing will stand the test of time and his influence has extended beyond his lifetime and beyond Australia.

In 1964 he took the initiative that led to the establishment of the A. W. Howard Memorial Trust. The aims of the Trust were firstly to commemorate the pioneering work on subterranean clover by Amos Howard, a farmer near Littlehampton, South Australia, and secondly to establish a fund to advance pasture development in Australia and particularly to help young pasture research workers. The Trust has been successful in meeting these objectives.

He had a warm personality. Any account of Colin Donald would not be complete without reference to his relationship with his postgraduate students during his years at the Waite Institute. He had a continuous succession of students of many different backgrounds. Although he was under considerable time pressure, he gave as much of himself as time permitted, and imparted something of his way of seeing things and thinking about agronomic problems. Many have gone on to successful careers of their own and they would readily attribute some of their success to Donald’s influence in shaping their attitudes and outlook.

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[](https://www.science.org.au/fellowship/fellows/biographical-memoirs/colin-malcolm-donald-1910-1985)

Colin Malcolm Donald 1910-1985  
Biographical Memoirs of a Fellow

Written by [R. Knight and J.P. Quirk](https://www.science.org.au/fellowship/fellows/biographical-memoirs/colin-malcolm-donald-1910-1985#knight).

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Introduction

Colin Malcolm Donald was born in Colchester in England on 21 March 1910, the son of a retired army Colonel. He had one sister and four brothers of whom two had careers in the army, one was a Professor of Medicine at Edinburgh University and one a forester. He spent his childhood with his parents on a small farming property and received his early education at Dover County School.

In 1926 he came to Australia as a boy migrant, under the Wembley Scheme, to Hawkesbury Agricultural College in New South Wales. The scholarship was for one year but he did so well that he continued for a second year and received a Diploma of Agriculture with first class honours. He won a scholarship to the University of Sydney and four years later graduated Bachelor of Agricultural Science, again with first class honours. While at Sydney University he met his future wife Margaret Voysey through a cousin who was also studying Agricultural Science. They were married in 1935.

Early research

As a young graduate in 1932, Colin Donald was appointed as an agrostologist to the New South Wales Department of Agriculture. However, a vacancy occurred in the CSIR Pasture Research Group, then located in the Department of Agronomy at the Waite Agricultural Research Institute, and in 1934 he moved to Adelaide. There, he worked initially on strain variation in subterranean clover*(Trifolium subterraneum L),*prairie grass *(Bromus uniloides HB & K)*and strawberry clover *(Trifolium fragiferum L),*and the soil and environmental factors that affected the distribution of different strains. These species are not indigenous to Australia and this caused him to wonder about their variation in their overseas centres of diversity in the Mediterranean region. Some of this research was carried out in collaboration with C. Neal Smith. In separate expeditions, and over a decade later, both were to play a major part in collecting and introducing pasture species from Mediterranean countries to Australia.

In the late 1930s Colin Donald was also interested in the mineral nutrition of pastures and worked with Professor H.C. Trumble (the Waite Professor of Agriculture) on phosphorus and David Riceman (CSIR) on trace elements. With Riceman he made the first discovery in Australia of a trace element deficiency of pastures. This was the copper deficiency that occurred in a region of calcareous soils near Robe in South Australia. The deficiency causes 'coast disease' in sheep. Although it was first recognized because of the symptoms in sheep, farmers of the region were unable to grow leguminous pastures or cereal crops and this alerted Donald and Riceman to the fact that the copper deficiency was affecting the growth of many species of plants as well. They found that supplying copper alone did not overcome all the problems and, in collaboration with C. Piper, established that there was an associated zinc deficiency. When these two elements were provided, there was a spectacular response in plant growth and the sheep disease was overcome. These discoveries led them to undertake many multi-factorial field experiments with trace elements.

In 1939 Colin Donald submitted four of his papers to the University of Adelaide to meet the requirements for the degree of Master of Agricultural Science. Two were concerned with strain variation, one with the response of pastures to phosphorus and the fourth was the discovery of the copper deficiency causing the disease of sheep.

Donald's interest in pasture nutrition, which began in the 1930s, was long-standing, and focused especially on the combined effect of phosphate and subterranean clover in increasing the productivity of pastures. It was a subject to which he returned on several occasions in his own research and later with post-graduate students. He drew attention to the effect of this combination on soil fertility, the magnitude of the contribution from the clover's nitrogen fixation to millions of hectares of southern Australia, and the increase in yields of the cereal crops that followed. The historical trends, which he highlighted with the diagram reproduced as Figure 1, have been the subject of several reviews.

[](https://www.science.org.au/files/userfiles/fellowship/memoirs/images/DONFIG.JPG)

Figure : click on this image to see a larger version.

In important studies undertaken with C.H. Williams in the early 1950s on podsolized soils in eastern Australia, he also showed that the clover's requirement for sulphur was being only partially met by the sulphur present in superphosphate fertilisers and additionally that the soils under clover pastures fertilized regularly with superphosphate showed a progressive decline in pH with time. They suggested that an alternative source of sulphur should be considered. Both these matters subsequently have gained national significance. In Western Australia notably, but also elsewhere, farmers have been applying very high rates of superphosphate fertiliser to obtain good clover pastures. The high rates have led to run-off of phosphorus from the pastures to waterways and the occurrence of blue-green algal blooms with resultant environmental damage. Research in Western Australia has shown that good clover growth could be obtained with a lower level of phosphorus application if it were combined with timely applications of sulphur. The problem is most prevalent in Western Australia because of the sandy nature of the soils which readily permits leaching of sulphide. Elsewhere in Australia, and particularly in large areas of New South Wales and Victoria, the soil acidification resulting from long established clover pastures has led to problems of reduced cereal production which could only be ameliorated by expensive applications of lime.

In 1958, Donald co-authored a review paper in *Advances in Agronomy* with C.G. Stephens (CSIRO Division of Soils) on Australian soils and their response to fertilisers. Donald and Stephens had known each other from the early 1930s when both were working for CSIR accommodated in the Waite Institute. They remained close family friends. By 1958 both had had extensive experience of their respective fields; Stephens the pedology of Australian soils and Donald fertilisers and plant growth. Their review drew the attention of a large number of overseas workers to the origin of the soils of Australia, many of which were of great antiquity and had severe nutritional deficiencies for plant growth. These latter soils occurred over extensive areas and 'were considered almost sterile and worthless'. However, by applying superphosphate and trace elements and fostering subterranean clover, 'They are now being converted to soils of satisfactory productivity by what is possibly the most extensive fertility-building program in the world'.

Being aware of this, Donald was concerned not only with the nutritional effect of phosphorus but with Australia's phosphatic resources and requirements and the government bounties that affected the cost and use by farmers of phosphatic fertilisers. Many papers were published in Australian and overseas journals over a thirty-year period – the last was in 1969, on the Northern Territory – on the contribution to the national economy of a pasture fertilized with phosphorus.

During 1939 Colin Donald was awarded a Pawlett travelling scholarship from the University of Sydney to study pastures in Britain, the USA and New Zealand. It was a study tour severely affected by the outbreak of war. However it did provide him with personal insight into pastures in these countries and he was able to compare them with those he knew so well in Australia. He lectured on the subject on his return and wrote a small book based on his lectures, published in 1941 by Sydney University Press, entitled*Pastures and Pasture Research.*For many years it was essential reading for anyone wishing to understand and compare the pastures of southern Australia with those of temperate Europe and the USA, where most of the previous work had been done. Writing the book was for Donald an introduction to a form of writing different from the concise phrasing of the scientific papers he had written previously. It shows he had a flair for this type of communication at an early stage of his career. It has several most apt quotations. One deals with a proposed Eleventh Commandment, an oversight of Moses. It was first suggested by a person who had witnessed soil degradation in the Middle East and in America. The Commandment deals with soil and water and the protection of forests, and could be as much a stricture today for proponents of sustainable agriculture as it was fifty years ago. While in America, Donald met J.E. Weaver of Nebraska who had studied the habit and size of individual plants growing in communities and therefore in competition with each other for resources. It was a meeting that was greatly to influence Donald's interest in plant competition and the growth of plants in communities.

Division of Plant Industry

On his return to Australia in 1941 Donald moved from Adelaide to the CSIR Division of Plant Industry in Canberra. During the war years, from 1942 to 1945, he was seconded to the Department of War Organization of Industry, at first with J.G. (later Sir John) Crawford in Sydney and then as Assistant Director of the Department in charge of the Rural Industries Division in Melbourne. His contact with Crawford was to be influential at a later time when the role of Australian scientists in agricultural development in the countries of South-East Asia was being considered. At the end of the war, in 1945, Donald returned to the Division of Plant Industry and became Assistant Chief of Division, responsible for pasture work right across southern Australia.

During this period, Donald carried out research on competition among annual pasture plants that has become classical. In the Mediterranean type of environment of southern Australia, seeds germinate in the autumn, plants grow during the winter and set seed before dying in the summer. The repetitive cycle depends on the reproductive capacity of the species involved. He was aware that many annual pasture species such as annual ryegrass, barley grass, subterranean clover and the annual medics were capable of high seed production in this environment. He was interested in the dynamics of competition that occurred when all the seeds germinated in the autumn and progressively formed a competing sward of plants. There could be as many as 60,000 plants per sq m. The interpretation of this competition that Donald was able to provide with his clear analytical mind was based on careful quantitative analyses. One seminal paper was published in 1951. It was followed by another in 1954 in which Donald drew attention to the inverse relationship between yield per unit area and yield per plant. These papers were classics and inspired much subsequent work, particularly in Japan and the United Kingdom. He highlighted the fact that to achieve rapid growth of a pasture in the autumn, plants needed to be at a very high density – so high a density, in fact, that each plant suffered intense competition. As a result, individual plants in productive swards were far smaller than a plant growing at a low density in a less productive sward. These papers also illustrated that, later in the year, seed yields rose with density to an optimum, beyond which seed yields would fall with further increases in density. In contrast, biomass rose with increasing density to a point where further increases were slight or the relationship reached a plateau. Donald suggested that light was the principal factor limiting growth when nutrients and water were present in sufficient amounts. This was not the first time he had drawn attention to the importance of competition for light, as he had discussed its significance in his book published in 1941. Then, however, he had referred mainly to interspecific competition such as occurred between a clover and a grass species in a mixed sward, whereas now he more fully considered intraspecific competition. This led in the late 1950s and early 1960s to his consideration along with colleagues and students, mainly J.N. Black and W.R. Stern, of the optimal leaf area of growing pastures and the concept that with increasing leaf area and progressive canopy closure, the lower leaves were shaded and a balance developed between the upper exposed leaves and the lower shaded leaves of the canopy. Although these initial studies were with pastures, Donald was later to apply similar analyses to competition among plants in grain crops.

During the late 1940s and the 1950s, Colin Donald's thinking about the appropriate species to grow in pastures was influenced by the research he had seen at the Welsh Plant Breeding Station, Aberystwyth, Wales. The results of this work had dominated the literature on pastures before the Second World War. It emphasized the part played by perennials in providing stability of production, preventing erosion and the infestation of weeds. Although carried out in Britain, it was claimed by its protagonists to have general applicability to pastures. From his own work, however, Donald was aware of the role in Australian pastures of plants of Mediterranean origin, many of which were annuals such as subterranean clover, strawberry clover, annual medics and annual ryegrass. The introduction of these species to Australia until that time had been largely accidental. In 1951, Donald led the first Australian plant-collecting expedition to the Mediterranean countries and with J.F. Miles collected extensively in North Africa. The expedition was co-sponsored by FAO. It was the forerunner of many other collecting expeditions that have followed. His collection, together with other material collected by C. Neal Smith in 1954, was the foundation of several large research programmes in CSIRO, the universities and state Departments of Agriculture carried out during the late '50s and the '60s. They resulted in many new cultivars. In retrospect these programmes were far more successful with annual than perennial species. Although many perennial pasture species were found in the Mediterranean countries, they survived as scattered plants often in protected areas. When the species were sown at densities appropriate to a pasture in Australia and constantly grazed as is the practice of Australian farmers, the plants thinned out during the first summer and were not capable of the high yields obtained from annual pastures that persisted through the summer as dormant seed at a high density. In general, only where the environment favoured plant growth for nine or more months of the year could perennials survive at a sufficiently high density to be as productive as annuals. This took some time to demonstrate, but was fairly well defined by the late 1960s by persons working with Colin Donald.

The Waite Institute years

In 1954, in succession to H.C. Trumble, Colin Donald was appointed the Waite Professor of Agriculture and Head of the Department of Agronomy at the Waite Agricultural Research Institute in the University of Adelaide. It was a position he held until his retirement in 1973, during a period of very rapid expansion of academic staff and post-graduate student numbers. For some time during the '60s his department was the largest single-chair department in the University of Adelaide, with seventeen persons with academic status. He rebuilt the plant breeding group and fostered sections concerned with crop nutrition, animal nutrition and pasture utilisation, as well as supporting the strong core theme of agronomy and crop physiology. As a result of his farming background, his tertiary education at Hawkesbury College and the University of Sydney, his research in a state Department of Agriculture, CSIRO and the University and his perceptive intellect, he was able to make significant intellectual contributions to all sections of the Department. Understandably, his personal research and major interactions were with those staff concerned with plant competition and crop nutrition.

Within a few years of his arrival at the Waite Institute and the necessary expansion of his interests to crops as well as pastures he began applying his knowledge to competition among crop plants, notably in wheat or barley crops. In 1961 he wrote a review on competition for light in crops and pastures, and in 1963 another in which he considered all aspects of competition. It was the latter review of 118 pages in *Advances in Agronomy*that brought world-wide recognition of his clear exposition of the factors that influenced yields of plants when grown at the high densities of our commercial crops and pastures. This review arose out of a series of lectures he gave at Cornell University during a sabbatical leave. It emphasized, as had his earlier work on pasture plants, that the individual plants in a crop were severely limited in size and were often less than one-tenth the size of plants grown more widely spaced. But to obtain maximal yields per unit area, dense crops were needed. During the sabbatical in the United States, he saw the development of single-stalk maize crops producing single cobs under a high-nitrogen fertiliser regime and he was able to contribute to discussions of plant competition and growth.

In 1962 Donald was awarded the degree of Doctor of Science in Agriculture by the University of Sydney for his collected papers on 'Studies of the growth and ecology of pastures'. The collection had three main parts: pasture species in southern Australia, plant-soil interrelationships, and competition in pasture plants.

Colin Donald was aware that the person who had first encouraged farmers to grow subterranean clover in Australia was a farmer, Amos William Howard, who had lived at Littlehampton in the hills above Adelaide and had died in 1930. Donald had been curious about Howard and what had first caused him to recognize the merits of subterranean clover and to popularize its cultivation. Howard had found subterranean clover growing naturally on his property. It had probably arrived there as a contaminant in imported hay, as the plant is not indigenous to Australia but occurs extensively in the Mediterranean region. Howard had seen how its presence improved the productivity of his pastures. He wrote about its merits in the press and did everything he could to foster its adoption by other farmers. Howard's task had not been simple for, as the plant's name suggests, the seeds borne by the plant are subterranean and this presents difficulties to anyone wishing to harvest them. In 1963 Colin Donald suggested to the Australian Institute of Agricultural Science that Howard's name should be commemorated by a trust bearing his name. The Trust would disburse funds for research that would relate to the development, management and use of pastures. A public appeal for funds was launched and the Howard Memorial Trust came into being. It continues to be highly successful and more than a hundred research workers in Australia have had the benefit of its Fellowships since its inception.

Donald's ideas on competition led him to develop in 1968 the concept of the ideotype. This was a term he coined to be analogous to phenotype and genotype and which described an 'ideal' type. The concept was first introduced at the third International Wheat Genetics Symposium held in Canberra in 1968 and was received coolly by cereal breeders at the time. He believed it was possible to define a set of characters – the ideotype – which a crop or pasture plant should have if it were to perform well in the dense communities used by farmers when cultivating crops (see Figure 2).

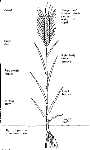
[](https://www.science.org.au/files/userfiles/fellowship/memoirs/images/DONFIG2.JPG)

Figure : The Design of a Wheat Ideotype. Click on this image to see a larger version.

He had noticed that cereal plants, early in the growing season, develop many tillers (branches), not all of which become culms and bear a head of grain at the end of the season. One of the characters of his cereal ideotype was that the plant should not tiller. He regarded the non-bearing tillers as a waste of resources and suggested that if uniculm plants could be produced by breeding, collectively they should be capable of a higher yield per unit area when grown at an appropriate density. The uniculm character, in conjunction with other characters, was the ideotype he proposed for wheat and barley. He suggested that the methods used by conventional plant breeders, when selecting for yield, would not select uniculms and were therefore inefficient in selecting plants that would give high yields in dense communities. For some years after his retirement, Donald worked on a programme to breed a cultivar of barley that conformed to his ideotype. He published one paper on this in 1979 but unfortunately ill-health terminated the work before there was any definitive outcome and comparisons with conventionally-bred cultivars of barley. His concept has remained contentious among breeders, many of whom believe the small loss of resources is not significant in relation to other issues such as the need for a higher seeding rate when sowing a uniculm. They also believe that an ability to tiller provides a plant with a degree of resilience or opportunism, given that growing seasons differ in their duration. They accept that if the growing season is abruptly terminated by dry weather, many tillers will die before they develop grain, but argue that if the season is prolonged, late tillers will develop grain. In 1991, a special issue of*Field Crops Research*(volume 26, part 2) was devoted to a review of the ideotype concept and touched on some of the aspects mentioned and evaluated its applicability to a wide range of crop and pasture plants. The term 'ideotype' that Colin Donald coined for desirable plant characters has earned him a lasting place in the international literature in crop science.

One of the other characters that occurs in Donald's ideotype for cereals is that they should have a high harvest index, by which he meant that the grain should represent a high proportion of the above-ground biomass at the time of harvest. In simple terms, there should be a lot of grain relative to the straw, which is not usually an economic product. The use of such an index was not new; it had been proposed by Bevan in 1914 and Niciporovic in 1956. Whereas Bevan thought the material in the grain was the result of transmission from the rest of the plant, more recent research had shown that a large proportion of it is the result of photosynthesis in the head itself. The consideration of photosynthesis in communities and competition among plants for light, and the idea that the lower parts of a plant could be a drain on the photosynthesis resources of other parts of the plant, were all part of Colin Donald's ideas on plants growing in communities. It was natural that a notion such as harvest index, despite its simple evaluation of a complex set of circumstances, should attract his attention. He believed that plant breeders should select those plants in their segregating populations that had a high harvest index. Again, as with the uniculm, the matter was contentious. Breeders did not deny that modern cultivars of wheat, barley and oats had a higher harvest index than cultivars produced 50-60 years before, but they were not prepared to accept the proposed physiological interpretation of this change. They had, after all, been breeding plants of shorter stature during that period to overcome lodging, which is the laying over of the crop that occurs near harvest if it is exposed to excessive wind and rain. Shorter crops were likely to have a higher ratio of grain to straw.

Colin Donald was very much a father figure in the department he led, with nearly all his staff being much younger in age, members of the expansion of the University in the 1950s. He was highly respected for his clear analytical mind, breadth of experience and ready wit. This wit always lay beneath the surface and could emerge even in the most serious moments of a university committee meeting. When an academic argued the value of assaying for weed seeds the filtrate coming from the Murray River's input to Adelaide's metropolitan water supply, notorious for its poor potability, Donald remarked that he thought the only objects filtered out by the Engineering and Water Supply Authority were the dead sheep.

During his busy period as the Waite Professor of Agriculture, Colin Donald only found time to write during the weekends. It was then he wrote several review papers that are notable for their insights and clarity and remain classics today. He encouraged his staff to publish, and would say to many that if they wrote just one sentence a day they would improve their rate of publication. No matter how busy he was, if asked to do so he would edit papers in a critically constructive way. Some were at first affronted by his suggested changes to their creations but they quickly realised that he had an exceptional flair for concise exposition of scientific subjects. Any paper he reviewed was unlikely to be rejected by a journal on editorial grounds.

Colin Donald was influential in several overseas programmes. In 1958, four years after his appointment as the Waite Professor of Agriculture, he was asked by the Bovril Company of the UK to provide an agronomist and to advise on pasture development for beef production in South America, especially Argentina. In 1959, he advised on pasture development in Sri Lanka during part of a study leave in that country. During the 1960s, several influential Australian agricultural scientists and economists suggested that Australia should be making a contribution to the agricultural development of the less developed countries of South-East Asia. In 1963 Donald led a mission to Indonesia and in 1965 he surveyed agricultural faculties in Malaysia, Thailand and the Philippines for the Department of External Affairs. The recommendations of these missions led ultimately to the formation in 1969 of the Australian-Asian Universities Cooperation Scheme (AAUCS) which became the Australian Universities International Development Program (AUIDP) and then the International Development Program (IDP) of Australian Universities and Colleges. The delay between the missions and the implementation of the scheme was due to the political unrest that occurred in the region during the mid-'60s. The aim of the scheme was to foster agricultural development through the upgrading of the agricultural faculties and staffs of South-East Asian universities. The initial co-operation was in agriculture and demography as food production and population numbers were vitally important to these countries, but it later expanded and now covers all faculties of the universities. The missions realised that Australian aid was unlikely to be successful if targeted directly at farmers of the region. They were too numerous and there were cultural and language barriers to communication. On the other hand, if Australian scientists became involved with the academic and research communities of the countries in question and helped in their upgrading through higher degrees and specific courses, there would be a filter-down effect that would eventually improve farming practice. This has proved to be the case. Because of his own commitment, Colin Donald was strongly supportive of his staff who became involved in the programme in South-East Asia, and at an early stage he acted as supervisor to post-graduate students from the region. One of these, the late Professor Soetono of Brawijaya University in Java, developed some of the attributes possessed by Colin Donald and had a profound influence on agriculture development in east Java. From 1969 up to his retirement in 1973, Colin Donald was on the Standing Committee of the Australian-Asian Universities Cooperation Scheme. He hoped that after his retirement he would be able to be more deeply involved in AAUCS and overseas aid programmes, but regrettably this did not occur.

Donald served on many committees during the 1960s and 1970s. The most notable of these were the Advisory Council of CSIRO (1961-66), the Australian Research Grants Committee (1967-73) and the Wheat Industry Research Council (1973-75).

In 1961, Colin Donald was appointed a Fellow of the Australian Institute of Agricultural Science and in 1962 he was president of the Australian and New Zealand Association for the Advancement of Science (ANZAAS). He was a member of the Australian delegation to the United Nations conference on the application of science and technology in the less developed countries, held at Geneva in 1963. He was awarded the Farrer Memorial Medal in 1964 for outstanding service to Australian agriculture, and was elected a Fellow of the Australian Academy of Science in 1968. In 1984 the Australian Society of Agronomy, to commemorate him, instituted the C.M. Donald Medal which is awarded to persons who have made major contributions to agronomic research in Australia. One of the recipients described Colin Donald as the ideotype of an agronomist, a person with the ideal attributes and characters for agronomic investigation.

In 1979, Colin Donald was appointed by Her Majesty the Queen as a Commander of the British Empire.

On 13 March 1985, at the age of 75, Professor Donald died in Adelaide. He had profoundly influenced pasture development in Australia by understanding the limitations to pasture growth imposed by soils and environment, and had advanced our understanding of competition between plants when grown in communities. Because of his open nature and friendly disposition, he inspired many young researchers in agricultural science. He is the first agronomist elected to the Australian Academy of Science.

About this memoir

This memoir was originally published in *Historical Records of Australian Science*, vol.10, no.1, 1994. It was written by R. Knight, Waite Campus, University of Adelaide; and J.P. Quirk, Nedlands, Western Australia.