Bulletin of the NSW Association of Agriculture Teachers

BAAT

NSW AAT Biennial Conference Dates

Must See PAGE 11

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Inside....

- HSC 1999 Agriculture (2/3 Common) + Worked Solutions
- D & T Assignment Ideas....
- Teaching Resources - Primary Industries
- Salinity

Winter 2000 **BAAT Edition Number 15.**

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PRESIDENTS REPORT.



Welcome to the first edition of BAAT for the Year 2000.

I hope that every one is starting to come to grips with the new Stage 6 Agriculture Syllabus and the programs that the Association sent you last year have come in useful as a starting point for your programming for the course. I would like some feedback on the programs and the ways in which they could have been improved. I am sure that after a couple of years of modification we can all end up with a useful document to help us in our teaching.

The Association is in the process of applying for some funding to help in the running of a number of workshops on the programming of the HSC component of the Stage 6 course as well as the development of a number of assessment tasks and marking guidelines. The thought is to run a number of workshops in various locations around the State to make them more assessable to more of our members. When confirmation of the funding occurs I will send out more information advertising dates and locations.

As an Association, I believe it is important to provide our members with as much assistance and information to help us with our teaching. I would welcome any ideas or initiatives that as an Association we can implement, organise or develop that can be of help to our members.

The Primary Industries course is also now in full swing and I am very keen to gather some feedback on the impact Primary Industries has had on Agriculture at your school. Has it been a great boost to Agriculture or has it had an effect on numbers, resources and your teaching load. I know that in many schools you are being given the option of either Agriculture or Primary Industries but not both, and often this is a decision being made not on student numbers.

We would like as an association come up with a program for at least the core modules for Primary Industries. Are their any members who have a program which they would be happy to supply to the association so that it can be put onto the DET website, so that it can be made available to all teachers to access and be able to modify to suit their own needs. Conversely are there any teacher groups or individual teachers who would be willing to sell a copy of their program to teachers for a price. We would be quite happy to place an advertisement for you in the next edition of BAAT.

Our treasurer, Angela McCann has been very busy over the last couple of months attending meetings, seminars and workshops on the implementation of the GST and learning of its impact on our association. From all reports and information, the GST should have little

effect on us, as we do not earn enough money. The Association has had to however apply for an ABN number to enable us to be able to run inservices and produce BAAT.
A reminder that your membership is now due for the year 2000, a list of current financial members and a membership form are included in this copy of BAAT. Just remember the more members we have the better we can service the needs and wishes of our members.

The Sydney Branch of the Association is in the process of organising the next biennial conference which is being held at University of Western Sydney Hawesbury in January 2001. I am sure it will be a very enjoyable and rewarding conference, so start planning your trip to the big smoke in January to attend the conference.

Many teachers represent our association on many committees. If you are one of our representatives on committees, such as syllabus committee, examination committee, Animal welfare, tractor replacement, Primary Industries or any other group or committee and it is possible to publish your name I would like to include a list and contact details in the next edition of BAAT. Often when someone has, a problem or a concern they do not know who to contact. If you could send me a fax or e-mail, I would appreciate it.

Thanks must go to the Sponsors of our Association, McGraw Hill Australia, Cotton Australia, University of Western Sydney, Hawesbury and NSW Agriculture. As you, maybe aware members of our association receive a discount of 10% on purchase through McGraw Hill, when ordering mark your order Attention Natalie Muir and mention you are a member of the NSWAAT.

The association has been involved in a number of activities this year. At the Sydney Royal Easter Show, we were lucky enough to be a part of the Agricultural Learning Centre, which was located in the Dome, next to the district exhibits. This was due in most to the work of Susan Lees from the RAS.

The display allowed a number of schools to promote Agriculture at their schools and be a source of information for a range of Agricultural Industries such as Cotton Australia, Olives Growers, Landcare and the Department of Fisheries.

Thanks must go to the following schools and their teachers for giving up 1 or 2 days of their holidays to come into the show to promote their school by putting up a display.



Bankstown Grammar - Phillip Oliver,
Bede Polding College - Danielle Krix
Doonside Technology High School - Vejay Nath
Elizabeth Macarthur High School - Nicolet Westerhof,
Girraween High School - John Killeen
Henry Kenndal High School - Darren Craig
Menai High School - Sheree Bourke,
Nagle College - Mykel Koller,
Narara Valley High School - Megan Chandler,
Pendle Hill High School - Tony Reddan,
Plumpton High School - Brigetta Herman

The Association in collaboration with the RAS is in the process of organising the development of an Agriskills challenge that twill be held in about 6 locations around the state such as AGQUIP in Gunnedah, ANFD in Orange, Wagga Wagga Show, Tocal College at Paterson and Casino Show. (locations still to be finalised)

The concept of the challenge is to have students in teams competing against each other in a range of tasks such as Tractor and Chemical safety, Tractor driving skills, fencing, working sheep and cattle in yards etc. The winning team from each region will then compete against each other at the 2001 Royal Easter Show, to decide the top school in NSW. Information should be in schools in June.

I would like to officially congratulate the teachers of the following students who placed 1st in 2 Unit and 3 Unit Agriculture in the 1999 HSC.

Amanda Lam who attended James Ruse Agricultural High School (1st Place 2Unit)
Ryan McBride who attended Elderslie High School (Equal 1st 3Unit Project)
Ruth Payne who attended Gosford High School (Equal 1st 3Unit Project).

Congratulations must go to all schools and teachers who judged at the Sydney RAS in many of the events such as Sheep, Cattle, Goats, Poultry, Horses, Art and Craft and undoubtedly many other events. Many students also competed in Young Judging competition finals in Beef Cattle, Dairy Cattle, Goats, Horses, Meat Sheep, Merinos, Fleece, Fruit and Vegetables and Grain. Congratulations must also go to a large number of teachers who were asked to be officials such as Stewards at the show.

Many teachers give up large amounts of their own time for their students and for the Association, often at times without the due recognition and accolades they deserve. The association is calling for nominations for the J A Sutherland award the most prestigious award that can be bestowed upon an Agriculture teacher in NSW. An outline for the award and the nomination details are found in this edition of BAAT.

Remember that BAAT is only as good as the articles supplied, to our editor Karen Damic, so please send her any article or information that you think would be of use to make our teaching easier.

Patrick McCann



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Minutes of NSWAAT EXECUTIVE AT BATHURST

Sunday 20th February

Present - Executive: Pat McCann, Angela McCann, Karin Damic, and Peter Napier

- Pat spoke of the recent NAAE conference held in Perth. Overall a good conference. A report will follow in this BAAT.

- Executive thanked Karin for a top job with the three BAAT's produced last year. This year first BAAT will be produced in term two. Depending on contributions from members two or three BAAT's will be produced this year.

- Discussions held as to the possibility of a workshop for programming day this year along the same lines as the successful Preliminary programming day held at Hawkesbury last year in September. The main focus for the workshops later this year would be the new HSC syllabus and he "project" option. Overall it was felt that the regional workshops held later in the year co-ordinated through the existing networks would be preferable. Again the problem of in-service funding expressed as members may have to entertain the possibility of a weekend day. Pat will approach the PTA for funding. Even if some money can be made available for each region for travelling and a meal - it would help.



- Role of regional/district co-ordinators is at this stage open ended. Only a few responses sent to NSWAAT secretary as to the current personnel in various networks (see article on published networks). Certainly there is scope for workshops mentioned above.

- Tractor Safety courses are to run for every teacher not already trained under the VET Primary Industries. Details available at a later date from Peter Jones and Phil Hurst of tractor replacement scheme.



- Development of a website for NSWAAT. To date has chased up many possibilities but no success so far. The endeavours continue.

- Educational school displays will be at the Sydney Royal Show this year. A school per day will have the opportunity to mount an educational display in the Pavilion area. If successful this may become an annual event.

- Ag Skills is a new event where young people of school age and above can compete at various agricultural skills. Eventual finalists will compete at the Royal Show the following year. At this stage the show centres will possibly be National Field Days at Orange, Ag Quip at Gunnedah, Casino Show, Tocal and the Wagga Show.

Peter Napier
Secretary
NSWAAT



Minutes of NSWAAT

Monday 5th June

(phone link up)

Present - Executive: Pat McCann, Angela McCann, Karen Damic, and Peter Napier

- Hopefully first BAAT will be produced term two waiting on contributions from members.

- Pat approaching PTA for funding. The workshops later this year would be the new HSC syllabus and the project option. A big emphasis on how to develop assessment tasks.

- Tractor safety courses are to be run for every teacher not already trained under VET Primary Industries. There is a large chemical user document coming out later this year.

- Development of a **WEBSITE**  for NSWAAT is starting to occur. Details out shortly.

- Funding for NSWAAT activities has only come from a small number of bodies. Cotton Australia has been paying $750 per year but will be reviewing this. McGraw Hill will continue to offer 10% discounts to financial members. University of Western Sydney has offered $___ and ____support.

- Agriculture Learning Centre at RAS went extremely well this year. There is no cost to schools, as the RAS will support it in a big way. There may be a change schools promote it next year???



- Ag Skills is a new event where young people of school age and above can compete at various agricultural skills at a number of regional NSW shows. This information has been sent to every school in the state.

- The 2001 NSWAAT Conference is in the hands of the Sydney Branch and detail should be out in the coming BAAT.

Peter Napier
Secretary
NSWAAT



SCHOOL AGRICULTURE NETWORKING THROUGHOUT NSW

Thank you to the "few" co-ordinators around the state who faxed in the details for they're networking contacts. Below is a list of various co-ordinators with their **FAX NUMBER** and their Ag teacher contacts and /or school.



These are long standing networks. How can they help us?

(iii) Co-ordinators are a good port of call for information or to disseminate information.

(iii) If you are looking to be involved in a network and not involved or heaven forbid "they left me off" then get in contact.

(iv) You may have developed something that you what to flog off $$$ then a network is possibly in a better position to look at your product and provide a more face to face evaluation and promotion.

	SCHOOL	FAX
ILLAWARRA AREA		
Ross Irwin	**Lake Illawarra High**	**02 4296 8948**
Peter Hickey	Oak Flats High	
Nick Staine	Albion Park High	
Ian Heffernan	Dapto High	
ARMIDALE AREA		
John Lee	**Glen Innes High**	**02 6557 0372**
Tony Barnett	Walcha High	
Alan Thomas	Armidale High	
Rob Forsberg	TAS	
Phil Jones	Guyra High	
Bob Watters	Ashford High	
Jill Wagner	NECS	
Dave Grady	Inverell High	
Mark Woodhouse	McIntyre High	
Neil Thomlinson	Bundarra	
Alan Mitchell	Warialda High	
Rowan Chandler	Uralla Central	
Robyn Roberts	Duval High	
David Vale	Tenterfeild High	
Mark McGowan	Bingara Central	
	PLC	
	O'Connor Catholic	

LOWER NSW		
Tony Bulter	**Tumut High**	**02 6947 2497**
Dave Muller	Batlow High	
Dale Chadwick	Gundagai High	
Chris McGee	Tumbarumba High	
NORTH COAST		
Peter Tait	**Wingham High**	**02 6557 0372**
	Taree High	
	Port Macquarie High	
	Melville High	
	Chatham High	
	Kempsy High	
CENTRAL WEST		
Peter Napier	**Orange High**	**02 6361 3616**
Trevor Thompson	Orange High	
Marty McGee	James Sheenan Catholic	
Anne Clarke	James Sheenan Catholic	
Kerry Pinnel	Canobolas Rural High	
Dave Crofts	Scotts Bathurst	
Pete Matus	Scotts Bathurst	
Leon Paix	Orange Christian School	
Owen McLaughlin	Canowindra	
Llyod Clever	All Saints	
	Molong Central	
	Blaney High	
SOUTHERN TABLELANDS		
Phil Armour	**Yass High**	**02 6226 3174**
	Canberra Grammer	
	Queanbyan	
	Karaba	
	Braidwood	
	Goulbourn	
	Mulwarre	
	Crookwell	
	Mossvale	
	Murrumburra	
WAGGA DISTRICT		
Allan McMillian	**Wagga High**	
	Junee	
	Temora	
	Lochart	

If your network is not listed and you would list it so - contact Peter Napier Secetary NSWAAT fax 02 6361 3616

REPORT
NATIONAL ASSOCIATION OF AGRICULTURAL EDUCATORS CONFERENCE
Monday 10th To Friday 14th January 2000.

In the last couple of weeks of the Christmas holidays, a number of members of the NSWAAT attended the National Association of Agricultural Educators Conference which was held at the Trade Winds Hotel, East Fremantle, Western Australia.

The theme of the conference was '*Educating for Rural Revival - Challenges and Opportunities for Rural Australia*'.

The conference had a number of well known guest speakers including Mr. Ian Donges, President of the National Farmers Federation, Glynnys Leyne, Rural Training Council of Australia and Dr Nacy Longnecker, University of Western Australia.

The conference was a chance for Agriculture teachers from all over Australia to be able to discuss a large range of the issues affecting Agricultural Education. The conference identified a number of key developments that have occurred recently that affect all teachers no matter what state or type of school they come from.

Agricultural education is going through a period of change brought about by the universal adoption of Student Outcome Statements in schools from kindergarten to Year 10. The large increases in the number of students studying Vocational Education and Training courses and the inclusion of elements from the national training packages in the upper secondary school curriculum.

In addition, there is a growing recognition of the need to prepare young people for life in rural Australia to ensure the viability and economic future of small towns and communities.

The Action Plan for Australian Agriculture formulated by the Federal Department of Agriculture listed a number of goals.

- ✧ Promotion of innovation and enterprise
- ✧ Creation of robust rural communities
- ✧ Development of leadership and networking
- ✧ Increasing the value of products through adoption of quality assurance
- ✧ Better, use of resources to expand existing enterprises and create new ones.

Agricultural educators are in a unique position to foster the skills and attitudes needed by young men and women to face the challenges and recognise the opportunities available in country areas.

The delegates at the conference considered the following attributes to be important.

- ✧ An understanding of enterprise and what it means to be enterprising
- ✧ The ability to recognize enterprise opportunities and create jobs and not just work for someone else
- ✧ Ability to explore opportunities to produce products as well as commodities
- ✧ Skills to look for different ways of doing things
- ✧ A positive attitude and a willingness by young people to take control of their futures.

The titles of some of the workshops at he conference included: -

- ✧ Challenges and opportunities for Rural Australia
- ✧ Preparing young people for leadership.
- ✧ Untapped treasures of the Australian Bush.
- ✧ Advanced farming systems.
- ✧ Linking Agricultural Education with Industry and the Community.
- ✧ Quality assurance and its role in adding value to farm production.

The conference included a day of tours which included visits to sites such as, University of Western Australia, Cunderdin Agricultural College, Muresk Institute of Agriculture and New Norcia. Farm visits that included enterprises such as tagasaste, alpaca, jojoba and melon growing and a dinner and wine tasting at Sandalford wines, which included the sampling of Sandalera a most delightful desert wine.

Members of NSWAAT who traveled over to Perth for the conference were, Ivan Gant, Vejay Nath, David Kent, Milton Gower, Nicolet Westerhof, Roland Clarke, Sheree Bourke, Angela McCann and Patrick McCann.

The conference was extremely well organised by the members of the Western Australian committee which was: -

Frank Slee	Harvey Agricultural College
Lindsay McNeil	Northam Senior High School
Br Frank Donohoe	Bindoon Catholic Agricultural College
Alec Fissioli	Cunderdin Agricultural College
Norm Hammond	Kelmscott Senior High School
Stuart Irwin	Cunderdin Agricultural College
Steve Kitching	Fremantle Education Office
Jeff Whittock	Harvey Agricultural College

The next conference of the NAAE is being held in Tasmania in January 2002 and I would strongly suggest a trip to the conference coupled with a holiday would be of great benefit to all teachers of Agriculture. The networking with teachers from all over Australia is an ideal way to keep up to date with all that is happening in the development of Agricultural Education Australia wide.

NOVA BIENNIAL CONFERENCE

14TH - 17TH JANUARY, 2001

KEEP THESE DATES FREE!

UWS-HAWKESBURY, RICHMOND.

STAY POSTED FOR MORE INFO

Sydney Branch of the Association of Agriculture Teachers



Nominations For The J.A Sutherland Award



For excellence / contribution to Agricultural Education in NSW Secondary schools

The most prestigious award that can be awarded to any teacher of Agriculture in NSW is the J. A. Sutherland Award.

The J.A Sutherland award is named after Allan Sutherland a man that the younger Agriculture teachers including myself never had the opportunity to meet.

I was looking through some old editions of BAAT and in the first edition of 1983, I found a tribute and the curriculum vitae of J. A Sutherland written by the President of our Association at the time and lifemember of our Association Mr. Norm Thomas.

I was amazed at the achievements of Alan Sutherland and can only be in awe of the influence that he had on Agricultural Education, not only in NSW but also all through the Pacific and the world.

I am sure that every Agriculture teacher would be happy to only achieve fraction of what Allan achieved in his life and to be able to have been an important part in the development of Agricultural Education in NSW.

I am sure that the only reason as to why NSW is seen as one of the leaders in Secondary Agricultural Education is due to men such as Allan Sutherland.

I thought it appropriate that the younger Agriculture teachers of our Association become more aware of who the J.A Sutherland award is named after come to recognise what an honour and privilege it is to be awarded the J. A Sutherland Award.
The last two recipients of the J. A Sutherland Award are: -

1997	Mr. Peter Jones
1999	Dr Rod Francis.

(If you know of the other recipients could you let me know, I would like to be able to recognise all of the winners of the J A Sutherland award in the next edition of BAAT)

A TRIBUTE TO ALAN SUTHERLAND

Dear Colleagues,

On the 21st of December last year, we were informed of the passing of our patron - Alan Sutherland. He had, until a few weeks prior, been actively working at the University of New England.

His demise has left a large gap in the ranks of Agricultural Educationalists in both Australia and the pacific region. Such Men as Alan are irreplaceable. He was an educator, artist and author. His publications have been of immense value to all schools and colleges. Alan's activities are so extensive that a special section is devoted to them.

All people who were privileged to meet him remember his lively and spectacular presentation of ideas. Those who were seated near him at functions often souvenir his humorous illustrations of some aspect of the proceedings.

Many of our members have expressed a desire to contribute to a memorial. This is something which will need to be discussed at our conference in May. Suggestions as to the form are varied. Most feel that it should be an award to a member of our Agricultural Teachers Association because of Alan's interest in the training of Agricultural teachers. If such were to eventuate, what criteria could be used? Others have expressed the idea of a Sutherland Oration to be given at each Biennial Conference. Please give the matter full consideration.

Condolences to Alan's wife, Sheila, son Hamish and daughter Isabel have been expressed on behalf of the Association.

Regards,

N.R. Thomas

PRESIDENT

OVERSEAS WORK OF J. A. SUTHERLAND

Mr. Sutherland made his first contribution to agricultural education in the Pacific in 1967. In that year, he was invited by the South Pacific Commission in Noumea to make a survey of agricultural education in the Pacific and to write a report. This report was published in 1968.

Subsequently he has been employed several times as consultant by the South Pacific Commission.

In 1972, he made an important contribution by writing a textbook called Introduction to Tropical Agriculture which is used in schools and colleges throughout the whole pacific region.

HI made his greatest contribution between the years 1973 and 1976 when he was employed by A.D.A.B. of Foreign Affairs as a consultant in agricultural education to the Ministry of Education in Fiji. The agricultural projects he wrote and illustrated were very successful and attracted a great deal of attention by the other countries of the South Pacific. After his Fiji contract was extended on two occasions, he returned to Australia for family reasons.

However, he was then invited by both the University of New England and the Australian Development Assistance Bureau to continue writing agricultural projects for the various Pacific Islands. He has now completed 38 such projects for use in schools of Vanuatu, Solomons, Tonga, Cook Islands, Tuvalu, Kiribati Since all these Countries have included the teaching of agriculture in school curricula, the written project notes have made a major contribution. He has also conducted In-Service courses for teachers in the different islands. Sutherlands work in the Pacific Islands has been described by A.D.A.B. of the Department of Foreign Affairs as an important contribution.

J.A SUTHERLAND

EDUCATION: Wagga Wagga High School, Sydney University, and University of New England

DEGREES: Bachelor Science Agriculture. Bachelor of Arts (Honors Degree)

AWARDS: 1970 - Fellow Australian Institute of Agricultural Science

1971 - Fellow of Australian College of Education.

APPOINTMENTS:

1935	Teacher of Agriculture, Kyogle Intermediate High School
1936	Junior Lecturer in Agriculture, Armidale Teachers College
1940-45	War service. RAAF Squadron Leader
1946	Teacher of agriculture, Lismore High School
1947	Lecturer in Agriculture, Armidale Teachers' College

1950	Senior Lecturer in Agriculture and Head of Science Dept., Armidale Teachers College
1962	Member of N.S.W. Agricultural Colleges Advisory Board. Member, Agriculture Syllabus committee, Secondary Schools Board
1963	Member, Agriculture Syllabus Committee, Board of Senior School Studies.
1967	Consultant in agricultural education to South Pacific Commission
1969	Acting Vice Principal, Armidale Teachers' College
1970	Leader of Australian delegation to First World Conference on Agricultural Education, Copenhagen. Acting Vice Principal, Armidale Teachers College for 2nd Term.
1972	Acting Vice Principal, Armidale Teachers' College for 3rd Term Australian Consultant on Agricultural Education to Conference at South Pacific Commission, Noumea.
1973	Australian Consultant in Science Education to U.N.D.P. Conference at University of South Pacific, Suva, Fiji Appointed by Dept.Foreign Affairs (ADAB) as Adviser in Agricultural education to Ministry of Education Suva, Fiji
1977	Appointed University Fellow, university of New England
1978	Consultant in Agricultural Education at Conference of Teachers' Colleges Lecturers in Agriculture at Lae, PNG, 1-5 May Consultant in agricultural education at International Training Course in Poultry Husbandry sponsored by ADAB and held at University of New England 20 April 1978.

BOOKS PUBLISHED:

1962	Introduction to Agriculture, Angus & Robertson 1964 - The Rocks, Wentworth Press, Sydney
1968	Understanding Farm Animals, McGraw-Hill
1971	Introduction to Tropical Agriculture, McGraw- Hill
1974	Rural Life. Angus and Robertson 1976 Vegetable Growing. Ure Smith
1980	Introduction to Agriculture, 6th edition, McGraw - Hill.

MONOGRAPHS:

1968	Agricultural Education in the South Pacific. South Pacific Commission

PAPERS PUBLISHED:

1964	Practical Work in Agricultural Education. Journal of Australian Institute of Agricultural Science, 30. 2.
1965	Agricultural Education in Secondary Schools. Annual Conference of Australian Institute of Agricultural Science.
1966	Agricultural Education. In N.S.W. Education Gazette, 1st April,-1966. Agricultural Education in Secondary Schools. Journal of South Australian Science Teachers Association.
1968	Careers in Agricultural Science. Published by Australian Institute of Agricultural Science.

1970	With J.L. Dillon, co-author of The Situation, Problems and New Trends in Agricultural Education in Australia and New Zealand. Background paper to First World Conference on Agricultural Education and Training. Copenhagen
1971	Training Teachers of Agriculture in Australian Education and Training. - Annual Review of Selected Developments. F.A.0. Rome, 1971. World Conference on Agricultural Education and Training. Journal of Australian Institute of Agricultural Science, March, 1971.
1974	The Place of Agriculture in the School Curriculum. in "Educational Perspective in Papua New Guinea". Australian College of Education.
1978	Education in Agriculture: The Role of the Teacher in Overseas Agricultural Development, in Proceedings, Conference of Australian Association of Agricultural Faculties, UNE., February 1978.
1979	Utilisation of Resources for Agricultural Education in Agritalk (Journal of Victorian Agricultural Teachers Assoc.) 1980:2.
1971	Present and Future Demand for Agricultural Graduates. Read at Conference of Australian Association of Agricultural Faculties at Sydney University.
1972	General Principles of Agricultural Curriculum Development. Read at Conference at South Pacific Commission, Noumea.
1973	Principles of Curriculum Construction in Science. Read at UNDP Seminar, University South Pacific.
1977	Modern Studies - A New Approach to School Agriculture in Fiji. Resources in Agricultural Development Programs. University of New England. Changing Patterns-of Secondary Education in the Pacific Islands. Paper read at meeting of N.S.W. Chamber of Australian College of Education, Sydney, 20th October, 1977.
1978	Papers read at International Training Course in Poultry Husbandry, University of New England, April/May 1978: a. Education for Change b. Use of local materials for Poultry Housing Curriculum Development in Papua New Guinea - some Suggested Guidelines. Paper read at Conference of Teachers' College Lecturers in Agriculture, Lae, May 1-5, 1978.
1987	Utilization of Resources for Agricultural Education. Paper read at O.E.C.D. Conference on Rural Education, Perth, Nov.1979.

REVEIWS:

1968	Review of Agricultural Education in Australia 'by R.N. Farquhar, A.C.E.R. in Journal of Australian Institute of Agricultural Science.
1977	Review of Organizational Genesis and Development: A Study of Australian Agricultural Colleges by A.W. Black, University of Queensland Press, published in Journal of Educational Administration, XV-1.

(From BAAT No 1 1983)



The J.A. Sutherland Award

The criteria for the awarding of the J. A. Sutherland Award are as follows: -

i. The Alan Sutherland Memorial Award be presented to an Agriculture teacher judged to have made a significant contribution to the teaching of Agriculture;

ii. The recipient be a secondary school teacher who is a member of the NSW Association of Agriculture Teachers;

iii. The award be judged by a committee comprising the executive of four and two members nominated by the committee;

iv. Nominations for the award be made by any member or group of members in writing at least three months prior to the Biennial Conference;

v. Nominations or a summary of nominations to be included in the Association Newsletter prior to the Biennial Conference;

vi. The judging committee reserves the right not to make an award in any Biennial; the award takes the form of -

a) a perpetual trophy inscribed with the name and year of the recipient, an
b) a personal award to the recipient;

vii. in the event of the Biennial conference not being funded, the award be made and the members advised in the next edition of BAAT.

A significant contribution should include -

- *a work or event from which many benefit*
  OR
- *an outstanding worker*
  OR
- *an innovation*

Please send nominations to
Patrick McCann
St Joseph's College
Mark Street
HUNTERS HILL 2110
NSW

Include name of the member nominating the teacher for the award plus the name of the member who is seconding the nomination.



Nominations Close 13th October 2000



Agriculture at Molong Central School

Molong Central School is a K-12 school in the Central West. Students can elect to do Agriculture for one semester in Year 8 and then for 9-10. There is currently a Year 11 class but due to low numbers in the previous few years keen agriculturalists have had to do the correspondence course.

The main enterprises we run are:

Merino ewes / Fat lambs: We find this a good combination as the ewes wool is usually worth something to us and the fat lambs are also reasonable profitable.

Poultry: We buy day old chicks and occasionally hatch our own. Egg layers and attractive breeds seem to find a ready market. They are reared in the shed until ready to go outside. Once established outside we begin to sell them to the public.

Oats: The main paddock is put in to oats and used for grazing. We have made hay in this paddock under share-farming arrangement with a neighbour. We are also able to borrow equipment from him and we service it before returning it.

Vegetables: The students work in small groups in 9 & 10 with metal box gardens. W strap is welded into 2m X 2m squares. These work well as they don't move in floods and tend to act as silt traps from free topdressing. Keen students can also build up their gardens with manure and compost. At the end of a 2 year cycle the boxes can be lifted and moved to the next spot. Year 8 has an open plan garden as it has to change hands each semester. The green house is now completed and we will be growing all our own seedlings.

Horticulture: The main school site plays host to the Molong community Nursery and this facility is available for our use. D&T classes have used it this year for a Herb Growing project. Use of the facility will be increased in the future.



Molong Central continued...

Some History

This Ag plot is relatively new to use. The original site was at the school and fairly well worked out. When the school was redeveloped a new site had to be found. This took longer to do than anticipated and we went without for quite some time. The new site is at the other end of town and goes completely under water in a reasonable flood. It does have much better soil and the area is larger (5 acres). In the first 4 years of operation we had 4 floods. This presents problems, which we try and overcome. We don't do any stud breeding any more as it is too expensive to lose valuable stock. So far I have had sufficient warning and luck to be able to rescue all stock bar one lamb. This will not always be the case. To manage the water we have gates in strategic places and design the fences to survive the flow.



The ground is mostly flat with one very large and one smaller channel running to the creek. Our paddock subdivision plan has to work around these leading to some interesting paddock shapes.

The whole area is still very much under development and challenges us to find solutions to the inherent problems. I am lucky to have 2 people sharing the Ag assistant's jobs, which means they can work together on the bigger projects such as green house and ideas are always flowing.







Assessor Guide

On the Rural Training Council of Australia Website
www.rtca.farmwide.com.au/assessment/intro.asp
you will find a list of assessor guide which are of great help when you are working out assessment events or just trying to work out how you are going to go about assessing a particular unit.

Included is an example of the assessor guide to carry out basic beef cattle handling duties (RUA AG1500BC A).

Carry out basic beef cattle handling duties	**Assessor Guide RUA AG1500BC A**

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Critical skills

Candidate should be able to:

- Safely and effectively handle and draft cattle in yards
- Select cattle using basic criteria such as sex, condition, breed, ear tag, age, etc.
- Safely and efficiently use gates, crush, calf cradle to draft and restrain cattle
- Control and direct cattle dogs (Note: where dogs are not used on the property, candidate should demonstrate knowledge of their use and care)
- Prepare and correctly use equipment such as vaccination and drenching guns, applicators for pour on treatments, etc.
- Interpret information on labels
- Identify and use relevant personal protective equipment
- Clean and store equipment
- Identify and correct hazards and maintain yards.

Critical knowledge

Candidate should demonstrate knowledge of:

- Cattle behaviour
- Breed characteristics for a range of common breeds
- Common selection criteria used with cattle
- Use of and care for working dogs
- Vaccination and parasite control programs appropriate to the local area
- Relevant Animal Welfare legislation and codes of practice
- Safety hazards associated with the handling of cattle.

Interdependence

This can be assessed independently but could be assessed holistically with RUA AG2500BCA Care of working dogs and RUA AG1100EO A Operate property vehicles.

Resource implications

- Assessor must have access to and knowledge of relevant Animal Welfare legislation and codes of practice, industry codes of practice, safe animal handling procedures and employer expectations.
- Candidates need access to a mob of cattle of various types, vehicles, motorbikes or horses, a set of yards with drafting and handling equipment, vaccination, drenching and/or other appropriate gear.

OH&S issues

Assessors should be aware of temperament of cattle and any possible danger to candidate as a result of handling animals, riding horses or driving vehicles, and the use of relevant equipment to draft, restrain and treat cattle. Appropriate protective equipment must be used for treatment of animals with chemicals. Protection from solar radiation by use of hat and sunscreen may be necessary as well as use of helmet if operating motor bikes and correct boots, etc., if riding horses.

Relevant legislative requirements

All state/territory and national legislation that applies to:
· Animal health and welfare
· Operation of vehicles
· Use of chemicals and vaccines
· OH&S

Evidence collection methods

1. Competency Record Book

Check the Competency Record Book to gain an overview of the candidate's experience in this area. Verbal confirmation may be obtained from the worksite supervisor/employer regarding this. Check other sections of the record book, particularly relating to operation of vehicles and cattle handling for evidence that would support this competency.

2. Documentation

Suggested documentary evidence includes:
· Information from previous employers about cattle handling experience and ability.
· Records of current competencies achieved on the job or courses completed.
· Relevant courses such as 'Managing farm safety'.

3. Suggested Questions

The following questions address underpinning knowledge, worksite understanding and contingency management issues. These questions are an indication of what may be asked and further questions should be developed according to need.

Questions can be asked while carrying out cattle handling duties. Supervisors can be used to ask and record responses if worksite visit is not available. Alternatively, a short answer test can be given using the following or similar questions.

What are the main methods of identifying cattle?	Shows knowledge of main methods eg brands, ear tags, ear marks, tattoos.
What selection criteria would be best to use in this situation?	Shows knowledge of the type of animal best suited to the situation eg heifers for breeding, fats for sale etc.
What can be done to minimise hazards when riding motor bikes/operating vehicles/riding horses?	Seek knowledge of and use of safety equipment and protective gear and of safe operation of vehicles
How would you handle flighty cattle? What would you do if one charged you in the yards?	Check knowledge of cattle behaviour and handling methods. Check that escape procedures have been thought out.
What are the common treatments applied to cattle in your area?	Check for knowledge of appropriate vaccination and parasite control measures
Name some hazards found in yards that could cause injury to animals or people?	Check knowledge of typical hazards and how to minimise injury to cattle and operators.
What would you do in the event of somebody being injured in the yards?	Check that the candidate can follow basic first aid procedures, such as assess potential risk to themselves and others, remove casualty if necessary and apply appropriate treatment.

4. Worksite visit

· Assessor can observe candidates mustering and handling animals and applying treatments. Hazards to operators should also be noted by the candidate.
· Candidates should be able to safely muster cattle, identify and draft animals, restrain and treat as instructed, clean and store equipment and return animals safely to their paddock.

Assessment Template

An Assessment Template for **Primary Industries** is available form Patrick McCann.
It is an Excel document.
If interested in a copy on disk or by email contact:

Patrick McCann
St Joesph's College
Mark Street
HUNTER HILL 2110
pamccann@bigpond.com.au

Sample below

PRIMARY INDUSTRIES - COMPULSORY UNITS

	1	2	3	4	5
Student Names					

RUA AGCORE1 A Meet industry requirements

Element of Competency	1	2	3	4	5
CORE1.1 Employment conditions identified					
CORE1.2 Meet workplace employment requirements					

RUA AGCORE2 A Follow enterprise occupational health and safety (OH&S) procedures

Element of Competency	1	2	3	4	5
CORE2.1 Comply with provisions of relevant state OH&S legislation					
CORE2.2 Follow farm procedures for hazard identification and risk control					
CORE2.3 Render appropriate emergency procedures					
CORE2.4 Administer first aid					
CORE2.5 Participate in arrangements for maintaining health and safety of all people in the rural workplace					

RUA AGCORE3 A Use hazardous substances safely

Element of Competency	1	2	3	4	5
CORE3.1 Handle hazardous substances					
CORE3.2 Store hazardous substances					
CORE3.3 Transport hazardous substances					
CORE3.4 Use hazardous substances					
CORE3.5 Act in emergency situations with hazardous substances					

RUA AGCORE4 A Communicate in the workplace

Element of Competency	1	2	3	4	5
CORE4.1 Gather, record and convey data					
CORE4.2 Gather, record and provide information in response to workplace requirements					
CORE4.3 Participate in work groups or teams					
CORE4.4 Participate in workplace meetings					
CORE4.5 Interact with others in the workplace					
CORE4.6 Communicate with the industry network					

RUA AGCORE5 A Act to minimise emergencies

Element of Competency	1	2	3	4	5
CORE5.1 Act to minimise emergency situations					
CORE5.2 Act as instructed in emergencies					
CORE5.3 Implement fire prevention and control on site and in the workshop					
CORE5.4 Deal with gas emergencies					

Centre for Workplace Training and Assessment

Farrar Memorial Agricultural High School *has received a grant from the BVET to help establish the school as a centre for Workplace Training and Assessment for students undertaking courses from the Primary Industries Framework.*



The grant is to be used to subsidise the students travel costs and to provide meals and accommodation whilst at the school.

Farrar is well placed to provide training in the workplace as they -

- have offered the Rural operations Certificate under licence to NSW TAFE for the last four years (including 20 days structured work placement per year)
- currently have 40 students from Year 11 taking between 2 units (120 hours) and 6 units (360hours) from the Primary Industries Framework.
- have 5 staff qualified to deliver and assess competencies from the Primary Industries Framework.
- A member of staff holding a Cat 2 (Certificate 4) in workplace training.
- 5 farm workers experienced in supervision of students in the workplace
- a 450 acre home farm plus an additional 1000 acre lease.
- an established network of farm work sites (training partners) accessible from the school by school bus.

Farm enterprises include:

a commercial diary enterprise (at least for the time being)
a 200 cow beef herd including a 120 cow Angus stud.
a meat sheep flock consisting of 130 White Suffolk ewes
a Merino flock of 50 ewes
irrigated luceme hay (6,000 bales/season)
dryland winter and summer cop production
pig production - growing out pigs from weaner to porker under contract to Woolworths.

Sufficient funding has been provided for approximately 50 students, on the basis of 2 per week for the rest of 2000.

Priority will be given to students from rural and remote areas, especially those studying via OTEN or Distance Education.

Places are available for either male or female students.

Participating schools/teachers/students will be responsible for negotiating the competencies to be developed/assessed prior to the start of the period of work placement.

The program will be coordinated by Bob Guest who can be contacted on
026760921 (ph) 0267609451 (fax) or email *bobguest@visto.com*

D & T ASSIGNMENT IDEAS



YEAR 8 -
A NEW FARM ACTIVITY

Name: _____

Due Date: _____

You have been employed by a local farmer to research for a new investment.



You may choose **one** of the following:



- Yabby farming
- Hydroponic tomatoes
- Mushroom growing
- Worm farming
- Glasshouse flower production





In your report you should:

- Describe in detail the optimum (best) environment that is needed including the nutritional requirements
- name the variety(s) you would use with the reasons for your choice
- Design a structure for the farmer to construct. This should include measurements and be drawn to scale. Make sure that you include the scale and the materials that you will use.

The size of your design should be for a side line industry that can make a profit but not be the only income from the farm so you may need to investigate the financial side of the activity before beginning you design.

YEAR 8 D&T
COTTON IN AUSTRALIA

Visit the cotton industry website www.cottonaustralia.com.au and find the education section.

- The timeline gives production details in Australia from 1788 to 1999. Present this information in a column graph (histogram).

- The timeline also provides details of cotton growing areas in Australia. On a map of Australia, mark the major cotton growing districts. Number them in order of establishment.

- Several unusual phrases are used in the timeline text. Write down the meaning of:
  - bounty
  - transgenic cotton

- You have been employed by Cotton Australia to produce an educational leaflet on Australian Cotton. Use information from cotton site to complete this task.



1. You should focus on the superior qualities of cotton, environmental issues and processing
2. This leaflet is to be no larger than 2, A4 pages.
3. Marks will be awarded for the information presented as well as the way you present it.
4. Neatness, correct spelling and colour are all important.
5. Assignments completed on the computer are encouraged but this is not essential.

YEAR 8 D&T- WOOL ASSIGNMENT



a) Go to the wool website **www.wool.com.au**

Click on the **Education** heading then go to "Fibre History" and "Wool in Australia". Read the information contained here and summarise it in a **timeline** extending from 5000BC to 2000. You should do this to scale and note on your work what scale you used eg. 1cm =100 years (you may need to tape several sheets together). Your timeline should show major dates and events in the history of wool.

b) Use the information under the "Wool Processing" heading to produce a **flow chart** of wool processing. Investigate the steps in production before scouring and what happens after spinning and add these to your flow chart.

c) Your teacher will give you a handout titled "The Natural Properties of Wool". Read through these pages and use the information to design a poster that advertises wool. You will be marked on your presentation as well as accuracy.

d) The sheet headed "The Australian Sheep Flock" presents the number of sheep in several major countries. Summarise this information in a graph you may use a pie, line or column graph.



Education
Sheep

THE WOOLMARK COMPANY

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The Australian Sheep Flock

The Australian rural landscape is uniquely suited to sheep, with our relatively mild climate extending over vast areas of natural grassland. Wool production is this country's largest and most important form of land use, with some 70,000 woolgrowing properties spread in a continuous crescent from the north of Queensland to the mid-north of Western Australia and including Tasmania and the Islands of Bass Strait.

Individual flocks range from a few hundred to as many as 100,000 or more animals, with some three quarters of all sheep run in flocks of 3,000 or more.

The Australian sheep flock now numbers123.3 million head (at 1997). Other significant sheep flocks are found in the USSR (137 million), China (117 million), New Zealand (58 Million) and Turkey (50 million).

Apart from its size, the outstanding feature of the Australian sheep flock is the overwhelming influence of a single breed - the Australian Merino - which is grazed primarily for its heavy fleeces of fine quality wool. More than 80 percent of all Australian sheep are pure Merino with most of the remainder at least part Merino blood.

> Though the Australian Merino derives its name and basic appearance from the famed Royal Flocks of Spain, it is in every way a distinct breed in its own right, developed and adapted in Australia to the specific conditions of this country.

WOOLMARK

Wool Assignment Information Sheets

Education Sheep

THE WOOLMARK COMPANY

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The Natural Properties of Wool

Wool, one of the oldest textile fibres known, has survived the test of time because of its unique natural properties. The basic characteristics wool possessed in the Stone Age era, for instance, are still the fundamental qualities that make wool unique in this 20th century. Today there are many other textile fibres, but as yet science has not been able to produce another fibre containing all the natural properties of wool. Wool remains unique; a masterpiece of design.

Wool Insulates Against Heat and Cold

Because it absorbs moisture vapour, wool clothing provides superior comfort in both hot and cold weather. In cold weather even a little moisture on the skin becomes cold, quickly reducing body temperature. However, by absorbing body moisture a dry layer of air is left next the skin and this helps to hold in body heat. In addition the crimp in the wool fibres makes them stand apart from each other. As a result, little pockets of still air are trapped between the fibres. This lining of air trapped inside the fabric acts as an insulator. Still air is one of the best insulators found in nature.

The absorption/evaporation process works in hot weather to help keep the body cooler. Evaporation of perspiration is the body's natural cooling device. Wool helps this process along. Its thirsty cells absorb body vapours and help reduce skin temperature. Also, much of the outdoor heat is blocked out because of wool's insulating barrier of air pockets. This means that the body is kept at an even temperature.

Wool is Healthy

Because wool has the ability to insulate against heat and cold, it protects against sudden changes of temperature, and it lets your body breathe. Wool can absorb up to 30 percent of its own weight in moisture before it becomes really damp. As moisture is absorbed heat is generated so that the wool remains warm rather than cold and clammy. After doing strenuous work or playing sport it is a good idea to pull on a wool jumper as it allows the body to cool down slowly and chills are prevented.

Wool Assignment Information Sheets

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Wool is Water Repellent

While wool can absorb moisture, it repels liquids. The scales on the outside of the fibre cause liquid to roll off the surface of the wool fabric. For instance, if you accidentally spill water on the floor, it is no use trying to mop it up with an old wool jumper because the wool will not absorb the liquid. Similarly, if you are caught in a shower or rain, it will take quite some time before the rain penetrates your wool clothing, and so wool keeps you dry. Even if wool does eventually get wet it generates heat and keeps you warm, not cold and clammy.

Wool is Fire Resistant

Wool is naturally safe. It does not have to be specially treated to become non-flammable. While it can catch alight, it will not flare up nor support a flame. Instead of burning freely, once the flame is removed a cold ash is left which can be brushed away immediately. Wool does not melt when burned, and so cannot stick to the skin and cause serious burns. Because of its fire-resistant qualities, wool blankets, furnishings and carpets in your home are necessary insurance, and wool for clothing (particularly children) will protect from accidents associated with fire. Firemen wear wool uniforms, and fire-fighters in rural areas should always ensure they dress themselves in wool before rushing to fight a fire.

Wool is Naturally Elastic

Wool's natural elasticity, greater than that of any other fibre, makes it comfortable to wear because it fits the shape of the body. Wool can be twisted, turned and stretched, and yet it returns to its natural shape. This is why wrinkles disappear from wool garments when they are rested, and why wool carpets retain their springy pile for many years. A wool fibre when dry can be extended by about 30 percent. When wet it will stretch by between 60 and 70 percent. This means that a wool garment gives freedom of movement, especially important for children's clothes and sportswear, when ease of movement is all important.

Wool Wears Longer

Wool not only wears longer, it also keeps its good appearance and stays new-looking longer. It doesn't get shabby in a short space of time. Each wool fibre is made up of millions of "coiled springs" that stretch and give rather than break, and so wool is extremely durable. Wool stands up to the stresses and strains of normal wear because

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"" Wool Assignment Information Sheets

it gives rather than resists friction. The durability and strength of the coarser wool gives us
furnishings materials and carpets which retain their good appearance for a long time.

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One of the reasons why so many people hang on to a favourite old wool garment for so many years is because it retains its original appearance longer than most other fabrics.

Wool is Versatile

Wool fabric, knitwear and carpets are made from a wide range of wool types varying from extrafine for suits and knitwear through to broad fibres which give carpets their strength and character. This means that wool gives designers endless potential for their creations - from delicate fabrics to rugged outdoor wear. Wool technologists have developed an endless number of combinations of weave, knits and textures, from sheer lacy knits and light airy worsteds to bulky tweeds and heavy overcoating. Different sheep breeds, each with their own unique fibre characteristics provide manufacturers with different wools for an even wider range of products. Blending various wool types in different ways adds further to wool's versatility. It is small wonder then that wool is found in products as diverse as paint-rollers and mattresses, carpets and coats, furnishing fabrics and high-fashion suits, blankets and underwear, curtains and skiwear, wall paper and tennis ball coverings.

Wool Resists Static

Because wool naturally absorbs moisture from the air, the tendency to collect static electricity is reduced. Walking across a wool carpet, you are less likely to receive a shock when you touch a grounded object. Wool garments are much less likely to "spark" or cling to the body.

Wool Insulates Against Noise

As mentioned above wool is a wonderful insulator against noise. It absorbs sound and reduces noise level considerably. For this reason wool wallpaper is often used in offices, restaurants, airport terminals, etc. Wool is also an ideal material used in such places as concert halls to attain the best acoustics possible.

Wool Resists Dirt

Wool resists dirt, retains its appearance, and stays cleaner longer. Its ability to absorb moisture prevents a build-up of static electricity and therefore wool does not attract

Wool Assignment Information Sheets

lint and dust from the air. Furthermore the crimp in the wool fibre and the scales on the outside of
the fibre assist in keeping dirt from penetrating the surface. The same qualities also make it easier to clean.

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Wool is Easy to Sew

For the home dressmaker, wool cuts cleanly, doesn't fray, drapes naturally, doesn't crush with handling and pins don't mark it. It responds instantly to shaping by iron and steaming and then holds shape.

Wool is Fashionable

Leading designers throughout the world prefer to use wool - it comes in a wide choice of textures, weaves and weights, and is suitable for any style required. No fabric drapes like wool fabric. It is alive, flexible and tailors easily. The soft and easy "give and take" of the wool fibre keeps garments in shape, prevents stretching and sagging, and resists wrinkling.

Wool Dyes Beautifully

Wool dyes so easily and the range of colours is limitless. The scales on the surface of the wool fibre tend to diffuse light giving less reflection and a softer colour. Because proteins in the core of the fibre are reactive, they can absorb and combine with a wide variety of dyes. This means that the wool holds its colour well as the dye becomes part of the fibre.

Wool is comfortable

Wool is so comfortable to wear because its elasticity means garments fit so well and yield to body movement. It absorbs moisture, allows your body to breathe, yet never feels damp and clammy. No other fabric serves so well under such a variety of conditions, nor combines so many natural properties.

Wool Assignment Information Sheets



SALT ACTION and the Stage 6 AGRICULTURE SYLLABUS



The topic of salinity of soil and water is addressed in the new syllabus generally in the core studies and specifically in the elective 6 "Sustainable Land and Resource Management". The importance of soil degradation, especially dry land salinity, is reflected not only in the amount of course time the syllabus allocated, but also in the interest of the students opting for this elective in the previous syllabus. There is also significant reference to salinity in other syllabuses eg Earth Science and Environment and Senior Science, which may also be taught by agriculture teachers.

Salt Action is the NSW Salinity Control Strategy. It is the program for joint action by the community and the NSW Government to control rising watertables, waterlogging and salinity throughout the state. The Salt action education program has developed and trailed a resource kit called "Salt of the Earth" in 14 schools in the Murry River region and other schools in the Lachlan and Murrumbidgee catchments. This kit is now available for use but relates mainly to irrigation salinity and suited for **primary schools** and stage 4.

Salt Action is developing teaching resources for teachers and students to use in **their secondary school** studies and it is planned to have these available for teachers 2001.

Salt Action is keen to participate in the education of schools students in the problem of salinity in Australia. We may be able to help in many ways and would appreciate any communication with teachers as to your requirements and suggestions. We may be available to visit your school, network groups of NSWAAT or other professional organisations.

Contact: Paul Robey
Education Officer Salt Action
Yanco Agricultural Institute.
PMB Yanco 2703

Ph 02 69512768
FAX 02 69557580
Email paul.robey@agric.nsw.gov.au





Salinity Teaching Resources

(a brief review)

Title	Type of Resource	Produced by..	Comments
Salinity our problem	booklet	NSW Ag, DLWC, Riverina Field Studies Centre (DSE)	A very good resource for year 7-10 and **a good introduction to salinity for HSC students**. It has clear and informative diagrams but lacks some detail required in the revised stage 6 syllabus for seniors especially in relation to processes and technologies.
Dryland Salinity	set of 8 pamphlets	May still be available from NSW Ag. and DLWC.	Very relevant to the elective especially books 1 *the causes*, book 2 *how severe is your discharge area* and book 7 *the economic picture*.
Salt	video Natural Resources Management series	Murry Darling Basin Commission GPO Box 409 Canberra ACT 2601. Ph 62790100	An excellent video, don't be put off by primary students at the beginning it covers the topic well, and is suited for secondary students. Concentrates on irrigation salinity. 25 mins
Dryland Salinity	video Natural Resources Management series	as above	Up to date, topical and relates to western NSW. Good visuals and integrated approach. There is probably too much "talking head" and therefore would be best with keen students. I would like to see more on causes- especially processes. 35mins
Fact Sheets	part of kit	Salt Action (Dept LWC and NWS AG)	The kit is out of date but fact sheets still useful. They explain the concepts simply, useful diagrams and good glossary.
Salting the Earth	video	Video Education 111A Mitchell St Bendigo VIC 3550 Ph. 03 54422433	
Salt Action Salinity Resource Kit.	Kit (one per school)	Contact P Robey Yanco Ph 02 69512768	Relates mainly to irrigation salinity and suited for primary schools and stage 4.
Dryland Salinity introductory extension notes	Notes (limited supply)	Contact P Robey Yanco Ph 02 69512768	Written for extension officers the material in this is very technical but may useful for teachers and advanced students doing salinity research.

Salinity Teaching Resources



continued

Useful Websites.

1. **Australian Academy of Science.** "monitoring the White death"
   http://www.science.org.au/noval/032/032key.htm

6. **WA Dept Ag. "Dryland Salinity an Introduction**
   http://www.agric.wa.gov.au/progserv/natural/tree/Salinity/salgen.htm

7. **Dept Land and Water Conservation**
   http://www.dlwc.nsw.gov.au/care/salinity/index.html

8. **Murry Darling Basin Commission.**



9. http://www.mdbc.gov.au
   Excellent Site covers salinity and many other issues!

10. **National Dryland Salinity Project**
    http://www.ndsp.gov.au
    Site lists resources most of which are technical and probably not suited to students. Recourse catalogue and good salinity email network (suitable for teachers only).



HSC EXAMINATION

1999
AGRICULTURE
2/3 UNIT (COMMON)

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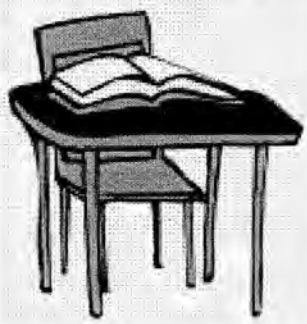
WORKED SOLUTIONS



SOME MARKING SCHEMES AND MARKER'S REPORTS INCLUDED

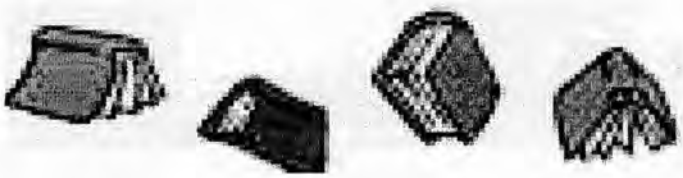
The NSW Association of Agriculture Teachers

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BOARD OF STUDIES
NSW

HIGHER SCHOOL CERTIFICATE EXAMINATION

1999

AGRICULTURE

2/3 UNIT (COMMON)

Total time allowed for Sections I,II,III, and IV- Three hours
(Plus five minutes reading time)

SECTION I

(20 Marks)

QUESTION 1
(Answers follow questions in *Italics*)

Name ONE farm product you have studied.

Name of farm product .....Wheat.....

a)State ONE feature of the product.
An Important feature of quality of wheat is the protein level. This is given as a percentage of the wheat of the grain.

b)Describe how this feature affects the price received for the product by the farmer.
A premium (i.e. a greater price) is given for wheat that has a higher than minimum (which is 12%) percentage of protein.

c)Describe TWO actions a farmer may take to maximise the quality of the product before it leaves the farm.

i)A farmer may (if he feels the protein levels may be low) decide to apply a late application of a high nitrogen based fertiliser (such as prilled UREA) at a fairly late stage of the growth.

ii)Also general hygiene practices such as making sure all the harvesting and handling equipment is clean and free of weed seeds, will help keep the wheat grains as free of foreign bodies as possible.

d)Give ONE example of feedback the farmer may receive on the quality of the product.
A farmer will get a whole range of test results back from the Grain Handling Authority, but a very important one is the percentage and type of weed seeds present in the samples.

e)Farmers do not always make changes to management in response to feedback. State TWO reasons for this.

- *One reason is the financial constraints that are on the framer, in this example the results may mean having to have different spray schedule, a costly outcome.*
- *Another reason may be the social constraints, that will be placed on the grower, by his peers, if he has to incorporate an extra spraying into his schedule.*

f)Explain how a factor, other than quality, may affect the price received for the product by the farmer.
The availability (or supply) of that particular grade of wheat to the market. If there is an oversupply in one particular grade of wheat for example Australian Hard, the premium a farmer received for growing that variety will be greatly reduced.

g)Explain how off-farm agencies or organisations may contribute to marketing of the product.
With wheat most of the marketing, for the international and domestic trade, is carried out by the Australian Wheat Board. They are the Board that will help to set the international price that is received for the product.

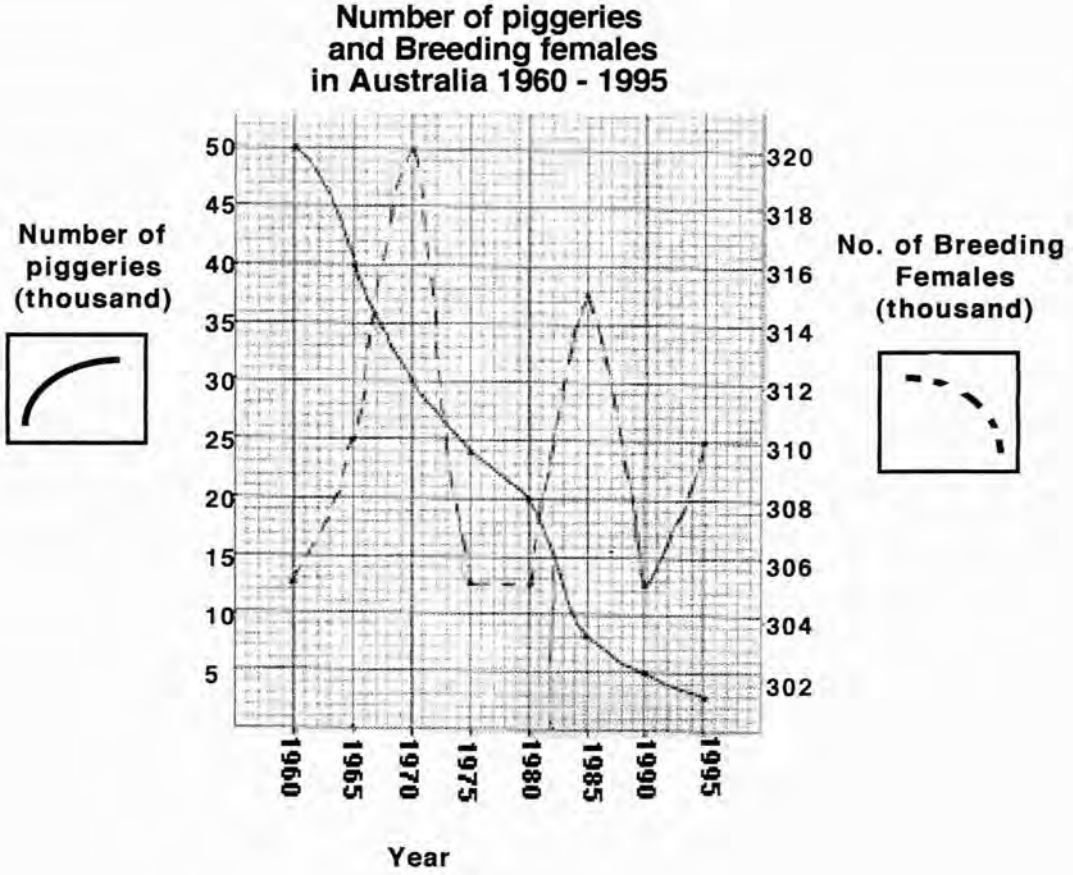
h)Outline a possible strategy for value adding to increase returns from product.
Wheat ⟶ *changed into Flour for Bread. The bread is of a higher value.*
(Prime hard)
however
Protein wheats ⟶ *biscuits.*
(Soft)

QUESTION 2

TABLE 1. NUMBER OF PIGGERIES AND BREEDING FEMALES IN AUSTRALIA 1960-1995

Year	Number of piggeries (thousands)	Number of breeding females (thousands)
1960	50	305
1965	40	310
1970	30	320
1975	24	305
1980	20	305
1985	8	315
1990	5	305
1995	3	310

a) i)Graph the data from Table 1



i)From the graph, estimate the number of piggeries in 1982.

15000 piggeries

ii)Describe the trends shown in the data you have plotted.

The number of piggeries have decreased over time, while the number of breeding sows have fluctuated but remained fairly constant.

iii)Give a possible explanation for the above trends.

- *Viability of small piggeries has fallen resulting in piggery closures*
- *Existing piggeries have expanded and sustained the number of breeding females to meet market demand.*

b)

i)Describe TWO factors a farmer may consider before borrowing money.

- *Interest rates (Factor 1) - will the farm profit be able to meet interest rates especially if the rise of fall over time.*
- *Family Income (Factor 2) - will the proposed borrowings interfere with family income from the farm business.*

ii)Outline a strategy, other than borrowing money, That a farmer may implement to manage economic sustainability.

Enter a share farming agreement to spread risk, debt and profit.

QUESTION 3

A Farmer noticed that grazing animals were eating soil from one area (*Area A*) of a paddock, but not from the remainder of the paddock (*Area B*).

Soil samples were taken from each area and sent to a laboratory for analysis.

a)Describe the actions the farmer would have taken ton ensure that the soil sent to the laboratory provided reliable results.

He would need to take a number of soil sample (replicate) from Area A and Area B. Selected spots should be randomly selected.

The laboratory analysis revealed the following results for each area.

TABLE 2. RESULTS OF SOIL ELEMENT ANALYSIS

Soil Element Tested	*Amount of Element (mg/kg soil)*	
	Area A	*Area B*
Zinc	53	52
Iron	20 655	15 536
Copper	6	8
Phosphorus	125	124

b)From the laboratory results, state which element is most likely to cause the animals to eat the soil.

Iron

c)On the basis of these results, suggest further investigations that could be undertaken.

Observing symptoms of the pasture/animals, tissue test pasture/animals, fertilizer trial of Iron in Area B.

d)Identify the statistical limitations of the data presented in Table 2.

2. *normal range of elements/ions/ not shown*
3. *other important elements not shown*

SECTION II

(45 Marks)

QUESTION 4

(Marking scheme and comments follow questions)

(a) For an animal production system you have studied, answer the following questions.

Name of animal production system.....

(i) List THREE characteristics a farmer may select for, as part of a genetic improvement program for this animal production system.

(ii) For a named characteristic listed in part (a) (i) above, explain why this characteristic is considered desirable.

Named characteristic.....

(iii) Suggest reasons why the farmer is not always successful in breeding animals with the desired characteristics.

MARKING SCHEME Question 4	COMMENTS	EXAMPLES
i) Any valid observation of a genetic nature 1 mark **Appropriate terminology must be used.**	These characteristics must relate to animal production system. Disreguard any wrong answer in box. Stating just "wool" or "milk" is not enough. It must state the characteristic of milk or wool e.g. milk quality.	• conformation • marbling • fecundity • milk quality • udder attachments • muscle score • growth rates 200 days • micro diameter
ii) State - 1 mark Brief outline - 1 mark Relate to market or demand - 1 mark or Relate to productivity - 1 mark **Max. 3 marks**	The characteristic doesn't have to be from the previous question but it must be relevant to an animal production system.	a) faster growth rates allow quicker turn around, more sales relate to more profits. b) more marbling (jap-ox) is paid a preium for in Japanese market resulting in a greater return.
iii) 1 reason - 1 mark + qualification - 1 mark 2x above = 4 marks or State 1 reason - 1 mark 2 reasons - 2marks 3 reasons - 3 marks (LIMIT) eg's - 1 mark	Time taken for improvement is acceptable. This question assumes the animals have been "bred" and the question asks for reasons why it has not worked. Therefore cost/price of breeding techniques is not acceptable.	c) genetic improvement is a slow proces due to variations caused in crossing over and recessive genes. d) genetic material may be beyond the farmers budget and can take a long time.

(b) Explain how farmers can use objective measurement and associated data in animal production systems.

MARKING SCHEME	COMMENTS	EXAMPLES
b) Mention a breeding value - 1 mark Talk about specific measurements eg fleece weight, scrotal circumference - 1 mark Brief description of use - 1 mark Good description of use - 2 marks Link to production - 1 mark **Max 4 marks only**		a) EBV's like 200 day wt & 400 day wt can be used by the farmer to improve yields and management by changing rates in lot fed steers. e) animals can be bred on the basis of scrotal circumference and this is linked closely to fertility potenial and can be linked to the breeding process re improvement.

(c)

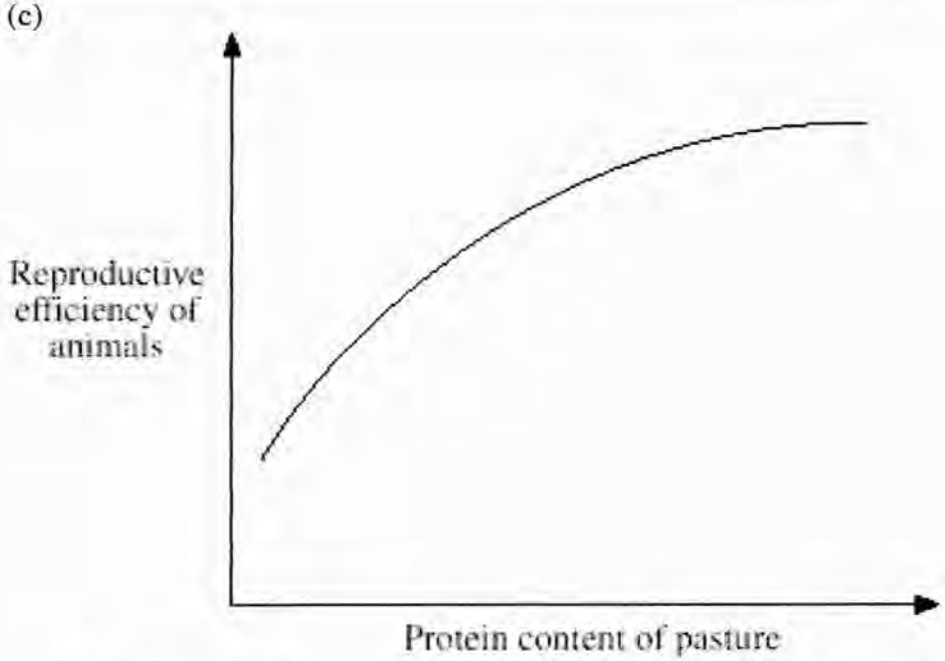


FIG. 1. EFFECT OF PROTEIN CONTENT OF PASTURES ON REPRODUCTIVE EFFICIENCY OF ANIMALS

(i) From the information presented in Figure 1, describe the relationship between protein content of pastures and reproductive efficiency.

(ii) Outline TWO management practices a farmer may use to optimise the protein content of pastures.

(iii) Describe TWO management techniques a farmer may use to optimise intake of available pasture protein.

(iv) Describe how the reproductive efficiency of animal production systems may be determined.

(v) List THREE factors, other than nutrition, that may affect the

reproductive efficiency of animal production systems.

MARKING SCHEME	COMMENTS	EXAMPLES
c i) Reproductive effeciency gradually increases in proportion to protein content -1 mark Up to end points - 1mark **Max. 2 marks**		
ii) Management practice - 1 mark Description - 1 mark Statements of FERTILISER or IRRIGATION - 1 mark + **Outlining** how the management practice improves protein content - 2 marks Grazing (only) - 1 mark Grazing + validation of how it improves protein content - 2 marks Lisitng of 2 practices on the one line - 1 mark **Max 4 marks**	Phosphate fertiliser has to be related to **legumes**. Nitrogen fertiliser has to be related to **grasses**. Have to clearly explain how practice improves protein content.	• plant a legume in a pasture to improve nitogen fixation and improve the overall growth and protein content. • the addition of nitrogenous fertilisers like urea will improve pasture growth, photosynthetic rate and protein content.
iii) Name any management technique - 1 mark relate it to **intake** of pasture protein - 1 mark Vague outline - 1 mark **Max 4 marks**	The answer has to relate to **INTAKE**.	• cut and carry systems to optimise the amount harvested - feed to livestock with minimal waste of protein. • Ensure minimal stress levels to allow free digestion of available protein.
iv) Name a measurement - 1mark Description of use - 1 mark Value judgement - 1 mark Describe 2 briefly - 3 marks Listing of measurements - (max) 2 marks **Max. 3 marks**	The measurement has to be a percentage or some sort of number.	number of lambs/ewe can be used to monitor effciency of reproduction eg 1 lamb/ewe good, lamb/ewe better, 2 lamb/ewe best - sires and dams can be chosen in response.
v) Any valid factor other than nutrition that affects reproductive effecicency. **Max 3 marks**	Accept management as a single entity only if the other examples don't suggest other management strategies. Accept environment as a single entity only if other examples are not environmental.	• weather or • climate • environment • daily temperature genetics • drought • libido • season • day length • disease/pests • hormonal influences

Marker's Report Question 4

a.i) The majority of candidates were able to state that the crop yield decreased in Year 2 and Year 5 because of an increase in harmful soil organisms from the previous year. E.g. Due to the increase of harmful soil organisms.

ii) Higher scoring candidates gave explanations for the trends such as stating that a number of harmful soil organisms were reduced during the soil preparation phase due to cultivation breaking life cycles or reducing organic matter. A second explanation included a reference to the fact that the presence of organic matter meant an increase in numbers.
E.g. The number is reduced during the soil during the soil preparation because of cultivation which interferes with the organisms and their life cycles and are sometimes destroyed. Their numbers build up during the crop growth phase as a result of an available food source of food. They decrease during fallowing because of reduced food availability.
Lower scoring candidates simply listed trends such as

1. build up of pests with cropping
2. decrease with fallow year
3. decrease during soil preparation phase

iii) Most of the candidates were able to name a relevant strategy other than fallowing or using chemicals and the better answers provided information describing how it decreased the number of harmful organisms.
The poorer candidates provided a brief explanation of the strategy.
E.g. Crop rotation where an alternative crop, of a different species, is planted to break the life cycle or build up of pest numbers as it is not a host of the pest.

iv) Most candidates managed to name a soil organism that may benefit plant production.
E.g. Rhizobium, earthworms

v)The better candidates managed to provide 3 points about the ways the organism was beneficial or described stages in a process. These candidates then related that process to a specific production improvement such as an increase in leaf area or yield.
The weaker candidates made one or two points about processes related to the organism only. Many candidates failed to relate the processes of the organism to improvement in plant production. An example of a better response would be: nitrogen-fixing bacteria, both free living and symbiotic.
E.g. Rhizobium can transform atmosphere nitrogen into nitrates to be used by the plant. Nitrogen fixing bacteria improves levels of soil nitrogen therefore increasing leaf area and yield.

b.i) The better candidates provided two well described reasons why the farmer had chosen the named plant production system.
eg

1. Potatoes are fairly high yielding crops in the cooler coastal and tableland zones.
2. There is plenty of constant demand for potatoes in the manufacturing sector for making crisps and hot chips meaning less risks for price drops.

Pooper responses consisted of two statements e.g.

1. His soil may have been suited to particular crops
2. The climate in his area may have been suited to potatoes.

ii) Most candidates managed to name a pest or disease of the named system.
E.g. potato moth, red legged earth mite, ducks, mice, rust, smut, take all.
A generalised term was not accepted e.g. caterpillar.

Marker's Report Continued... (Question 4)

iii) Candidates providing the detailed response such as: Potato moth larvae burrow into tubers leaving faeces and destroying tubers, thus lowering the quality of the product and decreasing the quality of the saleable product.
A poorer quality response did not provide detailed description of the effect and failed to indicate the way the pest or disease affected production e.g. The aphids are sapsuckers and without food plants are not productive.

iv) Most candidates were able to state 3 factors the factor the farm would need to consider before deciding to use a chemical agent.
E.g. cost of the chemical or treatment, effect on the local ecosystem, chance of resistance developing withholding period, waterway pollution availability of alternatives, use of biological control methods.

v)The candidates scoring full marks gave a well-developed description of the way the factor needed to be considered and then related this to a consequence e.g. Residues from the chemical may remain in the tuber, which can be potentially harmful to humans who eat the potato. Similarly any animal eating the potato may be harmed.
Poorer candidates made statements such as: IPM may be cheaper and safer.

vi) Most candidates identified a factor outside the framers control and were able to state a factor and relationship to the pest or disease. E.g. Dry climate causes the soil to be cracked so it is easier for the moth to lay eggs near the potatoes leading to greater likelihood of damage from the larvae.

QUESTION 5

(No sample answers available for this question)

a) Figure 2 illustrates the effect of the numbers of harmful soil organisms in a paddock on the yield of a crop over five years. Note that no crop was grown in Year 3 (fallowing).

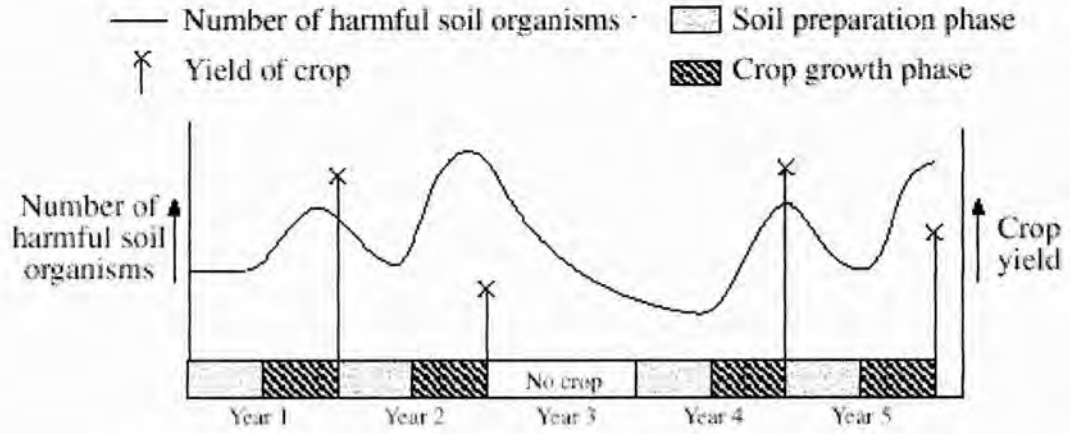


FIG. 2. RELATIONSHIP BETWEEN HARMFUL SOIL ORGANISMS AND CROP YIELD

(i) From the data presented in Figure 2, give a reason why crop yield has decreased in Year 2 and Year 5.

(ii) Give reasons for the trend in the number of harmful organisms in Figure 2.

(iii) Name a management strategy, other than fallowing or using chemicals, and describe how this strategy may reduce the number of harmful soil organisms.

Name of strategy.....

(iv) Name a soil organism that may benefit plant production.

(v) Explain how this named organism can improve plant production.

b) For a plant production system you have studied, answer the following questions.

Name of plant production system

(i) Describe TWO reasons why the farmer has chosen this plant production system.

(ii) Name a pest or disease of the named plant production system.

(iii) Describe how this pest or disease affects the productivity of the plant production system.

(iv) State THREE factors a farmer may consider before deciding to use a chemical agent to control pests or diseases.

(v) For one of the factors mentioned in part (iv) above, explain why this factor must be considered.

Name of factor

c) Describe how a factor outside the farmer's control may affect the impact of pests or diseases.

QUESTION 6

(a)

TABLE 3. PRODUCTION DATA FOR TWO FIELD CROPS ON A NSW FARM IN 1997

Factor	Crop A	Crop B
Yeild (t/ha)	2.5	3.0
fertiliser costs ($/ha)	50	20
Chemical and fuel costs ($/ha)	75	85
Seed costs ($/ha)	45	35
Price received ($/tonne)	200	180
Bank Interest charges ($)	10 000	
Shire rates	7 000	

(i) From the data in Table 3, calculate the gross margin for each crop. Show all working.

Crop A

Crop B

(ii) State which crop was the most profitable.

(iii) It is not always desirable for a farmer to grow the crop that would provide the most profit in the short term. Describe why a farmer may decide to plant the less profitable crop.

(iv) State TWO factors that can affect the price received ($/ tonne) for a crop.

(v) List THREE factors other than price that a farmer may consider before deciding to introduce a new crop.

MARKING SCHEME (Question 6)	COMMENTS	EXAMPLES
a)i) State gross margin in **$/ha** - 1 mark State in numbers or formula t/ha x $ = Income - 1 mark State 3 items to obtain **variable** costs - 1 mark State gross margin = income - variable costs 1 mark **4 marks max**	If neither GM's are correct then they only get 3 marks max	Crop A 2.5 x 200= 500 50+75+45=170 500-170= $330/ha Crop B 3x180=540 20+85+35=140 540-140=$400/ha
ii) State crop with highest GM from above ie Crop B - 1 mark	Cannot get mark if it disagrees with their answer in i) Ok to have Crop B with no working in i).	
iii) State one reason - 1 mark Reason described - 1 mark If well described - 1 mark **3 marks Max**		3. more sustainable 4. crop requires less pesticide thus is more sustainable 5. crop is resistent to common pests, requires less pesticide applications making it a more environ-mentally sustainable crop.
iv) Each factor stated - 1 mark **2 marks Max**	If they state quality for 1 then a specific quality characteristic for 2 then only one mark.	4. Quality 5. Demand for crop
v) Each factor stated - 1 mark **3 marks Max**	profit ok for 1 mark	• Improving soil fertility • Suitability to climatic conditions • Sustainability

(b) Some farming activities have harmful effects on the farm and beyond the farm boundary.

(i) State ONE such activity and describe its harmful effects.

Activity .....
Effects .....

(ii) Describe actions a farmer may take to minimise the possible harmful effects.

(iii) Describe how a farmer may evaluate the effectiveness of one of the actions you have listed in part (ii).

MARKING SCHEME (Question 6)	COMMENTS	EXAMPLES
b i) State an activity - 1 mark Naming an on farm effect - 1 mark Naming a beyond farm effect - 1 mark Extra mark for effect discribed **4 marks max**	Cannot get 3 marks if only covered one side of effect. Assume waterways are beyond farm unless stated.	Activity: fertiliser application Effect: Some fertilisers (Ammonium fertilisers) can decreased the pH of the farm soils (acid) making conditions detrimental to plant growth (ie pH levels will effect the uptake of soil nutrients eg Magnesium) **on farm** Fertiliser application can also leach into waterways. The increased nutrient levels can lead to algal blooms and "pollute" the water making it unsuitable to many life forms. **beyond farm**
ii) Each action listed - 1 mark (max 2) Extra mark for each action discribed. **3 marks max**		Do a specific soil test (eg For Nitrogen levels) before calculating the rate application and applying the fertiloiser - pH tests and lime application, if necessary, can also be done.
iii) Name evaluation method - 1 mark Discribe evaluation method - 1 mark **2 marks max**	*Must relate to their answer in i) and ii).* Cannot get 2 marks unless specific test is mentioned, and they look for change or improvement. See if things are dead on other side of fence = 0 (ZERO MARKS)	take two water samples from the waterways both up and down stream from the area where fertiliser application was made. Test this water for nutrient levels. Ideally, this test should be done before and after fertiliser application. or Measure the soil for pH using pH meter before and after the application of lime.

c) Table 4 illustrates the effect of a summer rain storm on five experimental plots of cropping land.

TABLE 4. EFFECT OF RAINFALL RUN-OFF ON SOIL LOSS

Treatment plot	*Run-off (% of storm rain)*	*Soil loss (tonnes/hectare)*
Stubble burnt	83	100
Stubble incorporated	41	5
Stubble mulched	45	2
Summer crop	16	2
Zero tillage	2.0	negligible

(i) Suggest a reason for the high soil loss in the 'stubble burnt' treatment.

(ii) Explain why farmers may choose to burn stubble.

(iii) State THREE factors, other than those listed in Table 4, that can affect the level of soil erosion.

MARKING SCHEME (Question 6)	COMMENTS	EXAMPLES
c i) State valid reason - 1 mark Explanation - 1 mark **2 mark max**		Burning stubble results in the removal of ground cover/plants. This means that the soil has no protection from the runoff and as there are less roots to hold the soil together and less ground cover to slow run off
ii) State valid reason - 1 mark Explanation - 1 mark Extra mark is explained well **3 marks max**		Farmers may choose to burn stubble in order to break a disease cycle. By burning the stubble there is no infected material left and no place foe the disease (eg spores) to survive until the next crop is planted eg strip rust spores in a wheat crop.
iii) Each factor stated - 1 mark **3 marks max**	**Unacceptable:** Rocks stubble Rain Animals Watertable	**Acceptable:** Topography of land, Soil Type, Vegetable cover **Just Acceptable:** Wind, Irrigation, Amount of rain, Weather.

QUESTION 7

(a) Figure 3 represents data from a dairy farm in the coastal district of NSW and shows:

- the typical production patterns for a permanent grass/legume pasture and an annual grazing crop; and
- the feed requirement for the milking herd with a stocking rate of TWO cows per hectare.

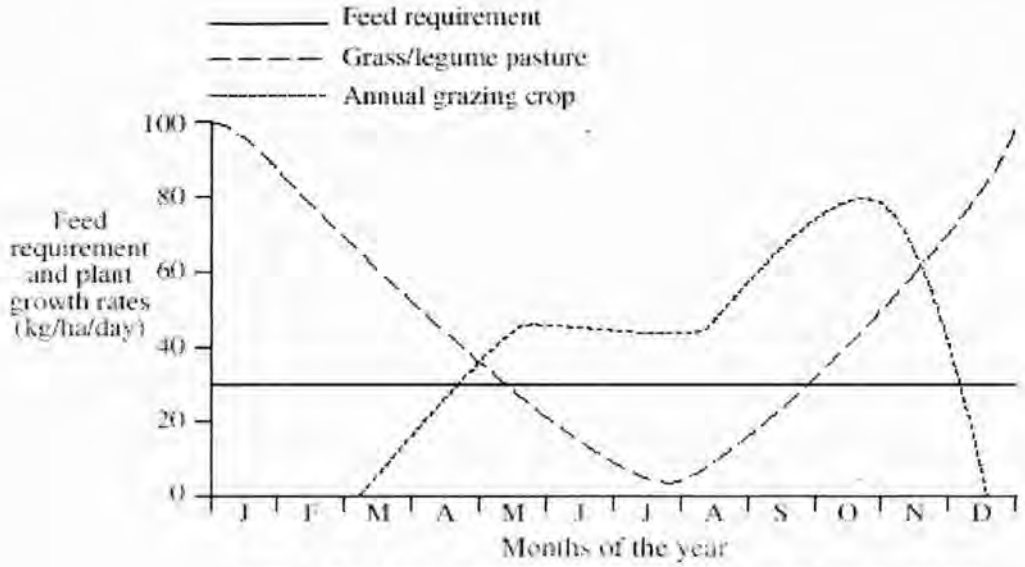


FIG. 3 PLANT GROWTH RATE AND ANIMAL FEED REQUIREMENT

Lovett, V.A. & Scott, J.M. Pasture Production and Management, Inkata Press, Port Melbourne, 1987

(i) From Figure 3, calculate the feed requirement of one cow per day.

(ii) State the main reason for including the annual grazing crop in the farm's feed production program.

(iii) Outline a reason for the reduced plant growth rate between May and July.

(iv) Grass/legume combinations are important in productive sustainable pastures. Suggest TWO roles played by each type of plant.

Grass
1 .....
2 .....

Legume
1 .....
2 .....

MARKING SCHEME (Question 7)	EXAMPLES
a i) 15kg -1 mark	
ii) Recognising that pasture production is low - 1 mark Explain annual grazing crop will fill gap - 1 mark	
iii) Reason for reduced plant growth - 1 mark Explanation - 1 mark	Cold Temperatures Slowing photosynthetic rate
iv) Each function - 1 mark	Grass 10.provides roughage for ruminants 11.utilises Nitrogen provided by legume Legume 2. Provides high protein feed for ruminants 3. enriches soil with Nitrogen

(b) Figure 4 shows the life cycle of the cattle tick. This tick is an external parasite of cattle.

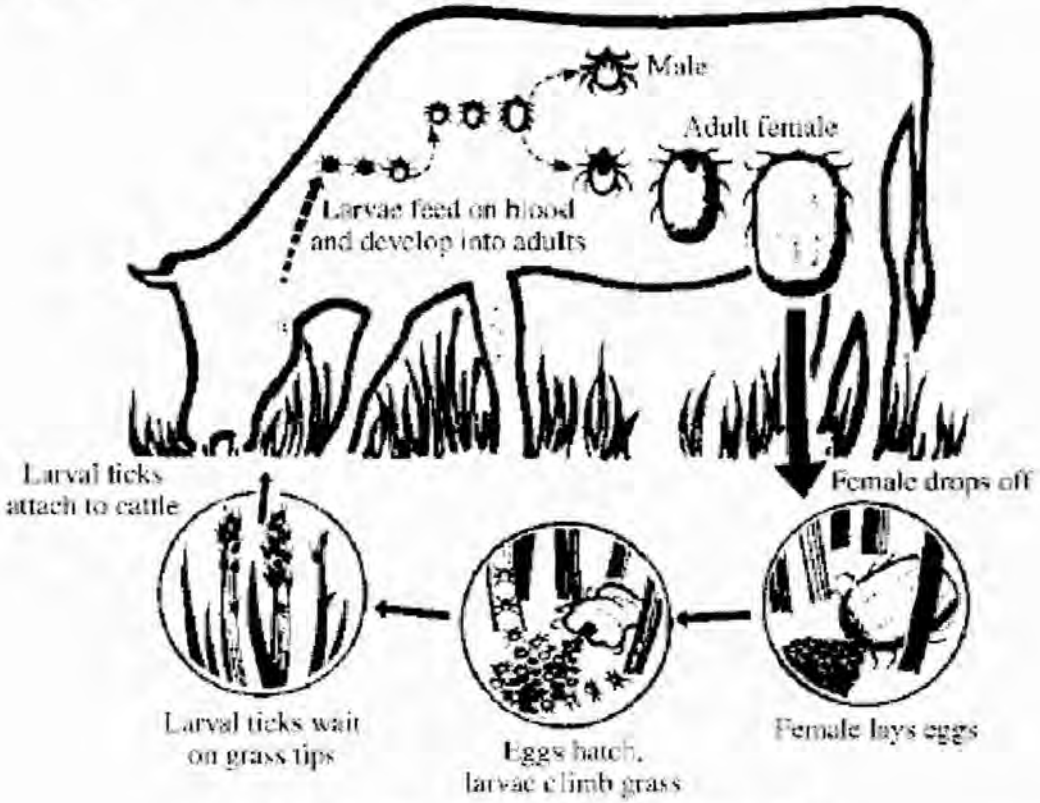


FIG. 4. THE LIFE CYCLE OF THE CATTLE TICK

Wilson, D & Bauer, M. Dynamic Science. McGraw Hill. Roseville, 1991

(i) Describe the role of the host animal in the life cycle of the cattle tick.

(ii) Describe the role of the pasture in the life cycle of the cattle tick.

(iii) State TWO factors that could increase the number of larval ticks. Give reasons for your answer.

(iv) The farmer could use integrated pest management (IPM) techniques to reduce the number of parasites on this host animal.
For a named pest or disease organism of an animal you have studied, describe a suitable IPM strategy.

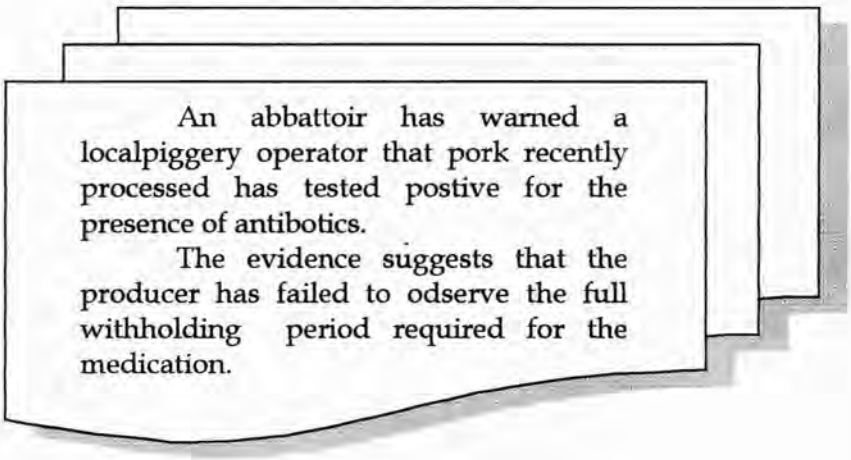
Animal you have studied

Pest or disease

Strategy

MARKING SCHEME (Question 7)	COMMENTS	EXAMPLES
b i) State:- 6. Nutrition provided by blood 6. Suitable environment for development 7. Site reproduction for full marks		
ii) Role of pasture; place for female tick to lay eggs - 1 mark point of transfer to the host - 1 mark		
iii) Each factor - 1 mark Reasons - 1 mark		Vigorous pasture provides ideal habitat for tick survival.
iv) Naming relevant pest or disease of named animal- 1 mark Naming a strategy - 1 mark Explanation - 1 mark	No mark for naming an animal in box. Must have at least two strategies.	Sheep Intestinal worms • chemical drenching based on animals body weight and orally administered • cultivation or cropping of paddock to dry soil and destroy the habitat for worm larvae.

(c) Read the following extract from a newspaper article and answer the questions that follow.



(i) State reasons for the use of antibiotics in intensive animal production systems such as piggeries.

(ii) Describe what is meant by withholding period.

(iii)State TWO animal welfare issues that must be considered by the farmer in intensive animal production systems.

MARKING SCHEME (Question 7)	EXAMPLES
c i) State 3 reasons	8. reducing disease 9. increasing food conservation ratio 10. increasing grow rate 11. increasing production 12. increasing quality
ii) Time period - 1 mark State safe consumption of the product - 1 mark	
iii) Any animal welfare issue - 1 mark	7. adequate housing 8. physical condition of animals

SECTION III

(20 Marks)

Attempt ONE question.

Each question is worth 20 marks.

Allow about 35 minutes for this Section.

QUESTION 8 Plant Production
(Answers follow questions in *Italics*)

(a) Using examples, describe techniques or strategies that lead to improved plant production through the manipulation of:

(i) soil moisture;
irrigation → *optimise plant water needs (spray, drip, flood)*
mulching → *causing reduced evaporative loss, more water available to plants.*
Other eg's Wind breaks, moisture probe

(ii) mineral nutrients.
Fertilisers (organic, inorganic) → *increases soil nutrient level maxmising plant growth*
Mulching → *breakdown O.M. returning nutrients*
Other eg's Legumes, Green manure crop, Cultivation causing

(b)

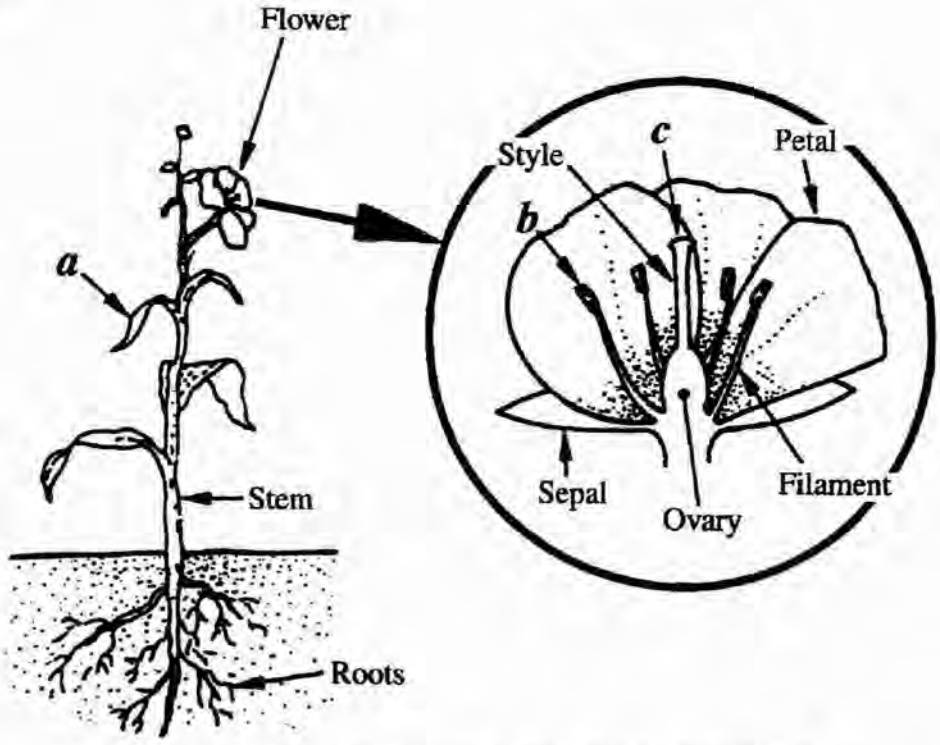


FIGURE 5 SIMPLE PLANT DIAGRAM

Using the above figure, complete the table below.

Part	Plant Part	Function
a	*Leaf*	*Photosynthesis*
b	*anther*	*Produces pollen ,Male gamate*
c	*stigma*	*Pollenation site. female part of the flower.*

(c) Using examples, outline the benefits to plant production systems of:

(i) hybridisation;
Hybrid breeding is the creation of a plant from parents tat are unrelated and would not normally pollinate one another. It results in an offspring being more rigorous than either of the parents for open pollinated species from which it has derived. It has more superior qualities than either of it's parents e.g. increase in dry matter yield and resistance to disease and pests.

(ii) tissue culture.
Plants which are economically valuable can be multiplied rapidly and put to commercial use. Evaluation of the new genotype can take place more rapidly. Increase in maturation rates and speed of flowering. Potatoes resistant to leaf roll virus can be multiplied more rapidly with the use of tissue culture.

(No sample answers available for the following question)

(iii) The following headline appeared in a recent rural newspaper.

The gene technology revolution: What's in it for farmers?

- Briefly describe the processes involved in genetic engineering (gene technology).

- Using examples from plant production systems you have studied, outline the benefits of genetic engineering.

QUESTION 9 Animal Production

(Answers follow questions in *Italics)*

a) The growth curves for two genetically identical animals are shown in Figure 6 below.

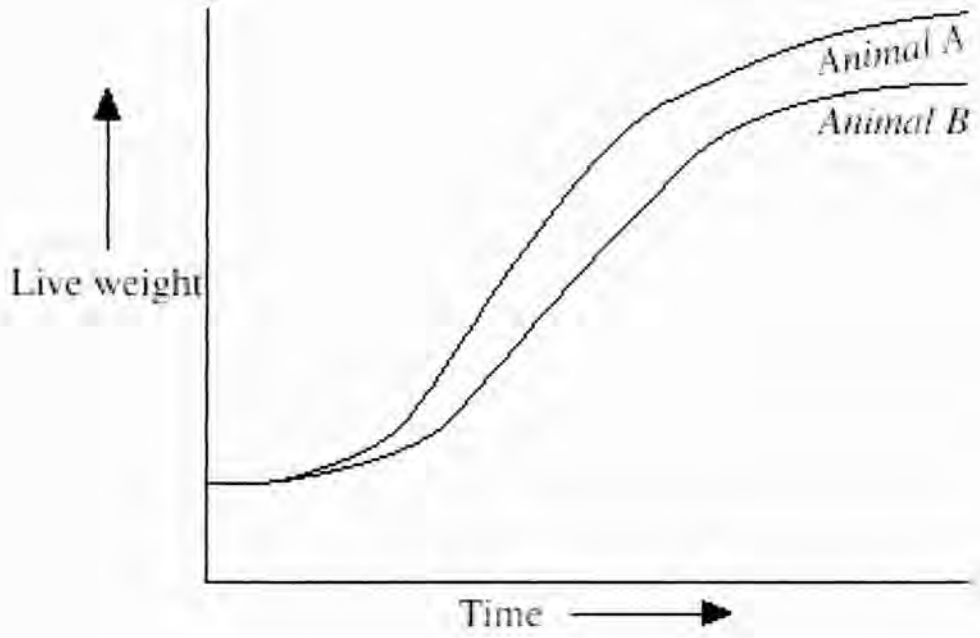


FIG. 6. GROWTH CURVES

i)Explain how the use of manufactured chemicals or hormones may affect growth and development.

Chemicals *(e.g. Sodium Bentonite/Salinomyum) regulate the rumen microrobe population composition, ensuring better/efficient us of digestible energy for metabolisable energy.*

Hormones *(HGP's) increases biological efficiency by 9% hence drastically increase growth rate by 10-15% with efficient use of digestible energy.*

ii)State TWO possible reasons, other than the use of manufactured chemicals and hormones, why Animal A has outperformed Animal B in terms of live-weight gain.

4. *"A" had been supplemented with grains and high quality by-pass proteins hence better nutrition*
5. *"B" climate conditions may be adverse (eg low temperatures which reducers eneregy for growth since must maintain body heat).*

iii)Describe ONE situation in which Animal B may be preferred to Animal A.

Animal A may have had HGP's for better growth, however European Union banned HGP use in animals, hence B (without HGP's) can be saleable product to Europe.

b) (i) Define the terms antigen and antibody.

Antigen*: is the pathogen (often clostridia eg Tetnus, Blackleg) which causes disease in animals through their production of adverse toxins.*

Antibody*: produced by lymphocytes by the animals immune response system, they are antigen specific. When contracting antigen is able to find ways of combating, antigen it injected into the animal.*

(ii) Explain how a vaccine can be used to develop long-term immunity to disease.

Vaccines are weakened strains of the antigen and when animals immune response system comes into contact with the antigen which produces antibodies which specifically overcome the antigen. These exist as memory cells in the body which has now received unnatural active immunity in lymph glands. 1st dose sensitises the animal but boasted doses required to maintain effective level of long term immunity (body produces memory cells).

c) For a named disease of an animal production system you have studied, answer the following questions.

Animal production system	***Diary herd***
Name of disease	***leptospirosis***

Explain possible disadvantages of ONE management practice used to control this disease.

Antibiotics are used to quickly overcome the disease. Antibiotics don't stimulate cows to develop active immunity to leptospira because the chemicals instantly reduce numbers. This hence is a short-lived method of protection and requires continuous use over a long period of time. This action can cause eventual resistance to leptospira to the antibiotic as antibiotic increase selection pressure on the disease. The costs of continuous implementation of high doses can cause exceeding high costs to keep the disease below economic injury and eventual become unviable.

d) i) Using appropriate terms, explain why energy ingested by an animal is not fully available for maintenance and production.

ii) Explain the advantages of the ruminant digestive system.

Food provides animals with its digestible energy. However the digestible energy ingested by an animal can't be completely used by the animal are metablisible energy. Animals aren't completely efficient in their conversion rates because some energy is lost firstly as indigestible energy (e.g. cellulose for monogastrics) this is lost through excrement and urine of whose energy the animal weren't able to extract. For nutrients, in the rumen, a portion of gross energy ingested is lost through methane production (12%) into the atmosphere. Some energy is also lost through heat caused by microbial fermentation. These losses of energy causes loss of digestible energy available to the animals and in turn the net energy (energy required for maintenance and production) available to animals, hence feed conversion rate of ruminants is only 15:1 compared to 3:1 of monogastrices.
Advantages of ruminant digestion is that cellulose, starch and sugars can be broken down to VFA's. UFA's with cheap non-protein Nitrogen (e.g. urea) can be ingested by rumen microbes of the rumen into high quality microbial protein, which gets absorbed in the blood system. Also microbes can produce vitamins B and K e.g. Thiamin.

QUESTION 10 Land Management

(Answers follow questions in *Italics*)

(a) (i) Describe TWO ways trees are beneficial on farms.

- *Provide a habitat for beneficial organisms and predators of pests. This can include birds, mites and other predators.*
- *Trees use up groundwater, and in this way, reduce the sponge effect of the soil. This reduces the likelihood of dryland salinity.*

(ii) Suggest why tree-planting programs are not always implemented on farms.

Tree planting may not always be implemented because it is time consuming and expensive. Some farmers believe that by planting out areas on the farm, that production will be lost, and that this will result in reduced returns. Framers that do not follow sustainable practices are unlikely to want to plant trees.

(b) Explain how agricultural activities may increase the rate of soil acidification.

The addition of nitrogenous fertilisers to the soil has increased soil acidity, as has the high percentage of legumes in many pasture production systems. By removing alkaline products, such as hay and manure, the process removes the natural balance which will restore soil neutrality, and soil acidification is caused. By not incorporating organic matter back into the soil, the farmer also increases the risk of developing soil acidity.

(c) Describe ways in which a farmer may become aware of a specific soil degradation problem on the farm.

- *A change in the species composition of the soil to species which are more tolerant of salt.*
- *The farmer might see white crystals forming on the top soil(salt crystals).*
- *The farmer might see his animals licking patches of soil (high salt concentrations)*
- *Die back might occur in certain plants*
- *Water may be seen ponding on the surface, in usually dry areas.*
- *Plants may exhibit signs of nutrient toxicity or deficiency as pH is affected by the increase of salinity.*
- *This can include chlorosis and phosphorous deficiency*

(d) Describe the causes of:

(i) dry-land salinity;

Dryland salinity is caused by the clearing of trees which occurred when European farming began in Australia. By removing the trees from areas the settlers removed the means by which the water table was stablised. The vegetation that was planted by the Europeans (ie: crops and pastures) did not utilize the water that fell onto the soil. This resulted in recharge (the addition of water to the water table), which meant the water table rose. In severe cases the water table rises and makes ponds on the surface of the soil. This is called discharge. When the water table reaches near the surface of the dry soil, capillary action draws it to the surface, where crystals form. Salinity reduces the profitability and the capability of the area.

(ii) irrigation salinity.

Irrigation salinity is caused by inappropriate irrigation, which results in the recharge of the watertable. The plants, which are being grown, are unable to use all the water, which is being delivered to the soil via irrigation, and this water sinks into the groundwater. This then results in the salination of the soil, and a loss of production as salt-intolerant plants are unable to be grown.

(e) i) Outline the activities used by Total Catchment Management and Landcare programs to improve the sustainable use of land and water.

ii) Describe the effectiveness of these activities.

TCM and Landcare hold meetings to identify problems with land and the waterways. Farmers, locals, landholders and businessmen come and discuss what should be done. Helping identify the problems is the first step to increase sustainability. These are effective as meetings are promoted via letter box drops and fliers to inform the public and improve attendance.

TCM encourages people to use water management strategies e.g.: spray chemicals away from waterways, to prevent algal blooms that produce toxins in rivers, making it unsafe for fish animals and humans. This is achieved through free education programs attracting many people. The advise given is not costly or difficult so people try it and awareness is raised that people actions in the catchment effect not only them but the whole catchment.

TCM revegetates waterways with natives to reduce erosion of water banks and salinity. This is a low cost project, which increase water quality in the rivers by reducing the erosion, which increases the turbidity of the river. This increases the sustainability of the river. Landcare groups plant trees on farms and vegetation on roadlines to promote sustainability. this decreases salinity, erosion and structure decline. Another low cost yet effective project because doing on thing can reduce many adverse effects of land degradation.

Landcare carry out land capability assessment of farms to let farmers know what they need to do to protect the land from soil degradation and to plan their future land use so the land isn't overused, maintaining long term sustainability. The response of Farmers to this can reduce the effectiveness of this program, as the loss of short-term profit inhibits the willingness of farmers to take action.

Activities	Effectiveness
Property Planning (Preventaive)	*Ensures sustainable use of land and decreasing degradation in problem areas.*
Property Subdivison (Reactionary)	*Recogition of problem areas and fencing off from revegeation.*
Careful Application Of Fertilisers	*Prevent soil acidification.*
Correct Stocking Rates	*Decrease trampling and structure damage*
Revegation Of Land	*Decrease erosion and salinity, intake of nutrients decreases soil acidification, binds soil improveing structure.*
Meetings To Discuss Problems	*Tackle off farm and run-off problems (common problems)*
Control Of Gully Erosion	*Cementing prevents further degradation*
Formation Of Stream Watch	*Active monitoring of EC levels (carrying out preventative measure)*
Careful Irrigation	*Decrease salinity (preventative)*
Careful Cropping Rates	*Decrease stress on land*
Minimal Tillage	*Decrease structural damage and erosion (preventative)*

Generally preventative measures are more effective than reactionary.

SECTION IV

(15 Marks)

Attempt ONE question.

Each question is worth 15 marks.

Allow about 30 minutes for this Section.

QUESTION 11

For an agricultural product you have studied:

a) describe the effect of the shift from supply-orientated production to demand-driven production;

b) assess the role of each of the major components in the marketing chain.

Marking Scheme 11(a)

Ideally the candidate will:	Mark allocation	Comments	Examples
i) describe **shifts** to demand driven in a named industry	***3 marks*** (1 mark for each point stated)	In practice the distinction between shifts and effects is blurred.	Possible shifts to demand-driven are: f) change to production specs g) quality grading h) increased importance of quality compared to quantity (yield) i) increased importance of consistent quality j) introduction of QA programs k) product differentiation l) target marketing / niche markets m) multiple markets n) increased importance of issues - animal welfare, product labeling, chemical residue. o) efficient use of resources required p) explanation of demand/supply interaction, price mechanism.
ii) explain some **effects** at the farm level	***3 marks*** (1 mark for each point stated)	State of change then a consequence of that change. The effect may be in the marketing chain rather than the farmer level. eg processing	Effects of shift may be: b) farmer attitudes/skills c) grading systems emerging/ developing d) decision making and management decisions e) utilisation of feedback to meet specifications f) change of enterprise g) social effects on families/rural communities h) rural adjustment
b i) Describe a marketing chain	3 marks	must be 4 + components model or written	
ii) State role of each component or link	***3 marks*** (1 mark for each link)	Process & how?	
iii) assess value of each component	***3 marks*** (1 mark for each role stated)	Why? 1 reason per component	a) enhance product b) protect health c) improve sales

QUESTION 12

A successful farmer must plan management practices to overcome limiting factors in plant production systems.

1. Outline some of the limiting factors involved in the growth and development of plants.

2. For a plant production system you have studied, describe management practices used to overcome limiting factors.

3. In what ways is the farmer able to assess the effectiveness of these management practices.

Maker's Report Question 12

Part A. Candidates receiving full marks for this part not only listed 5 limiting factors but also outlined the role of this factor. (as requested) eg water- needed as a raw material for photosynthesis.
Other limiting factors mentioned included CO_2, O_2, sunlight, temperature, genetics, pests, disease, climate, topography, slope, aspect, soil. fertility, soil structure, soil density, pH, frost, nutrients, wind, floods, drought, fires, interference.
Many candidates failed to outline the role of the limiting factor and only listed them. This was only awarded half marks

Part B. Candidates who received full marks gave specific details how management practices overcame specific limiting factors. Eg by planting seeds at the optimum spacing from each other so as t minimise competition for water nutrients and light.
Some candidates simply listed the management practices without describing it or used general terminology eg by applies fertilisers plants go better.
Management practices included: irrigation, fertiliser applications, ferigation, planting wing breaks, growing disease resistant crops, selecting for high yields, disease resistance, timing of operations.

Part C. Assessing the effectiveness of these management techniques required the candidate to: mention a comparison of the yield in appropriate units eg t/ha from one year to the next or a number of years, compare neighbourhood crop yields, and the quality analysis of the crop for protein %, use of a trial area
Possible Comparisons included:

1. visual assessment of the crop for disease and pests
2. sap, leaf and petiole analysis in laboratories to determine mineral content
3. soil test for nutrients and pH levels before and after the crop and number of seasons
4. visual assessment of moisture stress
5. gross margins and prices received (providing season were similar).

QUESTION 13

Modern animal production systems require the management of both genetic and environmental factors.

Using examples from animal production systems:

1. describe how genetic factors are managed to optimise production;
2. describe how environmental factors are managed to optimise production;
3. outline how an area of scientific research, other than in the field of genetics, has improved the productivity of animals.

MARKING SCHEME (Question 13)	EXAMPLES
a) Listing 2-3 genetic factors - 1 mark 4 or more factors - 2 marks or Description of each genetic factor - 2 marks (4 marks max) Extra mark for linking the management of genetic factors to optimising production.	cross breeding, selective breeding, line breeding, inbreeding, AI,ET, embryo sexing. When selectively breeding sires and danes to improve production or market requirements the use of EBV's and ABV's as a selection tool will enable the farmers to select genetically desirable breeding sock. The process of managing these genetic factors could be made more effective via the application of AI and ET technology. Selecting sires with postive 600day weight EBV's will increase the final weight sold. Hence increasing the amount of saleable meat and income returned.
b) Listing 2-3 environmental factors - 1 mark 4 or more factors - 2 marks or Description of each factor - 2 marks (4 marks max) Extra mark for link between management of environmental factors to production.	heat stress/climate, nutrition, disease and pests, daylength, management Extremes of climate can induce heat stress and cold stress in cattle. These stresses can be reduced via the planting of shelter belts, adequate water supply in each paddock. In intensive enterprises climate is controlled via artificial lighting, heating or cooling. The management and reduction of stress in animal production enables energy from nutrition to be channeled into growth and development of product rather than being wasted as lost heat energy.
c)State on area of scientific research - 1 mark Outline research - 2marks Link research to improved animal productivity - 2 marks	Animal health, agronomy (pasture species) Rumentek- by pass fat consists of milled canola seed. this is fed to dairy cattle whose rumen microbes are unable to breakdown. This passes straight through the S.I where it is brokendown and absorbed. The animal uses it to increase milk production which also contains a higher rates of unsaturated fat to saturated fat. Consequently the milk contains less cholesterol producing fats. The addition of by-pass fat into the diet of diary cattle not only increases the quanity of the milk produced, but also improves the quality of the product for human consumption. This will reflect higher returns to the enterprise.

QUESTION 14

(No sample answers available for the following question)

'Manage the microbes to maximise money.'

a) Describe, using examples, how micro-organisms benefit agricultural systems.

b) Describe, using examples, how micro-organisms have negative effects on agricultural systems.

End of paper

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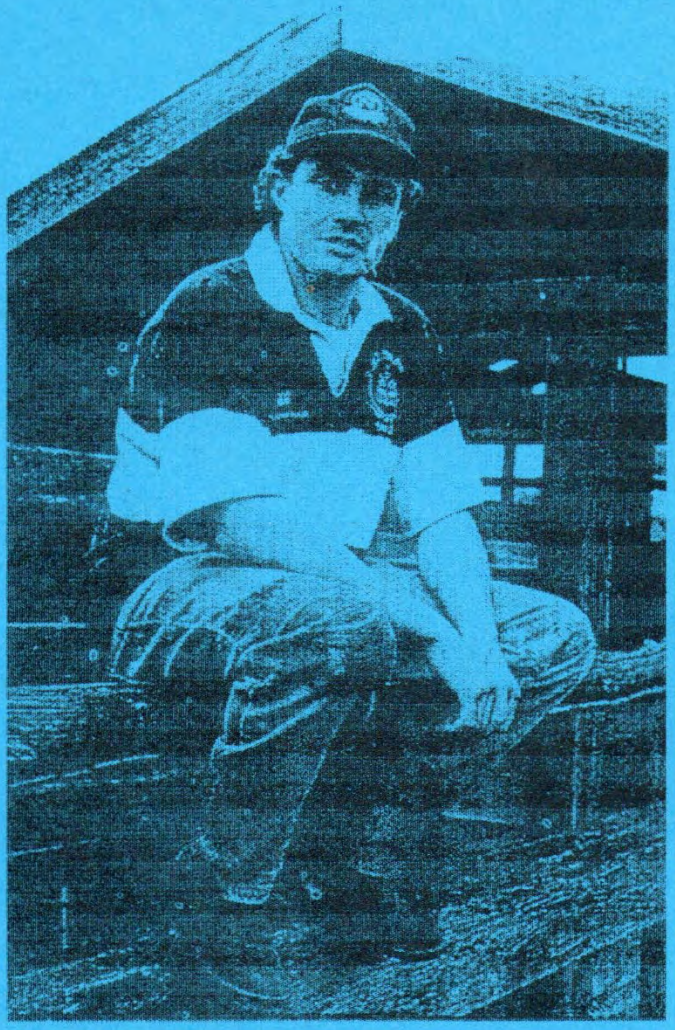
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