In Response to Need

A History of the Western Australian Department of Agriculture – 1894 to 2008

EN Fitzpatrick
About the author

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A farmer's son, Noel Fitzpatrick was born in the eastern wheatbelt town of Narembeen in 1929. He completed his primary education at a one-teacher, eleven-student school. Having won a scholarship, he completed his secondary education at Northam High School. He graduated with a BSc in Agriculture from the University of Western Australia in 1951 and joined the Department of Agriculture. He was awarded a MSc(Agric) degree in 1957.

Noel worked for 12 years on problems of pasture nutrition and legume establishment in the higher rainfall districts and the South Coast. In 1963 he moved to administration as the first Scientific Liaison Officer. He was appointed Deputy Director in 1969 and Director of Agriculture in 1971.

In 1984 he became Deputy Secretary of the Commonwealth Department of Primary Industry. A highlight of this period was the establishment of the Bureau of Rural Science. In 1988 he was invited to become the first President of the Murray-Darling Basin Commission, a position he held until he retired in 1994.

He is a Member of the Order of Australia, a Fellow of the Academy of Applied Science and Engineering, a Fellow and Medallist of the Australian Institute of Agricultural Science and Technology. He was awarded the Farrer Medal in 1995 and inducted into the Royal Agricultural Society's Hall of Fame in 2006. A sidelight of his career was being one of the three people who organised a successful salary appeal in 1963 which resulted in a major increase in the salaries of agricultural scientists across Australia.
Acknowledgments

I have not used many names in the book because an organisation of the size of the Department of Agriculture had to be a team to function properly. The technicians, laboratory assistants, instructors, inspectors, clerks in their many roles, typists, mechanics, and men in grey cardigans who knew where everything was, all made the organisation function, yet can only be recognised as unsung heroes.

My primary reference has been the annual reports and other publications of the bureau and department. Where these were not published in the first years when it was part of the Lands Department, details were obtained from the records of Parliamentary Proceedings.

I have also had the benefit of discussions with serving and retired officers and of some editing by officers more expert than I could hope to be. I am very grateful for all the assistance I have received. I must also thank the library staff for their assistance. However, the errors which will be found in the text are my responsibility and I apologise for them.

Note: The units of measurement have been generally those used at the time being discussed with metric conversions included for clarity. In other cases only the metric units are used, particularly when discussing money, to make the values easier for younger readers to understand.

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Introduction

The Department of Agriculture in mid-2008 was an organisation of some 1650 people employed in five Perth Metropolitan Area locations, 22 regional rural offices, 13 Community Advisory Centres and 13 District Agricultural Protection offices. It also controlled 14 research stations and had research centres at Bunbury, Albany, Esperance, Katanning, Northam, Merredin, Geraldton and Kununurra. In addition there were quarantine checkpoints at Eucla and Kununurra and quarantine stockyards at Halls Creek and Parkston.

The department was not always such a significant organisation; it came from very small beginnings. However, it has been a major component of the engine which has produced an agricultural industry in a Mediterranean climate zone which is superior to all others operating in this zone. This book is a summary of its work.

There are many more fascinating chapters to be recorded of work on specific issues of development, investigation or conservation. I hope they will be written by someone one day. With this in mind the department has decided to put the book on a web page where further chapters can be added by other authors to produce a more complete history.

Western Australia’s modern agriculture has been built in a little more than 100 years on the foundation of a hard-working and innovative farming community aided by advances in science and engineering. These innovative hard-working men and women established a tradition for innovation and seeking new ideas which has been followed by their sons, daughters, grandsons, granddaughters, great grandsons and great granddaughters who have always been ready to adopt new ideas or innovations.

Science and engineering have been essential components of this development because there are few, if any, parts of the world where science and engineering have been as important in the development of modern agriculture as in Western Australia. Engineering kicked in to help from the mid-1800s and from about 1900 science started to help, but its real contribution came after 1920.

The department has played a vital part in this development since its establishment in 1894. Before World War II, it was the only significant agricultural research organisation in WA. The University of Western Australia developed in the post-war years, as did CSIRO. The organisation was initially established as the Bureau of Agriculture with an independent board, but became a department four years later.

In the very early days the Department of Agriculture’s role was largely to distil and distribute information from around Australia and overseas and to maintain a barrier at ports of entry against the incursion of unwanted pests, weeds or diseases of plants and animals. However it also had a range of other roles in rural areas.

At various times it provided finance to farmers who started up without significant resources, built dams (earth tanks) for water reserves, cleared roads in new farming areas, and cleared heavily vegetated areas with stationary steam engines.

It was also charged with the maintenance of the rabbit-proof fence and the control of rabbits that got past that barrier. In the Perth Metropolitan Area and some country towns it variously maintained the State cold storage works, abattoirs, butter factories, a horse breeding operation for the State public service, a farm to provide meat for government meat outlets in the city, and central stables for government departments.

Its research capacity developed very slowly until the 1920s, when trained graduate staff, many trained under an innovative cadetship scheme, became available.
At the beginning of the Colony of Western Australia in 1829 the first challenge was to produce enough food to maintain the small population. Agriculture was very important because the cost of imports was very high. History shows that dairying, poultry and pig industries were very slow to develop.

Wheat production also developed slowly until 1904, with the last wheat imported to WA in 1910. In the early days the cost of production of wheat was estimated at 10 shillings ($1) a bushel (equivalent to 60 pounds or 27.2 kilograms). Fourteen shillings ($1.40) per bushel was the normal price. However, when a shortage developed the price reached 40 shillings ($4) per bushel.

Sheep grazing on the shrublands of the Gascoyne, Murchison and Pilbara, and cattle grazing on the grasslands of the Kimberley were important industries. The horticultural industries developed quite well along European lines.

During the latter part of the 19th century major changes were taking place in South Australia and Victoria with the development of machines for grain production. These are dealt with in some detail later. It is enough here to say that the Ridley stripper, the stump-jump plough, the harvester and the manufacture of superphosphate were all fundamental to the development of agriculture in WA in the early days. These inventions and further developments in the early 1900s and through the 20th century made possible an extensive agriculture which is the hallmark of WA agriculture today. However, without major contributions from science and engineering this promise would not have been realised.

It is remarkable that after 5000 years such major changes were made in a period of 150 years. Unfortunately the work of the department has not always been fully appreciated by either the farming community or the government. This latter attitude is reflected in the falling funding from State sources over the past 20 years.

I believe the Department of Agriculture has been an outstanding organisation. I was privileged to lead it from 1971 to early 1984. I undertook the task of writing this history because I also believed that its contribution should be recorded.

To some degree the work has been a labour of love. I must thank the then Director General, Ian Longson, for inviting me to write this history and the current Director General, Rob Delane, for approving its completion and publication.

The book is dedicated to those men and women, four of whom were my grandparents, who pioneered this harsh environment through drought, flood and fire and to the scientists and engineers who made it possible.
Chapter 1

1894 to 2008: one hundred and fourteen years in summary

Agriculture in Western Australia had a very slow beginning. In 1890, 60 years after European settlement, there were only 50,000 hectares cleared of the 2.2 million hectares which had been allocated for farming. The area sown to wheat was 14,000 hectares, which produced 13,000 tonnes—less than a tonne per hectare. A similar area would have been sown for hay. Farming areas were restricted largely to soils which gave some production without the addition of artificial fertiliser. There was little evidence of machinery use such as the stripper and the stump-jump plough, or of superphosphate.

Important advances followed the first combined conference of pastoralists, agriculturists and fruit grower associations in April 1893. A major request was for the establishment of a Bureau of Agriculture, to which the Premier, Sir John Forrest, agreed in 1894.

Some of the bureau’s main aims on establishment were to:
- establish experiment stations throughout the Colony and quickly disseminate the results of work done there to the community
- import new crop varieties, fruit trees and fodder plants
- prevent the introduction of noxious weeds and eradicate weed species
- encourage the introduction of new mechanical appliances and carry out field trials to demonstrate their use.

Land was surveyed for agricultural development in about 40 locations from Northampton to Albany and from Jandakot to Southern Cross in the decade following 1889.

Railways had a marked impact on where agriculture could be developed. As the easily-won gold was exhausted and the Government opened land along the railway lines for settlement, many miners turned to farming. The new land also attracted settlers from the city. However, these new farmers generally had little knowledge of farming, little equipment and often few other resources. The bureau became a major agency for providing advice and assistance.

The bureau was gazetted in January 1894 and almost immediately published a fortnightly journal “in order to place it in direct and frequent contact with the agriculturists”. In the first six months more than 16,000 copies were distributed.

A major activity was inspections under the Insect and Destructive Substances Act. A new Insect Control Act was passed in the following year, 1895. With few staff, activities were largely limited to inspection of ports and orchards under this Act.

Other early activities of the bureau:
- Viticultural and horticultural expert, Adrian Despeissis, came from the NSW Department of Agriculture and prepared a book of 350 pages on horticulture and viticulture.
- The bureau imported seeds of a range of crops and fodder plants for possible use.
- The first field station was established at Hamel in 1898 and used for testing introduced fodder crops, potato and cereal varieties. The first certified virus-free potato seed was produced there.
- The bureau attempted, but failed, to eradicate Mediterranean fruit fly.
Bureau becomes a department

The bureau became the Department of Agriculture in 1898, when it was placed under the control of the Minister for Lands, Forests and Agriculture. Over the next decade the staff increased gradually, as did its responsibilities.

In 1902 the State Government decided to build a rabbit-proof fence, following reports that rabbits had reached Eucla. The work was started by the department, but following a dispute over a contract, was transferred to the Public Works Department. Maintenance of the fence was a major undertaking for the department for many years.

In 1902 the Chief Rabbit Inspector and six other inspectors were transferred to the department along with the Chief Veterinarian and his assistant, and a number of stock inspectors.

The Chapman State Farm and the Narrogin Experiment Farm were established in 1903. In 1906 land in the Brunswick area was vested in the department “for the purpose of creating a Dairy Farm”. In 1907 the Nangeenan (Merredin) State Farm was transferred from the Lands Department to Agriculture. In 1913 the Commissioner for the South West was instructed by the government to establish a model dairy farm at Denmark.

In 1909 the department took on the responsibility of providing water supplies and road clearing in advance of settlement and as an aid to settlement in the new ‘outlying’ areas.

The clearing of land for cropping was slow and difficult before the advent of tractors and new machinery.

The department also provided initial capital to civil servants who were allocated blocks in the Tammin area.

In 1911 a new branch with eight stationary traction engines was established to pull trees.

In that dry year many settlers who had taken up land only a few years before, lost their crops, including their seed. The government decided to supply seed from the State farms, another major activity for the department.

Other activities were added to the department’s responsibilities. For example, it managed a project at Jigalong Station breeding horses for public service use. A farm at Yandanooka produced meat for city markets.
In 1910 the Minister decided that, because of the vast area, the diversity of agriculture and the multitude of problems facing the new settlers, it was appropriate to divide the work of the department and secure senior specialists in three distinct spheres. To meet this need he appointed three new Commissioners:

- Mr GL (George Lowe) Sutton as Commissioner for the Wheat Belt
- Mr JMB (James Millar Brook) Connor as Commissioner for the South West
- Mr JF (James Frederick) Moody as Commissioner for the Fruit Industries.

At the same time the expert staff was further strengthened by the appointment of a botanist and pathologist, two new veterinarians, and a sheep and wool instructor.

The reports of Sutton, Connor and Moody and their subsequent work, coupled with the increased professional capacity provided, resulted in a major shift in the work of the department. The arrangement appeared to work well, particularly for the wheatbelt where Sutton proved to be both innovative and decisive, and the problems and solutions were much clearer.

In 1912/13 the WA Government decided to establish an implement manufacturing factory, and gave the responsibility for its development to the Department of Agriculture.

In 1918 Sutton suggested that consideration be given to settlement east of Merredin, which was then regarded as the eastern margin of the wheatbelt. He went further and recommended that the department should develop a cadre of graduate agricultural scientists to advise potential settlers.

**The 1920s**

World War I finished in late 1918 and the settlement of ex-servicemen onto farms was a major post-war reconstruction initiative around Australia. In Western Australia some were settled in new districts while others were settled on farms created by the government buying up and subdividing large estates. Virtually all these properties were uncleared. Their development, coupled with the further expansion of existing properties, saw the State’s agricultural industry launched on another period of rapid expansion. This continued until the start of the Great Depression late in 1929.

Concerned at the continued large dairy imports, the State signed an agreement with the British Government in 1919 to develop dairy farms in the heavily timbered high rainfall districts of the South West. This was known as the Group Settlement Scheme and continued to the early 1930s. The department was heavily involved with its implementation, particularly in planning and pasture development.

In June 1921 the department Under Secretary HC Trethowen outlined a new policy. While the functions of the department were primarily advisory, educative and protective to the agricultural industries, an agricultural expert was to be appointed as permanent head and to employ a limited number of highly qualified technical officers “whose duties will keep them entirely in the field advising farmers”.

**GL Sutton, Director of Agriculture from 1921 to 1937. Sutton brought science to agriculture and established the department as a highly professional body.**
Despite expectations that the business functions would be transferred to another department to manage, the department retained the Metropolitan Abattoirs and Saleyards, Kalgoorlie Abattoir, the City Markets, Cold Stores and Butter Factories. GL Sutton was appointed Director of Agriculture in July 1921. He proceeded to appoint available graduates and to implement a cadetship scheme for training young men at university.

Sutton arranged for field officers to work closely with Agricultural Bank inspectors. He employed two veterinary graduates, one of whom was a veterinary pathologist. In 1922 he negotiated the return of the botanist and pathologist and his assistant. In general, Sutton took the first steps to establishing the department as a professional body. He also established the branch structure that would largely endure until the 1970s.

In 1923 a particularly serious animal health crisis occurred with an outbreak of rinderpest among dairy cattle. Through immediate and firm action the disease was successfully dealt with, to the great credit of the professional veterinarians on the ground at the time.

In 1923 a particularly serious animal health crisis occurred with an outbreak of rinderpest among dairy cattle. Through immediate and firm action the disease was successfully dealt with, to the great credit of the professional veterinarians on the ground at the time.

Sutton started the field service of the Department of Agriculture by posting four graduates and a diplomate to country towns as advisers. A viticulturist and an apiculturist were also appointed. Most future senior staff were appointed as graduates or cadets in the first five years of Sutton’s directorship.

The appointment of veterinary pathologist Bill Bennetts was a significant increase in the department’s research capacity. Bennetts had an outstanding career. Mr JF (John Francis) Filmer, was important in resolving nutritional problems of cattle in the Denmark area.

In order to improve the genetic base of the dairy industry the government enacted the Dairy Cattle Improvement Act in the mid-1920s.

Mr HJ Hughes was appointed as the first Principal of Muresk Agricultural College in November 1925 and took over management of the development of the college, which opened in 1926.

A special development, starting in 1924, was an arrangement for officers to give talks every second Monday on radio through Westralian Farmers Cooperative Limited’s new broadcasting station (6WF) in Perth. This was at the invitation of the company and the arrangement continued for many years.

During the mid-1920s, new experiment stations were opened at Avondale (1924), Wongan Hills (1925), and Salmon Gums, Ghooli and Dampawah (1925/26).

In the late 1920s and early 1930s, new veterinary appointments and officers returning from overseas tertiary studies began to make a significant contribution to the department and Western Australian agriculture.

Overall, the decade from 1921 to 1930 was a good one for the department in terms of building resources. It also saw a shift to a professional scientifically-trained cadre who would drive the organisation in the years ahead. The major downsides were the start of the Great Depression as the decade closed and that by 1925 the fight to keep rabbits out of WA had been lost.

**The Depression and following decade**

There was probably no real beginning or end of the Great Depression from a State agricultural point of view. It depended on which industry or part of the industry was concerned. The big industries of wheat and wool were the worst hit. The dairy, pig and fruit industries did not suffer the same severe price depression. Many returned servicemen who had taken up new land in 1921 or 1922 faced prices below the cost of production.

Results through the decade were also affected by seasonal conditions. It was not until 1939 when a yield of 13.8 bushels per acre was recorded that the crop equalled
1933. An important feature was the move to sown pasture.

The major changes in professional capacity of the department, started in the 1920s, continued slowly. Sutton, in his 1935/36 report written about 12 months before he retired, reviewed the development of the department in his 15-year term. His general comment was that "it is apparent that there has been a complete change in the organisation through the establishment of a scientifically trained advisory staff and a strong team of specially trained research officers".

In 1935 the department was asked to help the University of WA with lectures pending the arrival of a new professor.

Sutton was concerned at suggestions that a University of WA agricultural research institute should be established. He felt that this arose from a misconception that departmental researchers were distracted by administrative requirements or that the department could not undertake long-term projects. His concern rested on the potential competition for scarce funds.

The overall organisation of the department was stable from 1930 to 1940. Sutton retired in 1937 and in 1941 Mr GK (George Kingston) Baron Hay took over as Under Secretary.

Initially, the problems brought on by the Depression created greater demand for departmental services. In 1931 Sutton bemoaned the fact that, even making every effort at reorganisation, it had not been possible to meet this increased demand.

As years passed, the department’s reports display increasing emphasis on experimental and advisory work. Plant breeding was continuing at the experiment farms; trace elements started to be used.

The major increase in pasture and its topdressing with superphosphate which had started in the high rainfall areas, caused growing interest in legume-based pasture in the medium rainfall areas. The work of TC (Thomas Charles) Dunne at Muresk provided the foundation for publication by Dunne and FL (Francis Leonard) Shier of An Alternative Rotation for the Wheatbelt in 1934. This became the basic text for the development of ley farming which was to be the crop rotation from the 1950s to the early 1980s.

In the mid-1930s a cereal research laboratory was set up in the department to examine the bread-making characteristics of flour from WA wheat varieties.

The 1930s was a period of dramatic success in the solution of serious health problems in sheep and cattle in the medium and higher rainfall districts.

By 1931 the research on ‘braxy-like’ disease, which Bennetts had started in the mid-1920s had been successfully completed and a vaccine prepared for commercial use to protect sheep. In 1933 'Denmark wasting disease' was shown to be due to cobalt deficiency by EJ Underwood and veterinarian JF Filmer.

In 1937 HW Bennetts showed that the problem of enzootic ataxia in lambs at Gingin was due to deficiency of copper. This work resulted in extensive soil and plant surveys and analyses being carried out by the animal and plant scientists, together with field experiments. The results obtained progressively over the next decade provided the basis for the major expansion in WA agriculture during the three decades ahead.

The problem of botulism or toxic paralysis among sheep in the inner wheatbelt was shown to be due to a low protein diet resulting in a depraved appetite. The final solution came through a vaccine, prepared by CSIR, which was shown to protect sheep from the toxin under field conditions.

Tuberculosis in the dairy herds supplying milk for human consumption was a cause for serious concern at this time but a slaughter-out program did not start until after World War II.

During 1934/35 the first Dairy Products Marketing Board was set up. Its role was primarily to regulate and organise the
production, sale, distribution and storage of dairy products and related plant and equipment, and for plant inspections. The department was responsible for its implementation.

In 1936/37 the problem of 'falling disease' of cattle was identified in the Margaret River area, and shown to be cured by treatment with copper. 'Coast disease', a name given to the very poor performance of cattle grazing pastures on the sandy soils of the south and west coast was controlled by providing stock with both copper and cobalt. In 1938/39 a test for contagious abortion was made available by the department's veterinary pathologists.

There had been concern about poor crops in the Salmon Gums area from early in the settlement. Despite this knowledge, the government proceeded with an ambitious plan to develop 3500 farms between Salmon Gums and Lake King. Land west of Lake King was also encompassed in the scheme. Dr LJH (Laurence John Hartley) Teakle was asked to look at the soils of the area after his return from PhD studies, and in 1929 he identified the natural high salt content of the soil as the cause. This resulted in an extensive soil survey program. The combined effect of the soils data and the Depression led to the 3500 farm scheme being abandoned and the farms in the Salmon Gums area re-planned.

In 1936, in conformity with other states, a Soil Conservation Committee was formed within the department. No real action was taken until after World War II.

Insect and plant pathology problems were ever present. The primary sheep blowfly, *Lucilia cuprina*, which was first recorded in Australia in 1913, was found in WA in 1934. In 1937 concern was expressed about the predations of the bryobia mite. The apple weevil had reappeared and was a source of concern. There were outbreaks of black spot or scab in apples in 1930, 1934, and early 1936. They were controlled and heavily infested nurseries in the eastern states were identified as the source.

Webworm continued to damage crops sown on land previously in pasture which were ploughed and sown after the first rains. Redlegged earth mite was a major pest of pastures for the whole decade. The little plague grasshopper (*Austoicetes cruciata*) occurred in plague proportions in 1937/38 for the fourth year in succession.

The Plant Pathologist responded to increasing demand for Rhizobial cultures. The department's Dairy Laboratory examined a large number of milk samples for bacteriological content, cream content and solids-not-fat. It also introduced improved cheese starters and distributed them to manufacturers.

The Botany Branch began its seed certification program in 1934. Outbreaks of codlin (sometimes called codling) moth occurred in Collie in 1935 and 1937 but were effectively eradicated by 1938/39. In 1938 apple scald was found in an orchard but eradicated by 1939.

A problem of 'die back' or 'wither tip' of apple trees, particularly in the Bridgetown district, was investigated. The conclusion was that copper deficiency was the cause.

Tropical fruit production at Carnarvon began in the early 1930s. While it was planned in 1938/39, a research station was not developed there until after World War II.

The Manjimup district became the focus for the developing tobacco industry during the decade.

In the early 1930s the irrigation areas based on dams at Harvey and Collie were beginning to take shape.

Although concern was expressed about vermin (rabbits, dogs, emus and eagles), in the early 1930s, no real control was achieved until the Agriculture Protection Board was formed in 1952.

**The 1940s**

The 1940s were dominated by two different issues, World War II and post-war adjustment. Germany and Italy were the
initial aggressors in 1939 but Japan joined them in December 1941. The war finally ended in September 1945 but it was the early 1950s before Australia got back to ‘normal’.

Throughout the war the department was required to do whatever was necessary to support the war effort and keep the economy running. The early part of the war saw many young officers enlisting and coupled with other war-caused difficulties requiring officers to undertake additional tasks, made it difficult to maintain normal services to industry. The management of war-caused shortages resulted in the appointment of 13 District War Agricultural Committees to manage issues at a local level, chaired by the department.

The department was also faced with additional work to meet the quality requirements of UK contracts initially and then the US armed forces. The American forces demanded high quality standards, which triggered the TB eradication program in WA after the war.

Outcomes included the establishment of fruit and vegetable processing, and egg powder production. Statutory marketing of many agricultural products was introduced during the war and continued afterwards.

The period saw continued investigation of the extent of trace element deficiencies across the agricultural areas.

In 1940 staff of the department recorded in the Public Service List was 146. By 1945 numbers reached 205 and in 1950 the total was 235.

In 1947 there were four country offices and three professional advisory officers stationed in the wheatbelt. One officer was at Geraldton, another at Beverley and the third had offices at both Kellerberrin and Merredin. This was the re-establishment of the department’s regional extension service.

In 1949/50 there was still a shortage of technical staff, and accommodation remained an issue at head office. Three new research stations were established at Bramley near Margaret River, Wokalup south of Harvey, and on the sandplain at Esperance.

In 1945/46 the department began a bacteriological and chemical survey of all butter coming forward. As more manpower became available, inspections at all levels were increased.

During 1947/48 the Commonwealth Government announced its intention to make $500 000 available for dairy industry improvement over five years, of which the allocation to WA was $32 250.

The decade proved challenging for the pig industry. In 1941 there was an outbreak of swine fever, which was eradicated on a slaughter-out basis. Losses to individuals resulted in a Pig Industry Compensation Act being passed in late 1942, and as a result of the outbreak swill feeding was prohibited. During the decade the demands of the UK contract changed, making production difficult. There were also major fluctuations in pig numbers influenced by the price of wheat.

Early in the decade the department began investigation into incidence of dystokia among lambing ewes. Subsequent work showed that the subterranean clover variety used contained an oestrogenic substance. By the end of the decade the problem was being managed in the field by added cropping and a focus on balanced pastures. Later, low oestrogen clover strains were found or bred which overcame this problem.

Malnutrition and sterility in dairy cows at Manjimup were also investigated. A similar problem in the Margaret River area was shown to be due to serious phosphorus deficiency. Bramley Research Station was the focus of future investigations to overcome this problem. Despite improved methods of treatment, mastitis continued to cause serious losses to the industry.

Maintenance of strength in export flour was an issue as the quantity of wheat delivered was only enough to provide for orders, with little opportunity to blend wheat of varying quality.
The annual cropping competitions continued and most were judged by departmental officers. Numerous trials were conducted on farmers’ properties.

The wheat industry was seriously affected by war production restrictions and fertiliser shortage. By the end of the decade, production was still well below the 1930 level.

In view of the fertiliser shortage a lot of work was done on the residual value of previous phosphate dressings, and on alternative fertilisers for market gardeners.

Reconnaissance east of Pingrup to Lake Magenta showed the heavy soils had high salt content and it was concluded that more detailed examination was needed before settlement could be recommended. Concern was also increasing among farmers about secondary salinisation in the agricultural areas.

In 1941/42 the Agriculture and Public Works departments established an experimental site at Carlton Reach on the Ord River and by 1942/43 the experimental areas were providing useful information. In the dry season of 1943 a soil survey was carried out on the irrigation potential of the Ord River Basin. Development of Kimberley Research Station began in 1948/49.

The Soil Conservation Act was passed through State Parliament and LJH Teakle was appointed the first Commissioner of Soil Conservation in 1945.

The apple industry was seriously affected by the war as there was very little export and acquisition of the crop. The department was responsible for estimating the crop through the war and to the end of the decade, which was a major undertaking.

During the war the government was pressed to maximise vegetable production and the department was heavily involved. Work included publication of a vegetable growing guide for home gardeners, which was reprinted many times and was still in demand 50 years later.

‘Vegetable Growing’ was first issued to encourage home gardeners to produce vegetables during World War II and became the reference book for them for many years.

Problems included shortages of fertiliser, shortages of seed, and inexperienced growers. Entomological and plant pathological problems were extensive, also requiring departmental involvement.

The Government Botanist made major advances in classification of species and preparation of the Flora of WA. In addition, in 1941/42 a list of plants with medicinal qualities, or the possible capacity to produce rubber, was prepared. A list of possible fibre plants was prepared and in 1943/44 investigations of the drug potential of a range of plants were carried out.

The Abydos and Woodstock pastoral properties were taken over for experimental purposes. They had to be substantially renovated and it was not until the early 1950s that work could start.

During the 1940s the area irrigated in the three main districts was consolidated, with heavy involvement of departmental personnel. Vermin continued to be a problem.
1951 to 1970

The period from 1950 to 1968 was one of the most seasonally favourable for agriculture in Western Australia's history. Large areas of scrubland and forested country were cleared with the large tractors that had become available. The development of light land for farming was made possible by the demonstration that when fertilised with superphosphate and the trace elements copper and zinc, it could be cleared and farmed profitably. This triggered the biggest land development in Western Australia's history.

Major development halted with the collapse of wool prices in 1968/69, the introduction of restrictions (quotas) on wheat production in 1968, and the drought of 1969. In 1950/51 the demand for uniforms in the Korean War drove the price of wool to 1 pound and 9 shillings a pound. While tighter conditions developed in the mid-1950s, farming was still profitable. During the 1960s the push for development gained full pace. Most was driven by private farmers. The downturn in prices of the late 1960s was exacerbated in WA by drought in the medium and lower rainfall districts in 1969.

In view of the general financial problems of the sector, particularly the wheat and sheep industries, the State and Federal Governments decided in late 1970 to introduce a Rural Reconstruction Scheme. The dairy industry, which was not involved in the major expansion of the late 1950s and 1960s, started to adjust to poor market conditions in the mid-1960s.

Through the 1950s and 1960s the department expanded substantially. Rural research funding and the Commonwealth Extension Services Grant provided additional funding for research, extension and training.

Departmental services

The department provided a wide range of services, which included:

- Artificial breeding for the dairy industry
- Laboratory testing of milk quality and purity
- Milking machine testing
- Herd recording
- Land grading and irrigation
- Contour surveys
- Identification and classification of plants
- Grain and flour inspections
- Stock, produce and seed inspections
- Seed testing and certification
- Pedigreed grain production
- Potato seed certification

Veterinary services covering tuberculosis testing, advice and control of a wide range of other diseases including vibriosis and leptospirosis, footrot eradication in sheep, lupinosis and white muscle disease research, identification and advice on pig diseases, and examination of samples for mastitis from dairy cows. Post-mortem and parasitological services were provided to the
poultry industry. Separately, the APB was an almost entirely service and regulatory organisation.

Overall the department was responsible for administration of 50 Acts of Parliament.

Research stations
In the 1960s research stations in the north were at Kununurra, Carnarvon, Abydos Woodstock and Wiluna. Wheatbelt stations were at Chapman, Wongan Hills, Merredin, Badgingarra, Avondale, Mt Barker and Esperance. In higher rainfall areas they were established at Wokalup, Bramley, Manjimup and Denmark.

Research
Extensive research was carried out as numbers of specialist and general staff increased, reducing pressure from the farming community for immediate advice from individual specialists. Some major areas of research are listed below:

Soils
Soil structure issues, saltland vegetation studies, water run-off from catchments, nitrogen fertilisers on grassed waterways, land preparation for weed control and trash removal and ploughing comparisons between disc ploughs and scarifiers were all dealt with.

Cropping and development
Identification of the need for copper, zinc, molybdenum and occasionally manganese fertilisers across the State, studies of residual phosphate, nitrogen use in later crops in a multi-crop system, differences between copper ores, continuous cropping, nitrogen sources, nitrogen fertiliser on pastures in higher rainfall areas, rates of superphosphate on clover on new land, maintenance dressings on older clover pastures, the residual value of potash, legume species for deeper sands and Rhizobium strains for a range of legumes and environments were all included in the department’s work.

The effects of variety, climate and soils on the nitrogen status of plants were examined, as was the effect of nitrogenous fertiliser on grain quality and yield.

In the early 1960s the interaction between stocking rate and phosphate showed it was essential to test fertiliser rates for pastures under grazing. There was also widespread research on stocking rates.

Orchards
Fertiliser use on young fruit trees, further work on storage problems of fruit, fruit thinning, and rootstocks.

Viticulture
The focus was largely on the dried fruit and table grape industries. Currant pruning techniques, alternative packing material and technique for export grapes, use of gibberellic acid, and the possibility of using river or tributary water were investigated.

Early work began on establishment of a wine industry in the South West and studies continued on the established wine grape industry of the Swan Valley.

Vegetables
Variety trials were carried out on a range of vegetables. Potato variety trials pointed to Kennebec being the best for processing under WA conditions and the hybrid tomato Lakelend x Smoothskin showed great promise.

Pastoral areas
The Ord regeneration project started early in the 1960s. Buffel grass was tested on the Pindan and demonstration of the regeneration of denuded country in the Fitzroy Valley commenced. Work at Abydos Woodstock involving pasture and stock management continued.

Animal studies
Experiments were carried out on time of lambing and nutrition of ewes before mating. Studies showed that even in a 'balanced'
pasture some varieties of subterranean clover could influence ewe fertility. Following the identification of major differences in isoflavone content of subclover cultivars, extensive work on the impact on livestock and breeding low isoflavone cultivars was carried out. Time of mating was tested in the more favoured areas and weaner nutrition studied.

A general ‘ill-thrift’ of sheep was attributed to marginal copper and cobalt levels and low selenium levels in pasture were identified throughout the South West. Lupinosis studies continued. Resistance of mastitis to penicillin treatment was reported early in the period. Vibriosis was identified as the main source of infertility in the dairy herd.

In poultry, studies of the nutrition of both meat birds and layers showed that the energy to protein ratio was important.

Plant diseases
Root rots of cereals were shown to be a serious problem with initial crops following a period of clover ley. A new rust strain, 21-2, had removed Gabo from the list of recommended wheat varieties. Yellow dwarf virus of wheat was discovered in WA for the first time.

Work commenced to free important apple varieties of the apple mosaic virus. Virus indexing of plums commenced. Fumigation and the long-term impact of nematodes in orchards were tested.

Clover stunt virus was identified at Esperance. In a combined study with other organisations, Phytophthora cinnamomi was identified as the causative agent of Jarrah dieback. Control was found to be possible only through restricting access to clean areas.

Vermin
The Agriculture Protection Board continued its cooperation with shire councils and farmers, reducing vermin to low levels compared with previous years.

1970 to 1994

Marketing issues
The 1970s was a period of difficult marketing conditions, due largely to the agricultural policies of the European Economic Community. These were exacerbated when the United Kingdom joined in 1971. A large part of Australia’s market for fruit, butter and lamb to the UK was lost as a result. The United States also decided to protect its markets against the European policy which compounded the effects. Commodity prices fluctuated sharply. A board was established to acquire all lamb and equalise returns to growers according to the quality of the carcase produced for export and domestic markets.

The dairy industry continued the adjustment which had started in the mid-1960s. Despite these difficult conditions agriculture had a gross value of production of $2 billion for the first time by 1982/83. In that year the eastern states were affected by drought and WA produced 20 per cent of the total Australian gross agricultural product and supported about 25 per cent of Western Australia’s work force.

Reorganisation of the department
In July 1977 the Department of Agriculture was reorganised. This consolidated the growing focus on regional services. The major district offices became separate branches, with the officer-in-charge (OIC) as the branch head. Staff at these offices became responsible to the officer-in-charge who directed their duties on a day-to-day basis.

A Regional Services Division was created to take over the district offices, which included the advisory staff and all the regional offices.
The officers-in-charge were responsible directly to an assistant director who was part of the senior administration. Modifications were also made to the divisional and regional research and extension structure. From the early 1980s there was a trend to reduce funding of agricultural research and extension across Australia. As a result, in 1980/81 some traditional services ceased and others were modified. This trend was emphasised in 1982/83 when suggestions were made at Commonwealth level that agriculture was over-funded. Subsequently CSIRO funding for agricultural research was reduced. Nevertheless the department continued to grow, largely due to increased funding from Rural Industry Research Funds.

In 1983 the regionalisation process was extended through the transfer of responsibility for most research stations from the Division of Plant Production to appropriate district or regional offices. Following an internal review in 1982 it was recognised that a re-organisation of the research stations was necessary.

The mid-1980s saw increased community awareness of environmental issues. This was supported by State and Commonwealth Governments with financial assistance provided to address land degradation problems.

During 1986/87, 80 per cent of agricultural income came from grain cropping, 11 per cent from fruit and vegetables and a further 9 per cent from other industries. The industry continued to be under price pressure and in real terms wheat prices were 62 per cent of those in 1976/77.

In 1987, after discussion with the Minister, further changes were agreed. This resulted in modification of the structure and renaming of the resultant positions. In the process the Western Australian Herbarium was transferred to the Department of Conservation and Land Management.

In a move seen to further strengthen the regionalisation initiative, directors were appointed to each of seven regions covering the State.

The department also moved into farm management extension, which proved successful. It complemented this initiative with development of a computer-based farm planning tool called Landman combining both the environmental and economic aspects of farming.

At the same time the pastoral land inspectors were transferred to the Department of Agriculture from the Department of Land Administration, integrating inspection staff with professional rangeland management staff for the first time.

A dairy farm model was developed to maximise income from dairy enterprises.

In 1987/88 the Animal Health Division established an Epidemiology Branch to provide a disease control planning and development service, a field-based veterinary research service and a specialist advisory service. Laboratory services were provided at South Perth, Bunbury and Albany.

The 1989/90 year was a turning point for the sheep industry. The reserve floor price was lowered to 700 cents per kilogram and subsequently abandoned. There was also a major disruption to the live sheep trade to the Middle East. Coupled with a fall in wheat prices, this produced substantial challenges for the department.

An outbreak of Queensland fruit fly, a substantial increase in footrot in the South West, a major spring outbreak of plague locust, and apple scab in the Pemberton–Manjimup region compounded the challenge.

On 1 July 1989 the approved average staffing level for the department was 1710 full-time and temporary equivalents (FTEs). This increased by June 1990 to 1810 FTEs. The 1990s proved to be another period of change in the structure and management. In 1990, the Minister for Agriculture approved a policy based on full recovery of the cost of those services to industry which were delivered on an individual basis without benefit to other persons or the State as a
whole. This was coupled with a continuing fall in departmental budgets in real terms both from State sources and from industry funds.

There had also been a change in the reporting framework across the Public Service. There was now a need to follow the 'new age' management structure of identifying objectives and reporting formally against those objectives. This changed the structure of the department's reports and appeared to reduce the information provided to the public.

In 1991/92 a need to reduce staff appeared to trigger a further restructure. Operational divisions were cut from eight to four. The management change involved the development of full program management with a strong focus on industry and market development and continued progress towards sustainable production systems for all sectors of agriculture. Activities were packaged into four overall programs:

1. Industry and Market Development
2. Sustainable Agricultural Systems
3. Industry Support and Assistance

By 1 July 1993 the department had moved to full program management. All activities were directed through 33 operational programs, each with clear objectives, planned achievements and outcomes, with each subject to performance evaluation.

In the 1993/94 report the Director General stated that the future work of the department would be closely aligned to market opportunities. He commented that over the past two years the department had changed its emphasis from an organisation driven by research and development aspect there were new challenges. Cereal varieties had to suit the longer season, the new nutrient cycle needed to be understood, the level of cultivation for seedbed preparation and nutrient mobilisation needed study and the appropriate rotation to establish a sustainable agriculture had to be defined. Experimental work and farmer innovation resulted in further changes to the cropping system.

Issues for the period

In May 1987 unacceptable levels of organo-chlorine pesticide residues were detected in consignments of beef exported to the United States, threatening the future of the major meat market. All organo-chlorine pesticides were deregistered for any agricultural or horticultural use and action was taken to avoid further problems. Problems occurred due to the historical use of organo-chlorine pesticides on potato crops. The department had the lead role in dealing with this problem.

Seasonally, while 1970 was satisfactory in the agricultural areas and greatly assisted the recovery from the 1969 drought, the remainder of the 1970s and the first half of the 1980s experienced more poor years than good ones in the cropping districts.

The period from 1975 to 1990 saw the greatest change in the methods of crop production.

In the early 1970s drought and reduced stock numbers, coupled with better returns from continuous cropping, resulted in a move away from the clover ley system of farming. Progressively, the industry moved to continuous cropping without a pasture phase.

In the mid-1970s it became commercially possible to selectively or totally control weeds by spraying with herbicides, and this progressively changed the method of planting crops. While this achieved effective weed control there remained issues such as how much cultivation was needed to provide the necessary seedbed. Within this new framework developments took place which totally changed the cropping process and the potential for yield, particularly in the medium rainfall districts.

From a research and development aspect there were new challenges. Cereal varieties had to suit the longer season, the new nutrient cycle needed to be understood, the level of cultivation for seedbed preparation and nutrient mobilisation needed study and the appropriate rotation to establish a sustainable agriculture had to be defined. Experimental work and farmer innovation resulted in further changes to the cropping system.
At the same time the first effects of climate change started to be felt. Towards the 1990s a major problem of frost damage developed. This was caused by the drier periods in spring having clear night skies which allowed rapid cooling of the landscape with temperatures falling to frost levels. The need to settle on a new crop rotation and to develop suitable varieties to match that rotation and the changed climate conditions was a major challenge.

In 1987/88 the first phomopsis-resistant narrow-leafed lupin was released. It had a higher protein and lower alkaloid content than previous lupins.

The Australian Wheat Board introduced a varietal control scheme for the 1980/81 harvest, based on a trial approach in the previous year. Growers were required to name the variety of wheat delivered for each load. Incorrect naming could attract a penalty. Differential prices were paid depending on the assessed quality of the varieties. A number of varieties targeted at different markets were introduced.

In 1987/88 the production of pedigree seed from research stations ceased and basic seed was supplied to 191 registered seed growers for production of commercially registered or certified seed. This was the end of a service which started in 1911.

There was particular interest in the field pea as a possible legume in the rotation for heavy soil types. Other crops such as chickpeas, lentils and faba beans and different lupins were also being investigated.

A problem of hardpan development in some light soils, resulting from the previous traditional cultivation methods, was identified. These soils gave substantial yield responses to deep ripping with specialised machinery which causes minimal surface disturbance.

A re-examination of the impact of stubble retention through the 1985/86 season showed that retained stubble assisted in moisture penetration and reduced evaporation on fine-textured soils, increasing yield substantially when compared to areas where stubble had been burned.

New medics, hard-seededness and resistance to attack from redlegged earth mite became important issues in legume breeding.

In 1993 a Cooperative Research Centre for Legumes in Mediterranean Agriculture (CLIMA) was approved. The department was a partner, and parts of the legume breeding programs were transferred to the new organisation.

The department developed a range of models to help farmers make decisions on cropping programs. During 1990/91 a technical manual for wheat producers called The Wheat Book was produced and sent to growers.

The entomology group was faced with a continuous challenge of insect damage to commercial crops, pastures, gardens and livestock. In the post-war years there was also a continuous flow of new synthetic insecticides which needed to be assessed for effectiveness.

The plant pathologists faced a continuing stream of enquiries about endemic diseases of crops, gardens and pastures. The scope for biological control was limited and the major tools were fungicides, management or breeding to avoid a particular problem.

Weed research was focused on the new cropping systems. The department was also heavily committed to biological control and the weed agronomists were working with other specialists in a number of programs to bring biological control agents into WA to help control specific weeds.

Fruit

The loss of European markets made the period difficult for pome fruits, which were the major fruit industries. The loss of markets was due to a combination of high freight rates, some dissatisfaction with the varieties supplied, competition from other southern hemisphere growers and stored fruit from European suppliers. It was a national
problem but WA and Tasmania were more affected than other states because of their reliance on export. Restructuring of the apple and pear industry was discussed at national level.

The department experimented with new trellised planting systems which reduced land costs and allowed for machine management of plantings.

A fruit variety improvement scheme was initiated under which trees were established at Stoneville Research Station as a source of true-to-type virus-tested rootstocks. Departmental officers continued their involvement with industry in the development and testing of machinery to reduce the costs of operations such as pruning and harvesting. One such machine was a mechanical harvester on the Tatura trellis production system.

In the mid-1980s there was limited distribution of the department’s new apple varieties Cripps Pink and Cripps Red for trial and evaluation purposes. These were seen as having excellent potential for export and proved highly successful. Their fruit is now internationally renowned by the trademarked brand names Pink Lady™ and Sundowner™.

By 1988 the focus was on container loads of apples to the United Kingdom either in bulk bins or in bulk-filled containers. Following department trials, experimental shipments of 50 containers were exported in 1987. Although there were some initial complaints further orders were placed for 1988.

In 1987/88 on-farm trials carried out using watering regimes during summer resulted in yield improvements of 100 to 200 per cent in avocados.

**Viticulture**

In 1977 the department piloted grape growing in the Manjimup district and this provided an alternative industry for growers. In 1985/86 fertiliser trials at Margaret River and Frankland River confirmed remarkable responses to both superphosphate and nitrogen in vineyards.

**Vegetables**

Most vegetables were consumed in WA, with about one-sixth of the gross income coming from exports to Asia. Vegetable research centred on reducing the cost of production. A major program to provide a blueprint for the production of French fry potatoes began, covering a range of varieties and species of vegetables considered to have export potential.

**Floriculture**

The department initiated several research projects on propagation, tissue culture, postharvest handling and nutrition. A successful home garden information section was established for the general public.

**Inspection**

While largely unnoticed, inspection continued to be one of the most important parts of the department’s activities, as prevention of pests and diseases entering WA was a key to long-term viability of the agricultural industries. The department maintained a plant quarantine facility to assist with the introduction of potentially improved genetic material to aid stock and plant production.
The importance of continued vigilance was illustrated when an extensive outbreak of apple scab was identified.

**Animal industries**

The Animal Health Division continued to maintain important services for the livestock industries. These included processing applications for cattle tags, processing claims under animal compensation arrangements, diagnosis and advice on a range of stock diseases, inspection of abattoirs, diagnosis of diseases or nutritional deficiencies based on laboratory analyses, and quarantine and export inspection. The footrot eradication campaign had been in place for some years and a new test for footrot, the protease test, fortuitously was developed and accepted nationally as the diagnostic yardstick. This ensured that the virulent form was accurately identified.

In 1982 the toxin produced in annual ryegrass toxicity (ARGT) was identified in work with CSIRO. A new test was developed for leptospirosis and a live vaccine was developed for salmonellosis. During the period brucellosis was eradicated under the national eradication program. The tuberculosis eradication program was started initially by the department with the market milk producers in the mid-1940s. The national program began in the south in 1970 and southern areas were declared provisionally free in 1976. The disease was subsequently eradicated from the remainder of the State.

**Dairying**

The 1970s was a period of rapid adjustment in the dairy industry. In March 1971 there were 815 dairy farmers producing milk and cream for manufacture and 558 producing milk for the domestic market. By March 1980 there were 38 dairy farmers producing milk or cream substantially for manufacture and 585 farmers producing market milk.

In 1979 a new laboratory was opened in Bunbury and farmers were offered a wider range of services, including owner-sampling for herd recording. Farmers using the scheme rose from 26 to 42 per cent over two years.

In February 1987 a price penalty was imposed for continued high cell counts, to improve milk quality. The Dairy Industry Authority also used price incentives when it became responsible for quality control in 1987/88.

The department continued to provide advice to factories, which was particularly important to smaller factories and milk processors. During the late 1980s and early 1990s dairy industry study groups developed in a number of centres as extension/discussion groups had a positive effect on production.

**Food technology**

The Food Technology Branch covered a wide range of issues, including the demonstration that animals which are less stressed give better quality meat, better use of animal skins, a pork product for the Singapore market and production of paper from barley straw.

**Beef cattle**

Improved management of the pastoral cattle industry was a focus. By 1990/91 a long-term program on the Ord River Research Station had shown that substantial gains in efficiency and profitability were possible through improved weaning practices. This approach began to be adopted.

A beef genetics and technology experiment at Wokalup opened the way for embryo-based selection which had the potential to double the rate of genetic progress in a breeding herd.

During the period there was a general thrust across Australia for development of a carcase classification system for the beef industry. In WA a carcase classification group was established to develop and promote the use of objective descriptions for the marketing of livestock carcases and meat.
In 1986/87 the national meat body, Aus-Meat, saw WA as having the most comprehensive and complete system for carcase classification and asked the department to hand over responsibility for monitoring the various schemes. Other research showed that silage was a better way to conserve high quality roughage than hay.

**Sheep industry**

The sheep industry was in good condition through the 1970s and 1980s, following the price recovery in 1972. Major research issues related to annual ryegrass toxicity, facial eczema, sheep lice and lupinosis.

During the 1970s and 1980s the Division of Animal Health carried out research in a wide area of animal production and management. During 1986/87 farmers responded positively to legislation requiring them to contribute to a fund for lice eradication, and their representatives were involved in advisory services to the program.

The collapse of the wool market and price support scheme in 1990 ushered in a very difficult time. Sheep numbers fell sharply. The department worked with farmers to devise strategies to deal with the reduced income from sheep. The Wool Industry Strategic Extension Program was developed to extend the immediate and long-term implications of the wool industry changes to growers.

Experiments showed sheep subjected to very cold conditions immediately after shearing could not maintain body temperature for more than a few hours, leading to potential heavy losses.

In 1990/91 seven research programs were analysed and it was concluded that increased lambing percentage and decreased fibre diameter were likely to give the greatest industry benefit.

The Animal Breeding and Research Institute, established during the period near Katanning, carried out extensive work on artificial breeding of sheep against comparisons between different Merino strains.

New medic species were showing great promise as pastures on suitable soils.

Other animal research covered poultry and pig nutrition. Potential cashmere, kangaroo and emu industries were investigated but failed to establish successfully.

**Rangeland management**

The development of rangeland management for the semi-arid pastoral country and the Kimberley was an important part of the department’s work over four decades from the 1960s. This was based on major surveys and the production of quality maps plus guides for future use. A monitoring system covering many of the land systems was introduced.

After successful revegetation of the denuded and eroded Ord River catchment a similar approach was considered for regenerating the degraded soils of the Fitzroy Valley. Following experimental work the WA Government committed to this regeneration and voted the necessary funds in 1982/83.

**Soil conservation**

Soil conservation legislation was amended in 1982 to strengthen its provisions and provide for the formation of landcare groups within soil conservation districts. This legislation was used extensively in the late 1980s and 1990s to drive natural resource management.

Soil management studies included the use of geophysical methods developed for the mining industry, for salinity identification. Remote sensing continued to be used in land use study both in the agricultural and pastoral areas. Land capability was assessed in areas of the South West.

Landsat imaging and other evidence identified a waterlogging problem in some higher rainfall areas and the upper Great Southern was studied in some detail. The role of surface trash in countering wind erosion was examined.
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Studies of structures to conserve water in the eastern agricultural areas continued. The impact of wheat and lucerne on reducing groundwater recharge was compared.

Eutrophication studies of coastal water bodies due to phosphate and nutrient leaching from adjacent agricultural land continued. Experiments showed trickle irrigation gave better yields and quality on some vegetables than sprinkler irrigation.

The Esperance Research Station was redeveloped to demonstrate a sustainable farm system for this area. This included some deep drainage. Deep drains installed by farmers in the wheatbelt were also studied. The grazing value of halophytic shrubs was further tested under a range of stocking rates.

Protection of the Denmark River from further salinisation commenced. The treatment of sandplain seeps to manage salinity was demonstrated.

Plant research
After the major work on plant nutrition through the 1940s, 1950s and 1960s, the 1970s was one of consolidation and integration of the knowledge base and investigating the impact and opportunities of the new agriculture in cropping.

Issues of particular interest were the residual value of trace element applications, nitrogen in the new rotations, phosphate in soils after years of topdressing, leaching from sandy soils, and the development of diagnostic techniques. Considerable time was taken in testing the usefulness of some commercially advertised soil amendments and fertilisers against the extravagant claims made for them. The impact of acidity and the potential for various rates of lime to neutralise acidity were studied.

Soil testing was critically studied, including ways to increase its accuracy. A number of models to help farmer decision-making were developed. In 1988/89 the placement of phosphate fertiliser in narrow bands below the seed was shown to be more effective than the conventional banding of seed and fertiliser together. The use of peas in the rotation was shown to have a big effect on the following wheat crop. Work was undertaken with tagasaste on deep sands. The department also developed a furrowing technique for planting crops on water-repellent sands.

The Ord River
As a direct result of research after 1977 (when the cotton industry failed) a double cropping system was developed for the Ord River Irrigation Scheme. The components included soya or mung beans in the wet season and sorghum or sunflower in the dry season. High sugar yields continued on the pilot farm but markets remained difficult.

Overseas activities
There was strong overseas demand for the department’s expertise both in terms of Western Australian agriculture and its administrative approach. This resulted in four overseas projects being established during the period.

1995 to 2008 – A change of focus
Just as 1970 marked the end of the great period of expansion, largely in the medium and lower rainfall areas, the mid-1990s saw the completion of consolidation and development of new cropping methods within that framework. It also saw development of the viticultural industry in the South West and Great Southern and movement of horticultural activity out of the Perth Metropolitan Area to other areas to make way for urban expansion.

The department started to focus more on the specific needs of markets and opportunities. Increased productivity and emphasis on quality control were needed to ensure that industry could meet price competition,
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particularly in the corrupted markets which continued to plague world trade in commodities.

1994 Review

A major review of the Agriculture Portfolio was submitted in October 1994 covering the Department of Agriculture, the Agriculture Protection Board and the Rural Adjustment and Finance Corporation. While its recommendations were progressively implemented over the following 18 months it is hard to see that they made any substantial difference to the overall thrust or the administrative structure which had been set in place and reported in 1992/93. The recommendations, implementation and outcomes of the review are discussed in Chapter 5.

As indicated, structural and management changes were initiated in early 1993 (before the review). Overall, these changes appear to have had long-term detrimental effects on the department’s cohesiveness, not anticipated at the time.

In November 1994 the then Director General of the department, resigned. The new Director General commented in his June 1995 report that: “… future priorities will reflect a strong market orientation to research and development, a commitment to the sustainable development of agricultural production and land use and a renewed commitment to protection of the agricultural resource. There will also be a stronger focus on the delivery of services from regional bases”.

A similar statement had been made by his predecessor in 1993 and would be made by his successor.

The review combined three organisations under the name of Agriculture Western Australia and resulted in the loss of almost 120 positions in response to a voluntary severance package offered in November 1996. The loss of these positions was a significant and unfortunate outcome. This clearly reduced the capacity of the department to provide services. To the extent that experienced staff was lost, it was a double loss of capacity. A further loss came from the impact on morale. This was obvious at the time and recovery was slow.

The amalgamation of RAFCOR with the department departed from the original intent of keeping the adjustment decision-making body separate from the research, advisory and inspectorial role of the department and from political interference. The amalgamation with the APB may have had some minor advantages but these would have been small following changes from the 1987 review. Subsequent reduction in the role of the APB has seen a surge in vermin problems in outlying areas.

In 1996/97 the operational functions of the department were carried out under three programs:
1. Industry and Market Development
2. Sustainable Rural Development

Industry and Market Development comprised eight delivery programs; Sustainable Rural Development was based on six regional groups stretching from the South Coast to the Kimberley; Resource Protection was managed by the Agriculture Protection Board aided by regional advisory committees in each of its 10 zones.

In addition, the Office of Policy and Planning was responsible for strategic planning, budget allocation and valuation, and policy development. It also managed Ministerial issues, legislation and government business.

At this time the department participated in six Cooperative Research Centres (CRCs) related to Legumes in Mediterranean Agriculture, Biocontrol of Vertebrate Pests, Premium Wool Quality, Quality of Wheat and Wheat Products, Weed Management Systems and Sustainable Development of Tropical Savannas.

Communication had been dramatically enhanced through investment in statewide communication and financial management information systems. This facilitated the
transfer of functions to regional and district offices.

As part of the decentralisation of the department 10 new community agricultural centres (CACs) were developed. They were the first part of a program to establish 40 such centres over a three-year period. In practice, not many more were established, probably due to staffing problems. These offices were a departure from the policy set 40 years previously to avoid small offices because of the generally improved performance of officers where there was support within an office in dealing with complex issues.

The Director General saw a distinct shift from bureaucracy to business, accompanied by new opportunities to establish collaborative projects with industry. In 1996/97 the department maintained formal contact with rural industry through some 66 committees, some statutory and some related to statutory functions. Others were liaison committees.

He also commented that the department had established industry and regional partnership groups in each program area comprising industry, business and community representatives to provide direction for the WA Government's investment in agriculture. It is doubtful if this change was as marked as stated if comparison is made with the structure and industry committees existing before the review.

In support of the view that increased productivity was an important marketing tool, the Director General pointed to a key component being higher cereal yields. This in turn had been driven by research and development which had led to a total change in crop production, including the release of higher yielding varieties with emphasis on identifying new quality-discriminating markets.

A particular advance in the development of the department’s biological research capacity was the opening of a new biotechnology laboratory at the State Agricultural Biotechnology Centre at Murdoch University. The laboratory was to undertake collaborative research on new and existing molecular techniques.

The review also resulted in the introduction of a new operational system based on the Funder, Purchaser, Provider model. This involved the Office of Policy and Planning as the Funder, the Industry Resource Protection, Sustainable Rural Development and Industry and Market Development Programs as Purchasers, and Program Services and Corporate Services as Providers.

This program had never previously been used in a complex research/extension/biosecurity body and proved to be an administratively clumsy and ‘blunt’ tool for identifying and funding key and potentially important work. It was abandoned following a change of government in 2003.

In 2006/07 sources of the department's funding were the State Government 48 per cent, Commonwealth Government 24 per cent, research grants 15 per cent, revenues 8 per cent, and other sources 5 per cent.

Utilisation of the department’s budget by category showed the allocations were: employee expenses 37 per cent, grants 34 per cent, supply and services 14 per cent, capital use 4 per cent, depreciation 3 per cent and other expenses 8 per cent.

If the budget was divided on the basis of the area of service, agricultural and resource management received 44 per cent, food and fibre industry development 28 per cent, biosecurity 26 per cent and services provided to the Rural Business Development Corporation 2 per cent.

If the budget was divided on the basis of service to each industrial area, grain programs received 43 per cent, horticulture 20 per cent, wool 13 per cent, meat 8 per cent, trade and market development 10 per cent, new industries 3 per cent and dairy and apiculture 3 per cent.

The total staff at 30 June 2007 was 1660, of whom 703 (42 per cent) were professional, 431 (26 per cent) technical, 336 (20 per
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cent) were administrative and clerical, 53 (3 per cent) were wages and 137 (8 per cent) were inspectorial.

The report stated that agriculture and the department were operating in an environment in which:

...consumer demand was becoming very sophisticated, global sourcing was increasing competition and there was an impact of greenhouse policies and dryland salinity. In addition there were strong pressures to control agriculture's impact on environmental values, and internationally to scientifically justify bio-security barriers. Internationally there was the continuation of multi-functional agriculture which had resulted in countries supporting agricultural businesses for non-economic objectives, which continued to distort markets and continued the cost price squeeze. Risk management techniques were also needed to deal with the range of risks to which agriculture was exposed, including climate change, which had emerged as a major issue.

The department published information on the change in annual rainfall, comparing rainfall from 1976 to 1999 with 2000 to 2007. This showed that most of the State's agricultural areas had experienced rainfall reduction of at least 5 per cent, with 25 per cent experiencing 5 to 10 per cent less.

In his 2007/08 overview, the Director General stated that the focus of the new strategic plan was on how the department was going to do its business rather than what it was going to do. He saw the impact of climate change and rapid advancements in food and fibre technology as ensuring exciting and challenging times.

A staff development project was initiated to ensure staff quality was maintained in a tight labour market. The targeted staff level for 2007/08 was 1598. The average level for the financial year was 1499. The decrease was due to fewer externally funded projects. In this total, 42 per cent of staff were professional, 25 per cent technical, 8 per cent inspectorial, with 22 per cent administrative and 3 per cent wages.

The department continued to deliver production-related research, diagnosis and information services to industry over the period from 1995 to 2008. Communication systems were revolutionised by use of the internet for technical and market information.

Special activities during 2007/08

The department developed and launched the WA Government's new food marketing campaign. It also established the first commercial wheat breeding company, InterGrain Pty Ltd, a partnership with the Grains Research and Development Corporation.

During 2007 the *Bio-Security and Agriculture Management Act* (known as the *BAM Act*) was passed. This important piece of legislation improved the ability of the State to manage, prevent and contain biosecurity risks, including pest plants and animals as well as diseases. It was not proclaimed immediately as the regulations needed to be prepared and approved. The department also enhanced the biosecurity team of inspectors and detector dogs and launched the new look Quarantine WA (QWA)initiative.